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THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE COMMITTEE

MAIN SESSION AGENDA

Meeting of January 11th, 2024
San Antonio, TX

The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, Ohio 43229-1183
Phone: (614)888-8320
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1. **Call to Order**
   The Chair will call the meeting to order at 9:00 A.M. Central Time. For those attending in person, the meeting will be held in Iberian A and B at the hotel.

2. **Introduction of Members and Visitors**

3. **Check for a Quorum**

4. **Awards/Special Recognition**

5. **Announcements**
   - This meeting marks the end of Cycle C for the 2025 NBIC edition. The committees will have until the end of the July 2024 NBIC meeting to approve items for inclusion in the 2025 NBIC.
   - The National Board will be hosting lunch for those attending the Main Committee meeting. Lunch will be served from 11:30 a.m. to 12:30 p.m. in Veramendi (fourth level of the hotel).
   - If you'd like to request a new Interpretation or Action item, this should be done on the National Board Business Center.
     - Anyone, member or not, can request a new item.
   - As a reminder, anyone who would like to become a member of a group or committee:
     - Should attend at least 2 meetings prior to being put on the agenda for membership consideration. The nominee will be on the agenda for voting during their 3rd meeting.
     - The nominee must submit the formal request along with their resume to the NBIC Secretary **PRIOR TO** the meeting. *nbicsecretary@nbbi.org*
     - If needed, we can also create a ballot for voting on a new member between meetings.
   - Thank you to everyone who registered online for this meeting. The online registration is very helpful for planning our reception, meals, room set up, etc. Please continue to use the online registration for each meeting. If you are here in person, and did not register, please visit the National Board website to register now. Registering will make sure we have an accurate count for the reception, breakfast, and lunch. It also is a good way to make sure we have the most up-to-date contact information.

6. **Adoption of the Agenda**

7. **Approval of the Minutes of the July 2023 Meeting**
   The minutes are available for review online at https://www.nationalboard.org/Index.aspx?pageID=13&ID=18.

8. **Presentation on Safety Concerns Associated with Tee Branch Fittings**
   Mr. John Siefert will be presenting on EPRI's research and findings regarding issues related to safe operation of current tee branch fittings.

9. **Items Approved for the 2025 NBIC**
   See Attachment Page 2 for a summary of items currently approved for the 2025 NBIC edition.

10. Main Committee Task Group on Developing Rules for Additive Manufacturing Pressure Parts

Item Number: 23-09	**NBIC Location: TBD**	**No Attachment**

General Description: Developing Rules for Additive Manufacturing Pressure Parts

Subgroup: Repairs and Alterations

Task Group: G. Galanes (PM), J. Siefert, B. Schaefer, W. Sperko, J. Ferreira, J. Getter, T. Seime, and M. Wadkinson.

Explanation of Need: Determining appropriate rules and scope for the use of additive manufacturing pressure parts on pressure-retaining items.

January 2024 Meeting Action/Update:

11. Report of Subcommittees

a. Subcommittee Repairs & Alterations

i. New Interpretation Requests:

Item Number: I23-55	**NBIC Location: Part 3, S6.8**	**Attachment Page 3**

General Description: DOT Supplement 6 Intent Interpretation

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

Explanation of Need: The current wording in S6.8 of the 2021 and 2023 Edition of Part 3 incorrectly requires the National Board Commissioned Inspector to ALSO be a DOT Registered Inspector. The 2025 Edition is removing reference to Registered Inspector (Item 20-67). This Intent Interpretation addresses the incorrect reference to Registered Inspector and the "answer" reflects the approved wording from the 2025 Edition of Supplement 6.

January 2024 Meeting Action:

Item Number: I23-63	NBIC Location: Part 3, 3.4.4 d)	Attachment Page 8

General Description: Replacement of Heads with Different Types

Subgroup: Repairs and Alterations

Task Group: T. McBee (PM), M. Schaser

Explanation of Need: 2023 NBIC revises 3.4.4 d) to effectively remove, as an "Example of Alteration", a change in dimension or contour of a pressure-retaining item that does not decrease an item's pressure retaining capability. Prior to revision, 3.4.4 d) would classify any such changes as "alterations".

