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THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD SUBCOMMITTEE REPAIRS AND ALTERATIONS

MINUTES

Meeting of July 15, 2015
Columbus, OH

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1. **Call to Order**
   Chairman George Galanes called the meeting to order at 8:00 a.m.
2. **Announcements**
   Chairman George Galanes presented announcements for the remainder of the week.
3. **Adoption of the Agenda**
   The agenda was revised to add 7 new action items and one new interpretation. A motion was made and unanimously approved to accept the agenda as revised
4. **Approval of Minutes of January 21, 2015**
   A motion was made and unanimously approved to accept the minutes of the January 21, 2015 meeting
5. **Review of the Roster (Attachment Page 1)**
   R Valdesz is sitting in for Craig Hopkins, Monty Bost is sitting in for James Larson, and Pat Becker is sitting in for Ray Milletti**.** There are 17 members present. (Roster and Sign In, Attachment Pages 1-3)

a. Nominations

- A motion was made and unanimously approved to have Mr. Nathan Carter become a member of The Sub Group,(SG) Repairs and Alterations

- A motion was made and unanimously approved to have Mr. Adrian Pollock become a member of the SG FRP.

- A motion was made and unanimously approved to have Mr. Robert Underwood become a member of the SG Historical Boilers.

- A motion was made and unanimously approved to have Mr. Jamie Walker become a member of the Subgroup on Repairs and Alterations.

b. Reappointments

- A motion was made and unanimously approved to reappoint Mr. George Galanes, Mr. Brian Boseo, Mr. Paul Edwards, Mr. James Larson, Mr. Brian Schulte, Mr. James Sekely, and Mr. Michael Webb to the Subcommittee Repairs and Alterations.

- A motion was made and unanimously approved to reappoint Mr. Bryan Schulte, Mr. Paul Edwards, Mr. George Galanes, Mr. Frank Johnson, Mr. James Larson, Mr. Ray Milletti, Mr. James Pillow, Mr. James Sekely, and Mr. Michael Webb to the Subgroup Repairs and Alterations.

- A motion was made and unanimously approved to reappoint Mr. Stephen Butler, Mr. David Conrad, Mr. Robert Franzen, Mr. David Griner, Mr. Steve Jackson, Mr. Stephen Lee, Mr. Doyle McCormack, Mr. George Scerbo, Mr. Richard Stone, and Mr Robert Yuill to the Subgroup Locomotive Boilers.

- A motion was made and unanimously approved to reappoint Mr. Ed Soltow, Mr. Timothy Bonn, Mr. Merle Minick, and Mr. Andrew Stupica to the Subgroup Graphite.

- A motion was made and unanimously approved to reappoint Mr. Bernard Shelley, Mr. Juan Bustillos, Mr. Terry Cowley, Mr. Rick Crawford, Mr. Doug Eisberg, Mr. Michael Gorman, Mr. David Hodgkinson, and Mr. Dale Keeler are eligible for reappointment to the SG FRP. A vote will be taken.

- A motion was made and unanimously approved to reappoint Mr. Tom Dillon to the SG Historical Boilers.

c. Officer Selection

- The meeting was turned over the Vice Chairman Mr. Jim Pillow for the voting process.
  The members of the subcommittee were asked if anyone wished to move their name forward to be considered for Chairman. Mr. George Galanes expressed interest in continuing as Chairman of the Sub Committee, (SC) Repair and Alterations. No other member placed there name in nomination.
  A motion was made and unanimously approved to appoint Mr. George Galanes as Chairman of Subcommittee Repairs and Alteration.
  The meeting Chairmanship was returned to Chairman Mr. George Galanes.

- The members of the subcommittee were asked if anyone wished to move their name forward to be considered for Vice Chair of Subgroup Repairs and Alterations. Mr. Bryan Schulte expressed interest in being Vice Chair of the SG Repair and Alterations. No other member placed there name in nomination.
- A motion was made and unanimously approved to appoint Mr. Bryan Schulte as Vice Chair of SG Repairs and Alteration.

- A motion was made and unanimously approved to endorse Mr. Ed Soltow for Chair of SG Graphite.

- A motion was made and unanimously approved to endorse Mr. Bernard Shelley for Chair of SG FRP.

- A motion was made and unanimously approved to endorse Mr. Tom Dillon for Vice Chair of SG Historical Boilers.

6. Interpretations

Item Number: IN14-0701	**NBIC Location: Part 3**	**Attachment Page 4**
General Description: Interpretation question regarding certification required and documentation of post weld heat treatment **Subgroup:** Repairs and Alterations **Task Group:** W. Sperko (PM), B. Wielgoszinski, and George Galanes **History:** <u>July 2014</u> Mr. Galanes reported that a task group of W. Sperko (PM), B. Wielgoszinski and himself has been assigned.		

January 2015
Mr. Galanes presented the proposed answers to the interpretation questions along with the Subcommittee on Repairs and Alterations' rationale for their answers. SC Repairs and Alterations approved the interpretation response with one abstention. The NBIC Committee voted unanimously to send this item to letter ballot for vote. The letter ballot did not receive sufficient response to pass.

Meeting Action:
July 15, 2015
Mr. Galanes reported during the first letter ballot process there appeared to be issues with lack of voter participation. After the interpretation was discussed, the motion was unanimous to reaffirm the interpretation and send out for a 2nd letter ballot.

Item Number: IN14-0801 **NBIC Location: Part 3, 3.3.3) s)** **Attachment Pages 5-6**

General Description: Interpretation question clarifying definition of "minimum required thickness" required on U-1 form as nominal wall thickness minus corrosion allowance

Subgroup: Repairs and Alterations

Task Group: Brian Morelock (PM)

History:

January 2015
Mr. Galanes gave a report. SC Repairs and Alterations motioned and approved the interpretation unanimously. The NBIC Committee voted unanimously to send this item to letter ballot for vote. The letter ballot did not receive sufficient response to pass. One abstention with a comment for revision was registered in the voting.

Meeting Action:
July 15, 2015
Mr. Morelock reported during the first letter ballot process there appeared to be issues with lack of voter participation. The interpretation was discussed; a motion was unanimous to reaffirm and to send the interpretation out for a 2nd letter ballot.

Item Number: IN15-0201 **NBIC Location: Part 3** **Attachment Pages 7-8**

General Description: Interpretation question regarding "R" Symbol Stamp quality system.

Subgroup: Repairs and Alterations

Task Group: Bob Wielgoszinski, Ben Schafer, & Rob Trout

History: None

Meeting Action:
July 15, 2015
A task group was assigned. B. Wielgoszinski and his task group above will work on this interpretation.

7. Action Items

Item Number: NB11-0204B	**NBIC Location: Part 3, S2**	**No Attachment**

General Description: Review NDE requirements of stayed areas for historical boilers

Subgroup: Historical

Task Group: M. Wahl (PM), J. Larson, F. Johnson

History:

July 2010
A task group of M. Wahl (PM), J. Larson and F. Johnson was assigned.

January 2011
Mr. Wahl gave a progress report.

July 2011
No progress.

January 2012
A progress report was given by Mr. Wahl.

July 2012
A progress report was given by Mr. Wahl.

January 2013
A progress report was given by Mr. Wahl. The requirements were reviewed to assure the task group was working in the right direction.

July 2013
A progress report was given by Mr. Wahl. Discussion included: adding language related to Jurisdictional requirements, volumetric NDE.

January 2014
A progress report was given by Mr. Wahl. Discussion included: volumetric NDE in lieu of radiographic NDE and correcting Fig S2.13.10.3-a …Move arrow to correct location for knuckle radius.

July 2014
A progress report was given by Mr. Wahl.

January 2015
Mr. Galanes gave a progress report.

Meeting Action:
July 15, 2015
Mr. Galanes gave a progress report. No action taken, the task group plans to have documents at the January 2016 meeting.

Item Number: NB12-0801	NBIC Location: Part 3	Attachment Pages 9-18

General Description: Add requirements for repair and alteration of gasketed PHEs in the field

Subgroup: Repairs and Alterations

Task Group: R. Cauthon (PM), B. Wielgoszinksi, N. Carter

History:

January 2012
This item was transferred from R/A General. A task group of E. Ortman (PM), G. Galanes and B. Wielgoszinski was assigned.

July 2012
A progress report was provided by Mr. Cauthon

January 2013
A progress report on this Action Item was given by B. Wielgoszinski and E. Ortman. During discussions it was suggested by R. Wielgoszinski that it may only be necessary to list actions that are considered repairs and actions considered alterations. The Task Group will continue to gather information for the next meeting.

July 2013
A progress report along with 3 documents for review was presented by Mr. Ed Ortman.

January 2014
Mr. Ortman is coordinating the NBIC updates with the ASME code future requirements. Once established a letter ballet will be sent out. Mr. Galanes and Mr. Pillow will be copied on correspondence should questions come up.

July 2014
Mr. Cauthon gave a progress report; Section VIII Div.1 has a revision in progress to address PHEs. We are waiting resolution of that action before finalizing the NBIC proposal.

January 2015
Mr. Cauthon gave a progress report. Progress is being made in ASME BPV Section VIII Division 1 on a PHE appendix, which the task group is keeping tabs on.

Meeting Action:
July 15, 2015
Mr. Cauthon reported a Task Group under Section VIII, Div. 1 is working on PHE design requirements. The committee has asked the National Board Staff to correspond with the secretary of the ASME PHE Task Group by sending our NBIC proposal for their committees' comments. Mr. Cauthon is cleaning up the proposal on the document before it is sent out.

Item Number: NB13-0403	NBIC Location: Part 3, S1.9.2	No Attachment

General Description: Add requirements for installation of boiler arch tubes

Subgroup: Locomotive

Task Group: Unknown

History:

July 2014
A progress report given by Mr. Reetz. This item had not yet been considered by the SG locomotive boilers.

January 2015
Mr. Galanes gave a progress report. There was no action to report.

March 2015
No progress was made at the March 2015 subgroup meeting.

Meeting Action:
July 15, 2015
Mr. Galanes reported the Subgroup had voted to close this item with no action. A motion was made and unanimously approved to close this item with no action.

Item Number: NB13-0902	NBIC Location: Part 3, S2	No Attachment

General Description: Review alternate methods of tube sheet repair

Subgroup: Historical

Task Group: F. Johnson, T. Dillon, and M. Wahl

History:

January 2015
Mr. Galanes gave a progress report. There was no action to report.

Meeting Action:
July 15, 2015
A progress report was given by Linn Moedinger. He stated Mr. Wahl was making new figures for the supplement.

Item Number: NB13-1401	NBIC Location: Part 3, S1.9.2	Attachment Pages 19-29

General Description: Add wording in this section regarding boiler tube welding

Subgroup: Locomotive

Task Group: Unknown

History:

July 2014
A progress report given by Mr. Reetz. This item had not yet been considered by the SG locomotive boilers.

January 2015
Mr. Galanes gave a progress report. There was no action to report**.**

March 2015
This item unanimously passed SG Locomotive Boilers.

Meeting Action:
July 15, 2015
Mr. Galanes discussed this item that came from the SG Locomotive. A motion was made and unanimously approved to send this item out for a review and comment letter ballot on how it may be incorporated into the NBIC.

Item Number: NB13-1403	NBIC Location: Part 3	No Attachment

General Description: Installation of boiler tubes and arch tubes

Subgroup: Repairs and Alterations

Task Group: R. Stone (PM)

History:

March 2015
Subgroup Locomotive Boilers requested this item be moved to Subgroup Repairs and Alterations for further work.

Meeting Action:
July 15, 2015
Mr. Galanes reported the Subgroup Locomotive had voted to close this item with no action. A motion was made and unanimously approved to close this item with no action.

Item Number: NB13-1404A	NBIC Location: Part 3, S1	Attachment Page 30

General Description: Add requirements for fillet welding staybolts in locomotive boilers

Subgroup: Locomotive

Task Group: Unknown

History:

July 2014
A progress report given by Mr. Reetz. This item had not yet been considered by the SG locomotive boilers.

January 2015
Mr. Galanes gave a progress report. There was no action to report.

March 2015
This item was closed by SG Locomotive Boilers to be incorporated into NB15-1701 and NB15-1702.

Meeting Action:
July 15, 2015
Mr. Galanes indicated the item has been incorporated into two separate action items during the March, 2015 SG Locomotive meeting. A motion was made and unanimously approved to close this item with no action as it has been incorporated into items NB15-1701 and NB15-1702.

Item Number: NB13-1405	**NBIC Location: Part 3, S1.2.9**	**No Attachment**

General Description: Add requirements for throttle pipes, dry pipes, superheater headers, and front end steam pipes

Subgroup: Locomotive

Task Group: Unknown

History:

July 2014
Progress report given by Mr. Reetz. This item had not yet been considered by the SG locomotive boilers.

March 2015
This item was not worked on at the SG Locomotive Boilers meeting

Meeting Action:
July 15, 2015
Linn Moedinger gave a progress report. No action taken.

Item Number: NB13-1407	**NBIC Location: Part 3, S1**	**Attachment Page 31**

General Description: Add requirements for repair and alteration of bolts, nuts, and studs in locomotive boilers

Subgroup: Locomotive

Task Group: Unknown

History:

July 2014

A progress report given by Mr. Reetz. This item had passed SG locomotive boilers but did not make the SC R&A agenda.

January 2015
Mr. Galanes gave a progress report. There was no action to report.

March 2015
This item unanimously passed SG Locomotive Boilers.

Meeting Action:
July 15, 2015
The SC reviewed the proposed text from SG Locomotive. Linn Moedinger had the text formatted for a revision and the sub-committee made a motion and unanimously approved to send it out for a letter ballot at the Subcommittee level.

Item Number: NB13-1408	**NBIC Location: Part 3, S1**	**Attachment Page 32-37**

General Description: Add requirements for repair and alteration of locomotive boilers with threaded boiler studs of the taper thread and straight thread varieties

Subgroup: Locomotive

Task Group: Unknown

History:

July 2014
A progress report given by Mr. Reetz. This item had passed SG locomotive boilers but did not make the SC R&A agenda.

January 2015
Mr. Galanes gave a progress report. There was no action to report.

March 2015
This item unanimously passed SG Locomotive Boilers.

Meeting Action:
July 15, 2015
The SC reviewed the proposed text from SG Locomotive. Linn Moedinger had the text formatted for a revision. A motion was unanimously approved to send the item out for an up or down letter ballot at the Subcommittee level.

Item Number: NB14-0203	**NBIC Location: Part 3**	**Attachment Pages 38-43**

General Description: Review Part 3 for any changes needed to be made to "R" accreditation requirements

Subgroup: Repairs and Alterations

Task Group: Ron Trout (PM), N. Carter, & R Cauthon

History:

July 2014
A progress report was given by Mr. Cauthon. Information of proposed changes to accreditation section of Part 3 of the NBIC was presented for information. This item passed subgroup in July 2014, but no vote was taken in subcommittee.

January 2015
Mr. Galanes gave a progress report. SC Repairs and Alterations will vote to on this item via letter ballot. The ballot did not pass, with four disapproval votes from Mr. Brian Morelock, Mr. George Galanes, Mr. Rob Troutt, and Mr. Wayne Jones.

Meeting Action:
July 15, 2015
Rob Troutt presented a revised document for the accreditation section of Part 3 to address previous negatives and comments. A motion was made and unanimously approved to forward this item to the Main Committee for a letter ballot.

Item Number: NB14-0301	**NBIC Location: Part 3**	**Attachment Pages 44-47**

General Description: Add requirements for encapsulation

Subgroup: Repairs and Alterations

Task Group: Brian Boseo (PM) R. Wielgoszinski, Frank Johnson , & Kathy Moore

History:

July 2014
A progress report was given by Mr. Wielgoszinski

January 2015
Mr. Wielgoszinski is expected to report.

Meeting Action: Mr. Wielgoszinski is expected to report.
July 15, 2015
Mr. Boseo presented a progress report on encapsulation. Further work is to be done. Task group assigned with new two members – Johnson and Moore.

Item Number: NB14-0302	**NBIC Location: Part 3, S6**	**Attachment Pages 48-56**

General Description: Develop additional "TR" forms to include in Part 3

Subgroup: Repairs and Alterations

Task Group: C. Withers (PM), B. Underwood, K. Moore, B. Vallance

History:

July 2014
A progress report was given on the status of form development by Bill Vallance

January 2015
Mr. Galanes gave a progress report. A new task group was formed to address "TR" program revisions.

Meeting Action: Mr. Withers is expected to report.
July 15, 2015
Mr. Chuck Withers gave a progress report that he is going to meet with Stan **S**taniszewski of Department of Transportation, DOT. The discussions will ensure Supplement 6 meets the DOTs needs and to have the program use the R stamp and not the TR stamp.

Item Number: NB14-0701 NBIC Location: Part 3, 3.2.2 c) Attachment Pages 57-62

General Description: Result of IN13-0301, clarify requirements about an "R" certificate holder using an ASME pressure part they fabricated in a separate repair or alteration they are performing

Subgroup: Repairs and Alterations

Task Group: Bob Wielgoszinski (PM)

History:

July 2013
A letter ballot was approved to be sent to the NBIC Main Committee for comment only.

January 2014
Mr. Wielgoszinski presented a report. Through much discussion Mr. Wielgoszinski will present a report to the sub-committee after incorporation of discussion comments on January 15, 2014.

July 2014
A progress report was given with a document NB14-0701 with responses to ballot comments.

January 2015
Mr. Galanes gave a progress report. Mr. Wielgoszinski provided further information on the item. SC Repairs and Alterations will vote on this item via letter ballot. The ballot did not pass, with disapproval votes from Mr. Brian Boseo, Mr. George Galanes, Mr. Paul Edwards, Mr. Rob Troutt, and Mr. Wayne Jones.

Meeting Action:
July 15, 2015
Mr. Wielgoszinski presented the information from the Subgroup action that they voted to reaffirm the original proposal and move it to the Sub Committee Repairs and Alterations. The committee voted and approved, with two abstentions, to reaffirm the original proposal and forward it to the NBIC Main Committee. Mr. Edwards and B. Boseo abstained.

Item Number: NB14-1102 NBIC Location: Part 3 Attachment Pages 63-64

General Description: ~~Diagram~~ Diaphragm Weld Repair

Subgroup: Repairs and Alterations

Task Group: Unknown

History:

March 2015
SG Locomotive Boilers requested that this item be transferred to SG Repairs and Alterations for further work.

Meeting Action:
July 15, 2015
Mr. Galanes was informed the Subgroup Locomotive voted to close this item with no action. This committee voted and unanimously approved to close this item with no action.

Item Number: NB14-2401 **NBIC Location: Part 3, S6.5** **Attachment Pages 65-66**

General Description: Replace the referenced TR-1 form with a TR-3 form

Subgroup: Repairs and Alterations

Task Group: C. Withers (PM), B. Underwood, K. Moore, B. Vallance

History:

July 2014
No action taken on this item as there currently in not a form within Part 3.

January 2015
Mr. Galanes gave a progress report. A new task group was formed to address "TR" program revisions.

Meeting Action:
July 15, 2015
Mr. Chuck Withers gave a progress report that he is going to meet with Stan **S**taniszewski of Department of Transportation, DOT. The discussions will ensure Supplement 6 meets the DOTs needs and to have the program use the R stamp and not the TR stamp.

Item Number: NB14-2402 **NBIC Location: Part 3, S6.3** **Attachment Pages 67-68**

General Description: Remove "TR" accreditation requirements from the NBIC because "TR" accreditation requirements will be addressed in a separate National Board "TR" document

Subgroup: Repairs and Alterations

Task Group: C. Withers (PM), B. Underwood, K. Moore, B. Vallance

History:

July 2014
It was discussed to form a task group to look over the NBIC Supplement-6 DOT too see where updates can be made. No action taken on this item.

January 2015
Mr. Galanes gave a progress report. A new task group was formed to address "TR" program revisions.

Meeting Action:
July 15, 2015
Mr. Chuck Withers gave a progress report that he is going to meet with Stan **S**taniszewski of

Department of Transportation, DOT. The discussions will ensure Supplement 6 meets the DOTs needs and to have the program use the R stamp and not the TR stamp.

Item Number: NB15-0509 **NBIC Location: Part 3, 2.5.3.6** **Attachment Pages 69-71**

General Description: Originally contained PR15-0157, PR15-0158, PR15-0156, and PR15-0501; now only addressing PR15-0156 and PR15-0501 regarding use of propriety filler metal names in Welding Method 6

Subgroup: Repairs and Alterations

Task Group: George Galanes, (PM)

History:

January 2015
Two of the public review comments, PR15-0157 and PR15-0158, were removed from NB15-0509 and added to a new action item, NB15-1402. For NB15-0509, Mr. Galanes gave progress report on the use of proprietary electrode names in welding method 6. The Subcommittee on Repairs and Alterations approved a proposed wording change, but elected to return the item without vote for further work in light of new information.

Meeting Action:
July 15, 2015
Mr. Galanes presented proposed revisions based on Public Review Comments received to Welding Method 6 for filler metal names as examples. Motion was made and unanimously approved revision and to move it onto the NBIC Main Committee.

Item Number: NB15-0511 **NBIC Location: Part 3, 5.13.5.1** **Attachment Page 72**

General Description: Result of PR15-0120, how does one fill out "NR" paperwork if the repairs or alterations were performed to an international code other than Section III or Section XI?

Subgroup: Repairs and Alterations

Task Group: P. Edwards (PM), B. Schafer, B. Wielgoszinski, C. Withers

History:

January 2015
Mr. Galanes gave a progress report. This item was transferred to the "NR" task group for further work.

Meeting Action:
July 15, 2015
Mr. Edwards presented a progress report on the NR task groups' progress. Two items the task group is focused on are revisions to paragraph 1.8.9 and how best to promote the NR program.

Item Number: NB15-0512 **NBIC Location: Part 3, S3.5.5 b)** **Attachment Page 73**

General Description: Result of PR15-0121, should UIG-79 and UIG-80 be referenced in their entirety in this section?

Subgroup: Graphite

Task Group: None assigned

History:

January 2015
Mr. Galanes gave a progress report. This item was transferred for further work to the SG Graphite.

Meeting Action:
July 15, 2015
No report at this meeting.

Item Number: NB15-1003	NBIC Location: Part 3	www.nbicshare.org

General Description: Update "stamp" vs. "certification" language to maintain consistency with ASME code

Subgroup: Repairs and Alterations

Task Group: Rob Troutt (PM), J. Amato, J. Pillow

History:

January 2015
Mr. Galanes gave a progress report. A task group was assigned for further work with Rob Troutt as the project manager.

Meeting Action:
July 15, 2015
Mr. Troutt presented a proposed revision where the term Stamp vs. Certification language was revised. It was decided to take the item back to the Task Group to consider addition of code text or footnotes related to the transition of the ASME symbol to designator. Progress Report

Item Number: NB15-1101	NBIC Location: Part 3	No Attachment

General Description: Investigate code addition for carbon fiber wrap reinforcement of high pressure metal pressure vessels

Subgroup: Repairs and Alterations

Task Group: Dave Martinez (PM) & Kathy Moore

History:

January 2015
Mr. Galanes gave a report. In July 2015, a presentation will be given by HJ3 Composite Technologies, Inc. about this system.

Meeting Action:
July 15, 2015
Mr. Galanes provided the Sub Committee with a brief summary of the power point presentation on

Carbon Fiber Reinforced Polymer (CFRP) Reinforcement of High Pressure Metal Pressure Vessels technology by Mr. Olley Scholer from HJ3. This process could be an inclusion in the NBIC Part 3 for repairs to vessels and piping.
The presentation will be provided in the subgroup R/A minutes. Task group appointed. It is recommended to have a member of FRP added to the Task Group. That Person is to be determined.

Item Number: NB15-1201 **NBIC Location: Part 3, 5.6** **No Attachment**

General Description: Expand requirements for form logs in Section 5 to include not only "R" program, but also "VR" and "NR"

Subgroup: Repairs and Alterations

Task Group: Chuck Withers, (PM)

History:

January 2015
Mr. Galanes gave a report. More information from National Board staff needs to be obtained before work can continue.

Meeting Action:
July 15, 2015
A progress report was given by Mr. Galanes. The National Board staff will seek more information on this item.

Item Number: NB15-1401 **NBIC Location: Part 3, Section 3** **Attachment Pages 74-80**

General Description: Investigate new requirements for weld buildup of thin walled tubes

Subgroup: Repairs and Alterations

Task Group: W. Sperko (PM), G. Galanes, J. Siefert

History:

January 2015
Mr. Galanes gave a progress report, and a new task group was formed to address this issue.

Meeting Action:
July 15, 2015
B. Wielgoszinski gave a progress report that the task group has not had a chance to meet.

Item Number: NB15-1402 **NBIC Location: Part 3, 2.5.3.6** **Attachment Pages 81-82**

General Description: Result of PR15-0157 and PR15-0158, investigate appropriate humidity protection for materials used in Welding Method 6

Subgroup: Repairs and Alterations

Task Group: G. Galanes (PM), J. Seifert, N. Carter

History:

January 2015
Mr. Galanes gave a progress report. A task group was formed to work on the public comments related to humidity protection in Welding Method 6.

Meeting Action:
July 15, 2015
Mr. Galanes presented a proposed revision to subparagraph 3 of Welding Method 6 to address several Public Review Comments. The SG Repairs and Alteration unanimously approved the revision. A motion was made and unanimously approved the revision and to move it to the NBIC Main Committee.

Item Number: NB15-1403	**NBIC Location: Part 3**	**Attachment Pages 83-88**

General Description: Create a new supplement on weld repair to CSEF Grade 91 steel

Subgroup: Repairs and Alterations

Task Group: G. Galanes (PM), J. Siefert

History:

January 2015
Mr. Galanes gave a progress report. Mr. Siefert presented a powerpoint presentation with research on Grade 91 steel that could be used to develop a new supplement

Meeting Action:
July 15, 2015
Mr. Siefert gave a presentation to the Subgroup Repairs and Alteration with research on Grade 91 repairs that could be used to develop a new supplement for the NBIC. The Task Group developed wording for a possible new supplement. A motion was made and unanimously approved to move the new supplement wording for an up or down letter ballot at the Subcommittee level with review and comment by the NBIC Main Committee. The presentation Mr. Siefert gave can be found in the Subgroup Repairs and Alteration minutes.

Item Number: NB15-1404	**NBIC Location: Part 3, 1.6.1, 3.2.1**	**No Attachment**

General Description: Define "existing material" as used in 1.6.1 and 3.2.1

Subgroup: Repairs and Alterations

Task Group: W. Jones (PM), M. Toth, J. Amato, R. Troutt

History:

January 2015
Mr. Galanes gave a progress report. The task group is working to develop a footnote in the text to define existing material.

Meeting Action:
July 15, 2015
Mr. Jones gave a progress report that the task group will work to develop a definition of existing material for the glossary.

Item Number: NB15-1410	NBIC Location: Part 3, S6.14	Attachment Pages 89-90

General Description: Result of PR15-0122, add requirements for the number of repairs or alterations allowed under a single nameplate/stamping

Subgroup: Repairs and Alterations

Task Group: C. Withers (PM), B. Underwood, K. Moore, B. Vallance

History:

January 2015
Mr. Galanes gave a progress report. This item was transferred for further work to the "TR" task group.

Meeting Action:
July 15, 2015
Mr. Chuck Withers gave a progress report that he is going to meet with Stan **S**taniszewski of Department of Transportation, DOT. The discussions will ensure Supplement 6 meets the DOTs needs and to have the program use the R stamp and not the TR stamp.

Item Number: NB15-1602	NBIC Location: Part 3, S2.7.1	No Attachment

General Description: Revise material list for historical boiler reports to include bolts, studs, buts and formed pressure parts

Subgroup: Historical

Task Group: T. Dillon (PM), M. Wahl, G. Galanes

History: None

Meeting Action:
July 15, 2015
Mr. Joel Amato gave a progress report.

Item Number: NB15-1702	NBIC Location: Part 3	Attachment Page 91-92

General Description: Fillet welded staybolt repair

Subgroup: Locomotive

Task Group: Linn Moedinger (PM)

History:

March 2015
This item unanimously passed SG Locomotive Boilers.

Meeting Action:
July 15, 2015
Mr. Moedinger presented a document to add paragraph S1.2.5.1 for Un-threaded Fillet Welded Staybolts to supplement 1. A motion was made and approved to move this to the NBIC Main Committee for an up or down ballot with one negative, Mr. Frank Johnson and two abstentions, Joel Amato and James Sekely.

Item Number: NB15-1703	**NBIC Location: Part 3**	**No Attachment**

General Description: Welded staybolt procedures

Subgroup: Locomotive

Task Group: None assigned

History:

March 2015
This item was not worked on at the SG Locomotive Boiler meeting.

Meeting Action:
July 15, 2015
Mr. Moedinger gave a report that no action has been taken.

Item Number: NB15-1801	**NBIC Location: Part 3**	**Attachment Pages 93-96**

General Description: Assuring leak tightness by seal welding

Subgroup: Repairs and Alterations

Task Group: M. Webb (PM)

History: None

Meeting Action:
July 15, 2015
Mr. Webb presented a proposed addition of seal welding to routine repairs in Part 3. A motion was made and unanimously approved, to move this to the NBIC Main Committee for a letter ballot.

Item Number: NB15-1901	**NBIC Location: Part 3**	**No Attachment**

General Description: Address the performance of postweld heat treatment on PRIs that were not previously postweld heat treated

Subgroup: Repairs and Alterations

Task Group: B. Wielgoszinski (PM), George Galanes, and Walt Sperko

History: None

Meeting Action:
July 15, 2015
Mr. Wielgoszinski gave a progress report. Mr. Sperko has not yet met with the Task Group.

Item Number: NB15-2501	NBIC Location: Part 3, 3.3.4.10	No Attachment

General Description: Bolts, Screws, Studs, Nuts, and Washers

Subgroup: Repairs and Alterations

Task Group: None assigned

History: None

Meeting Action:
July 15, 2015
Mr. Galanes gave a report that the Subgroup Locomotive and SG Repairs and Alteration closed this item with no action. A motion was made and unanimously approved to close the item with no action.

Item Number: NB15-2601	NBIC Location: Part 3	Attachment Pages 97-98

General Description: Radius of flush patches

Subgroup: Repairs and Alterations

Task Group: R. Wielgoszinski (PM)

History: None

Meeting Action:
July 15, 2015
Mr. Wielgoszinski presented a proposed change to paragraph 3.3.4.6 a) 2). If the patch is rectangular, an adequate radius of at least 3 times the plate thickness shall be provided at the corners was added. A motion was made and unanimously approved to move this to the NBIC Main Committee. The reference for the radius size was found in NBIC Part 3 S1.2.11.2.

8. New Business

Item Number: IN15-0401	NBIC Part 3, 4.2 a), 4.4 a, b, c, d)	Attachment Page 99

General Description: May Phased Array UT (PAUT) examination be used for verification of final circumferential weld repair integrity in lieu of pressure testing or other typical NDE methods (MT/PT/RT) involving boiler tubes where the thickness is below ½ inch, with NPS of 4 inch and less?
Subgroup: Repairs and Alterations

Task Group: George Galanes (PM), Frank Johnson, Jim Sekely, and Warren Taylor

History:

Meeting Action:
July 15, 2015
Mr. Galanes gave a progress report from the Subgroup Repairs and Alteration meeting that the Iowa Chief wanted the NBIC committee to address a request for interpretation related to alternative NDE testing allowing phased array UT.
It was decided at the Subgroup Repairs and Alteration and SC Repairs and Alteration to have a National Board Staff person call the Chief of Iowa to gather his reasoning for the committee to consider future action.

Item Number: NB15-1902	**NBIC Location: Part 3**	**Attachment Pages 100-101**

General Description: Weld Method 6 revisions

Subgroup: Repairs and Alterations

Task Group: George Galanes(PM), Nathan Carter, and Walt Sperko

History: None

Meeting Action:
July 15, 2015
Mr. Galanes provided proposed revisions to text for weld method 6 that was approved at the Subgroup Repairs and Alteration. A motion was made and unanimously approved to forward the revisions to the NBIC Main Committee.

Item Number: NB15-1903	**NBIC Location: Part 3**	**Attachment Page 102**

General Description: Distribution of R forms, when it is required.

Subgroup: Repairs and Alterations

Task Group: Bill Vallance (PM),

History: None

Meeting Action:
July 15, 2015
Mr. Vallance presented draft wording for a change to Section 5 of Part 3. A motion was unanimously approved to forward the proposed wording to the NBIC Main Committee.

Item Number: NB15-2305	**NBIC Part 3 Footnotes**	**No Attachment**

General Description: Evaluate footnotes in Part 3

Subgroup: Repairs and Alterations

Task Group: Rob Trout,(PM) Jim Pillow, Joel Amato

History:

Meeting Action:
July 15, 2015
Mr. Scribner presented a request to have the task group evaluate footnotes throughout Part 3 for their necessity as one or if they should be within the Code rules. Progress Report

Item Number: NB15-2502	**NBIC Part 3, 3.4.5**	**Attachment Pages 103-109**

General Description: Provide guidance for the inspection, repair and replacement of the tubes in water tube boilers when OEM procedures are not available.

Subgroup: Repairs and Alterations

Task Group: Frank Johnson (PM), Jim Sekely, and Warren Taylor

History:

Meeting Action:
July 15, 2015
Mr. Galanes gave a progress report as the National Board staff needs time to review the history of this Item. Task Group assigned.

Item Number: NB15-2503	**NBIC Part 3, 3.4.6**	**Attachment Page 110**

General Description: Calculating Tube Expansion By Wall Thickness Reduction. To provide a reference calculation for inspectors and code users to determine the percentage of wall thickness reduction when expanding boiler tubes into different diameter holes in drums and tube sheets.

Subgroup: Repairs and Alterations

Task Group: Frank Johnson (PM), Jim Sekely, and Warren Taylor

History:

Meeting Action:
July 15, 2015
Mr. Galanes gave a progress report as the Task Group needs to work with the National Board staff review the history of this Item.
Task Group assigned.

Item Number: NB15-2801	NBIC Part 3, 4.2 b)	Attachment Pages 111-112

General Description: Change reference standard, "ACCP-189" to "ANSI/ASNT CP-189" and also included reference to the ACCP Program.

Subgroup: Repairs and Alterations

Task Group: N. Carter,(PM)

History:

Meeting Action:
July 15, 2015
N. Carter presented a revision to the paragraph 4.2 b) that was approved at the Subgroup. A Motion was made and unanimously approved to have an up or down letter ballot at the Subcommittee Repairs and Alteration level and to move this to the NBIC Main Committee for a review and comment letter ballot.

Item Number: NB15-2802	NBIC Part 3, S6.10 b)	Attachment Page 113-114

General Description: Change reference standard, "ACCP-189" to "ANSI/ASNT CP-189" and also included reference to the ACCP Program.

Subgroup: Repairs and Alterations

Task Group: N Carter (PM)

History:

Meeting Action:
July 15, 2015
N. Carter presented a proposed revision to paragraph S6.10 b). A Motion was made and unanimously approved to move this to the NBIC Main Committee.

9. Future Meetings

January 11-14 2016 – Corpus Christi, Texas
July 18-21 2016 – Columbus, Ohio
January 2017—San Antonio Texas

10. Adjournment

Motion was made and unanimously approved to adjourn the meeting at 2:15PM

Attachment Page 1

Last Name	First Name	Interest Category	Role
Galanes, PE	George	Users	Chair
Pillow	James	General Interest	Vice Chair
Vallance	William		Secretary
Amato	Joel	Jurisdictional Authorities	Member
Boseo	Brian	National Board Certificate Holders	Member
Bramucci	Angelo	Authorized Inspection Agencies	Member
Edwards	Paul	National Board Certificate Holders	Member
Hopkins	Craig	National Board Certificate Holders	Member
Jones	Wayne	Authorized Inspection Agencies	Member
Larson	James	Authorized Inspection Agencies	Member
McManamon, Jr.	Larry	Labor	Member
Miletti	Ray	Manufacturers	Member
Moore	Kathy	[R] Stamp Holder	Member
Morelock, PE	Brian	Users	Member
Ortman	Edward	Users	Member
Schulte	Bryan	Users	Member
Sekely	James	General Interest	Member
Troutt	Rob	Jurisdictional Authorities	Member
Webb	Michael	Users	Member

SC Repairs and Alterations Attendance Sheet - 7/15/15

Name	Company	Phone Number	Email	Signature
George Galanes	DTS, Inc	630-799-8162	ggalanes@diamond technical services.com	
James Pillow	Common Wealth	864-686-2531	JPILLOW@commonwealth.com	
MONTE BEST ~~William Vallance~~	HSB Global	937-620 3676	Monte_best@hsbct.com	
Joel Amato	Minnesota	651 284-5137	joel.amato@state.mn.us	
Brian Boseo	Graycor Services	708 941 3016	brian_boseo @graycor.com	
Angelo Bramucci	Angelo Bramucci	860 285-9176	angelo.bramucci@[illegible]	
Paul Edwards	CBI STONE & WEBSTER	617 929-3690	PAUL.EDWARDS@CBI.COM	
Craig Hopkins				
Wayne Jones	ARISE	251. 895.8826	Wayne.Jones@ ARISEINC.com	
James Larson				
Larry McManamon				
Ray Milletti				
Kathy Moore	Joe Moore Co	919 bbb 7472	KATHYMOORE@joemoore company.com	
Brian Morelock	EASTMAN CHEMICAL	423 229-1265	morelock@ eastman.com	
Bryan Schulte	NRG	713-203-4129	Bryan.Schulte@ nrg.com	
James Sekely	Weldus Services	724 514 7101	JSekely@Comast.Net	
Rob Troutt	TEXAS	512 654 2727	Rob.Troutt@TDLR.Texas.gov	
Michael Webb	Xcel Energy	303) 628-2840	mike.webb@xcelenergy.com	
PAT BECKER	B&W	330 860 2807	pabecker@babcock.com	
Rick Valdez	ARB, INC	661 331 6024	rvaldez@arbinc.com	

SC

Frank Johnson	PBF Energy	419-386-8456	Frank.Johnson@PBFEnergy.com	
William VanHaun	NETL Bd			
John Sharier	State of Ohio	614-644-2541	john.sharier@com.state.oh.us	
Linn Moedinger	Standard Rail Road	717 575-4478	lmoedinger@sperryrail.com	
CHARLES [illegible]	NYB			
Ben Schaefer	AEP	614-716-1643	bschaefer@aep.com	
DARRELL WISNER	Duke Energy	317-838-6926	darrell.wisner@duke-energy.com	
Dawn Holt	Babcock & Wilcox	330-860-1086	drholt@babcock.com	
RANDY CARTHON	ALSTOM POWER INC.	860-285-3481	randal.t.carthon@alstom.com	
WARREN TAYLOR	DOMINION	804/3172586	WARREN.TAYLOR@Dom.com	
JAMIE WALKER	HAYES MECH.	773.910.5592	JWALKER@HAYESMECHANICAL.com	
BOB UNDERWOOD	HSB GS	618 593-6231	robert_underwood@hsbgt.com	
Nathan Carter	HSB GS	843-407-0387	nathan.carter@hsbgt.com	
BOB WIELGOSZINSKI	HSB GS	~~860 470~~ 860 722 5264		

NBIC Interpretation Draft

IN14-0701 - *Part 3 PWHT* - Subject: NBIC 2010, part 3, Post Weld Heat Treatment of a Vessel.

Q1. Must a company that performs post weld heat treatment be required to hold an "R" certification?
ANS: YES

Q2. Is this post weld heat treatment now considered an "Alteration" to this vessel, as per NBIC part 3?
ANS:
YES

Q3. Shall this "Alteration" be documented on a NBIC R-2 form? ANS: YES

Subject: NBIC 2010 Edition, Part 3, Post Weld Heat Treatment of a Vessel

Committee Question 1

An R-Certificate holder decides to perform post weld heat treatment (PWHT) of a vessel at the request of a client, where no PWHT was performed in the original construction. Is the performance of PWHT of the vessel considered an alteration and subject to documentation using a Form R2?

Reply: Yes.

Committee Question 2

For the vessel described above, must the weld procedures used for construction of the vessel be qualified with PWHT?

Reply: Yes.

Committee Question 3

Must the PWHT described above be performed by the R-Certificate holder?

Reply: No, the PWHT may be subcontracted; however the R certificate holder retains the responsibility for the performance of the PWHT.

Rationale: PWHT can reduce the mechanical properties and/or notch toughness of the original vessel material affecting the pressure retaining capability, which is the definition of an alteration in the NBIC.

PROPOSED INTERPRETATION

Inquiry No.	IN14-0801				
Source	William R Chalfant, PBF Energy, Delaware City Refinery				
Subject	**2013 NBIC , Part 3, Section 3.3.3 s) and 3.3.4.3.a)**				
Edition	2013				
Question	Question #1: 2013 NBIC, Part 3, Section 3.3.4.3.a) When performing weld metal buildup of wasted areas of pressure retaining items in accordance with NBIC Part 3, paragraph 3.3.4.3.a), is the interpretation that the final metal thickness (including base metal and weld metal build up) shall be the calculated minimum required thickness in accordance with the original Code of Construction plus any future corrosion allowance for the desired remaining life? Question #2: 2013 NBIC, Part 3, Section 3.3.3, paragraph s) When replacing a part on a pressure retaining item in accordance with NBIC Part 3, paragraph 3.3.3.s), is it the intent of the term "minimum required thickness" to mean nominal wall thickness minus corrosion allowance as shown on the original Manufacturer's Data Report?				
Reply	Reply #1: Yes. Reply #2: Yes.				
Committee's Question	**Question #1: 2013 NBIC, Part 3, Section 3.3.4.3 a)** **When performing weld metal buildup of wasted areas of pressure retaining items, is the wall thickness required to be restored to the thickness listed on the Manufacturers Data Report?**				
Committee's Reply	**Reply #1: No. The minimum thickness after build-up shall be the original thickness of the pressure retaining item minus the corrosion allowance.**				
Rationale	**See Below.**				
SC Vote	Unanimous	No. Affirmative	No. Negative	No. Abstain	No. Not Voting
NBIC Vote	Unanimous	No. Affirmative	No. Negative	No. Abstain	No. Not Voting

Negative Vote Comments	

Reference:

2013 NBIC Part 3, Section 3.3.3 s): s) Replacement of a pressure-retaining part with a material of different nominal composition and, equal to or greater in allowable stress from that used in the original design, provided the replacement material satisfies the material and design requirements of the original code of construction under which the vessel was built. The minimum required thickness shall be at least equal to the thickness stated on the original *Manufacturer's Data Report.*

2013 NBIC Part 3, Section 3.3.4.3.a)

a) Shells, Drums, Headers

Wasted areas in stayed and unstayed shells, drums, and headers may be built up by welding, provided that in the judgment of the Inspector the strength of the structure has not been impaired. Where extensive weld buildup is employed, the Inspector may require an appropriate method of NDE for the completed surface of the repair. For suggested methods of building up wasted areas by welding. (See NBIC Part 3, Figure 3.3.4.3-a).

Rationale:

ASME Section VIII, Division 1 references:

MANDATORY APPENDIX 3 DEFINITIONS

3-2 DEFINITIONS OF TERMS

thickness of vessel wall:

(a) design thickness: the sum of the required thickness and the corrosion allowance (see UG-25).

(b) required thickness: that computed by the equations in this Division before corrosion allowance is added (see UG-22).

(c) nominal thickness: except as defined in UW-40(f) and modified in UW-11(g), the nominal thickness is the thickness selected as commercially available, and supplied to the Manufacturer. For plate material, the nominal thickness shall be, at the Manufacturer's option, either the thickness shown on the Material Test Report {or material Certificate of Compliance [UG-93(a)(1)]} before forming, or the measured thickness of the plate at the joint or location under consideration.

We Energies
231 W. Michigan Street
Milwaukee, WI 53203

www.we-energies.com

IN15-0201

March 13, 2015

Mr. Brad Besserman
National Board of Boiler and Pressure Vessel Inspectors
1055 Crupper Ave.
Columbus, OH 43229-1183

Subj.; NBIC Interpretation Inquiry

Dear Mr. Besserman;

This letter is a written request for interpretation regarding the National Board Inspection Code, ANSI /NB-23 relating to the National Board "R" Symbol Stamp Quality System. The request is presented using the format of stating the question, presenting a suggested reply and an applicable background statement. The request involves two Quality System organization questions as outlined below.

Question 1; Is it permissible to amend or revise the content or implementation of the Quality System, including the written Quality System Manual, without the direct involvement of the titled individual designated as responsible to ensure compliance as given in the Statement of Authority and Responsibility?

Reply 1; No – The titled individual designated as responsible for Quality System shall be fully involved in the preparation, planning and implementation of any and all amendments or revisions to the Quality System, including the written Quality System Manual. The Statement of Authority and Responsibility is required to grant the freedom and authority to carry out this responsibility.

Background 1 - The National Board Inspection Code, ANSI /NB-23, 2013, Part 3, 1.6 and 1.6.1, e) sets the requirement for having a Quality System functional responsibility. The National Board Certificate of Authorization is required to be formalized and conducted in accordance with a written Quality System. Revisions, changes or updates of the system are normal and expected during the life of the program. The titled individual designated as responsible for Quality System has the defined responsibility to ensure that the requirements of the NBIC and the Jurisdiction are followed. This individual is also granted the freedom and authority to fulfil those responsibilities. Administration of program changes and revisions is part of the responsibility scope. Any action involving the Quality System that bypasses the titled individual circumvents the process. In addition, revisions to the Quality System must be accepted by the Authorized Inspection Agency prior to implementation. The titled individual is also responsible to ensure this approval is obtained.

Question 2; Is it permissible for a single immediate supervisor to manage both quality and non-quality related work assigned to the titled individual designated as responsible for Quality System?

Reply 2; No – Quality related functions shall follow the administrative relationship structure between the titled individual designated as responsible for Quality System and the officer of the organization who signed the Statement of Authority and Responsibility. The structure of the quality related system shall follow the Quality System organization chart, which addresses functions that affect quality. A single immediate supervisor managing both quality and non-quality related work details performed by the titled individual may be viewed as a conflict of interest.

Background 2 – The National Board Inspection Code, ANSI /NB-23, 2013, Part 3, 1.6.1, d) 3) and f) sets the requirement for having a Quality System organization structure. The size and population of an organization may determine if multiple duties are needed. In cases where titled individuals have quality and non-quality responsibilities, management of functions that affect quality shall follow the administration structure of the quality organization as a separate administrative item. Immediate supervision management function is limited to non-quality issues for individuals performing both quality and non-quality activities. Management separation of quality and non-quality functions is a standard practice in the industry.

Please forward this request to the applicable NBIC committee as necessary for review and reply. Please feel free to contact me if you have any questions or would like to discuss this matter further.

Thank you,

Tim Bacha
Principal Engineer
PH (414) 221 3517
CF (414 587 5036

NBIC Subcommittee R&A Action Block

Subject	Gasketed Plate Heat Exchangers		
File Number	NB12-0801	**Prop. on Pg.**	1 thru 9
Proposed Revision	Add examples of routine repairs, repairs, and alterations for gasketed plate heat exchangers and revise R-1 form to include gasketed PHEs.		
Statement of Need	Because of the unique design of the PHE, the current ASME Pressure Vessel and NBIC Codes do not specific ally address the design of PHE's, nor the potential r epairs or alterati ons. This is intended to provide guidance to the industry and the Jurisdictions.		
Project Manager	Ed Ortman		

SubGroup	R&A Specific		
SubGroup Negatives		**SG Meeting Date**	July 16, 2013

SubCommittee Negatives		**SC Meeting Date**	July 17, 2013

3.2.5 CALCULATIONS

For alterations, calculations shall be completed prior to the start of any physical work. All design calculations shall be completed by an organization experienced in the design portion of the standard used for construction of the item. All calculations shall be made available for review by the Inspector accepting the design.

3.2.6 REFERENCE TO OTHER CODES AND STANDARDS

Other codes, standards, and practices pertaining to the repair and alteration of pressure retaining items can provide useful guidance. Use of these codes, standards and practices is subject to review and acceptance by the Inspector, and when required, by the Jurisdiction. The user is cautioned that the referenced codes, standards and practices may address methods categorized as repairs; however, some of these methods are considered alterations by the NBIC.

In the event of a conflict with the requirements of the NBIC, the requirements of the NBIC take precedence. Some examples are as follows:

(a) National Board *Bulletin* - National Board Classic Articles Series;

(b) ASME PCC-1, Guidelines for Pressure Boundary Bolted Flange Joint Assembly;

(c) ASME PCC-2, Repair of Pressure Equipment and Piping.

3.3 REPAIRS TO PRESSURE-RETAINING ITEMS

3.3.1 DEFECT REPAIRS

Before a repair is made to a defect in a welded joint or base metal, care should be taken to investigate its cause and to determine its extent and likelihood of recurrence.

3.3.2 ROUTINE REPAIRS

a) Routine repairs are repairs for which the requirements for in-process involvement by the Inspector and stamping by the "R" Certificate Holder may be waived as determined appropriate by the Jurisdiction and the Inspector. All other applicable requirements of this Code shall be met. Prior to performing routine repairs, the "R" Certificate Holder should determine that routine repairs are acceptable to the Jurisdiction where the pressure-retaining item is installed;

b) The Inspector, with the knowledge and understanding of jurisdictional requirements, shall be responsible for meeting jurisdictional requirements and the requirements of this Code;

c) The "R" Certificate Holder's Quality System Program shall describe the process for identifying, controlling, and implementing routine repairs. Routine repairs shall be documented on Form R-1 with this statement in the Remarks section: "Routine Repair.";

d) Repairs falling within one or more of the following categories may be considered routine:

1) Welded repairs or replacements of valves, fittings, tubes, or pipes NPS 5 (DN 125) in diameter and smaller, or sections thereof, where neither postweld heat treatment nor NDE other than visual is re-

5) The following on gasketed plate heat exchangers:
   i) Removal and replacement of heat transfer plates identical to those listed on the Manufacturer's Data Report;
   ii) In kind replacement of tightening bolts;
   iii) A change in welded attachments (e.g. welded feet).

3) Weld buildup of wasted areas in heads and shells not exceeding an area of 100 sq. inches (64,520 sq. mm) or a thickness of 25% of nominal wall thickness or ½ inch (13 mm), whichever is less; A11

4) Corrosion resistance weld overlay not exceeding 100 sq. in. (64,520 sq. mm).

SECTION 3

3.3.3 EXAMPLES OF REPAIRS

a) Weld repairs or replacement of pressure parts or attachments that have failed in a weld or in the base material;

b) The addition of welded attachments to pressure parts, such as:

   1) Studs for insulation or refractory lining;

   2) Hex steel or expanded metal for refractory lining;

   3) Ladder clips;

   4) Brackets having loadings that do not affect the design of the pressure-retaining item to which they are attached; and

   5) Tray support rings.

c) Corrosion resistant strip lining, or weld overlay;

d) Weld buildup of wasted areas;

e) Replacement of heat exchanger tubesheets in accordance with the original design;

f) Replacement of boiler and heat exchanger tubes where welding is involved;

g) In a boiler, a change in the arrangement of tubes in furnace walls, economizers, or super heater sections;

h) Replacement of pressure-retaining parts identical to those existing on the pressure-retaining item and described on the original *Manufacturer's Data Report*. For example:

   1) Replacement of furnace floor tubes and/or sidewall tubes in a boiler;

   2) Replacement of a shell or head in accordance with the original design;

   3) Rewelding a circumferential or longitudinal seam in a shell or head;

   4) Replacement of nozzles of a size where reinforcement is not a consideration;

i) Installation of new nozzles or openings of such a size and connection type that reinforcement and strength calculations are not a consideration required by the original code of construction;

j) The addition of a nozzle where reinforcement is a consideration may be considered to be a repair, provided the nozzle is identical to one in the original design, located in a similar part of the vessel, and not closer than three times its diameter from another nozzle. The addition of such a nozzle shall be restricted by any service requirements;

k) The installation of a flush patch to a pressure-retaining item;

l) The replacement of a shell course in a cylindrical pressure vessel;

m) Welding of gage holes;

n) Welding of wasted or distorted flange faces;

o) Replacement of slip-on flanges with weld neck flanges or vice versa;

p) Seal welding of buttstraps and rivets;

q) Subject to the administrative procedures of the Jurisdiction and approval of the Inspector, the replacement of a riveted section or part by welding;

r) The repair or replacement of a pressure part with a code-accepted material that has a nominal composition and strength that is equivalent to the original material, and is suitable for the intended service; and

s) Replacement of a pressure-retaining part with a material of different nominal composition, equal to or greater in allowable stress from that used in the original design, provided the replacement material satisfies the material and design requirements of the original code of construction under which the vessel was built. The minimum required thickness shall be at least equal to the thickness stated on the original *Manufacturer's Data Report.*

t) The replacement of a Pressure Relieving Device (PRD) attached by welding, provided the replacement device's relieving capacity is equal to or greater than the PRD-capacity required by the original code of construction.

3.3.4 REPAIR METHODS

u) In a gasketed plate heat exchanger:
1) Weld repair of any pressure part (e.g. nozzle repair or in kind replacement of nozzle);
2) In kind replacement of frame or pressure plates.

Except as provided in NBIC Part 3, 3.3.4.u, a repair or a defect in a welded joint or base material shall not be made until the defect has been removed. A suitable Nondestructive Examination (NDE) method, such as Magnetic Particle (MT) or Liquid Penetrant (PT), may be necessary to ensure complete removal of the defect. If the defect penetrates the full thickness of the material, the repair shall be made with a full penetration weld such as a double buttweld or single buttweld with or without backing. Where circumstances indicate that the defect is likely to recur, consideration should be given to removing the defective area and installing a flush patch or taking other corrective measures acceptable to the Inspector, and when required, by the Jurisdiction.

3.4 ALTERATIONS

3.4.1 RE-RATING[10]

Re-rating of a pressure-retaining item by increasing the maximum allowable working pressure (internal or external) or temperature or decreasing the minimum design metal temperature below which notch toughness testing is required by the original code of construction, shall be done only after the following requirements have been met to the satisfaction of the Jurisdiction at the location of the installation:

a) Revised calculations verifying the new service conditions shall be prepared in accordance with the "R" Certificate Holder's Quality Control System. Establishing a higher joint efficiency to re-rate a pressure-retaining item is not permitted;

b) All re-ratings shall be established in accordance with the requirements of the construction standard to which the pressure-retaining item was built;

c) Current inspection records verify that the pressure-retaining item is satisfactory for the proposed service conditions;

d) The pressure-retaining item has been pressure tested, as required, for the new service conditions. Any insulation, coatings, or coverings that may inhibit or compromise a meaningful pressure test shall be removed, to the extent identified by the Inspector;

e) In lieu of pressure testing, alternative methods can be used to ensure the structural integrity of the re-rated pressure-retaining item. The alternative methods shall be documented and subject to review and approval by the Jurisdiction.

3.4.2 ALTERATIONS BASED ON ALLOWABLE STRESS VALUES

For re-rating or re-calculating a new minimum wall thickness for a pressure-retaining item using a later edition/addenda of the original code of construction or selected construction standard or code that permits use of higher allowable material stress values than were used in the original construction, the following requirements shall apply:

a) The "R" Certificate Holder shall verify, by calculations and other means, that the re-rated item can be satisfactorily operated at the new service condition (e.g., stiffness, buckling, external mechanical loadings);

b) The pressure-retaining item shall not be used in lethal service;

c) The pressure-retaining item shall not be used in high-cycle operation or fatigue service (i.e., loadings other than primary membrane stress are controlling design considerations) unless the pressure-retaining item was originally designed for fatigue service and a fatigue analysis is performed;

d) The pressure-retaining item shall have been constructed to the 1968 edition or later edition/addenda of the original code of construction;

e) The pressure-retaining item shall be shown to comply with all relevant requirements of the edition/addenda of the code of construction, which permits the higher allowable stress values (e.g., reinforcement, toughness, examination, pressure testing);

10 Re-rating: Except as provided for Yankee Dryers in Supplement 5, this code does not provide rules for de-rating boilers or pressure vessels; however, when the MAWP and/or allowable temperature of a boiler or pressure vessel is reduced, the Jurisdiction where the object is installed should be contacted to determine if specific procedures should be followed.

f) The pressure-retaining item shall have a satisfactory operating history and current inspection of the pressure-retaining item shall verify the item exhibits no unrepaired damage (e.g., cracks, corrosion, erosion). Areas of corrosion or erosion may be left in place provided the remaining wall thickness is greater than the minimum thickness for the new design conditions;

g) The re-rating shall be acceptable to the Inspector and, where required, the Jurisdiction;

h) All other requirements of Part 3, as applicable, and jurisdictional requirements shall be met;

i) Use of this paragraph shall be documented in the Remarks section of Form R-2.

3.4.3 EXAMPLES OF ALTERATIONS

a) An increase in the maximum allowable working pressure (internal or external) or temperature of a pressure-retaining item regardless of whether or not a physical change was made to the pressure-retaining item;

b) A decrease in the minimum temperature;

c) The addition of new nozzles or openings in a boiler or pressure vessel except those classified as repairs;

d) A change in the dimensions or contour of a pressure-retaining item;

e) In a boiler, an increase in the heating surface or steaming capacity as described on the original Manufacture's Data Report;

f) The addition of a pressurized jacket to a pressure vessel;

g) Except as permitted in NBIC, Part 3, 3.3.3 s);

h) Replacement of a pressure-retaining part in a pressure-retaining item with a material of different allowable stress or nominal composition from that used in the original design; and

i) The addition of a bracket or an increase in loading on an existing bracket that affects the design of the pressure-retaining item to which it is attached.

j) The replacement of a Pressure Relieving Device (PRD) as a result of work completed on a Pressure-Retaining Item (PRI) that changes the resultant capacity to exceed the Minimum Required Relieving Capacity (MRRC) required by the original code of construction as described on the original Manufacturer's Data Report.

3.4.4 ALTERATION OF ASME CODE SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS

k) The following on gasketed plate heat exchangers:
a) A change in heat transfer plate material;
b) A change in thickness of heat transfer plates;
c) A change in tightening bolt material or grade;
d) A change in tightening bolt diameter
e) A change in the material or thickness of the frame plate of pressure plates.

The alteration plan shall be reviewed and certified by an Engineer meeting the criteria of ASME Section VIII, Division 2 or 3, as applicable, for an Engineer signing and certifying a Manufacturer's Design Report. The review and certification shall be such as to ensure the work involved in the alteration is compatible with the user's design specification and the Manufacturer's Design Report.

5.13.1 FORM R-1, REPORT OF REPAIR

FORM R-1 REPORT OF REPAIR
in accordance with provisions of the *National Board Inspection Code*

1. Work performed by (1) (name of repair organization) (2) (Form Registration No.)
   (53) (PO No., Job No., etc.)
2. Owner (3) (name)
   (address)
3. Location of installation (4) (name)
   (address)
4. Item identification (5) (boiler, pressure vessel or piping) Name of original manufacturer (6)
5. Identifying nos.: (7) (mfg. serial no.) (8) (National Board No.) (8) (Jurisdiction No.) (8) (other) (9) (year built)
6. NBIC Edition/Addenda: (10) (edition) (10) (addenda)
   Original Code of Construction for Item: (11) (name/section/division) (11) (edition/addenda)
   Construction Code Used for Repair Performed: (11) (name/section/division) (11) (edition/addenda)
7. Repair Type: (55) ☐ Welded ☐ Graphite Pressure Equipment ☐ FRP Pressure Equipment
8. Description of work: (12) ☐ Form R-1, Report Supplementary Sheet is attached ☐ PISA Form (NB-403) is attached
   (use Form R-1, if necessary)

   Note to Editor: Add as part of line 7
   ☐ Gasketed Plate Heat Exchanger

   _____ Pressure Test, if applied (13) psi MAWP (54) psi
9. Replacement Parts. Attached are Manufacturer's Partial Data Reports or Form R-3s properly completed for the following items of this report:
   (14) (name of part, item number, data report type or Certificate of Compliance, mfg. name, and Identifying stamp)
10. Remarks: (15)

CERTIFICATE OF COMPLIANCE

I, (16), certify that to the best of my knowledge and belief the statements in this report are correct and that all material, construction, and workmanship on this Repair conforms to the *National Board Inspection Code*.
National Board "R" Certificate of Authorization No. (17) expires on (18),
Date (19), (20) (name of repair organization) Signed (21) (authorized representative)

CERTIFICATE OF INSPECTION

I, (22), holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the Jurisdiction of (23)
and employed by (24) of (25)
have inspected the work described in this report on (26), and state that to the best of my knowledge and belief this work complies with the applicable requirements of the *National Board Inspection Code*.
By signing this certicate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date (19), Signed (27) (Inspector) Commissions (28) (National Board and Jurisdiction No.)

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229 NB-66 Rev. 12

5.13.4.1 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM "R" REPORTS A11

These instructions are to be used when completing the National Board Form "R" Reports. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form "R" Reports shown in NBIC Part 3, 5.13.1 through 5.13.4.

1. The name and address of the "R" Certificate Holder performing the work as it appears on the "Certificate of Authorization". On a Form R-2, the organization that performed the design work will complete sheet 1 of 2, and the organization completing the construction activities will complete sheet 2 of 2. A11

2. When registering a Form "R" Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicate so by "N/A". As described in NBIC Part 3,5.6, a log shall be maintained identifying sequentially, any Form "R" registered with the National Board. For re-rating only, the Design Organization registers the Form R-2. Where physical work is also performed, the Construction Organization registers the Form R-2. A11

3. Name and address of the Owner of the pressure-retaining item.

4. Name and address of plant or facility where the pressure-retaining item is installed.

5. Description of the pressure-retaining item, such as boiler or pressure vessel, or piping. Include the applicable unit identification. A11

6. Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, "unknown". A11

7. Document the serial number of the pressure-retaining item if assigned by the original manufacturer. If there is no serial number assigned or is unknown, indicate "unknown". A11

8. When the pressure-retaining item is registered with the National Board, document the applicable registration number. If the pressure-retaining item is installed in Canada, indicate the Canadian design registration number (CRN), and list the drawing number under "other." If the item is not registered, indicate, "none". A11

9. Identify the year in which fabrication/construction of the item was completed.

10. Indicate edition and addenda of the NBIC under which this work is being performed.

11. Indicate the name, section, division, edition, and addenda of the original code of construction for the pressure-retaining item. Also indicate the name, section, division, edition, and addenda of the construction code used for the work being performed. If code cases are used, they shall be identified in the "Remarks" section.

12. Provide a summary describing the exact scope of work that was completed to a Pressure-Retaining Item (PRI). The information to be included when describing the scope of work shall consider items such as, the nature of the repair or alteration characterized by the listed examples, the specific location of the work performed to the PRI, the method of repair used to include as applicable, the steps taken to remove a defect or as allowed by NBIC Part 3, 3.3.4.8 to remain in place, the welding process and procedure when used, any special processes required such as PWHT, noting the soak time and temperatures recorded, and any acceptable in-process and final NDE-examinations or tests performed. When additional space is needed to fully describe the scope of work, a Form R-4 shall be used and attached.. A11

13. Indicate test pressure applied.

A11 14. As applicable, identify what parts manufactured by welding or bonding were introduced as needed to complete the scope of work. Indicate part, item number, manufacturer's name, stamped identification, and data report type or Certificate of Compliance.

15. Indicate any additional information pertaining to the work involved (e.g., routine repairs, code cases). For Form R-3, the part manufacturer is to indicate the extent he has performed any or all of the design function. If only a portion of the design, state which portion.

A11 16. Type or print name of authorized representative of the "R" Certificate Holder attesting to accuracy of the work described.

17. Indicate National Board "R" *Certificate or Authorization* number.

18. Indicate month, day, and year that the "R" certificate expires.

19. Enter date certified.

A11 20. Record name of "R" Certificate Holder who performed the described work, using full name as shown on the *Certificate of Authorization* or an abbreviation acceptable to the National Board.

21. Signature of authorized representative.

22. Type or print name of Inspector.

23. Indicate Inspector's Jurisdiction.

24. Indicate Inspector's employer.

25. Indicate address of Inspector's employer (city and state or province).

26. Indicate month, day, and year of inspection by Inspector. In case of Routine Repairs this shall be the month, day, and year the Inspector reviews the completed Routine Repair package.

27. Signature of Inspector.

28. National Board commission number of Inspector, and when required by the Jurisdiction, the applicable State or Provincial numbers.

A11 29. Document name and address of organization that purchased the parts for incorporation into the repair or alteration. If the part's origin is unknown or the part was built for stock, so state.

A11 30. Document name of organization responsible for specifying the code design conditions, if known. If origin of design conditions are unknown, state "unknown".

A11 31. Document name of organization responsible for performing the code design, if known. If code design organization is unknown, state "unknown".

A11 32. Name, section, and division of the design code, if known. If the design is unknown, state "unknown"

33. Indicate code edition year used for fabrication.

34. Indicate code addenda date used for fabrication.

35. Indicate the code paragraph reference for formula used to establish the MAWP, if known. If the code reference of the formula is unknown, state "unknown". A11

36. If available, identify component by part's original name, function, or use the original equipment manufacturer's "mark or item number." A11

37. Indicate quantity of named parts.

38. Match line number references for identification of parts and description of parts.

39. Indicate manufacturer's serial number for the named part.

40. Indicate drawing number for the named part.

41. Indicate Maximum Allowable Working Pressure for the part, if known.

42. Use inside diameter for size: indicate shape as square, round, etc.

43. Indicate the complete material specification number and grade.

44. Indicate nominal thickness of plate and minimum thickness after forming.

45. Indicate shape as flat, dished, ellipsoidal, or hemispherical.

46. Indicate minimum thickness after forming.

47. Indicate outside diameter.

48. Indicate minimum thickness of tubes.

49. Complete information identical to that shown on the Form R to which this sheet is supplementary.

50. Indicate the Form R type. Example: Form R-1, Form R-2, Form R-3.

51. Indicate the reference line number from the Form R to which this sheet is supplementary.

52. Complete information for which there was insufficient space on the reference Form R.

53. If applicable, document the unique purchase order, job, or tracking number, assigned by organization performing work. A11

54. Indicate the maximum allowable working pressure of the pressure-retaining item.

55. Indicate the type of repair, e.g., welded, graphite pressure equipment, or fiber-reinforced plastic pressure equipment, or gasketed plate heat exchanger.

Subgroup Locomotives

National Board Item Numbers: NB13-1401 & ~~NB13-1403~~. In addition, the new text also includes and replaces our original NBIC Part 3 sections S1.2.9.6: RE-ROLLING OF FLUE-TUBES AFTER SEAL WELDING and S1.2.9.8 FLUES SMALLER THAN 3 INCHES.

Current Level: Subgroup discussion

NBIC Part 3 Paragraph(s): S1.2.9.1 Title: INSTALLATION OF BOILER FLUES (Figures S1.2.9.1-a, S1.2.9.1-b, S1.2.9.1-c, S1.2.9.1-d & S1.2.9.1-e)

Note to group: I recommend we number this new section as S1.2.9.1. Then re-number the existing section S1.2.9.1 FLUE AND TUBE RE-ENDING as S1.2.9.6 and keep its original title. We can then delete our original sections S1.2.9.6: RE-ROLLING OF FLUE-TUBES AFTER SEAL WELDING and S1.2.9.8 FLUES SMALLER THAN 3 INCHES because the new text also includes and replaces both of them.

Date: Opened: November 2007 & April 2011

Rationale & Background:
Committee generated to provide guidelines for boiler flue installation in locomotive boilers.

In addition, this subject is based on the experiences of Mike Tillger with a boiler repair firm that cut the boiler flues too short for installation into a locomotive. The boiler repair firm personnel tried to heat the boiler flues during the installation process in order to lengthen them sufficiently to engage the tube sheet. When Mike questioned them about it they replied, "we do this all the time". Mike forbid it and sent them back to their shop to obtain the correct length flues.

This same problem also occurs in the power boiler industry for fire tube and water tube boilers on boiler tubes or boiler water wall tube panels have been cut too short or been formed to the wrong shape. The heating is used to lengthen the tubes or panels so they can be installed, but ignores the consequences of future tube failures caused by the tube contracting when it cools. This contraction places both the weld and tube metal under great tension that creates high stress and causes either the material or weld to crack.

On another occasion I encountered a locomotive boiler on which the firebox flue ends

were machined to the required small diameter to fit the firebox tube sheet, instead of being swedged. This reduced the flue wall thickness considerably and made all of the flues unfit for use.

Existing NBIC Part 3 Sections To Be Replaced

~~S1.2.9.6: RE-ROLLING OF FLUE-TUBES AFTER SEAL WELDING:~~
~~All flues and tubes that are installed by rolling and seal welding shall be re-rolled after seal welding is complete).~~

Note #1: New Items 'q' and 'r' duplicate and replace existing NBIC section S.1.2.9.6 RE-ROLLING OF FLUE-TUBES AFTER SEAL WELDING.

~~S1.2.9.8 FLUES SMALLER THAN 3 INCHES~~
~~All flues smaller than 3"OD shall be rolled and beaded or rolled and seal welded on the firebox end, and at least one in ten at the front flue sheet end. All flues 3" OD and larger shall be rolled and beaded or rolled and seal welded at both ends and all adjacent flues smaller than 3" OD that are within the large flue pack shall be rolled and beaded or rolled and seal welded at both ends.~~

~~At least one in ten of the remaining flues smaller than 3" OD shall be beaded or seal welded on the front flue sheet in addition to rolling. Where less than all flues are seal welded or beaded on the front flue sheet those seal welded or beaded shall be distributed as evenly as practical throughout the flue pack. This shall be considered a repair.~~

Note #2: New Items 'n' and 'o' duplicate and replace existing NBIC section S1.2.9.8 "FLUES SMALLER THAN 3 INCHES".

Revised Title & Section

S1.2.9.1 Title: INSTALLATION OF BOILER FLUES (See Figures S1.2.9.1-a, S1.2.9.1-b, S1.2.9.1-c, S1.2.9.1-d & S1.2.9.1-e)

Flues used on locomotive boilers shall be installed in accordance with the directions of the original equipment manufacturer (OEM). If this information is not available, the following procedures shall be used.

a. Locomotive boiler flues shall be installed by the expanding method by use of either a roller-type expander or prosser-type expander unless the original design requires a different installation method be used. The prosser-type expanders shall be either the combination roller/prosser-type or the sectional prosser-type. The use of a combination roller/prosser expander instead of a segmented prosser expander is a repair. The expander length shall be sized to expand the flue across the entire width of the tube sheet and into the flue body. The expander rollers or prosser segments shall have smooth surfaces with smooth rounded corners or ends to prevent cutting or damaging the flue and tube sheet surfaces.

b. The deletion of prosser expanding from the flue expansion process is a repair provided the method used to expand the flue consists of roller expanding and seal welding, with or without beading.

c. Changing the method by which flues are installed from the method of expanding and beading, with or without seal welding the bead to the tube sheet, to the method of expanding straight without beading and then seal welding the straight flue end to the tube sheet is a repair.

d. The addition of seal welding to flues that are installed by expanding and beading into either the firebox or front tube sheets is a repair.

e. Boiler flues shall be cut to or made to the correct length required for installation when the boiler and flues are at equal temperature. The use of heating or stretching the flue during installation to obtain the required length by thermal or mechanical expansion is prohibited. Flues that are cut too short shall not be used unless repaired by re-ending. Refer to NBIC Part 3, Section S1.2.9.1 FLUE AND TUBE RE-ENDING for additional information. Flues shall be cut to the final required length by a mechanical cutting method such as sawing or by use of a roller pipe cutter. Cutting the flue to the required length by use of any torch or electric cutting process is prohibited. If flues are to be cut to the rough length by either the torch or electric cutting process, the cut line from these processes shall be located at least 1 in. (25.4 mm) from the final cutting edge length and the flue shall be cut to its finished length by use of a mechanical cutting method.

f. Prior to installing the boiler flues the boiler tube sheets shall be straightened or braced in their required position to prevent flexing in the event this is necessary using removable braces or strong-backs. All cut or damaged tube holes shall be repaired as required.

g. The clearance between the flue OD and tube sheet hole ID shall not exceed 0.030 in. (0.76 mm) unless the original design requires a different value be used.

h. When required by the original design, the ends of boiler flues shall be swedged to a smaller or larger diameter as required to fit the tube sheet holes. The swedging shall create smooth surfaces, smooth curves, and a uniform diameter reduction across the entire swedged length. Swedging shall be performed using dies. Machining the flue end to a smaller diameter to obtain the required swedge diameter is prohibited. When flues are swedged to a larger diameter, the new reduced wall thickness of the enlarged flue end shall be reviewed to confirm that upon completion of the flue expansion process the new wall thickness will be sufficient for the MAWP.

i. The surfaces of the flue and tube sheet holes shall be clean, dry, and free of all grease, tube rolling lubricant and oil prior to installing the flue, prior to beading, and prior to seal welding. If a lubricant is used to lubricate the flue expander

during use, the lubricant shall be a water soluble-type to aid its removal and surface clean up.

j. Sharp edges on both sides of each tube sheet hole shall be removed prior to installing the flue and/or ferrule unless the original design requires a different method be used. When the hole edges are required to have a radius to prevent it cutting into the flue surface upon expansion, the dimension range of the radius shall be between 1/32 in. -1/16 in. (0.794 mm - 1.59 mm) unless the original design requires that a different value be used.

k. If ferrules are used, each ferrule shall be secured into position in the tube sheet hole by expanding and flaring (belling) prior to insertion of the flue. Each ferrule shall remain in position in the tube sheet hole without any movement or slippage during the flue installation and expansion process. The ferrule installation work shall be performed using the required size ferrule expander. Refer to NBIC Part 3, Section S1.2.9.7 FERRULES for additional information. The deletion of ferrules from the flue installation is a repair per Part S1.2.9.7 FERRULES provided the flues are made to or swedged to the required diameter to provide the required amount of expansion and minimum wall thickness reduction permitted by the original design

l. Each flue during installation shall be placed in its required position in both tube sheets and then be temporarily locked or fixed in place to prevent it from moving as it is expanded. Each flue shall have both ends expanded into its mating tube sheet holes using the required amount of expansion or wall thickness reduction required by the design. In the event the flue is to receive only an initial and partial expansion subsequent to performing beading, prossering or seal welding, the expansion work at both flue ends shall be completed to the extent that the flue is secured firmly in position within the tube sheet prior to performing this work. Upon completion of this work the flue shall be expanded to its final setting.

m. At the firebox tube sheet all flues regardless of size shall be expanded in combination with being either beaded, beaded and seal welded, or seal welded. The installation into the firebox tube sheet of flues that are expanded only is prohibited.

n. At the front tube sheet, when the boiler is fitted with both large and small diameter flues, all flues that are 3 in. (76.2 mm) OD or larger shall be expanded and beaded. In addition, all flues smaller than 3 in. (76.2 mm) OD located within the flue pack formed by the large diameter flues shall be expanded into the front tube sheet and beaded.

All remaining flues in the front tube sheet that are smaller than 3 in. (76.2 mm) OD and located within the flue pack formed by the remaining small diameter flues shall be expanded and also shall be beaded per the number and location

arrangement of the original design. If the original design did not require all remaining small diameter flues to be beaded, the beading shall be performed on at least one in every ten of these remaining small diameter flues. These beaded flues shall be located as evenly as practical throughout the small diameter flue pack. Increasing the number of small flues over the one-in-ten ratio is a repair.

o. At the front tube sheet, when the boiler is fitted with only small diameter flues not exceeding 3 in. (76.2 mm) OD all flues shall be expanded and also shall be beaded per the number and location arrangement of the original design.

p. Beading of flues shall be performed to prevent damaging the flue and tube sheet by cutting or grooving. The flue bead edge shall contact the tube sheet surface around the entire flue circumference upon completion of the beading work. The flue shall then be lightly re-expanded to confirm the beading process has not loosened it in the tube sheet hole. If the flue bead is to also be seal welded, this light re-expansion of the flue shall be performed upon completion of seal welding. Repair of a defective or incorrectly formed flue bead by welding is prohibited. Flues shall not be heated during the beading process. If ferrules are used, no part of the ferrule shall interfere with the forming of the bead.

If the original design did not require that all small diameter flues be beaded, the beading shall be performed on at least one in every ten of the flues. These beaded small flues shall be located as evenly as practical throughout the flue pack. Increasing the number of small diameter flues that are beaded over the one-in-ten ratio, or beading all of the small diameter flues, is a repair.

q. When beaded flues are to be seal welded to the tube sheet, the flue shall first be expanded either partially or completely into the tube sheet hole, then beaded around its entire circumference and all oil or lubricant removed prior to seal welding. The tube sheet temperature shall not be less than 70°F (21°C) during the seal welding process. The seal weld size shall range between 1/8 in. - 1/4 in. (3.2 mm - 6.3 mm) and be applied as a fillet weld of the equal leg or unequal leg type unless the original design requires a different weld size or weld type be used. Upon completion of seal welding the flue shall either be expanded to its final setting or re-expanded lightly to confirm that the seal welding has not loosened it in the tube sheet hole. If ferrules are used, no part of the ferrule shall protrude from the bead and come into contact with the seal weld.

r. When flues are installed by expanding straight and seal welding without beading, each flue shall first be expanded either partially or completely into the tube sheet hole then all accessible oil or lubricant shall be removed prior to seal welding. The tube sheet temperature shall not be less than 70°F (21°C) during the seal welding process. The seal weld size shall range between 1/8 in. - 1/4 in. (3.2 mm - 6.3 mm) based on the flue thickness unless the original design required different values be used. See Figure S1.2.9.1-b and ASME Code, Sec I, Part PFT, Figure 12.1 for additional information regarding the seal weld size for this flue

installation method.

The seal weld shall be applied so its horizontal (longitudinal outermost) edge is even and in line with the flue end upon completion. If flue end is longer and extends past the seal weld edge, the flue end shall be trimmed back and made even with the seal weld edge by filing or grinding. Then all sharp edges of the flue and seal weld shall be smoothed and rounded by filing, sanding, or grinding. Care shall be used to prevent tearing, cracking or overheating the flue during all trimming and smoothing work. Upon completion of the seal weld and trimming work, the flue shall either be expanded to its final setting or re-expanded lightly to confirm that the seal welding has not loosened it in the tube sheet hole.

s. If steel ferrules are used, the seal weld shall be sized and positioned to contact the flue end and tube sheet. The use of copper ferrules with this flue installation method is prohibited.

t. If it is necessary to determine the workmanship of the flue installation prior to seal welding the flues, the boiler shall be tested hydrostatically to either MAWP or to a lower value. If this test is done, the boiler shall be given its required hydrostatic test to MAWP upon completion of the seal welding work.

u. Any flue that show cracks within the expanded section or the flue bead upon completion of the flue installation process shall be replaced.

v. Cracks in seal welds shall be repaired by grinding out the crack and then reapplying the seal weld. These cracks often result from oil contamination of the weld seal. The temperature of the flue sheet shall not be less than 70°F (21°C) during the seal weld crack repair process. Upon completion of seal welding the flue shall be re-expanded lightly to confirm the seal welding has not loosened it.

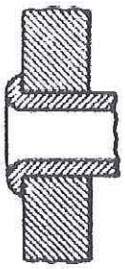
w. The thickness of boiler flues shall equal the original design values. Changing the boilers flue thickness from the original value is an alteration.

New Figures S1.2.9.1-a, S1.2.9.1-b, S1.2.9.1-c, S1.2.9.1-d & S1.2.9.1-e are attached and are to be included as part of this action.

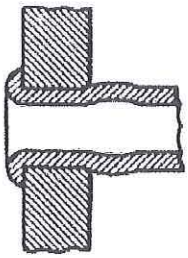
Voted by Subgroup: Date:

COMMON LOCOMOTIVE BOILER FLUE INSTALLATION METHODS

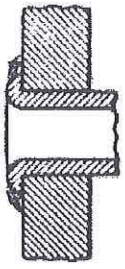
Figure S1.2.9.1-a



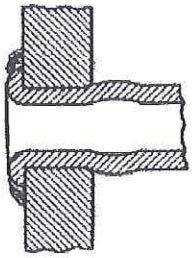
ROLLER EXPANDED
& BEADED



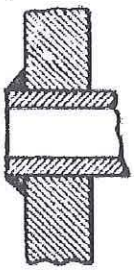
PROSSER EXPANDED
& BEADED



ROLLER EXPANDED, BEADED
& SEAL WELDED



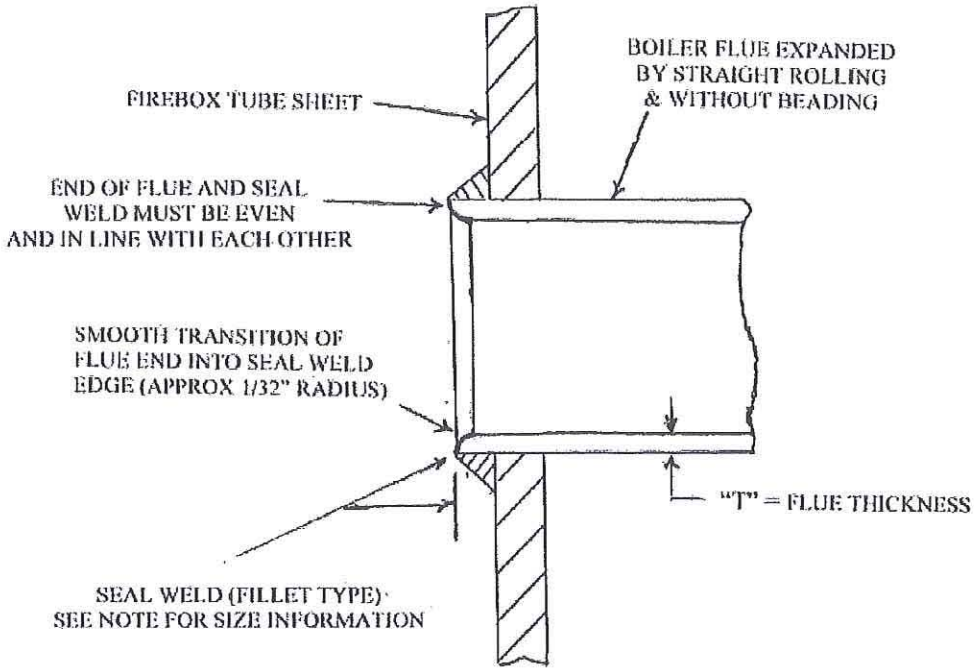
ROLLER EXPANDED, PROSSER
EXPANDED AT REAR
& SEAL WELDED



ROLLER EXPANDED USING
STRAIGHT ROLLER & SEAL WELDED -
SEE FIGURE S1.2.9.2 FOR DETAILS

METHOD OF INSTALLING LOCOMOTIVE BOILER FLUES
BY EXPANDING USING STRAIGHT ROLLER
EXPANDER & SEAL WELDING

Figure S1.2.9.1-b

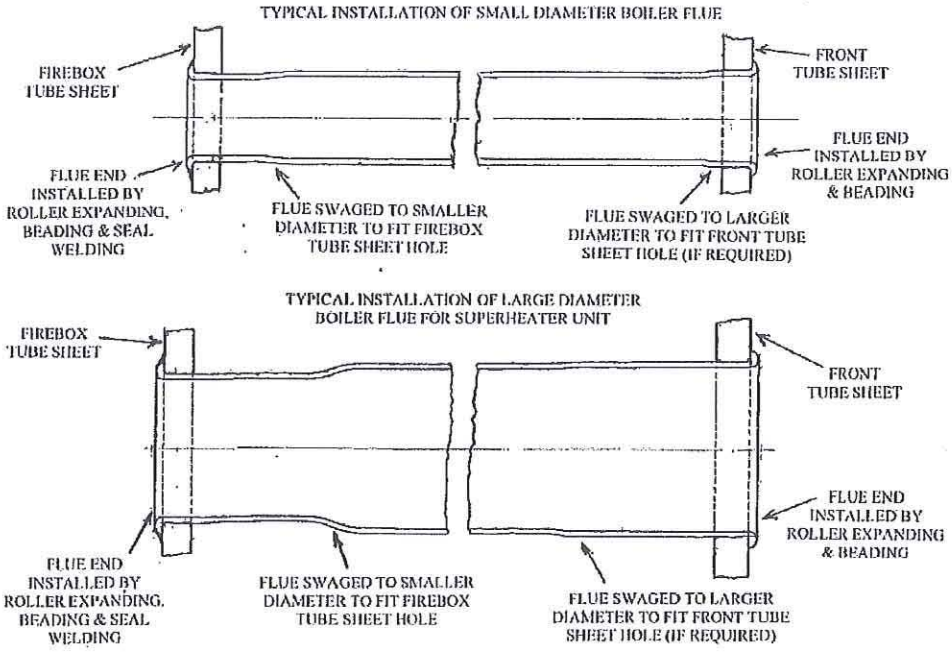


NOTE:
MINIMUM SEAL WELD SIZE TO BE NOT LESS THAN "T"
OR 1/8" (3.2 mm) WHICHEVER IS GREATER
&
MAXIMUM SEAL WELD SIZE TO BE NOT LARGER THAN
2 x "T" OR 1/4" (6 mm)

REF: ASME B&PVC SEC I, PART PFT, FIGURE PFT-12.1

EXAMPLES OF LOCOMOTIVE BOILER FLUE INSTALLATION

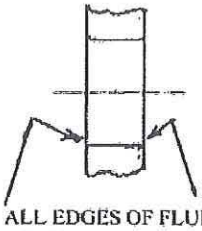
Figure S1.2.9.1-c



DETAILS OF LOCOMOTIVE BOILER FLUE INSTALLATION

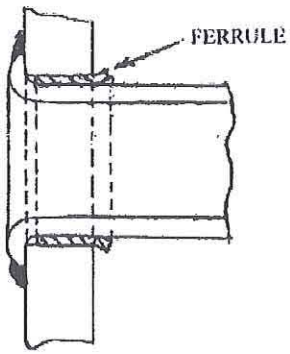
Figure S1.2.9.1-d

PREPARATION OF TUBE SHEET FLUE HOLE

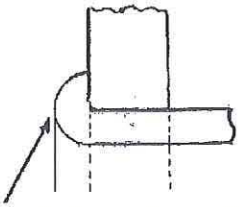


ALL EDGES OF FLUE HOLE TO BE CHAMFERED OR ROUNDED

EXAMPLE OF FLUE EQUIPPED WITH FERRULE & INSTALLED BY EXPANDING, BEADING & SEAL WELDING

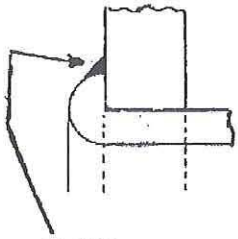


DETAIL OF FLUE BEADED TO TUBE SHEET



FLUE BEAD TO BE FORMED TO FULL SHAPE AND TO CONTACT TUBE SHEET AROUND ENTIRE CIRCUMFERENCE

DETAIL OF FLUE BEADED AND SEAL WELDED TO TUBE SHEET

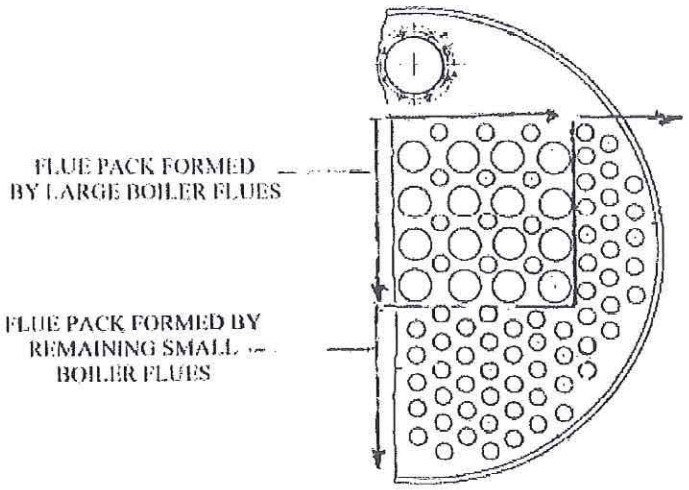


FLUE BEAD TO BE SEAL WELDED TO TUBE SHEET AROUND ENTIRE CIRCUMFERENCE

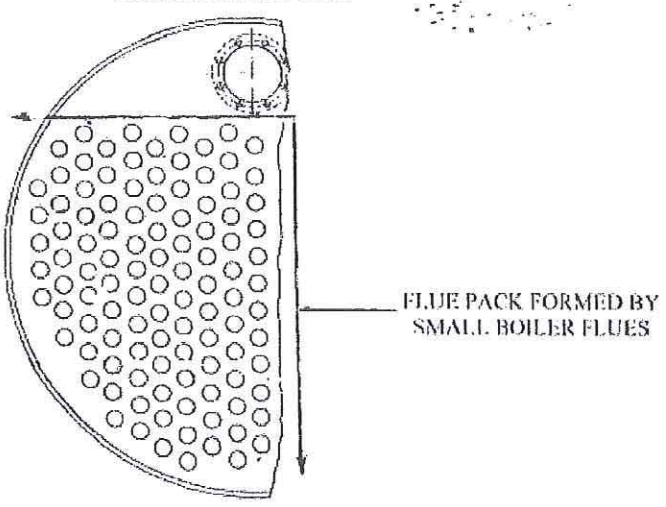
EXAMPLES OF FLUE PACK ARRANGEMENT AT FRONT TUBE SHEET

Figure S1.2.9.1-e

FRONT TUBE SHEET WITH LARGE AND SMALL BOILER FLUES



FRONT TUBE SHEET WITH SMALL BOILER FLUES



Subgroup Locomotives National Board Item No. NB13-1404

Current Level: Subgroup

NBIC Part 2 & 3 Paragraph(s): To Be Determined

Title: Fillet welded staybolts
Date Opened: April 2011

Background:

Fillet welded staybolts
A Task group consisting of Griner, Moedinger, Janssen, and Rimmasch
Committee thoughts
Part 2 – leakage, look at heads, welds
Part 3 – Method + NDE, do not allow threaded to be changed to fillet welded.

Proposed Action:

Subgroup voted Date:

Subgroup Locomotives National Board Item No. NB13-1407

Current Level: Subgroup discussion

NBIC Part 3 Paragraph(s): S1.2.7.1 Title: Bolts, Nuts & Washers

Date Opened: April 2013

Background:
To provide guidance for the repair and replacement of the bolts, nuts and washers used on locomotive boilers for assembly of pressure retaining components.

Proposed Action:

S1.2.7.1 Bolts, Nuts, & Washers

Bolts, nuts and washers used on locomotive boilers for assembly of pressure retaining components, shall be maintained, repaired or replaced in accordance with the directions of the original equipment manufacturer. If this information is not available, the following procedures shall be used.

a. Bolts, nuts and washers that have wastage, corrosion or mechanical damage, sufficient to impair the holding power or function of the fastener shall be replaced.

b. Bolts and nuts that have damaged threads may be repaired by re-threading.

c. Replacement bolts, nuts and washers shall have the same fit-up, alignment and thread engagement length as the original.

d. The use of replacement bolts, nuts and washers of a different strength, grade specification or size than the original shall be suitable for the service intended.

Note 1: For material requirements for bolts and nuts can be found in Table S1.1.3.1

Note 2: If a bolt or nut is heated to a metal temperature that exceeds 1100°F (593°C), it will be damaged or suffer a reduction of hardness and should be replaced.

Subgroup Locomotives

National Board Item No. NB13-1408. This new section includes and replaces the existing NBIC section S.1.2.7 THREADED STUDS and FASTENERS

Current Level: Subgroup

NBIC Part 3 Paragraph(s): Locate at S1.2.7.2 (Note: This is the location of existing section THREADED STUDS) Patch Bolts S1.2.7.3 from S1.2.8

Date Opened: April 2013

Background: To provide guidance for the repair and replacement of taper thread boiler studs. These are studs that thread directly into the boiler by use of a boiler-type taper thread. The mating taper thread tapped hole in the boiler shell and the taper threaded stud body end usually extend directly through the boiler shell. The opposite end of the stud is machined with standard straight machine-type threads to permit attachment of a nut and washer. These are used to secure a boiler or related locomotive component such as a pipe bracket for boiler piping, dome cover.

Existing title and section:

~~S1.2.7 THREADED STUDS~~
~~Studs threaded into the boiler or firebox sheets shall not be seal welded.~~

S1.2.7 THREADED FASTENERS

Revised title and section: S1.2.7.2 TAPER THREAD BOILER STUDS (SEE NBIC PART 3, FIGURES S1.2.7.2-a, S1.2.7.2-b & S1.2.7.2-c)

Taper thread boiler studs are designed to thread directly into the boiler shell and are used to secure locomotive boiler components or related locomotive components such as pipe brackets for boiler piping, dome cover and feed water check valves. The stud end that threads into the boiler shell is machined with a boiler-type taper thread and the mating hole in the boiler shell is tapped with the same boiler-type taper thread. The opposite end of the stud is machined with standard straight machine screw-type threads to permit attachment of the components along with a nut and washer.

Taper thread boiler studs used on locomotive boilers shall be maintained, repaired or replaced in accordance with the directions of the original equipment manufacturer. If this information is not available, the following procedures shall be used.

a) Taper thread boiler studs and the mating tapped holes shall be made to the required size and taper to create a tight and leak free joint upon final tightening. The stud taper threads shall have a good uniform fit along the entire length of the tapped hole threads and not

just at the top or bottom edges of either the stud or hole. When the hole threads are to be tapped in new material or re-tapped for repair or cleaning the taper tap shall be run through the entire hole depth in order to form all threads correctly. The length of the taper thread section shall be sized so that upon the stud being tightened at final assembly at least one full thread shall be above the boiler shell exterior surface and at least one full thread shall extend beyond the interior surface. (See Fig.S1.2.7.2-c)

b) When taper thread boiler studs are installed into blind holes on the boiler shell or sheet the taper section length shall be confirmed to be shorter than the hole depth in order to prevent the stud from contacting the hole bottom upon being tightened at final assembly.

c) Studs and boiler shell surfaces that are cracked or damaged shall be either repaired or replaced per items "f" and "g" of this section.

d) Changes to the taper, thread pitch or thread form of the taper thread boiler stud or its mating tapped hole in the boiler shall be suitable for the service intended.

e) The use of replacement taper thread boiler studs, nuts and washers of a different strength, grade specification or size than the original shall be suitable for the service intended.

f) ~~f)~~ A worn or damaged taper thread stud hole may be repaired by re-tapping it to a larger diameter and installing a taper thread boiler stud that has a corresponding larger diameter boiler thread end than the original stud. The largest portion of the tapered section of the stud shall not exceed the original stud straight section (shank) diameter by 33%. The larger diameter boiler stud shall be made with a 1/8 inch (3mm) radius from the stud body into the larger diameter boiler thread end.

g) g) Oversize cracked or damaged boiler studs holes in the boiler shell may be repaired by weld build-up or by replacing the damaged plate section using a flush patch. If weld build-up is performed, the existing boiler stud threads shall be removed from the hole by reaming, grinding or machining prior to welding. All welding and welded repairs shall be performed per NBIC Part 3.

h) Taper thread boiler studs, nuts and washers that have wastage, corrosion or mechanical damage, sufficient to impair the holding power or function of the fastener shall be replaced.

i) Taper thread boiler studs and nuts that have damaged threads may be repaired by re-threading.

j) Replacement taper thread boiler studs, nuts and washers shall have the same fit-up, alignment and thread engagement length as the original.

Note 1: For material requirements for bolts and nuts can be found in Table S1.1.3.1

Note 2: If a taper thread boiler stud or nut is heated to a metal temperature that exceeds 1100°F (593°C), it will be damaged or suffer a reduction of hardness and should be replaced.

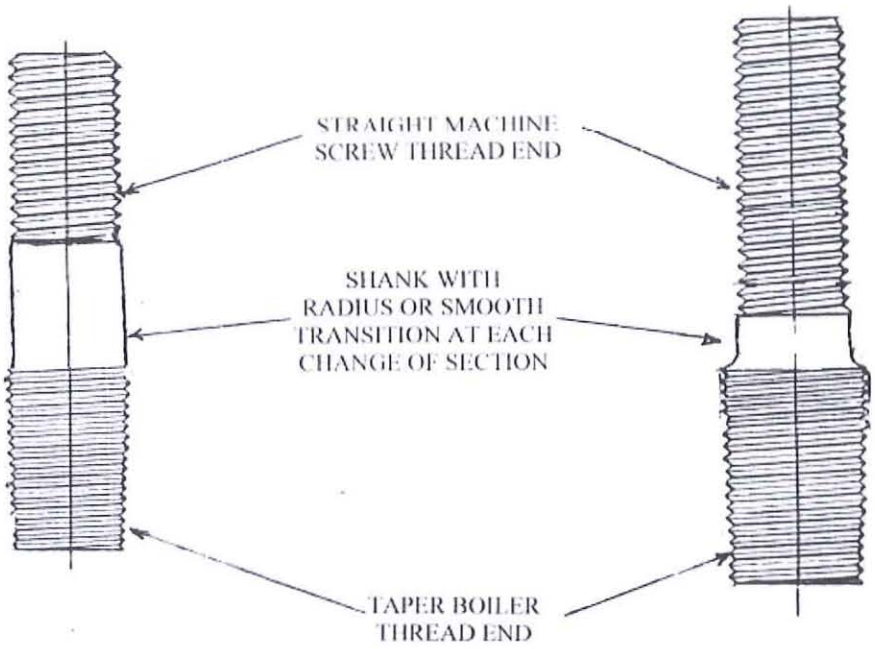
New Figures S1.2.7.2 –a, S1.2.7.2-b and S1.2.7.2-c are attached are to be included as part of this action.

Subgroup voted Date:

EXAMPLES OF TAPER
THREAD BOILER STUDS

Figure S1.2.7-a

TAPER THREAD BOILER STUDS
ARRANGED FOR EXTERNAL
COMPONENT ASSEMBLY

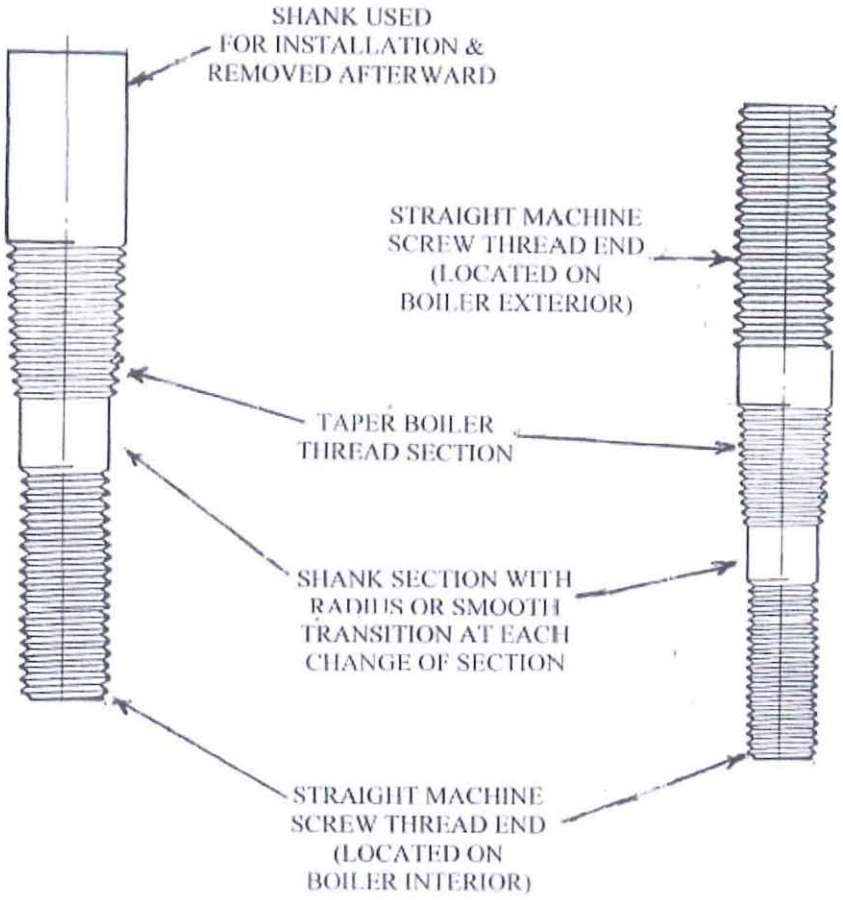


ADDITIONAL EXAMPLES OF TAPER THREAD BOILER STUDS

Figure S1.2.7-b

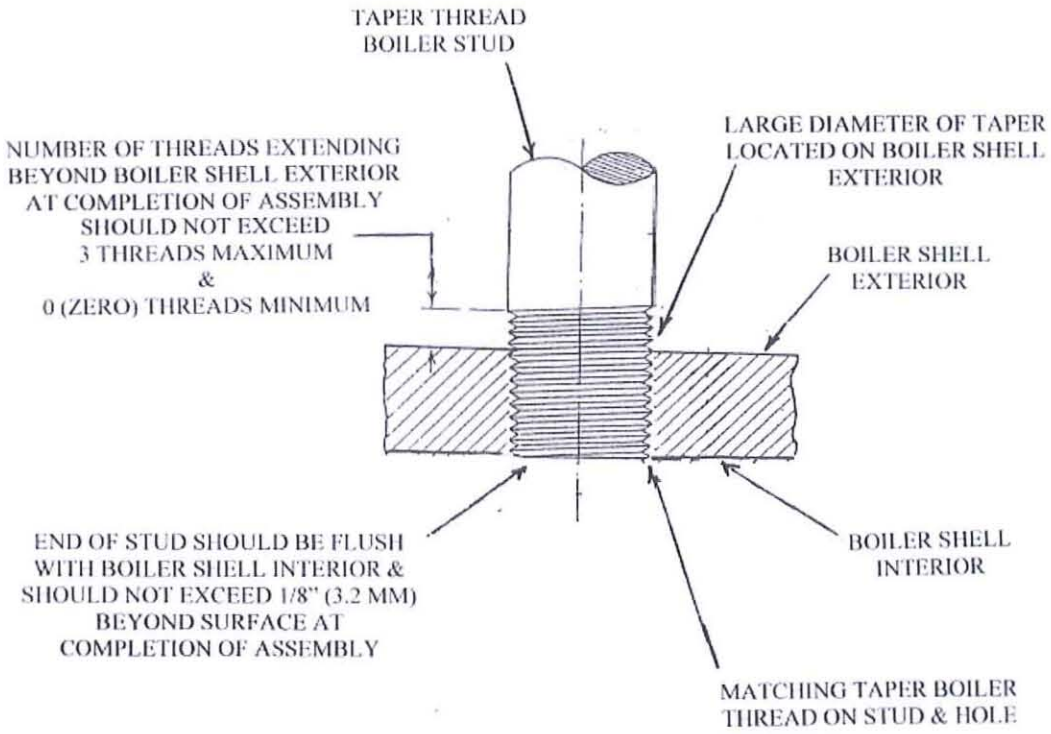
TAPER THREAD BOILER STUD ARRANGED FOR INTERNAL COMPONENT ASSEMBLY

TAPER THREAD BOILER STUD ARRANGED FOR INTERNAL & EXTERNAL COMPONENT ASSEMBLY



TYPICAL INSTALLATION OF
TAPER THREAD BOILER STUD
IN A THROUGH HOLE

Figure S1.2.7-c



1.4 ACCREDITATION

a) Organizations performing repairs or alterations to pressure-retaining items shall be accredited as described in this section, as appropriate for the scope of work to be performed.

b) Organizations performing repairs outside the scope of the NBIC may be accredited and shall meet any additional requirements of the Jurisdiction where the work is performed.

1.5.1 ACCREDITATION PROCESS

a) The National Board administers accreditation programs for authorization of organizations performing repairs and alterations to pressure-retaining items in accordance with NB-415 and/or pressure relief valves in accordance with NB-514. ADD FOOTNOTE FOR NB-415 AND NB-514 SHOWING COPIES CAN BE OBTAINED AT http:www.nationalboard.org

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b) Any organization may apply to the National Board to obtain a *Certificate of Authorization* for the requested scope of activities. A review shall be conducted to evaluate the organization's quality system. The individual assigned to conduct the evaluation shall meet the qualification requirements prescribed by the National Board. Upon completion of the evaluation, any deficiencies within the organization's quality system will be documented and a recommendation will be made to the National Board regarding issuance of a *Certificate of Authorization*.

c) As part of the accreditation process, an applicant's quality system is subject to a review. National Board procedures provide for the confidential review resulting in recommendations to issue or not issue a *Certificate of Authorization*.

d) The accreditation programs provide requirements for organizations performing repairs and alterations to pressure-retaining items. ~~Depending upon the expected scope of activities at the time of review, organizations may be authorized to perform design only, metallic or non-metallic repairs, and/or alterations either in the shop only, field only, or shop and field. Repairs and/or alterations to metallic and non-metallic pressure-retaining items are made by welding, bonding and/or mechanical assembly.~~

~~e) Organizations desiring to renew or obtain a National Board *Certificate of Authorization* shall apply to the National Board using forms obtained from the National Board. Application for renewal shall be made prior to the expiration date of the *Certificate of Authorization*.~~

~~f)~~e) ~~When an organization has plants or shops in more than one location, the organization shall submit separate applications for each plant or shop.~~ The organization may perform repairs or alterations in its plants, shops, or in the field, provided such operations are described in the organization's Quality System.

~~g)~~f) The Jurisdiction[2] ~~m~~, as defined in Part 3, Section 9, may audit the Quality System and activities of an organization upon a valid request from

~~2 Jurisdiction: The National Board member jurisdiction where the organization is located. Alternatively, where the Jurisdiction elects not to~~

an owner, user, inspection agency, or the National Board.

~~h)~~g) The NBIC Committee may at any time change the rules for the issuance of Certificates of Authorization and use of the "R" Symbol Stamp. These rules shall become binding on all certificate holders.

1.5.2 NATIONAL BOARD "R" SYMBOL STAMP

~~a) All "R" Symbol Stamps shall be obtained from the National Board of Boiler and Pressure Vessel Inspectors. Authorization to use the "R" Symbol Stamp may be granted by the National Board at its absolute discretion to the certificate holder.~~

~~b)~~a) The "R" Symbol Stamp is furnished on loan by the National Board for a nominal fee. ~~Each organization shall agree if authorization to use the "R" Symbol Stamp is granted, that the "R" Symbol Stamp is at all times the property of the National Board and will be promptly returned upon demand. If the organization discontinues the use of the "R" Symbol Stamp, inspection agreement with an Authorized Inspection Agency, or if the Certificate of Authorization has expired and no new certificate has been issued, the "R" Symbol Stamp shall be returned to the National Board.~~

~~c)~~b) ~~The organization's Quality System shall provide for adequate control of the "R" Symbol Stamp.~~ Provisions may be made for the issuance of the "R" Symbol Stamp for use at various field locations.

d) ~~The holder of a Certificate of Authorization may obtain more than one "R" Symbol Stamp provided the organization's Quality System describes how the use of such stamps is controlled from the location shown on the certificate.~~

e) ~~An organization shall not permit others to use the "R" Symbol Stamp loaned to it by the National Board.~~

c) Additional requirements shall be met in accordance with NB-415 and/or NB-514 as applicable.

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1.6 QUALITY SYSTEM

A holder of a National Board Certificate of Authorization shall have and maintain a written Quality System. The System shall satisfactorily meet the requirements of the NBIC and shall be available for review. The Quality System may be brief or voluminous, depending on the projected scope of work. It shall be treated confidentially by the National Board.

1.6.1 OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM FOR QUALIFICATION FOR THE NATIONAL BOARD "R" *CERTIFICATE OF AUTHORIZATION*

The following is a guide for required features of a Quality System which shall be included in the organization's Quality System Manual. As a minimum, each organization shall address the required features relative to the scope of work to be performed. Organizations shall explain their intent, capability and applicability for each required feature outlined in this section. Work may be subcontracted provided controls are clearly defined for maintaining full responsibility for code compliance by the National Board repair organization certifying the work.

a) **Title Page**

The name and complete address of the company to which the National Board *Certificate of Authorization* is issued shall be included on the Title Page of the Quality System Manual.

b) **Contents Page**

~~perform the review or where there is no Jurisdiction or where the Jurisdiction is the organization's Authorized Inspection Agency, the National Board of Boiler and Pressure Vessel Inspectors will represent the Jurisdiction. At the Jurisdiction's discretion, the Jurisdiction may choose to be a member of the review team if the Jurisdiction chooses not to be the team leader.~~

The manual should contain a page listing the contents of the manual by subject, number (if applicable), and revision number of each document.

c) **Scope of Work**

The manual shall clearly indicate the scope and type of repairs or alterations the organization is capable of and intends to carry out.

d) **Statement of Authority and Responsibility**

A dated *Statement of Authority*, signed by an officer of the organization, shall be included in the manual. Further, the *Statement of Authority* shall include:

1) A statement that all repairs or alterations carried out by the organization shall meet the requirements of the NBIC and the Jurisdiction, as applicable;

2) A statement that if there is a disagreement in the implementation of the Quality System, the matter is to be referred for resolution to a higher authority in the company;

3) The title of the individual who will be responsible to ensure that 1) above is followed and has the freedom and authority to carry out the responsibility.

e) **Manual Control**

The manual shall include the necessary provisions for revising and issuing documents to keep the manual current. The title of the individual authorized to approve revisions shall be included in the manual. Revisions must be accepted by the Authorized Inspection Agency prior to issuance of the manual and its implementation.

f) **Organization**

An organizational chart shall be included in the manual. It shall include the title of the heads of all departments or divisions that perform functions that can affect the quality of the repair or alteration, and it shall show the relationship between each department or division.

The manual shall identify the title of those individuals responsible for preparation, implementation, or verification of the Quality System. The responsibilities shall be clearly defined and the individuals shall have the organizational freedom and authority to fulfill those responsibilities.

g) **Drawings, Design and Specifications**

The manual shall contain controls to ensure that all design information, applicable drawings, design calculations, specifications, and instructions are prepared or obtained, controlled, and interpreted in accordance with the original code of construction.

h) **Repair and Alteration Methods**

The manual shall include controls for repairs and alterations, including mechanical assembly procedures, materials, nondestructive examination methods, pre-heat, and postweld heat treatment, as applicable. Special requirements such as nonmetallic repairs and alterations to graphite and fiber-reinforced thermosetting plastic pressure-retaining items including bonding or mechanical assembly procedures shall be addressed, if applicable.

i) **Materials**

The manual shall describe the method used to ensure that only acceptable materials (including welding material) are used for repairs and alterations. The manual shall include a description of how existing material is identified and new material is ordered, verified, and identified. The manual shall identify the title of the individual(s) responsible for each function and a brief description of how the function is to be performed.

j) **Method of Performing Work**

The manual shall describe the methods for performing and documenting repairs and alterations in sufficient detail to permit the Inspector to determine at what stages specific inspections are to be performed. The method of repair or alteration must have prior acceptance of the Inspector.

k) **Welding, NDE and Heat Treatment**

The manual shall describe controls for welding, nondestructive examination, and heat treatment. The manual is to indicate the title of the individual(s) responsible for the welding procedure specification (WPS) and its qualification, and the qualification of welders and welding operators. It is essential that only welding procedure specifications and welders or welding operators qualified, as required by the NBIC, be used in the repair or alteration of pressure-retaining items. It is also essential that welders and welding operators maintain their proficiency as required by the NBIC, while engaged in the repair or alteration of pressure-retaining items. The manual shall also describe controls for ensuring that the required WPS or Standard Welding Procedure Specification (SWPS) is available to the welder or welding operator prior to welding. Similar responsibility for nondestructive examination and heat treatment shall be described in the manual.

l) **Examinations and Tests**

Reference shall be made in the manual for examinations and tests upon completion of the repair or alteration.

m) **Calibration**

The manual shall describe a system for the calibration of examination, measuring, and test equipment used in the performance of repairs and alterations.

n) **Acceptance and Inspection of Repair or Alteration**

The manual shall specifically indicate that before the work is started, acceptance of the repair/alteration shall be obtained from an Inspector who will make the required inspections and confirm NBIC compliance by signing and dating the applicable NBIC Report Form [3] upon completion of the work.

The manual shall specifically address allowance for acceptance of the inspector for application of the "R" symbol stamp to a pressure retaining item.

The manual shall provide for adequate control of the "R" Symbol Stamp.

o) **Inspections**

The manual shall make provisions for the Inspector to have access to all drawings, design calculations, specifications, procedures, process sheets, repair or alteration procedures, test results, and other documents as necessary to ensure compliance with the NBIC. A copy of the current manual shall be available to the inspector.

p) **Report of Repair or Alteration Form**

The manual shall indicate the title of the individuals responsible for preparing, signing, and presenting the

NBIC Report Forms to the Inspector. The distribution of the NBIC Report Forms[3] shall be described in the manual.

q) **Exhibits**

Any forms referenced in the manual shall be included. The form may be a part of the referencing document or included as an appendix. For clarity, the forms may be completed and identified as examples. The name and accepted abbreviations of the "R" Certificate Holder shall be included in the manual.

r) **Construction Code**

The manual shall include provisions for addressing the requirements that pertain to the specific construction code for the equipment being repaired or altered.

s) **Nonconforming Items**

There shall be a system acceptable to the Inspector for the correction of nonconformities. A nonconformance is any condition that does not comply with the applicable rules of the NBIC, construction code, jurisdictional requirements, or the quality system. Nonconformance must be corrected or eliminated before the repaired or altered component can be considered in compliance with the NBIC.

t) **Records Retention**

The quality manual shall describe a system for filing, maintaining, and easily retrieving records supporting or substantiating the administration of the Quality System within the scope of the "R" Certificate of Authorization.

1) Records may represent any information used to further substantiate the statements used to describe the scope of work completed to a pressure-retaining item (PRI), and documented on a Form "R" report.

2) Records are not limited to those depicting or calculating an acceptable design, material compliance or certifications, NDE-reports, PWHT-charts, a WPS used, a welder, bonder, or cementing technician's process continuity records, drawings, sketches, or photographs.

3) The record retention schedule described in the Quality System Manual is to follow the instructions identified in NBIC Part 3, Table 1.6.5.1.

Table 1.6.5.1

Form "R" Reports, Records, or Documents	Instructions	Minimum Retention Period
a) Form "R" Reports and supporting records and documentation	The organization performing repairs and alterations shall retain a copy of the completed "R" Form report on file, and all records substantiating the summary of work described in NBIC Part 3, 5.13.4.1, Item 12, for a minimum of 5 years. When the method of repair described in NBIC Part 3, 3.3.4.8 is used, the record retention period shall be described in b)	5 years

[3] NBIC Report Form: National Board Form R-1 for Repair, Form R-2 for Alterations, Form R-3 for Fabricated Parts, or Form R-4 Report Supplementary Sheet.

b) Form "R" Report with REPORT OF FITNESS FOR SERVICE ASSESSMENT FORM (NB-403) attached.	When the method of repair described in NBIC Part 3,3.3.4.8 is used, the record retention period shall be for the duration described on the FITNESS FOR SERVICE ASSESSMENT (FFSA) Form required by the repair method and as described in NBIC Part 2, 4.4 Notes: 1. The "R" Certificate Holder should be aware that when used, some of the referenced codes and standards identified in NBIC Part 2,, 1.3 describe requirements for permanent record retention throughout the service life of each equipment item. 2. When the "R" Certificate Holder is not the owner or user of the equipment, the record retention period is limited to the FFSA-results described on line 8 of the Report of Fitness for Service Assessment Form (NB-403)	5 years or as described on line 8 as reported on Form NB-403; whichever period is longer
c) Continuity records for a welder, welding operator, bonder, or cementing technician	Minimally, continuity records for a welder, bonder, or cementing technician within the Certificate Holder's quality system shall be described and established at the time of the applicant's initial certificate review and demonstrated at each triennial review required thereafter.	As applicable to the scope of work identified on the Certificate of Authorization, the continuity records are subject to review during each National Board triennial certificate review.
d) Administrative record review of the "R" Certificate Holder's administrative processes.	Records supporting completed administrative reviews or audits of procedures or processes required by the "R" Certificate Holder's Quality System Manual, or in combination with the applicable part of the NBIC Part 3, Supplementary Section 6 as it applies to the identified scope listed on the "R" Certificate of Authorization.	Subject to review during the triennial evaluation of the certificate holder's Quality System.

Item NB14-0301

New Section *MANUFACTURER's DATA REPORT*

3.4.3 ENCAPSULATION

Encapsulation is a repair method to restore the pressure retaining capability of an item by building a new pressure containing boundary over the item in the form of a welded leak box.

a) Welded Leak Box

1) Welded leak box design consists of a pressure retaining enclosure used to seal off leaking components or reinforce damaged or thinned components. The use of a leak box is subject to concurrence of the inspector and, when applicable, the jurisdiction.

a. A leak box can take a variety of shapes (e.g., cylindrical, rectangular, with either flat or formed heads), often following the contour of the component being encapsulated. Leak boxes may be fabricated by welding split pipe, pipe caps, or plates to encapsulate a pressure retaining item. Consideration should be given to add centering guides to aid with the installation. An example of a Welded Leak Box is shown in NBIC Part 3, Figure 3.4.3.

b. The annular space between the leak box and the component may be filled with an inert material (i.e., epoxy, sealant, fiber, refractory, etc.) which will support the effectiveness of the repair under pressure.

2) The "R" Certificate Holder responsible for the design scope of the encapsulation shall ensure a Fitness for Service Assessment (FFSA) has been performed on the part being encapsulated in accordance with NBIC, Part 2, 4.4.1, supporting the continued service of the item. The leak box shall not remain in place beyond the calculated life of the pressure retaining item.

a. The remaining life of the encapsulated pressure retaining item shall be documented on the Report of FFSA in the Remarks section. The Report of FFSA Form shall be affixed to the Form R-2.

3) Design of the box and fabrication welds shall be in accordance with the original code of construction, when practicable or the basis of design shall be acceptable to the inspector and when required, the jurisdiction.

a. Design of the encapsulation shall consider original design conditions, taking into account current service conditions and corrosion mechanisms.

b. The leak box design shall consider the potential introduction of new failure modes including that of the encapsulated component (i.e., encapsulated parts, expansion joints, pressure thrust, temperature differential, differential expansion, additional weight, sealant seepage, etc.).

4) The following are requirements for the leak box design;

a. The welded leak box assembly should be designed with vents and drains to permit venting the leak during assembly.

b. The leak box shall fully encapsulate the thinned or leaking area, as specified in the FFSA, to the distance where the minimum required metal thickness is verified.

1. Wall thickness shall be verified in the vicinity of the area to be welded.

c. When sealant is injected between the leak box and the component, consideration shall be given to off-gassing of sealant compounds as they cure.

d. The WPS followed shall be qualified in accordance with ASME Section IX. When the code of construction requires post weld heat treatment (PWHT) or the encapsulated component required PWHT, the WPS followed shall be qualified with PWHT. As an alternative and with concurrence of the inspector an Alternate Welding Method may be used in accordance with NBIC Part 3, 2.5.3.

Comment [BB1]: hanged the proposal from a "Repair" to an "Alteration" of the design aspects.

Comment [BB2]: laced the responsiblity on the "R" Certificate Holder responsible for the desing to ensure a FFSA is performed.

Comment [BB3]: Required the FFSA to be attached to the FFSA and forwarded with the Form R-2 to the Certificate Holder performed the work associated with the Alteration.

Comment [BB4]: I remember our discussion of design as it relates to items that may or may not be outside the design aspects of the Code of Constrcution... I look at the Codes, specifically piping as that was of primary concer to you and determined that closures (flat end caps) are addressed within the design aspects of the code. That being said, the way I would interpret paragraph 4 is that if the original code doesn't allow for a specific application or configuration, then it would not be allowed for work under the NBIC.

Comment [BB5]: I removed the term sound metal and replaced it with minimum required metal thickness.

Comment [BB6]: I recall you having concern about an item that is to be encapsulated which required PWHT and the work was to be done while in service... I feel the language in paragraph 5. d. addresses this as I provide an option to use an Alternative Welding Method.

1. Hazards associated with welding on degraded components should be addressed with the Owner-User by the use of engineering controls, administrative controls and personal protective equipment.
2. The nominal chemical composition of the deposited weld metal shall be compatible with the materials of construction. In addition, the nominal tensile strength of the deposited weld metal shall be equal to or exceed the encapsulated component's specified minimum tensile strength and shall be based on the requirements of the welding consumable.
3. When pressure retaining butt welds of the encapsulated component will be welded over, they shall be ground flush and volumetrically examined in accordance with the code of construction to ensure the existing weld is free from defects.
4. Longitudinal weld seams of the leak box components shall be staggered at a distance of at least five (5) times the thickness of the thicker component.
5. When welding to a component that is under pressure, the following shall be considered in developing the WPS: preheat temperature, exposure to moisture, the effect of process fluid flow on weld cooling rate, the effects of the welding temperature on the strength of the metal under service conditions and the risk of burn through.
    a. Every measure shall be taken to remove the moisture from the weld environment.

5) Welds shall be subjected to the nondestructive examination method used in the original code of construction or an alternative acceptable to the inspector. In addition, all full penetration longitudinal leak box welds shall be volumetrically examined to the fullest extent practicable and evaluated in accordance with the code of construction
    a. Visual examination attributes shall be in accordance with the NBIC, Part 3, Paragraph 4.4.1 e).
    b. The "R" Stamp Holder performing the alteration shall provide detailed information on the Form R-2, describing the extent of the alteration and include the specific location the work was performed on the item. A copy of the completed Form R-2 with the completed FFSA Form attached shall be registered with the National Board, and when required, filed with the jurisdiction where the item was installed.

Comment [BB7]: Added this paragraph to address safety requirements including Owner-User involvement.

Comment [BB8]: Added the verbaige "exposure to moisture" when considering the development of the WPS.

Comment [BB9]: Added paragraph d. 1. which allows for peening the metal in an attempt to minimize or stop moisture.

Comment [BB10]: egister the Alteration with the National Board and where required, the jurisdiction.

Renumber

3.4.4 EXAMPLES OF ALTERATIONS

j) The installation of a welded leak box.

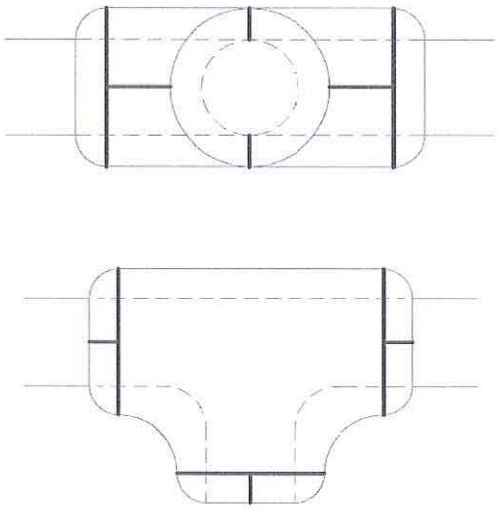
3.4.5 ALTERATIONS OF ASME CODE SECTION VIII, DIVISION 2 or #, PRESSURE VESSELS

3.4.5.1 ALTERATION PLAN

DEFINITIONS

Encapsulation – to enclose, seal off or reinforce a component.

FIGURE 3.4.3
Welded Leak Box



SECTION 5

Page 2 of the Form R-2 will need to be revised to indicate a FFSA Form (NB-403) is attached.

DESIGN REPORT SHEET 2 OF 2

1. Design performed by (1) (name of "R" organization responsible for construction design) (2) (Form "R" Registration No.)

(address) (PO No., Job No., etc.)

2. Owner (3) (name)

(address)

3. Location of installation (4) (name)

(address)

4. Item identification (5) (boiler, pressure vessel, or piping) Name of original manufacturer (6)

5. Identifying nos.: (7) (mfg. serial no.) (8) (National Board No.) (8) (jurisdiction no.) (8) (other) (9) (year built)

6. NBIC Edition/Addenda: (10) (edition) (10) (addenda)

Original Code of Construction for Item: (11) (name/section/division) (11) (edition/addenda)

Construction Code to be used for Alteration Performed: (11) (name/section/division) (11) (edition/addenda)

7. Description of Design Scope: (12) ☐ FFSA Form (NB-403) is attached

(use supplemental sheet. Form R-4 if necessary) ☐ Form R-4, Report Supplementary Sheet is attached

NB 14-0302

5.13.1 FORM R-1, REPORT OF REPAIR

FORM R-1 REPORT OF REPAIR

in accordance with provisions of the *National Board Inspection Code*

1. Work performed by (1) (name of repair organization) (2) (Form Registration No.)
   (53) (PO No., Job No., etc.)
2. Owner (3) (name)
   (address)
3. Location of installation (4) (name)
   (address)
4. Item identification (5) (boiler, pressure vessel or piping) Name of original manufacturer (6)
5. Identifying nos.: (7) (mfg. serial no.) (8) (National Board No.) (8) (Jurisdiction No.) (8) (other) (9) (year built)
6. NBIC Edition/Addenda: (10) (edition) (10) (addenda)
   Original Code of Construction for Item: (11) (name/section/division) (11) (edition/addenda)
   Construction Code Used for Repair Performed: (11) (name/section/division) (11) (edition/addenda)
7. Repair Type: (55) ☐ Welded ☑ Graphite Pressure Equipment ☐ FRP Pressure Equipment
8. Description of work: (12) (use Form R-1, if necessary) ☐ Form R-1, Report Supplementary Sheet is attached ☐ FISA Form (NB-403) is attached

   _____ Pressure Test, if applied (13) _____ psi MAWP (54) _____ psi
9. Replacement Parts. Attached are Manufacturer's Partial Data Reports or Form R-3s properly completed for the following items of this report:
   (14) (name of part, item number, data report type or Certificate of Compliance, mfg. name, and identifying stamp)
10. Remarks: (15)

CERTIFICATE OF COMPLIANCE

I, (16), certify that to the best of my knowledge and belief the statements in this report are correct and that all material, construction, and workmanship on this Repair conforms to the *National Board Inspection Code*.
National Board "R" Certificate of Authorization No. (17) expires on (18)
Date (19) (20) (name of repair organization) Signed (21) (authorized representative)

CERTIFICATE OF INSPECTION

I, (22), holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the Jurisdiction of (23)
and employed by (24) of (25)
have inspected the work described in this report on (26), _____ and state that to the best of my knowledge and belief this work complies with the applicable requirements of the *National Board Inspection Code*.
By signing this certicate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date (19) _____, _____ Signed (27) (inspector) Commissions (28) (National Board and Jurisdiction No.)

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229 NB-66 Rev-12

A13 ~~5.13.2~~ FORM R-2, REPORT OF ALTERATION

Form R-2 Report of Alteration

in accordance with provisions of the National Board Inspection Code

(Form "R" Registration no.)

(PO No., Job No., etc.)

1a. Design performed by: _____
(name of "R" organization responsible for design)

(address)

1b. Construction performed by: _____
(name of "R" organization responsible for construction)

(address)

2. Owner of Pressure Retaining Item: _____
(name)

(address)

3. Location of Installation: Service
(name) (USA, Canada, Mexico, etc...)

(address)

4. Item identification: _____ (boiler, pressure vessel, or piping) Name of original manufacturer: _____

5. Identifying nos: _____ (mfg. serial no.) _____ (National Board No.) _____ (jurisdiction No.) _____ (other) _____ (year built)

6. NBIC Edition / Addenda: _____ (edition) _____ (addenda)

Original Code of Construction for Item: _____ (name / section / division) _____ (edition / addenda)

Construction Code Used for Alteration Performed: _____ (name / section / division) _____ (edition / addenda)

7a. Description of Design Scope: _____

☐ Form R-4, Report Supplementary Sheet is attached

7b. Description of Construction Scope: _____

☐ Form R-4, Report Supplementary Sheet is attached

Pressure Test, if applied _____ psi MAWP _____ psi

8. Replacement Parts. Attached are Manufacturer's Partial Data Reports or Form R-3's properly completed for the following items of this report:

(name of part, item number, data report type or Certificate of Compliance, mfg's. name and identifying stamp)

~~NB-229, Rev. 6, (03/25/13)~~

FORM R-2 BACK

A13

9. Remarks: _____

DESIGN CERTIFICATION

I, _____, certify that to the best of my knowledge and belief the statements in this report are correct and that the Design Change described in this report conforms to the *National Board Inspection Code*.
National Board "R" Certificate of Authorization No. _____ expires on _____
Date _____ _____ Signed _____
(name of design organization) (authorized representative)

CERTIFICATE OF DESIGN CHANGE REVIEW

I, _____, holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the jurisdiction of _____ and employed by _____ of _____ have reviewed the design change as described in this report and state that to the best of my knowledge and belief such change complies with the applicable requirements of the *National Board Inspection Code*.
By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date _____ Signed _____ Commissions _____
(inspector) (National Board and jurisdiction no.)

CONSTRUCTION CERTIFICATION

I, _____, certify that to the best of my knowledge and belief the statements in this report are correct and that all material, construction, and workmanship on this Alteration conforms to the National Board Inspection Code.
National Board "R" Certificate of Authorization No. _____ expires on _____
Date _____ _____ Signed _____
(name of alteration organization) (authorized representative)

CERTIFICATE OF INSPECTION

I, _____, holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the jurisdiction of _____ and employed by _____ of _____ have inspected the work described in this report on _____ and state that to the best of my knowledge and belief this work complies with the applicable requirements of the National Board Inspection Code.
By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date _____ Signed _____ Commissions _____
(inspector) (National Board and jurisdiction no.)

5.13.3 FORM R-3, REPORT OF FABRICATED PARTS

FORM R-3 REPORT OF PARTS FABRICATED BY WELDING
in accordance with provisions of the *National Board Inspection Code*

1. Manufactured by (1) _____ (2) _____
   _____ (53) _____
2. Manufactured for (29) _____
   _____
3. Design Condition specified by (30) _____ Code design by (31) _____
4. Design Code (32) _____ (33) _____ (34) _____ (35) _____
5. Identification of Parts

Name of Part (36)	Qty. (37)	Line No. (38)	Manufacturer's Identifying No. (39)	Manufacturer's Drawing No. (40)	MAWP (41)	Shop Hydro PSI (13)	Year Built (9)

6. Description of Parts

	(a) Connections other than tubes			Heads or Ends			(b) Tubes		
Line No. (38)	Size and Shape (42)	Material Spec. No. (43)	Thickness (in.) (44)	Shape (45)	Thickness (in.) (46)	Material Spec. No. (43)	Diameter (in.) (47)	Thickness (in.) (48)	Material Spec. No. (43)

7. Remarks (15) _____

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229 NB-239 Rev. 2

Form R-3 (back)

(2) (Form "R" No.)

CERTIFICATE OF COMPLIANCE

I, (16) _____, certify that to the best of my knowledge and belief the statements in this report are correct and that all material, fabrication, construction, and workmanship of the described parts conforms to the *National Board Inspection Code* and standards of construction cited.

National Board "R" Certificate of Authorization No. (17) _____ expires on (18) _____, _____

Date (19) _____, _____ (20) _____ Signed (21) _____

(name of "R" Certificate Holder) (authorized representative)

CERTIFICATE OF INSPECTION

I, (22) _____, holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency issued by the jurisdiction of (23) _____ and employed by (24) _____ of (25) _____

have inspected the parts described in this report on (26) _____, _____ and state that to the best of my knowledge and belief the parts comply with the applicable requirements of the *National Board Inspection Code*.

By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.

Date (26) _____, _____ Signed (27) _____ Commissions (28) _____

(inspector) (National Board and Jurisdiction No.)

5.13.4 FORM R-4, REPORT SUPPLEMENTARY SHEET

FORM R-4 REPORT SUPPLEMENTARY SHEET
in accordance with provisions of the *National Board Inspection Code*

1. Work performed by (1) (49) (name) — (2) (49) (Form "R" referenced)
   (address) — (53) (49) (PO No., Job No., etc.)
2. Owner (3) or (29) (49) (name)
   (address)
3. Location of installation (name)
   (address)

Reference Line No. (51) — Continued from Form R– (50) (52)

Date (19) , ____ Signed (21) (authorized representative) Name (20) (49) (Name of "R" Certificate Holder)

Date (19) , ____ Signed (27) (inspector) Commissions (28) (National Board and Jurisdiction No)

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Ave., Columbus, OH 43229 NB-231 Rev. 2–

5.13.4.1 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM "R" REPORTS

These instructions are to be used when completing the National Board Form "R" Reports. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form "R" Reports shown in NBIC Part 3, 5.13.1 through 5.13.4. [OR NEW S 6.19.4]

1. The name and address of the "R" Certificate Holder performing the work as it appears on the "Certificate of Authorization". On a Form R-2, the organization that performed the design work will complete line 1b) and the organization completing the construction activities will complete line 1a).

2. When registering a Form "R" Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicate so by "N/A". As described in NBIC Part 3, 5.6, a log shall be maintained identifying sequentially, any Form "R" registered with the National Board. For re-rating only, the Design Organization registers the Form R-2. Where physical work is also performed, the Construction Organization registers the Form R-2.

3. Name and address of the Owner of the pressure-retaining item.

4. Name and address of plant or facility where the pressure-retaining item is installed.

5. Description of the pressure-retaining item, such as boiler or pressure vessel, or piping. Include the applicable unit identification.

6. Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, "unknown".

7. Document the serial number of the pressure-retaining item if assigned by the original manufacturer. If there is no serial number assigned or is unknown, indicate "unknown".

8. When the pressure-retaining item is registered with the National Board, document the applicable registration number. If the pressure-retaining item is installed in Canada, indicate the Canadian design registration number (CRN), and list the drawing number under "other." If the item is not registered, indicate, "none".

9. Identify the year in which fabrication/construction of the item was completed.

10. Indicate edition and addenda of the NBIC under which this work is being performed.

11. Indicate the name, section, division, edition, and addenda of the original code of construction for the pressure-retaining item. Also indicate the name, section, division, edition, and addenda of the construction code used for the work being performed. If code cases are used, they shall be identified in the "Remarks" section.

12. Provide a detailed summary describing the scope of work that was completed to a Pressure Retaining Item (PRI). The information to be considered when describing the scope of work should include such items as, the nature of the repair or alteration (i.e. welding, bonding, cementing), the specific location of the work performed to the PRI, the steps taken to remove a defect or as allowed by 3.3.4.8 to remain in place, the method of repair or alteration described as listed in the examples of Part 3, Section 3 or supplemental section if applicable, and the acceptance testing and or examination method used in accordance with the NBIC. When additional space is needed to describe the scope of work, a Form R-4 shall be used and attached. Information determined to be of a proprietary nature need not be included , but shall be stated on the Form. A13

13. Indicate test pressure applied.

14. As applicable, identify what parts manufactured by welding or bonding were introduced as needed to complete the scope of work. Indicate part, item number, manufacturer's name, stamped identification, and data report type or Certificate of Compliance.

15. Indicate any additional information pertaining to the work involved (e.g., routine repairs, code cases). For Form R-3, the part manufacturer is to indicate the extent he has performed any or all of the design function. If only a portion of the design, state which portion.

16. Type or print name of authorized representative of the "R" Certificate Holder attesting to accuracy of the work described.

17. Indicate National Board "R" Certificate or Authorization number.

18. Indicate month, day, and year that the "R" certificate expires.

19. Enter date certified.

20. Record name of "R" Certificate Holder who performed the described work, using full name as shown on the Certificate of Authorization or an abbreviation acceptable to the National Board.

21. Signature of authorized representative.

22. Type or print name of Inspector.

23. Indicate Inspector's Jurisdiction. (US or Canadian)

24. Indicate Inspector's employer.

25. Indicate address of Inspector's employer (city and state or province).

26. Indicate month, day, and year of inspection by Inspector. In case of Routine Repairs this shall be the month, day, and year the Inspector reviews the completed Routine Repair package.

27. Signature of Inspector.

28. National Board commission number of Inspector, and when required by the Jurisdiction, the applicable State or Provincial numbers.
Registration

29. Document name and address of organization that purchased the parts for incorporation into the repair or alteration. If the part's origin is unknown or the part was built for stock, so state.

30. Document name of organization responsible for specifying the code design conditions, if known. If origin of design conditions are unknown, state "unknown".

31. Document name of organization responsible for performing the code design, if known. If code design organization is unknown, state "unknown".

32. Name, section, and division of the design code, if known. If the design is unknown, state "unknown"

33. Indicate code edition year used for fabrication.

34. Indicate code addenda date used for fabrication.

35. Indicate the code paragraph reference for formula used to establish the MAWP, if known. If the code reference of the formula is unknown, state "unknown".

36. If available, identify component by part's original name, function, or use the original equipment manufacturer's "mark or item number."

37. Indicate quantity of named parts.

38. Match line number references for identification of parts and description of parts.

39. Indicate manufacturer's serial number for the named part.

40. Indicate drawing number for the named part.

41. Indicate Maximum Allowable Working Pressure for the part, if known.

42. Use inside diameter for size: indicate shape as square, round, etc.

43. Indicate the complete material specification number and grade.

44. Indicate nominal thickness of plate and minimum thickness after forming.

45. Indicate shape as flat, dished, ellipsoidal, or hemispherical.

46. Indicate minimum thickness after forming.

47. Indicate outside diameter.

48. Indicate minimum thickness of tubes.

49. Complete information identical to that shown on the Form R to which this sheet is supplementary.

50. Indicate the Form R type. Example: Form R-1, Form R-2, Form R-3.

51. Indicate the reference line number from the Form R to which this sheet is supplementary.

52. Complete information for which there was insufficient space on the reference Form R.

53. If applicable, document the unique purchase order, job, or tracking number, assigned by organization performing work.

54. Indicate the maximum allowable working pressure of the pressure-retaining item.

55. Indicate the type of repair, e.g., welded, graphite pressure equipment, or fiber-reinforced plastic pressure equipment.

NB14-0701
Parts fabricated by R Stamp Holder
07/15/15

SG- Repairs and Alterations action on 7/14/15, Voted (with Edwards and Galanes abstaining) to approve this revision to Part 3, 3.3.2 c)

Revised Proposal:

c) When ASME is the original code of construction, replacement parts subject to internal or-external pressure fabricated by welding, which require inspection by an Authorized Inspector-shall be fabricated by an organization having an appropriate ASME *Certification of Authorization*. The item shall be inspected and stamped as required by the applicable section of the ASME Code. A completed ASME *Manufacturer's Partial Data Report* shall be supplied by the manufacturer;

ASME stamping and completion of an ASME Manufacturer's Partial Data Report is not required for parts fabricated by the "R" Certificate Holder that will be used on pressure retaining items being repaired or altered by the same "R" Certificate Holder. The controls for this activity shall be described in the quality control system.

The "R" Certificate Holder; using replacement parts fabricated and certified to an ASME Code edition and addenda different from that used for the original construction, shall consider and seek technical advice where appropriate, for change or conflicts in design, materials, welding, heat treatment, examinations and tests to ensure a safe repair/alteration is performed. Note that work once classified as a repair could now be considered an alteration;

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Parts fabricated by R Stamp Holder
07/15/15

Response to Letter Ballot of February 2015

Commenter	Comment / Negative	Response
Brian Boseo	I disapprove. After further consideration, I am falling back on my original stance. I do see merit in allowing an "R" Certificate holder to adjoin material together to support the Repair/Alteration of a pressure retaining item. However, when dealing with the repair/alteration of a boiler which can be made up of many larger pressure parts (e.g. headers, drums), this issue becomes clouded as I am not confident all "R" Certificate Holders maintain the technical expertise to manufacturer a major ASME Section I pressure part, especially when working to a different Edition/Addenda than what was used during original construction of the boiler. I agree with George Galanes and find merit in Mike Webb's proposed approach. BOSEO 3/12/15	The proposal has been reworked to require the R stamp holder to hold an ASME Certificate and have the work inspected by an AI. The only real change to the Code, in effect, is how the work is documented. The new version is included herein. RVW 07/12/15
Rob Troutt	While I agree this issue needs better clarity, I do not agree with the proposal. I have always had concerns with this part of the NBIC. Back when I was an Authorized Inspector, with Hartford, I found it odd that a R stamp holder could basically replace components of a vessel and not have the applicable ASME Code Stamp that the vessel was fabricated under. One of the problems that I have with the proposal is that it is addressing	See response to Brian Boseo. The proposal is now limited to being performed by someone with and ASME Code mark and the work is inspected by an AI. With regard to inclusion of alteration, the R stamp holder, today, does not need to go to an ASME stamp holder to approve any design or fabrication for an alteration. They MUST have this feature in the scope of their own R Certificate. RVW 0712/15

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Parts fabricated by R Stamp Holder
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Commenter	Comment / Negative	Response
	both repairs and alterations. I am not be concerned with a R stamp holder to fabricate a part of a vessel if it is fabricated with the same design of the part it was replacing (i.e. Same material, same thickness and so on). This by definition is a repair. Now if a R stamp holder is fabricating that part, but there is design changes, this is an alteration and now that part should be fabricated by someone holding the applicable ASME Code Certification Mark. I would like to make it clear, I am not saying that a R stamp holder should not be able to make alterations. Instead, I am saying if a "Part" is being fabricated as part of a alteration, then that part should be built to the applicable ASME Code of Construction for which it will be installed on. TROUTT 3/7/15	
Michael Webb	Disapprove. I am clearly in favor of this item to better profile "R" Certifcate holder activities. However, in my opinion the confusing elements of replacement parts may be better clarified by separating the Part 3 – 3.3.2 c) paragraph into 3 items of distinct context. To address this opinion the attached is offered to the subcommittee for their consideration. WEBB 02/19/15 (NOTE: Webb negative withdrawn) To ensure my favorable opinion of this item is counted, I change my vote accordingly. Setting my opinion of the 3.2.2 –c) paragraph format and wording aside, comments voiced by Mr. Morelock and Mr. Schulte are well stated and are in concert with the routine vigilance and "monitoring" of a repair organization's activities by the AIA, an expectation of the National Board. The introduction of material into a repair or alteration is an in-process, Quality System-control, for which	Thank you for support. And thank you for your additional thoughts on this issue. I have reworded the proposal to take some of your idea into consideration. Please see the attached new proposal. RVW 07/12/15

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Parts fabricated by R Stamp Holder
07/15/15

Commenter	Comment / Negative	Response
	the holder of a "R" Certificate of Authorization has been dutifully reviewed and accepted by the AIA and national Board. For those users whose experience in the use of the Code has not been patiently augmented by committee meeting participation, the opportunity to mentor is well within the prerogatives of the AIA to better institute other controls as necessary. WEBB 3/4/15	
Brian Morelock	I understand the reasoning for the negatives, but I feel this item has merit and I approve it. Yes, we will need to agree on the wording. This item states, "The controls for this activity shall be described in the quality control system". For the purposes listed in this item, it really boils down to this: an "R" stamp holder can carry out ASME Code materials into the field, weld them, inspect them, perform NDE, and test them as a repair, but if this same "R" stamp holder would want to use the same ASME Code materials, same qualified WPS's, same qualified welders, same inspection, same NDE, etc. in their shop to preassemble this material as a "component" (as stated in this item) prior to installation in the field, this "R" stamp holder must now also have a ASME stamp strictly based upon how the materials are staged prior to welding? MORELOCK 3/3/15	Thank you for your support on this. I have revised the proposal that requires the R stamp holder to have an ASME Code mark if he is going to fabricate ASME parts. Please see revised proposal attached. RVW 07/12/15
Paul Edwards	Mr. Galanes' review is well stated, I concur with his concerns on this proposal. EDWARDS 3/2/15	Please see response to Mr. Galanes. RVW 07/12/15
Wayne Jones	The term "Part" is recognized by ASME while NB-23 refers to "Pressure Retaining Item". During my participation with Joint Reviews he was made clear that ASME does not recognize the term "pressure retaining item". Maybe we should take a look	The term "part" is used throughout the NBIC without definition. In this paragraph, we are dealing with "replacement" parts. There may be some value to defining that term better in the NBIC since it usually means "like-for-like". But not always. For this action, I do not think it will help very

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Parts fabricated by R Stamp Holder
07/15/15

Commenter	Comment / Negative	Response
	at using this term which would provide clarification when the R stamp holder needs to fabricate a replacement. JONES 2/26/15	much. At the next meeting, I will bring this topic up for discussion and if the committee feels that it should be better defined, an item will be opened to do so. RWV 07/12/15
Brian Schulte	I approve. I believe the additional language provides clarification, however review and acceptance by the AI is the key to precluding Mr. Galanes' concern about abuses by less than sophisticated R stamp holders with no design or fabrication expertise. SCHULTE 2/26/15	Thank you for your support. RVW 07/12/15
George Galanes	I am voting disapprove because if we allow R-Certificate holders to fabricate ASME pressure parts for repairs or alterations even when the parts are installed by the same R-Certificate holder, where does this card blanche end? I am still wrestling with the concept if we need to place restrictions on what an R-Certificate holder can fabricate regarding type of pressure parts, similar to examples for repairs and alterations. For those that cited previous examples, like roll forming a shell and seam welding the formed shell into an existing pressure retaining item (repair) or fabricating butt welds in boiler tube dissimilar metal welds, these are fabricated pressure parts that can be supplied by a typical R-Certificate holder. What I am most concerned about are abuses by less sophisticated R-Certificate holders trying to reverse engineer ASME pressure parts, like headers or steam drums with no design or headers or steam drums with no design or fabrication expertise. I am not sure that stating "controls for the activity shall be described within the quality control system" will be definitive. The current wording in Part 3. 3.2.2 clearly states pressure parts shall be	Take note that this activity of R stamp holders fabricating ASME parts has been going on in industry for as long as I can remember. Typical examples are butt welding tubing together before installing the completed tube as a replacement tube in utility boilers, or welding LWN flanges to pipe pieces to form spools for installation in the pressure vessel, or assembling spool pieces on the shop floor to be installed in BEP in the field. All this has typically been performed by an R stamp holder, with the inspection being performed by the NB Commissioned Inspector, and the work recorded on R-1 forms. The "roll forming a shell and seam welding" that you mentioned is another typical part fabricated by an R stamp holder. Same for making dissimilar tubing welds. These are the types of fabrication that is intended in this proposal. As far as reverse engineering pressure parts, that is also done today to some extent, and is pretty much sanctioned by the NBIC, i.e. supplying like-for-like replacement parts. In fact, there is no engineering performed there. So I'm not sure what having an ASME stamp will do in that scenario. However, to respond to your negative, I added the rule that to fabricated

NB14-0701
Parts fabricated by R Stamp Holder
07/15/15

Commenter	Comment / Negative	Response
	fabricated by an ASME Certificate holder. I believe, this wording was intentional by the NBIC main committee at the time it was incorporated into the NBIC to avoid having an R-Certificate holder assuming design and fabrication responsibility for another code's pressure part. Simply adding another paragraph seems to provide an alternative approach where shall was originally used to express the intent that fabricated pressure parts will be designed and fabricated to the original code of construction (ASME) regardless of size and function. I am very sympathetic to allowing an R-Certificate holder to fabricate limited ASME pressure parts under their control including installation. If we, as a group collectively, decide to go down the path of allowing an R-Certificate holder to fabricate pressure parts under their control during repair or alteration, we should state that and eliminate 3.2.2 (c) or eliminate shall to allow flexibility. GALANES 2/19/15	parts, the R stamp holder must hold an ASME Code mark. To address your concern about not being definitive enough in the QC System, the revised proposal includes some additional specificity of what needs to be included in the QC system. This additional text is in line with what ASME requires for transfer of parts between ASME stamp holder locations without supplying a Data report or stamping the part. With regard to the comment about what was originally intended by the Code Committee when the words were included, I agree with you. That is exactly what they intended. But it was intended for organizations that were designing and supplying Parts to the R stamp holder. But regardless, this new proposal will require the R stamp holder to hold an ASME mark as well. I think we already allow this fabrication methodology to exist today. The only part that needs clarification is how it is documented. Which is the only intent of this action. I do not believe that we should eliminate 3.2.2 c) since it the heart of the matter, and provides much needed rules to control how replacement parts are treated. With regard to stopping abuse of this, I don't think R stamp holders will generally replace complete drums RVW 07/12/15

NB14-1102

Action Item Request Form

8.3 CODE REVISIONS OR ADDITIONS

Request for Code revisions or additions shall provide the following:

a) Proposed Revisions or Additions

For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

Existing Text:

None

Circulator and thermic syphon neck to diaphragm welds are typically fillet welds and no guidance has been provided on the repair of locomotive boiler fillet welds.

c) Background Information

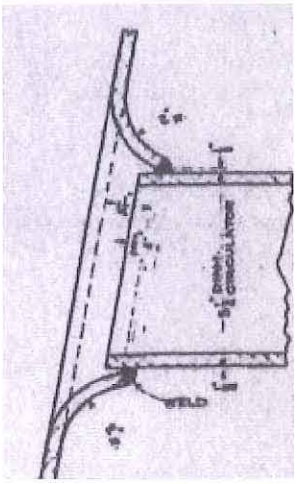
Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the Committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate.

When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

S1.2.9.5.1 CIRCULATOR & THERMIC SYPHON FILLET WELDS

1. The weld to be restored will be ground to bright metal and Visually Inspected for indications prior to welding.
2. Indications will be evaluated to the indication acceptance criteria provided in the ASME Code, Section I (PW51).
3. Any unacceptable indication shall be removed prior to restoring the weld to the installed size.
4. Completed welds shall be Visually Inspected for unacceptable indications. Where repairs are required, the weld may be repaired once, if unacceptable on final inspection the entire weld shall be removed and replaced according to the initial installation criteria.
5. All welding will be conducted by welders qualified to the ASME Code, Section IX, for all positions (6G).
6. When any repair or restoration has been conducted to attachment welds, the boiler shall be hydrostatically tested to 1.25 times the MAWP.
7. A footnote will be attached to all records submitted to the FRA documenting inspections of the fillet weld, noting conditions found along with the signature of the inspector conducting the examination.

S1.2.9.5.1a CIRCULATOR & THERMIC SYPHON NECK TO DIAPHRAGM INSTALLATION



NB14-2401

Action Item Request Form

8.3 CODE REVISIONS OR ADDITIONS

Request for Code revisions or additions shall provide the following:

a) Proposed Revisions or Additions

For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

Existing Text:

S6.5 Replacement Parts
d) When the original code of construction is other than ASME, replacement parts subject to internal or external pressure fabricated by welding shall be manufactured by an organization certified as required by the original code of construction. The item shall be inspected and stamped as required by the original code of construction. Certification to the original code of construction as required by the original code of construction or equivalent shall be supplied with the item. When this is not possible or practicable the organization fabricating the part may have a National Board *Certificate* of *Authorization*. Replacement parts shall be documented on Form TR-1 and the 'TR" Stamp applied as described in NBIC Part 3, S6.14.

b) Statement of Need

Provide a brief explanation of the need for the revision or addition.

The need is to be consistent with NBIC part 3 for replacement parts fabricated by a TR stamp holder. The parts should be documented on a separate form similar to the one for an R stamp holder completes. The form referenced on the last line should be a TR-3 not 1.

c) Background Information

Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the Committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate.

When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

Throughout Supplement 6 the work that is done is documented on one form (TR-1). This can be a repair or alteration or modification. To develop a form to also address replacement parts is extremely difficult.

Paragraph S6.5 would be affected.

NB14-2402

Action Item Request Form

8.3 CODE REVISIONS OR ADDITIONS

Request for Code revisions or additions shall provide the following:

a) Proposed Revisions or Additions

For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

Existing Text:

S6.3 ACCREDITATION
Organizations performing repairs, alterations, or modifications shall be accredited as in accordance with the National Board "TR" Program.

b) Statement of Need

Provide a brief explanation of the need for the revision or addition.

The need is to discuss in text the accreditation process for a TR program in the supplement.

c) Background Information

Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the Committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate.

When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

S6.3 ACCREDITATION

Organizations performing repairs, alterations, or modifications shall be accredited as in accordance with **NBIC Part 3, Accreditation, Section 1; Major Section 1.5 and Section 1.5.1.** ~~the National Board "TR" Program.~~

NB15-0509; PR15-0156

NBIC Part 3 paragraph: 2.5.3.6 c) 5) d)

d) The filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43 and limited to the following consumables: ERNiCr-3 (e.g. Filler Metal 82), ENiCrFe-3 (e.g. INCONEL Welding Electrode 182), ENiCrFe-2 (e.g. INCO-WELD A), ASME B&PV Code Cases 2733 and 2734 (e.g. EPRI P87).

NB15-0509

National Board of Boiler and Pressure Vessel Inspectors
National Board Inspection Code
Submission of Public Review Comment
2015 Draft Edition

PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE
Make additional copies as needed

Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: October 7, 2014

Commenter Name: Nathan Carter

Commenter Address: HSB Global Standards, One State Street, PO Box 299
Hartford, CT 06141-0299

Commenter Phone: 860-722-5750

Commenter Fax: _____

Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 3, 2.5.3.6 5) d)

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

Filler Metal 82, Inconel Welding Electrode 182, and INCO-WELD A are all Brand names for ~~consumables sold by Special Metals. EPRI P87 is a Brand name, I believe licensed~~ to be sold by Metrode at least. Why are the consumable classifications and Code Cases by themselves not sufficient. Without an "e.g." in the parenthesis after each classification, it can be read that these Brand names are required, which would restrict trade by not allowing other manufacturers from supplying consumables to those ~~classifications and Code Cases.~~

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rhough@nationalboard.org

NB Use Only

Commenter No. Issued: PR15-01

Comment No. Issued: 56

Project Committee Referred To: SC Repair and Alteration

NB15-0509

National Board of Boiler and Pressure Vessel Inspectors
National Board Inspection Code
Submission of Public Review Comment
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PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE
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Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: 10/13/14

Commenter Name: Mark R. Kincs

Commenter Address: Xcel Energy Services Inc.
1518 Chestnut Ave., Minneapolis, MN 55403

Commenter Phone: (612) 630-4152

Commenter Fax: (612) 630-4367

Commenter Email: mark.r.kincs@xcelenergy.com

Section/Subsection Referenced: Part 3 - Section 2.5.3.6 d)

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

The proposed language references Code Case filler metals acceptable for consideration as F-No. 43 for welding performance qualifications only (ref. Code Cases 2733 & 2734). Also, the accepted F-No. 43 materials, as presented, allow supply by a single manufacturer only. The following alternative language is proposed.

"Filler metals shall be austenitic, nickel-based consumables limited to ASME Code Case 2733, Code Case 2734, or one of the following F-No. 43 materials listed in ASME Section IX: ERNiCr-3, ENiCrFe-2, or ENiCrFe-3."

Source: ☒ Own Experience/Idea ☒ Other Source/Article/Code/Standard ASME Sect. IX & CC 2733, 2734

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rhough@nationalboard.org

NB Use Only

Commenter No. Issued: PR15-06

Comment No. Issued: 01

Project Committee Referred To: SC Repair and Alteration

NB15-0511

National Board of Boiler and Pressure Vessel Inspectors
National Board Inspection Code
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Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: October 1, 2014

Commenter Name: Nathan Carter

Commenter Address: HSB Global Standards, One State Street, PO Box 299
Hartford, CT 06141-0299

Commenter Phone: 860-722-5750

Commenter Fax: _____

Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 3, 5.13.5.1 31.

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

What about Category 3 repairs/alterations, etc? What if it was performed to an International Code other than Section III or XI? Per the instruction, there isn't a way to address this situation.

Also, Hyphenate "rerating" to "re-rating" to be consistent with the NBIC.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rhough@nationalboard.org

NB Use Only

Commenter No. Issued: PR15-01

Comment No. Issued: 20

Project Committee Referred To: SC Repair and Alteration

NB15-0512

National Board of Boiler and Pressure Vessel Inspectors
National Board Inspection Code
Submission of Public Review Comment
2015 Draft Edition

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Make additional copies as needed

Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: October 1, 2014

Commenter Name: Nathan Carter

Commenter Address: HSB Global Standards, One State Street, PO Box 299
Hartford, CT 06141-0299

Commenter Phone: 860-722-5750

Commenter Fax: _____

Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 3, S3.5.5 b)

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

My comment refers to Section VIII, Division 1, Part UGI-79 and UGI-80 referenced on the last line. After reading these paragraphs in whole, I ~~do not understand why only some of the subsections are listed and not~~ the whole of UGI-79 and UGI-80. In my opinion, all of UGI-79 and UGI-80 should be included.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rhough@nationalboard.org

NB Use Only

Commenter No. Issued: PR15-01

Comment No. Issued: 21

Project Committee Referred To: SC Repair and Alteration

NB15-1401

From: Parrish, David [mailto:david.parrish@fmglobal.com]
Sent: Thursday, September 25, 2014 11:10 AM
To: George Galanes; jpillow@commonarc.com
Cc: bvallance@nationalboard.org; Martinez, David; Barker, Timothy
Subject: Weld Buildup Wasted Areas - Tubes

Thought your committee members might find attached interesting. It is extracted from the BLRBAC October 2013 meeting minutes (posted on the www.blrbac.org website). Wasted areas of tubes are frequently repaired by "pad" welding -- even for leaks. A few operators do not permit pad weld repair if failure could admit water to furnace (smelt-water explosion potential). Some operators replace tube section at next maintenance outage. For remainder, the pad weld becomes a long-term solution that may again leak.

It might be helpful for this industry if a "Welding Method" could be developed for inclusion in Part 3.

Best Regards,

Dave P
Senior Staff Engineering Specialist
FM Global - Engineering Standards, Equipment Hazards
781-255-4734

NATIONAL BOILER SERVICE, INC.

Weld Build Up Research

This report contains the results of *Weld Build Ups* that were performed on the outside diameter of boiler tubes (approx.180 thick) that were turned down (milled) on a lathe to a thickness of .120", .100", .090", .080", .070" thick to simulate boiler tube thinning for this research.

Weld Build Up of Wasted Area is the correct term for this type of repair in the Boiler and Pressure Vessel industry. Other jargon or terms used to describe this type of repair are Pad Welding (which is most frequently used) and Weld Overlay.

The objective of this research is to identify and/or determine what the welding process is doing to the inside of the tubes after weld build up was performed and at what wall thicknesses the tubes were adversely affected.

The Following Welding Processes were used:

- GTAW (TIG) - 3/32" Filler Metal
- SMAW (Stick) - 3/32" Filler Metal
- GMAW (MIG) (Hard Wire) - .035" Bare Wire Filler Metal

Note: The tubes must be cleaned thoroughly before welding.

The Tube positions when the weld build up was performed was about 45° and Vertical positions to simulate different configurations in a boiler such as vertical (Water-wall Tubes), Flat (Floor or Roof Tubes) and approximately 45° (Arch or Sloped Floor Tubes etc.).

The following photos are of weld build up that were performed on tube specimens that were cut in half to view and inspect the inside of the tubes. A description of our findings is under each photo.

Welding Terms:

- Burn-thru – A hole is burned through the base metal.
- Melt-thru – The welding filler metal is melted through to the inside of the base metal (push-thru).
- Sugaring - Oxidation of the weld or base metal.

Base Metal Designations and Terms:

* P1 - Carbon Steel Tubes ,"SA 178, 210 etc."
* P3 - Carbon/Moly Steel Tubes, "SA 209 T1"
* P4 - 1.25% Chrom, Alloy Steel Tubes, "SA 213 T11"
* P5 - 2.25% Chrom, Alloy Steel Tubes , "SA 213 T22
* P8 – Stainless Steel Tubes, "SA 213 TP 304,308,316 etc."

Conclusion

From this research, It is our opinion, the GTAW (TIG) process, is not recommended to perform Weld Build Up on P1, P3, P4 or P5 base metals that are below .100" thick. Burn-thru and melt-thru is virtually inevitable.

The GMAW (MIG) process (downhill progression with .035 Wire Size) can be used to Perform Weld Build Up on Tubes as thin as .080" thick, with minimal melt-thru or burn thru.

For stainless base metals (P8), it is not good practice or recommended to perform Weld Build Up on base metals that are below .120" thick. Extreme oxidization (Sugaring) virtually cannot be avoided on the Inside diameter of the tube where no backing or shielding gas is utilized.

Steve Harville
Corporate Quality Control Manager

176 North Industrial Blvd PO Box 279, Trenton, GA 30752 P:(706) 657-6200 F: (706) 657-4875
www.nationalboiler.com

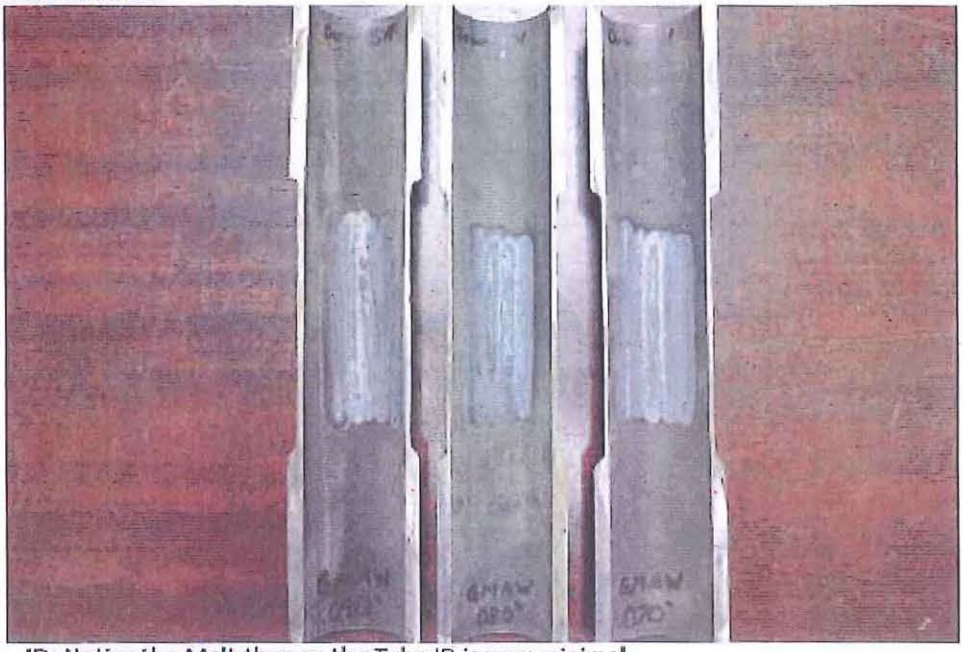
OD: Carbon Steel (P1) *SMAW (Stick) process with E 7018 - 3/32"* was used on these samples. The Weld Progression was Uphill. On all 4 of these samples the Welder Burned-thru the base metal, as the samples got thinner, the Burn-thru was more frequent.

ID: Carbon Steel (P1) The Burn-thru that you see here is not "Melt-thru" it is "Burn-thru." Holes were actually burned in the base metal and filled back up with the SMAW process as the Welder was welding. Note: .070" sample was too thin to Weld.

OD: Carbon Steel (P1), *GTAW (TIG) process with E 70 S2 - 3/32"* was used on these samples. The Weld Progression was Uphill. On all 4 of these samples the Welder Melted-thru the base metal, as the samples got thinner, the Melt-thru was more frequent and excessive.

ID: The Melt-thru here is very excessive on the .090", .080" and .070" Samples

OD: Carbon Steel (P1), *GMAW (MIG) process with E 70 S2 - .035"* Wire was used on these samples. The Weld Progression was Downhill. Uphill is not recommended. On all of these samples the Welder had very minimal Melt-thru on all thicknesses of the base metal. The GMAW Process requires the base metal to be very clean. When applying Weld Build Up on Tubes of approximatly .120" and below, GMAW (MIG) is the preferred method for Weld Build UP.



ID: Notice the Melt-thru on the Tube ID is very minimal.

OD: Stainless: *GTAW (TIG) process with E 316L - 3/32"* was used on these samples. The Weld Progression was Uphill. On all 3 of these samples the Welder Melted-thru the base metal, as the samples got thinner, the Melt-thru was more frequent and excessive.

ID: Stainless: The Melt-thru on the .100" & .080" thick samples was excessive and "Sugared" (oxidized) the ID of the Tube. This is because the ID of the Tube is not accessible to use a Backing Gas such as Argon to shield the base metal or weld area.

OD: 1-1/4 Chrome (P4), SA 213 T11: *Superheat Tube Simulation* (with Water in the Tube). ***GTAW (TIG) process with ER 80S B3-*** 3/32" was used. The Weld Progression was Uphill. Welder Burned-thru the base metal once on the .090" sample and multiple times on the .070" sample.

ID: 1-1/4 Chrome (P4), SA 213 T11 *Superheat Tube Simulation* (with Water in the Tube). With water in the Tube, there is little to no indication it is about to burn though the base metal. With the .070" Tube we had to let it cool 3 to 5 minutes between weld passes or between half a weld pass.

Item NB15-1402

Single Strike-through and single underline: Comments/edits by Walt Sperko and Nathan Carter including NBIC Items 15-0509 and Nb15-1403 from January 2015 NBIC meeting in Orlando, FL

Comment [SJ1]: George, please fill in

Double Strike-through and double underline: Proposed edits by EPRI

2.5.3.6 Welding Method 6

This welding method provides ~~guidance~~ requirements for welding only Grade 91 tube material within the steam boiler setting and when ~~it's~~ it is impracticable to perform local post-weld heat treatment (PWHT). ~~This repair method utilizes a controlled fill technique.~~ When using this welding method, the following ~~is required~~ apply:

(1) This method is limited to butt welds in tubing NPS 5 (DN 125) or less in diameter and ½ in. (13 mm) or less in wall thickness for which the applicable rules of the original code of construction did not require notch toughness testing.

(2) Application shall be limited to only boiler tube repairs at a location internal to the boiler setting.

~~(3) Upon the completion of weld repair, the repair region shall be kept from humid or moist environments until the return to service.~~ Upon completion of weld repair, the repair area shall be kept above the dew point temperature so that condensation does not form on the repair surface before returned to service or a moisture-barrier coating shall be applied to the surface.

Comment [GG2]: The words in blue were revised based on approval of item NB15-1402.

(a) The material shall be limited to P-No 15E, Group 1, Grade 91, creep strength enhanced ferritic steel (CSEF).

(b) The welding shall be limited to the SMAW or GTAW processes, manual or automatic, using suitably controlled maintenance procedures to avoid contamination by hydrogen producing sources. The surface of the metal shall be free of contaminants and kept dry.

(c) The ~~test material for the~~ welding procedure qualification test coupon shall be P-No 15 E, Group 1, Grade 91 ~~for the repair.~~

(d) Qualification thickness limits of base metal and weld deposit thickness ~~for the test plates and repair groove depths~~ shall be in accordance with ASME Section IX, QW-451.

(e) The Welding Procedure Specification (WPS) shall be qualified in accordance with the requirements of ASME Section IX, ~~except that no~~ No postweld heat treatment shall be applied to the test coupon. Additionally, the ~~qualification~~ WPS shall include the following requirements;

1) The minimum preheat for the GTAW process shall be 200 deg F (~~93~~100 deg C). The minimum preheat for the SMAW process shall be 300 deg F (150 deg C). The preheat temperature shall be checked to ensure the minimum preheat temperature is maintained during welding and until welding is completed. The maximum interpass temperature shall be ~~400 deg F (200 deg C).~~ 550 deg F (290 deg C).

(2) When the SMAW process is specified for a fill pass layer ~~as a controlled filled welding technique,~~ the electrode diameter is restricted to a maximum size of 1/8 in. (3.2 mm). When the GTAW process is specified, any limits in filler size is to be ~~reflected in the qualified PQR and~~ shown on the WPS.

(3) Regardless of the welding process (SMAW or GTAW), only the use of stringer beads shall be permitted.

(4) The filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43 and limited to the following consumables: ERNiCr-3 (e.g., Filler Metal 82), ENiCrFe-3 (e.g., INCONEL Welding Electrode 182), ENiCrFe-2 (e.g., INCO WELD A), ASME B&PV Code Cases 2733

Comment [GG3]: The highlighted blue was revised under another action NB15-0509.

and 2734 (e.g., EPRI P87) or
(5) A martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.

NB15-1403

NBIC Part 3 PROPOSED SUPPLEMENT

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Supplement X

WELD REPAIR AND POST REPAIR INSPECTION OF CREEP STRENGTH ENHANCED FERRITIC STEEL

SX.1 SCOPE

The technical information provided in this supplement pertains to weld repair options and post repair inspection guidelines which can be used for creep strength enhanced ferritic steels (CSEF).

Creep Strength Enhanced Ferritic alloys (CSEF's) are a family of ferritic steels whose creep temperature strength is enhanced by the creation of a precise condition of micro-structure, specifically martensite or bainite, which is stabilized during tempering by controlled precipitation of temper-resistant carbides, carbo-nitrides, or other stable and/or meta-stable phases. Careful consideration shall be given to pressure-retaining items that are fabricated from CSEF's. The behavior of these materials in low temperature (i.e. fracture toughness and/or fatigue) and in high temperature (i.e. creep and/or creep-fatigue) components can be degraded by not adhering to provided welding procedures and improper application of post-weld heat treatment (PWHT).

During service, weld repairs to CSEF can occur which may not be conducive to weld repairs following original construction fabrication requirements regarding post weld heat treatment (PWHT) and repair weld joint design. This supplement provides guidelines for alternative weld repair options and post repair inspection using a well-engineered approach for CESF steels. The user is cautioned to seek technical guidance for welding and heat treating requirements and attention should be made to temperature cycles required to achieve the micro-structures beyond preheat and post weld heat treatment requirements specified from the original code of construction. A key document that should be solicited in the development of weld repair procedures is:

Comment [GG1]: John:
I don't believe this statement would fly with NBIC committee members. We do not endorse publications other than other Codes and Standards.

SX.2 WELD REPAIR OF GRADE 91 STEEL

SX.2.1 Alternative Weld Repair Options

SX.2.1.1 9Cr-1Mo-VNbN Filler Metal (i.e. matching to Grade 91) + Controlled Fill + Low PWHT (Minimum temperature is 1250°F, 675°C). Acceptable filler materials are referenced in Table 1. The minimum time and maximum heat treatment temperature shall be referenced by the original code of construction.

For reference, where the Ni+Mn content of the filler metal *is not known*, ASME B&PV Code restricts the maximum PWHT temperature to 1425°F (775°C). As general best practice, this maximum should be enforced to avoid over-tempering or exceeding the absolute maximum PWHT temperature. Rules, as specifed by ASME B&PV Code Section I or ASME B31.1 for PWHT are provided below with regard to the required minimum hold time for PWHT.

a. Minimum holding time at PWHT temperature is specified as 1 hour per 1.0 inch (25 mm) of thickness, 30 minute minimum provided the component < 0.5 inches (12.5 mm) in thickness;

b. Minimum holding time at PWHT temperature is specified as 5 hours plus 15 minutes for each additional 1.0 inch (25 mm) over 5.0 inches (125 mm);

SX.2.1.2 9Cr-1Mo Filler Metal + Controlled Fill and No PWHT. Acceptable filler materials are detailed in Table 1.

SX.2.1.3 Ni-base Filler Metal + Controlled Fill and No PWHT. Acceptable nickel base consumables include selected ASME F No. 43 filler metals as detailed in Table 1.

Table 1. Alternative Weld Repair Methods, Filler Metals and Welding Processes for Grade 91 Steel.

Acceptable Weld Repair Method		Welding Process and Filler Metal AWS Classification
Filler Metal	Welding Procedure	
Matching (9Cr-1Mo-VNbN)	Controlled Fill + Low PWHT	• SMAW – E9015-B9 or E9015-B91[A] • FCAW – E91T1-B9 • GTAW – ER90S-B9 or ER90S-B91[A]
9Cr-1Mo	Controlled Fill	• SMAW – E8015-B8 • FCAW – E81T1-B8 • GTAW – ER80S-B8
Ni-base	Controlled Fill	• SMAW – EPRI P87[B], ENiCrFe-2, ENiCrFe-3 • FCAW – None available • GTAW – EPRI P87[C], ERNiCr-3

[A] –B91 AWS classification is pending for the various Grade 91 filler metal product forms (currently –B9)
[B] Incorporated by ASME B&PV Code as Code Case 2734 for classification as an F No. 43 filler material
[C] Incorporated by ASME B&PV Code as Code Case 2733 for classification as an F No. 43 filler material

SX.2.2 Application of Controlled Fill Welding Procedure

SX.2.2.1 The minimum preheat for the repair procedure shall be 300 deg F (150 deg C). The preheat temperature shall be checked to ensure the minimum preheat temperature is maintained during welding and until welding is completed. The maximum interpass temperature shall be 550 deg F (290 deg C).

SX.2.2.2 In general, to control heat input, it is recommended to weld the excavation using a "controlled fill" technique. In this technique, the first layer in contact with the machined excavation can be identical or smaller in diameter than the fill passes.

SX.2.2.3 The bead-to-bead overlap should be ~50% or greater. The fill passes should be deposited working from the bevel towards the center of the excavation with a minimum overlap of 25% and ideally 50%. As a rule of thumb, if the welder aims for the toe of the previously deposited weld bead, an overlap of at least 40% will be achieved.

SX.2.2.4 For ferritic filler materials, and when the SMAW process is specified for a fill pass layer as a controlled fill welding technique, the electrode diameter is restricted to a maximum size of 1/8" (3.2 mm). When the GTAW process is specified, any limits in filler size is to be reflected in the qualified PQR and WPS.

SX.2.2.5 For ferritic filler materials, and when the SMAW process is specified for a fill pass layer as a controlled fill welding technique, the electrode diameter is restricted to a maximum size of 5/32" (4.0 mm). For weld beads in contact with the machined excavation. The maximum size shall be restricted to 1/8" (3.2 mm). When the GTAW process is specified, any limits in filler size is to be reflected in the qualified PQR and WPS.

Notes:

1. *The excavation should have rounded corners to prevent lack of fusion. It may be advisable to use a smaller diameter electrode (such as 2.5 mm or 3/32 in.) to ensure good tie in.*
2. *The step should be machined at least 10 mm beyond the fusion line of the original weld*
3. *The fill passes along the bevel should be restricted in height so as to not reduce access to the bottom of the excavation for the welder*

Additional Instructions:

- *The fill passes should be conducted working "outside-in", whereby the fill passes are first deposited on either side of the excavation and additional fill passes are deposited welding towards the center of excavation*
- *50% overlap is recommended for all welding passes either in contact with the bevel or fill*
- *Stringer beads only are recommended for all welding passes either in contact with the bevel or fill*
- *A 2.5 mm (3/32 in.) diameter electrode may be utilized for the weld passes in contact with the bevel but is not mandated nor required for acceptable performance*

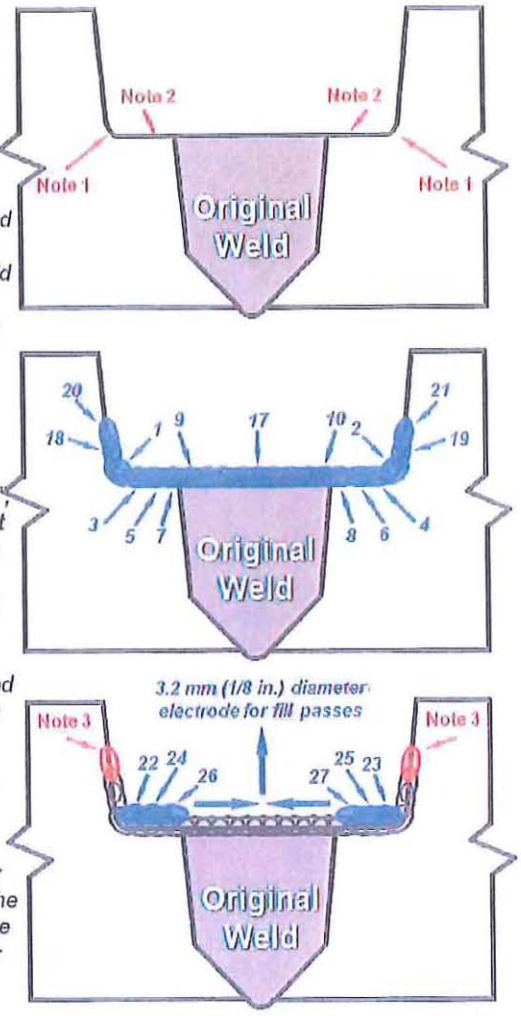


Figure 1. Schematic of the Controlled Fill Welding Procedure for Grade 91 Steel for a Partial Weld Repair of a Circumferential Girth Weld.

SX.2.3 Qualification of Controlled Fill Welding Procedure

SX.2.3.1 The test material for the welding procedure qualification shall be P-No 15E, Group 1, Grade 91 for the repair.

SX.2.3.2 Qualification thickness for the test plates and repair groove depths shall be in accordance with ASME Section IX, QW-451.

SX.2.3.3 The Welding Procedure Specification (WPS) shall be qualified in accordance with requirements of ASME Section IX. If a given procedure does not require post weld heat treatment, none shall be applied.

SX.2.3.4 For qualification of weld repair procedures using 9Cr-1Mo filler metal and in the as-welded condition, the requirements for the bend test shall be relaxed to a test which achieves a minimum of 14% in the outer fibers. Guidance is provided in ASME B&PV Code Section IX QW-466.1 which allows for base materials to be side bend tested that exhibit between 3 and less than 20% elongation values and should be referenced.

SX.3 POST REPAIR INSPECTION

X.3.1 After the completion of weld repairs to CSEF steels, post inspection requirements shall be developed and implement based on approval from the Inspection, and if applicable the Jurisdiction using a well-engineered approach.

X.3.2 Inspection method and intervals shall be developed to ensure safe operation and margin to locate and monitor defect growth in service. The selected non-destructive evaluation method shall have a minimum resolution to detect a flaw size of 0.125 inches (3.2 mm)

X.3.3 Post repair inspection shall not be considered a single event. A recommended base re-inspection interval is every other planned major outage or six years, whichever is less. The Owner/User may expand or compress the re-inspection interval based on trend results from previous inspections.

X.3.4 Where a hydro-test is mandated in lieu of NDE, the guidelines in NBIC NB-23 shall be followed. The water shall be heated to a temperature as recommended in the 2013 Edition of the NBIC Part 3, Table 4.4.2 to prevent risk of low temperature fracture for full penetration or near full penetration repair welds.

The position paper links are available below for download:

1. A Well-Engineered Approach for Establishing the Minimum Allowable Post-Weld Heat Treatment for Power Generation Applications of Grade 91 Steel

http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002005350

2. A Perspective on the Selection of Preheat, Interpass, and Post-Weld Cool Temperatures Using Grade 91 Steel as an Example

http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002005351

3. The Benefits of Improved Control of Composition of Creep-Strength-Enhanced Ferritic Steel Grade 91

http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002003472

4. The Influence of Steel Making and Processing Variables on the Microstructure and Properties of Creep Strength Enhanced Ferritic (CSEF) Steel Grade 91

http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002004370

Guideline/Summary Documents

5. Best Practice Guideline for Well-Engineered Weld Repair of Grade 91 Steel

http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002003833

6. Alternative Well-Engineered Weld Repair Options for Grade 91 Steel: An Executive Summary of Results from 2010 to 2014

http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002006403

NB15-1410

NBIC Part 3 paragraph: S6.14.1 f)

f) The non-embossed Code Symbol stamping, when directly applied on the item or when a nameplate is used shall be applied adjacent to the original manufacturer's stamping or nameplate. A single repair, ~~alteration, or modification~~ stamping or nameplate may be used for more than one repair to a Transport Tank, provided the repair, ~~alteration, or modification~~ activity is carried out by the same certificate holder;

National Board of Boiler and Pressure Vessel Inspectors
National Board Inspection Code
Submission of Public Review Comment
2015 Draft Edition

PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE
Make additional copies as needed

Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: October 1, 2014

Commenter Name: Nathan Carter

Commenter Address: HSB Global Standards, One State Street, PO Box 299
Hartford, CT 06141-0299

Commenter Phone: 860-722-5750

Commenter Fax: _____

Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 3, S6.14.1 f)

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

I understand the intent for numerous repairs throughout the life of a Transport Tank using one nameplate under the conditions listed. Do you ~~really mean for infinite "alterations and modifications" to be allowed~~ under a single nameplate/stamping? Please reconsider this.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rhough@nationalboard.org

NB Use Only

Commenter No. Issued: PR15-01

Comment No. Issued: 22

Project Committee Referred To: SC Repair and Alteration

NB15-1702 Revised at 15 July 2015 SC R&A meeting

S 1.2.5.1 Un-threaded Fillet-Welded Staybolts

Repairs to un-threaded fillet welded staybolts shall be performed in accordance with the original Code of construction. If the original Code of construction is not known, repairs shall be performed as follows in accordance with an appropriate code of construction that allows fillet welded staybolts:

a) The replacement of un-threaded fillet-welded staybolts is permissible.

b) Existing un-threaded fillet-welded staybolts that leak shall be repaired by re-welding after mechanically removing the entire weld. Only the leaking stays are to be re-welded.

c) Minor leakages (sweat pores) may be repaired by gently caulking the fillet weld, however identifiable cracks shall be repaired by re-welding.

Reference for information only: DEUTSCHE BAHN AG, Instruction for the Maintenance of the Steam Locomotive Boilers,
DS 991 99 05 (Dv 946 Part 1), Ed. 1st June 1994

Bill Valance
negative

NB15-1702

July 15, 2015

To: NBIC Main Committee

Re: Caulking and Peening of Stay Bolts in Locomotive Boilers

In my opinion, seal welds on locomotive boilers that can contain porosity or pin holes are not acceptable. All seal welds on locomotive boilers should be of sound weld metal and meet visual or MT or PT requirements with no leakage in hydro static test. Peening or caulking is not acceptable for stopping these leaks.

Respectfully Submitted,

Frank D. Johnson
NBIC Repairs and Alterations Sub Group

Frank D Johnson

NBIC Sub-Group Repairs & Alterations

Subject:	Leak tightness by seal welding a designed inspection or maintenance access opening

NB-Item number:	NB15-1801

Explanation of assignment needed:	Is it reasonable to add as a routine repair activity, the replacement of a seal weld when the pressure retaining item's design and leak tightness are derived in combination from using a seal weld of limited size?

Assigned to:	M. Webb

Background:	Inspection and maintenance openings are routinely designed to allow access to assess equipment condition and exercise maintenance activities in concert with reliability and safety. By design, pressure retention is assured by mechanical interface. By design, some openings include a seal weld to assure leak tightness and the weld is not considered to add strength or to enhance the item's pressure retaining capability. Routinely, the Manufacturer provides time-proven instruction for their replacement, routinely following the governing rules from the original code of construction, exempting the seal weld and weldment from PWHT and citing VT-examination throughout the installation, both within the established parameters of a routine repair. *See the Interpretations 07-10, 01-09, PCC-2, Article 2.3 (2011) on pg-2, and an example of Instructions on pg-3 supporting this proposed action as a routine activity …*

Current Wording:	NBIC, Part 3, paragraph 3.3.2 (e) items 1-4: *Not recognized currently as a routine repair.*

Proposal: ***double underline***	New paragraph 3.3.2. (e) 5): 5) Seal welding a mechanical connection for leak tightness where by-design, the pressure retaining capability is not contingent on the weld for strength and requires no PWHT. (B. Wiegoszinski's original proposal, 1-21-15: Seal welding of mechanical connections provided postweld heat treatment is not required by the Code of construction.")

NBIC Sub-Group Repairs & Alterations

INTERPRETATION 11-01

Subject: Part 3, 3.3.2

Edition: 2011

Question: In Part 3, 3.3.2 d), is the replacement scope or the number of valves, fittings, tubes, or pipe NPS 5 in diameter and smaller, or sections thereof, a consideration when determining if the work is a routine repair?

Reply: No. The NBIC does not address the magnitude of work or scope in qualifying repairs as routine but rather addresses the exceptions representing routine repairs as noted within Part 3, 3.3.2 d) 1).

INTERPRETATION 07-10

Subject: Part 3, 3.3.2 and 3.3.3

2007 Edition with 2009 Addendum

Question: Is it the intent of the NBIC that weld build-up of a damaged gasket surface on a flange where neither PWHT no NDT is required by the code of construction considered a routine repair?

Reply: Yes, provided the "R" Certificate Holder's quality system program describes the process for identifying, controlling and implementing routine repairs.

INTERPRETATION 01-09

Subject: RC-2031(a)(1) Routine Repairs

1998 Edition with 2000 Addendum

Question: Is the seal welding of tubes which are five NPS in diameter and less considered a routine repair?

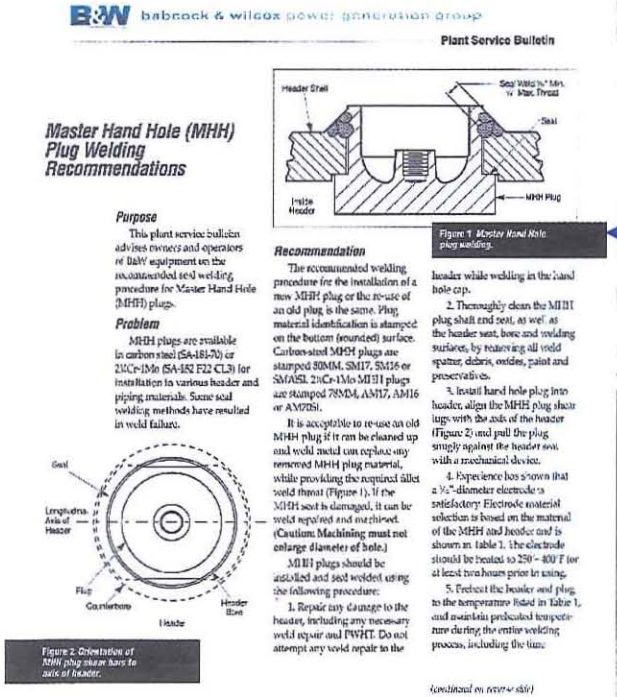
Reply: Yes.

NBIC Part-3,
3.2.6 REFERENCE TO OTHER CODES AND STANDARDS (can provide useful guidance)
(c) ASME PCC-2, Repair of Pressure Equipment and Piping-

ASME PCC-2, Article 2.3, (2011)- seal welded threaded connections and seal weld repairs
3.1 (a) The seal weld shall only be used to provide the hermetic seal, not the mechanical strength to the joint.

NBIC Sub-Group Repairs & Alterations

INSTRUCTION EXAMPLE:



B&W babcock & wilcox power generation group

Plant Service Bulletin

Master Hand Hole (MHH) Plug Welding Recommendations

Purpose

This plant service bulletin advises owners and operators of B&W equipment on the recommended seal welding procedure for Master Hand Hole (MHH) plugs.

Problem

MHH plugs are available in carbon steel (SA-181-70) or 2¼Cr-1Mo (SA-182 F22 CL3) for installation in various header and piping materials. Some seal welding methods have resulted in weld failure.

Figure 2. Orientation of MHH plug shown here to axis of header.

Figure 1. Master Hand Hole plug welding.

Recommendation

The recommended welding procedure for the installation of a new MHH plug or the re-use of an old plug is the same. Plug material identification is stamped on the bottom (rounded) surface. Carbon-steel MHH plugs are stamped 80MM, SM17, SM16 or SMASL. 2¼Cr-1Mo MHH plugs are stamped 78MM, AM17, AM16 or AM78SL.

It is acceptable to re-use an old MHH plug if it can be cleaned up and weld metal can replace any removed MHH plug material, while providing the required fillet weld throat (Figure 1). If the MHH seat is damaged, it can be weld repaired and machined. (Caution: Machining must not enlarge diameter of hole.)

MHH plugs should be installed and seal welded using the following procedure:

1. Repair any damage to the header, including any necessary weld repair and PWHT. Do not attempt any weld repair to the header while welding in the hand hole cap.

2. Thoroughly clean the MHH plug shaft and seat, as well as the header seat, bore and welding surfaces, by removing all weld spatter, debris, oxides, paint and preservatives.

3. Install hard hole plug into header, align the MHH plug shear lugs with the axis of the header (Figure 2) and pull the plug snugly against the header seat with a mechanical device.

4. Experience has shown that a ⅛"-diameter electrode is satisfactory. Electrode material selection is based on the material of the MHH and header and is shown in Table 1. The electrode should be heated to 250 - 400°F for at least two hours prior to using.

5. Preheat the header and plug to the temperature listed in Table 1, and maintain preheated temperature during the entire welding process, including the time

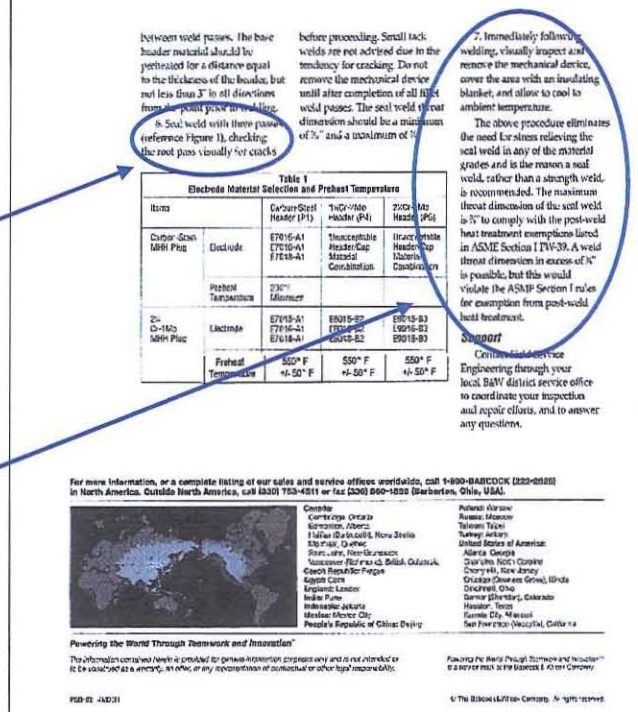
(continued on reverse side)

EXAMPLE:
Page 1 and 2 of instructions offered by Babcock & Wilcox for installing Master Hands Hold illustrating a seal weld of limited size;

"6. Seal weld with three passes (reference Figure 1) checking the root pass visually for cracks …The seal weld throat dimension should be a minimum of 5/16" and maximum of 3/8"."

"7. Immediately following welding, visually inspect…"

The above procedure eliminates the need for stress relieving the seal weld in any of the material grades and is the reason a seal weld, rather than a strength weld, is recommended. The maximum throat dimension of the seal weld is 3/8" to comply with the post-weld heat treatment exemptions listed in ASME Section I PW-39. "



between weld passes. The base header material should be preheated for a distance equal to the thickness of the header, but not less than 3" in all directions from the point prior to welding.

6. Seal weld with three passes (reference Figure 1), checking the root pass visually for cracks

before proceeding. Small tack welds are not advised due to the tendency for cracking. Do not remove the mechanical device until after completion of all fillet weld passes. The seal weld throat dimension should be a minimum of 5/16" and a maximum of 3/8".

7. Immediately following welding, visually inspect and remove the mechanical device, cover the area with an insulating blanket, and allow to cool to ambient temperature.

The above procedure eliminates the need for stress relieving the seal weld in any of the material grades and is the reason a seal weld, rather than a strength weld, is recommended. The maximum throat dimension of the seal weld is 3/8" to comply with the post-weld heat treatment exemptions listed in ASME Section I PW-39. A weld throat dimension in excess of 3/8" is possible, but this would violate the ASME Section I rules for exemption from post-weld heat treatment.

Table 1
Electrode Material Selection and Preheat Temperature

Items		Carbon-Steel Header (P1)	½Cr-½Mo Header (P4)	2¼Cr-1Mo Header (P5)
Carbon-Steel MHH Plug	Electrode	E7016-A1 E7018-A1 E7018-A1	Unacceptable Header/Cap Material Combination	Unacceptable Header/Cap Material Combination
	Preheat Temperature	200°F Minimum		
2¼-Cr-1Mo MHH Plug	Electrode	E7015-A1 E7016-A1 E7018-A1	E8015-B2 E8016-B2 E8018-B2	E9015-B3 E9016-B3 E9018-B3
	Preheat Temperature	300°F +/- 50°F	550°F +/- 50°F	550°F +/- 50°F

Support

Contact field service Engineering through your local B&W district service office to coordinate your inspection and repair efforts, and to answer any questions.

For more information, or a complete listing of our sales and service offices worldwide, call 1-800-BABCOCK (222-2625) in North America. Outside North America, call (330) 753-4511 or fax (330) 860-1886 (Barberton, Ohio, USA).

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The information contained herein is provided for general information purposes only and is not intended or to be construed as a warranty, an offer, or any representation of contractual or other legal responsibility.

PSB-01 4M0301

Additional Background-pg-4

NBIC Sub-Group Repairs & Alterations

Initially presented by Bob Wielgoszinski, 1-21-15:
During the inspection activity of some high pressure header type boilers, it is necessary to remove handhole covers or handhole plugs to access the inside of the header for inspection of tubes. The subsequent closure of the handholes by reinstalling the handhole covers or plugs sometimes necessitates the cover or plug being seal welded to its seat.

The seal weld is solely for the purpose of preventing leakage at the seat. The strength of the connection is based on back pressure applied to the cover or plug from boiler internal pressure. This seal welding constitutes a repair by welding as defined in the NBIC, and therefore requires inspection by a NB Commissioned Inspector, completion of an R-1 form, and attachment of a repair nameplate by the R stamp holder.

This repair activity has been interpreted as a routine repair, which would allow for the NB Inspector to waive in-process inspection and rule out the attachment of a repair nameplate by the R stamp holder (if permitted by the Inspector and the Jurisdiction). It would still, of course, require the completion of an R-1 form for the work performed. Although this seal welding process seems inconsequential to the structural integrity of the boiler, the problem here is that this type of repair is not mentioned specifically in "the list of 4" categories allowed by the NBIC, Part 3, 3.3.2(e). In fact, seal welding is not mentioned at all for routine repairs, even though interpretation 01-09 specifically addresses it for seal welding of tubes. Also, interpretation 95-35 addresses seal welding of tubes and confirms that it is a repair.

So, as a result of this, it would be helpful to the industry if the NBIC Committee could provide an interpretation of the rules to address seal welding of handhole covers or plugs as a routine repair. And if the Committee were to determine that such a repair is permitted as a routine repair, then a revision to the rules to address it would be equally as helpful to the public. Included below is a proposed question and reply for an interpretation.

IN15-0101-
Subject: Seal welding of handhole covers
Question: Is seal welding of inspection opening covers, such as handhole plates or plugs, considered a routine repair in accordance with NBIC, Part 3, paragraph 3.3.2 (e)?
Reply: No.

If the Committee feels that a repair such as described herein SHOULD be considered as a routine repair, then I will offer the following revision to the NBIC to clarify it. If the Committee does not believe it should be considered as a routine repair, then no revision would be necessary since the interpretation confirms that it is not permitted.

(Proposed 1-21-15) New paragraph 3.3.2. (e) 5):
5) Seal welding of mechanical connections provided postweld heat treatment is not required by the Code of construction."

Request for NBIC Revision

Robert V. Wielgoszinski
Hartford Steam Boiler of CT

NB15-2601

Purpose	To provide minimum radius dimension for corners of a flush patch
Scope:	Repairs and alterations to pressure retaining items that contain a flush patch, 3.3.4.6 a)2).
Background	In the performance of repairs by installation a flush patch, the treatment of the corners often becomes controversial because of the lack of specificity in the NBIC. The Code (Part 3 – 3.3.4.6 a)2), says in part, simply that "... If the patch is rectangular, an adequate radius should be provided at the corners. Square corners should be avoided..." The issue is the guidance "should be provided". Usually most R stamp holders provide an ample radius at these corners. A radius helps to avoid any undue stresses at the corner by eliminating a potential stress riser of a sharp right angle weld configuration. At a recent flush patch repair, it was reported that a radius was not provided and the subsequent pressure test revealed leaks at three of the four corners of the patch. Further investigation with LP examination discovered cracks at all three corners. This situation was clearly the result of poor application of the repair method, but could have been prevented by applying a radius at the corner, which was the corrective action in this case. So, the recommendation here is to revise the NBIC by requiring a minimum radius at corners of square or rectangular flush patches. A prescribed minimum, of say ½", would not cause any hardship on an R stamp holder that performs such repairs. And it does not preclude providing a larger radius if necessary. If there is a question of measurement, I also don't think this is a problem. A US quarter has about a ½" radius. UPDATE: 07/14/15: At the SG meeting it was pointed out that Supplement 1 of Part 3 already has some criteria for a minimum radius for patches in paragraph S1.2.11.2 d). This requires a 3x the plate thickness minimum radius. This is more conservative than ½". The SG voted to accept this revision with ½" changed to 3x the plate thickness.
Proposed Revision	Revise NBIC, Part 3, Paragraph 3.3.4.6 a) 2) to require a minimum of 3 times the plate thickness radius at the corners of square or rectangular flush patches. Before installing a flush patch, the defective material should be removed until sound material is reached. The patch should be rolled to the proper shape or curvature. The edges should align without overlap. In stayed areas, the weld seams should come between staybolt rows or riveted seams. Patches shall be made from a material whose composition and thickness meet the intended service. Patches may be any shape or size. If the patch is rectangular, an adequate radius ~~should~~ of at

	least 3 times the plate thickness shall be provided at the corners. Square corners ~~should~~ are not permitted. The completed welds shall meet the requirements of the original code of construction.

IN15-0401
Phased Array UT

Mr. Besserman:

This email is being sent for the purpose of requesting a Code Interpretation regarding the use of PAUT for final examination of boiler tube repair welds, as detailed below.

Purpose:

Code Interpretation

Inquiry:
Subject: Part 3, 4.2 a), 4.4 a, b, c, d)
Edition: 2013
Question: May Phased Array UT (PAUT) examination be used for verification of final circumferential weld repair integrity in lieu of pressure testing or other typical NDE methods (MT/PT/RT) involving boiler tubes where the thickness is below ½ inch, with NPS of 4 inch and less?

Reply: Yes

Background: A Midwestern energy company expressed desire to use PAUT in this application, foregoing any other examination or testing method. This was presented to past Iowa Chief, who gave his approval upon reviewing proposed PAUT procedure to be used by a qualified NDE company, using certified examiners. Newly installed Iowa Chief has taken exception to past Chief's decision, and will not allow use of this NDE method, stating that it does not meet requirements of ASME I, Table PW-11 General Note (g).

Regards,

Jamie Walker
Director of Quality Control
Hayes Mechanical
O: 773.292.2707
C: 773.910.5892
jwalker@hayesmechanical.com

Item NB15-1902

Single Strike-through and single underline: Comments/edits by Walt Sperko and Nathan Carter including NBIC Items 15-0509 and Nb15-1403 from January 2015 NBIC meeting in Orlando, FL

Comment [SJ1]: George, please fill in

Double Strike-through and double underline: Proposed edits by EPRI

2.5.3.6 Welding Method 6

This welding method provides ~~guidance~~ requirements for welding only Grade 91 tube material within the steam boiler setting and when ~~it's~~ it is impracticable to perform local post-weld heat treatment (PWHT). ~~This repair method utilizes a controlled fill technique.~~ When using this welding method, the following ~~is required~~ apply:

(1) This method is limited to butt welds in tubing NPS 5 (DN 125) or less in diameter and ½ in. (13 mm) or less in wall thickness for which the applicable rules of the original code of construction did not require notch toughness testing.

(2) Application shall be limited to only boiler tube repairs at a location internal to the boiler setting.

~~(3) Upon the completion of weld repair, the repair region shall be kept from humid or moist environments until the return to service~~. Upon completion of weld repair, the repair area shall be kept above the dew point temperature so that condensation does not form on the repair surface before returned to service or a moisture-barrier coating shall be applied to the surface.

Comment [GG2]: The words in blue were revised based on approval of item NB15-1402.

(a) The material shall be limited to P-No 15E, Group 1, Grade 91, creep strength enhanced ferritic steel (CSEF).

(b) The welding shall be limited to the SMAW or GTAW processes, manual or automatic, using suitably controlled maintenance procedures to avoid contamination by hydrogen producing sources. The surface of the metal shall be free of contaminants and kept dry.

(c) The ~~test material for the~~ welding procedure qualification test coupon shall be P-No 15 E, Group 1, Grade 91 ~~for the repair.~~

(d) Qualification thickness limits of base metal and weld deposit thickness ~~for the test plates and repair groove depths~~ shall be in accordance with ASME Section IX, QW-451.

(e) The Welding Procedure Specification (WPS) shall be qualified in accordance with the requirements of ASME Section IX~~., except that no~~ No postweld heat treatment shall be applied to the test coupon. Additionally, the ~~qualification~~ WPS shall include the following requirements;

1) The minimum preheat for the GTAW process shall be 200 deg F (~~93~~100 deg C). The minimum preheat for the SMAW process shall be 300 deg F (150 deg C). The preheat temperature shall be checked to ensure the minimum preheat temperature is maintained during welding and until welding is completed. The maximum interpass temperature shall be ~~400 deg F (200 deg C).~~ 550 deg F (290 deg C).

(2) When the SMAW process is specified for a fill pass layer ~~as a controlled filled welding technique,~~ the electrode diameter is restricted to a maximum size of 1/8 in. (3.2 mm). When the GTAW-process is specified, any limits in filler size is to be ~~reflected in the qualified PQR and~~ shown on the WPS.

(3) Regardless of the welding process (SMAW or GTAW), only the use of stringer beads shall be permitted.

(4) The filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43 and limited to the following consumables: ERNiCr-3 (e.g., Filler Metal 82), ENiCrFe-3 (e.g., INCONEL Welding Electrode 182), ENiCrFe-2 (e.g., INCO WELD A), ASME B&PV Code Cases 2733

Comment [GG3]: The highlighted blue was revised under another action NB15-0509.

and 2734 (e.g., EPRI P87) or
(5) A martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.

NB15-1903

5.3 DISTRIBUTION OF FORM R-1

a) Legible copies of completed Form R-1, together with attachments, shall be distributed to the owner or user and Jurisdiction, if required, and shall be provided to the Inspector and the inservice Authorized Inspection Agency of the pressure retaining item upon request. ~~the Inspector, the Jurisdiction, if required, and the Authorized Inspection Agency responsible for inservice inspection.~~

5.4 DISTRIBUTION OF FORM R-2

b) Legible copies of the completed Form R-2, together with attachments, shall be distributed to the owner-user, the "R" Certificate Holder responsible for design, and the Jurisdiction, if required, and shall be provided to the Inspector and inservice Authorized Inspection Agency of the pressure retaining item upon request

From:	Richard Stone <richardbstone@verizon.net>
To:	"rferrell@nationalboard.org"< rferrell@nationalboard.org>
Date:	06/30/2015 06:25 PM
Subject:	NBIC: Two Proposed New Documents For Repair Sub-Group - Installing Tubes In Water Tube Boilers By The Expanding Method

NB15-2502

Hello Bob;

1) I've prepared two new documents for the NBIC Repair Sub-Group to review for addition to the NBIC Part 3, Section 3 "Repair". Both documents describe the method of expanding (rolling) boiler tubes into water tube boilers.

I recommend these new documents be added to the NBIC Part 3, Repair either as 'Recommended Procedures' or as 'Guidelines' since there are some variations in the tube rolling process for different design boilers.

Both documents can be edited by the Repair Sub-Group as they consider necessary.

2) My reason for submitting these documents to the Repair Sub-Group is to provide all NBIC inspectors, state boiler inspectors and code users a basic procedure for installing and expanding boiler tubes by rolling. The present NBIC does not have any guidelines or procedures for tube rolling and this lack of information has caused problems to inspectors and code users who are not familiar with the work. I have discussed this problem with several inspectors and decided to prepare these draft document for the Repair Sub-Group to review.

In addition, I've also encountered in the power industry a number of defective boiler repair jobs caused by poor quality tube rolling. These problems show a general lack of knowledge and understanding of the tube rolling process by many power industry staff and workers.

3) I request you assign an NBIC item number to each document and then forward both documents to the Chairman of the Repair Sub-Group.

4) My primary reference document for both documents is: Technical Association Pulp & Paper Institute (TAPPI) - Technical Information Paper (TIP) #0416-08 "Guidelines For Replacement Of Generating Bank Tubes With Expanded Joints In Two Drum Boilers", dated 2002. I've attached a scanned copy of it with my documents for the Repair Sub-Group's use during the review process. My other reference is the tube rolling practices

used by Combustion Engineering.

Thanks.

Dick Stone
NBIC Locomotive Boiler Sub-Group

Subgroup: Repair & Alteration - Section 3

National Board Item No. **NB15-2502**

Current Level: Subgroup discussion

NBIC Part 3 Section 3 Paragraph(s): 3.4.5 *(Recommended)*

Title: **Guidelines For Installation Of Boiler Tubes In Water Tube Boilers**

Date Opened: *To Be Determined By Subgroup*

Background:
To provide guidance for the inspection, repair and replacement of the tubes in water tube boilers when OEM procedures are not available.

Proposed Action:
Boiler tubes shall be installed in accordance with the directions of the original equipment manufacturer (OEM). If this information is not available, the following procedures shall be used.

a. Boiler tubes installed by the expanding method shall use either a roller-type expander, a prosser-type expander or use the hydraulic expanding method.

b. The length of the tube expander or process shall be sized to expand the tube across the width of the drum wall and into the tube body. The expander rollers, expander mandrels, or prosser segments shall have smooth surfaces with smooth rounded corners or ends to prevent cutting or damaging the tube and drum wall surfaces. Tube expanders, including the rollers and mandrels, and prossers that become worn or damaged during the work shall be replaced.

c. The method of installing, attaching, expanding and flaring the boiler tubes into the drums or tube sheets shall equal the original design method and dimensions. Changing the tube installation and attachment method of any boiler tube from the original method is an alteration. This includes adding or deleting flaring the tube end and seal welding.

   When tubes are expanded into thick wall drums the tube expansion process may be performed on the tube in one stage or in two stages by first expanding the upper or lower section and then the remaining section.

d. The thickness of boiler tubes shall equal the original design values. Changing the boiler tube thickness from the original value is an alteration.

e. The shape and arrangement of boiler tubes shall equal the original design. Changing the shape or arrangement of any boiler tube from the original design is an alteration.

f. Boiler tubes shall be cut, bent and formed to the correct length and shape required for installation when the boiler and tubes are at equal temperature. The use of heating or stretching the tube during installation to obtain the required length by thermal or mechanical expansion is prohibited.

g. Tubes that are cut too short shall not be used unless repaired by re-ending. Tubes shall be cut to the final required length by a mechanical cutting method such as sawing or by use of a roller pipe cutter. Cutting the tube to the required length by use of any torch or electric cutting process is prohibited. If tubes are to be cut to the rough length by either the torch or electric cutting process, the cut line from these process shall be located at least 1 in. (25.4 mm) from the final cutting edge length and the tube shall be cut to its finished length by use of a mechanical cutting method.

h. Tube ends that are found to be too long after expanding into the tube sheet or drum shall be cut down to their required length by milling back the tube end using a tube milling cutter tool.

i. Tube bends shall be made to create smooth surfaces and smooth curves across the entire bend length. Bending shall be performed using dies or other mechanical methods. Tubes that are bent incorrectly or formed to the wrong configuration shall not be used unless the defect is repaired by re-bending the tube to the required configuration.

j. When the ends of boiler tubes are swedged to a smaller or larger diameter as required to fit the drum wall holes ,the swedging shall create smooth surfaces, smooth curves, and a uniform diameter reduction across the entire swedged length. Swedging shall be performed using dies. Machining the tube end to a smaller diameter to obtain the required swedge diameter is prohibited. When tubes are swedged to a larger diameter, the new reduced wall thickness of the enlarged tube end shall be reviewed to confirm that upon completion of the tube expansion process the new wall thickness will be sufficient for the MAWP.

k. Prior to installing the boiler tubes all cut or damaged tube holes and retention groves shall be repaired as required. Tube sheets shall be straightened or braced in their required position to prevent flexing in the event this is necessary such as by using removable braces or strong-backs. All surfaces of the hole shall be clean, dry, and free of all grease, tube rolling lubricant and oil prior to installing the tube and expanding it. If the hole surfaces are cleaned using grinding or polishing wheels, these shall be the fine grade type to prevent cutting the surfaces. The cleaning shall be performed to prevent cutting longitudinal grooves or cuts on the hole surfaces because this type of damage can serve as a pathway for leaks.

The cleaning shall be performed in the circumferential direction whenever possible.

l. The clearance between the tube OD and the drum or tube sheet hole ID shall not exceed 0.040 in. (1.0 mm) unless the original design requires a different value be used.

m. The exterior and interior surfaces of the tube end shall be clean, dry, and free of all preservative and dirt prior to installing the tube and expanding it. If the tube surfaces are cleaned using grinding or polishing wheels, these shall be the fine grade type to prevent cutting the tube surfaces. The cleaning shall be performed to prevent cutting longitudinal grooves or cuts on the tube surfaces because this type of damage can serve as a pathway for leaks. The cleaning shall be performed in the circumferential direction whenever possible.

n. If a lubricant is used to lubricate the tube expander during use, the lubricant shall be a water soluble-type to aid its removal and surface clean up.

o. Sharp edges on both sides of each drum or tube sheet hole shall be removed prior to installing the tube unless the original design requires a different method be used. When the hole edges are required to have a radius to prevent it cutting into the tube surface upon expansion, the dimension range of the radius shall be between 1/32 in. -1/16 in. (0.794 mm - 1.59 mm) unless the original design requires that a different value be used.

p. Each tube during installation shall be placed in its required position in both drum or tube sheet walls and at the furnace exterior. The tube shall then be temporarily locked or fixed in place to prevent it from moving as it is expanded. This locking work may be performed by use of removable blocks, wedges, fixtures or gages.

q. The ends of tubes that are flared shall project through the hole not less than 1/4" (6 mm) nor more than 3/4" (19 mm) before flaring. Where tubes enter at an angle, the maximum limit of 3/4" (19 mm) shall apply only at the point of least projection.

r. Each tube shall have both ends expanded into its mating holes using the required amount of expansion or wall thickness reduction required by the design. If the original design expansion values are not known, the expansion shall be in the 8% - 12% wall reduction and not exceed 15% upon completion of all subsequent re-expansion work such as flaring the tube end. Tubes expanded in excess of 25% wall reduction are classified as "over-rolled" and shall be replaced.

The percentage of tube wall reduction shall be measured using go-no go gages, tube micrometers or ultrasonic thickness (UT) testing. To calculate the percentage of tube reduction required for a specific hole ID see "Guideline For Calculating Tube Expansion By Wall Thickness Reduction".

s. Tubes that are expanded and flared without seal welding shall be flared to an outside diameter of at least 1/8" (3.0) greater than the diameter of the tube hole and shall not exceed 3/4" (19 mm).

t. When tubes ends are flared, the flaring work shall be performed and the depth limited to prevent the bottom of the flare from contacting the surface or edges of the drum or tube sheet.

u. When tubes are to be beaded the beading shall be performed to prevent damaging the drum wall or tube sheet by cutting or grooving it. Upon completion of the beading work the bead OD shall contact the drum or tube sheet surface around the entire tube circumference. The tube shall then be lightly re-expanded to confirm the beading process has not loosened it in the drum or tube sheet hole. If the tube bead is to also be seal welded, this light re-expansion of the tube shall be performed upon completion of seal welding. Repair of a defective or incorrectly formed tube bead by welding is prohibited. Tube shall not be heated to assist forming the bead during the beading process. If ferrules are used in the drum or tube sheet hole, no part of the ferrule shall interfere with the forming of the bead.

v. When beaded tubes are to be seal welded to the drum or tube sheet, the tube shall first be expanded either partially or completely into the hole and then be beaded around its entire circumference. Next, all oil or lubricant shall be removed prior to seal welding. The drum or tube sheet temperature shall not be less than 70°F (21°C) during the seal welding process. The seal weld size shall range between 1/8 in. - 1/4 in. (3 mm - 6 mm) and be applied as a fillet weld of the equal leg or unequal leg type unless the original design requires a different weld size or weld type be used. Upon completion of seal welding the tube shall either be expanded to its final setting or re-expanded lightly to confirm that the seal welding has not loosened it in the hole. If ferrules are used, no part of the ferrule shall protrude from the bead and come into contact with the seal weld.

w. When tubes are installed by expanding straight and seal welding without beading, each tube shall first be expanded either partially or completely into the hole then all accessible oil or lubricant shall be removed prior to seal welding. The drum or tube sheet metal temperature shall not be less than 70°F (21°C) during the seal welding process. The seal weld size shall range between 1/8 in. - 1/4 in. (3 mm – 6 mm) based on the tube thickness unless the original design required different values be used. Upon completion of seal welding the tube shall either be expanded to its final setting or re-expanded lightly to confirm that the seal welding has not loosened it in the hole. If ferrules are used, no part of the ferrule shall protrude from the bead and come into contact with the seal weld.

x. If it is necessary to determine the workmanship of the tube installation prior to seal welding the tubes, the boiler shall be tested hydrostatically to either MAWP

or to a lower value. If this test is done, the boiler shall be given its required hydrostatic test to MAWP upon completion of the seal welding work.

y. Any tube that show cracks within the expanded section, the flare, the bead or the seal weld upon completion of the tube installation process shall be replaced.

z. Cracks in seal welds shall be repaired by grinding out the crack and then reapplying the seal weld. These cracks often result from oil contamination of the weld seal. The metal temperature of the drum or tube sheet shall not be less than 70°F (21°C) during the seal weld crack repair process. Upon completion of seal welding the tube shall be re-expanded lightly to confirm the seal welding has not loosened it.

Notes To Reviewers:

1. *This document is based on Technical Association Pulp & Paper Institute (TAPPI) - Technical Information Paper (TIP) #0416-08 "Guidelines For Replacement Of Generating Bank Tubes With Expanded Joints In Two Drum Boilers", dated 2002.*

2. *If this document is approved for inclusion into the NBIC I recommend that an NBIC version of ASME B&PVC Figure PWT-11 "Examples Of Acceptable Forms Of Tube Attachment" be included with it. This addition of this figure will aid inspectors to understand the different designs of rolled tube joints.*

From:	Richard Stone <richardbstone@verizon.net>
To:	"rferrell@nationalboard.org"< rferrell@nationalboard.org>
Date:	06/30/2015 06:25 PM
Subject:	NBIC: Two Proposed New Documents For Repair Sub-Group - Installing Tubes In Water Tube Boilers By The Expanding Method

NB15-2503

Hello Bob;

1) I've prepared two new documents for the NBIC Repair Sub-Group to review for addition to the NBIC Part 3, Section 3 "Repair". Both documents describe the method of expanding (rolling) boiler tubes into water tube boilers.

I recommend these new documents be added to the NBIC Part 3, Repair either as 'Recommended Procedures' or as 'Guidelines' since there are some variations in the tube rolling process for different design boilers.

Both documents can be edited by the Repair Sub-Group as they consider necessary.

2) My reason for submitting these documents to the Repair Sub-Group is to provide all NBIC inspectors, state boiler inspectors and code users a basic procedure for installing and expanding boiler tubes by rolling. The present NBIC does not have any guidelines or procedures for tube rolling and this lack of information has caused problems to inspectors and code users who are not familiar with the work. I have discussed this problem with several inspectors and decided to prepare these draft document for the Repair Sub-Group to review.

In addition, I've also encountered in the power industry a number of defective boiler repair jobs caused by poor quality tube rolling. These problems show a general lack of knowledge and understanding of the tube rolling process by many power industry staff and workers.

3) I request you assign an NBIC item number to each document and then forward both documents to the Chairman of the Repair Sub-Group.

4) My primary reference document for both documents is: Technical Association Pulp & Paper Institute (TAPPI) - Technical Information Paper (TIP) #0416-08 "Guidelines For Replacement Of Generating Bank Tubes With Expanded Joints In Two Drum Boilers", dated 2002. I've attached a scanned copy of it with my documents for the Repair Sub-Group's use during the review process. My other reference is the tube rolling practices used by Combustion Engineering.

Thanks.

Dick Stone
NBIC Locomotive Boiler Sub-Group

NBIC Subcommittee R&A Action Block

Subject Remove revision of ACCP Program in Paragraph 4.2 b)

File Number NB15-2801 **Prop. on Pg.**

Proposal Explanation

In NBIC Part 3, Paragraph 4.2 b), a year and date is listed for ACCP (i.e. "Rev. 3, Nov 1997"). This is an improper way to reference the ACCP Program. The correct way is to adopt the program and list solely, "ASNT Central Certification Program (ACCP)" without a date and revision. The ACCP-CP-1 document used by ASNT is not a standard. It is an internal program document used solely by ASNT and their Authorized Examination Centers (AEC) for the Central Certification of NDT Personnel. ASNT is currently working to Rev 8 of this document. There are multiple problems that can arise from listing a Revision and Year for this document.

First, if a NB Team Leader were to request proof that an ACCP Professional Level II or III performing work to the NBIC, was certified to "Rev. 3, Nov 1997" of the ACCP Program, there would be no direct way to do so. The two certification documents issued by ASNT (i.e. wallet card and wall certification) do not reference the ACCP-CP-1 document or its revision and date. ASNT's online "certification check" also doesn't reflect a revision and date for the ACCP-CP-1 document used to certify the ACCP Professional by ASNT. This potentially would be a finding, which is an unfair burden to place on the R-Certificate Holder with no direct way to clear.

Also, by listing "Rev. 3, Nov 1997", literal interpretation would mean that ONLY ACCP Professionals Certified by ASNT when they used Rev 3 of the ACCP-CP-1 document are valid for performing work to the NBIC. Therefore, if an ACCP Professional Level II or III was initially certified to Rev 1, 2, or 4-8, then they can't perform work to the NBIC, including people being certified today. Also, ACCP Professionals are recertified by ASNT, if they meet the requirements on a 5-year cycle. When you consider this and since Rev. 3 went into effect in Nov. 1997, which was roughly 18 years ago, and since Rev 7 is dated 7/17/2010, literal interpretation of Paragraph 4.2 b) would beg the question if there are any ACCP Professional Level II or IIIs technically eligible to perform work to the NBIC today?

This proposal recognizes that as long as the ACCP Professional is properly certified by ASNT and maintains that certification, then the adoption of the ACCP Program in itself is sufficient. It also includes "ANSI" as part of the title for CP-189.

Project Manager Nathan Carter

Task Group Negatives **TG Meeting Date**

NBIC Subcommittee R&A Action Block

NBIC Part 3, Paragraph 4.2 b)

Current

b) NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice Nondestructive Testing Personnel Qualification and Certification* (2006 edition), or ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel* (2006 edition), shall be used as a guideline for employers to establish their written practice. The ASNT Central Certification Program (ACCP, Rev. 3, Nov. 1997) may be used to fulfill the examination and demonstration requirements of the employer's written practice. Provisions for training, experience, qualification, and certification of NDE personnel shall be described in the "R" Certificate Holder's written quality system.

Proposed

b) NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice Nondestructive Testing Personnel Qualification and Certification* (2006 edition), or ANSI/ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel* (2006 edition), shall be used as a guideline for employers to establish their written practice. The ASNT Central Certification Program (ACCP~~, Rev. 3, Nov. 1997~~) may be used to fulfill the examination and demonstration requirements of the employer's written practice. Provisions for training, experience, qualification, and certification of NDE personnel shall be described in the "R" Certificate Holder's written quality system.

Comment [NAC1]: Insert

Comment [NAC2]: Deleted

NBIC Subcommittee R&A Action Block

Subject Change reference standard, "ACCP-189" to "ANSI/ASNT CP-189" and also included reference to the ACCP Program.

File Number **Prop. on Pg.**

Proposal Explanation In NBIC Part 3, Paragraph S6.10 b), "ACCP-189" is referenced, but this standard does not exist. The correct reference standard is "ANSI/ASNT CP-189". This does not appear to be an errata though. It first appeared this way in the 2007 Edition of NBIC Part 3, when Supplement 6 was first printed. Either SNT-TC-1A or CP-189 is used as a guideline for employers to establish their written practice and not used for meeting the examination and demonstration requirements. From the existing language, it appears that the intent was to also include the ACCP Program. This item also includes reference to the ACCP Program and other editorial modifications, which brings this paragraph in line with Paragraph 4.2 b).

Project Manager Nathan Carter

Task Group Negatives **TG Meeting Date**

NBIC Subcommittee R&A Action Block

NBIC Part 3, Paragraph S6.10 b)

Current

b) NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice for Nondestructive Testing Personnel Qualification and Certification*, or ACCP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel*, may be used to fulfill the examination and demonstration requirements of SNT-TC-1A and the employer's written practice. Provisions for qualification and certification of NDE personnel shall be described in the "TR" Certificate Holder's written quality system.

Proposed

b) NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice for Nondestructive Testing Personnel Qualification and Certification*, or ANSI/ASNT CP-189 ~~*ACCP-189*~~, *Standard for Qualification and Certification of Nondestructive Testing Personnel*, shall be used as a guideline for employers to establish their written practice. The ASNT Central Certification Program (ACCP) may be used to fulfill the examination and demonstration requirements of ~~SNT-TC-1A and~~ the employer's written practice. Provisions for training, experience, qualification and certification of NDE personnel shall be described in the "TR" Certificate Holder's written quality system.

Comment [NAC1]: Insert
Comment [NAC2]: Delete
Comment [NAC3]: Insert
Comment [NAC4]: Delete
Comment [NAC5]: Insert