January 2024 Meeting Action:

Item Number: I23-64	NBIC Location: Part 3, 3.3.3 j)	Attachment Page 9

General Description: Review of calculations for a new nozzle per 3.3.3 j)

Subgroup: Repairs and Alterations

Task Group: T. McBee (PM), M. Schaser

Explanation of Need: Example of repair 3.3.3 j) may allow for limits of reinforcement to over lap in some cases and as such is not conservative.

January 2024 Meeting Action:

Item Number: I23-65	NBIC Location: Part 3, 3.3.4.8 a) and 4.4	Attachment Page 10

General Description: Returning a vessel to service without repairing known defects

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM), J. Ferreira

Explanation of Need: The vessel is located in the state of Texas whose laws do not address pressure vessels, and there are no jurisdictional inspection requirements. Repairs applied by the R Certificate holder to one part of the vessel are complete and acceptable. The R Certificate holder is not satisfied with leaving another part of the vessel with a known defect at the direction of the owner, who intends to return the vessel to operation in its current state. It has been explained to the repair organization that the owner is ultimately responsible for the condition and safety of the vessel and is accountable to the jurisdiction.

January 2024 Meeting Action:

Item Number: I23-66	NBIC Location: Part 3, 3.2.7	Attachment Page 11

General Description: Applying PWHT to a vessel not previously PWHT for a change of service

Subgroup: Repairs and Alterations

Task Group: C. Hopkins (PM), M. Carlson, G. Galanes

Explanation of Need: The pressure vessel is to be installed and operated in the state of Texas. The Chief Inspector reports that Texas state laws do not address pressure vessels, and has directed the user to contact the National Board for assistance. The NBIC has issued an interpretation that applying PWHT to a vessel not previously subject to PWHT is an alteration, and we agree. The NBIC does not address whether applying PWHT to such a vessel makes it unsuitable for service since the original WPSs were not qualified with PWHT. The owner intends to apply PWHT and operate the vessel in its new service application by September 1, 2023.

January 2024 Meeting Action:

Item Number: I23-71	NBIC Location: Part 3, 3.3 and 3.4	Attachment Page 12

General Description: Applying PWHT to a vessel not previously PWHT for a change of service

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM), D. Kinney, P. Becker

Explanation of Need: The repair/alteration method shown is used for tube replacement. This method is being done in Texas, but there is confusion on whether this method of tube replacement should be classified as a repair or an alteration.

January 2024 Meeting Action:

Item Number: I23-75	NBIC Location: Part 3, 4.4.2 c)	Attachment Page 17

General Description: NDE In Lieu of Pressure Testing for Alterations

Subgroup: Repairs and Alterations

Task Group: M. Toth (PM), L. Dutra

Explanation of Need: The existing language in NBIC Part 3, Section 4, Paragraph 4.4.2.c – in concert with the new definition of "practicable" added in the 2023 Edition of the Code – may confuse Repair Organizations and owners about their options when it comes to verifying a successful alteration to a pressure-retaining item.

January 2024 Meeting Action:

Item Number: I23-79	NBIC Location: Part 3, 2.5.3 d) and 2.5.3.6	Attachment Page 18

General Description: Alternative Welding Method 6 - Controlled Fill

Subgroup: Repairs and Alterations

Task Group: P. Gilston (PM), R. Derby

Explanation of Need: There is a lack of clarity as to the current requirement, need, and definition of controlled fill technique for application to Welding Method 6.

January 2024 Meeting Action:

Item Number: I23-82	NBIC Location: Part 3, 2.5.3 d) and 2.5.3.6	Attachment Page 19

General Description: Replacement of non-pressure retaining parts in Electrolyzer PEM Stack

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: Hydrogenics is a manufacturer of hydrogen electrolyzers which operate on PEM (Proton Exchange Membrane) technology. The PEM stack operates at 30 bar (435 PSIG) pressure and is rated for a MAWP of 40 bar (580 PSIG) and we perform pneumatic pressure tests to ensure structural integrity according to ASME Sec VIII-1. At times we see cell shortage faults occurring which is not a failure of the pressure-retaining components but of components within the pressure vessel failing due to normal wear and tear. Need to determine if our company requires the NB R Certificate holder status.

January 2024 Meeting Action:

ii. Action Items

TG Interpretations Items:

Item Number: A23-73	NBIC Location: Section 10 and the NBBI Website	Attachment Page 20

General Description: Revise Interp 21-05 to add later ASME Editions

Subgroup: Repairs and Alterations

Task Group: T. Seime (PM), D. Kinney

Explanation of Need: Interp 21-05 intended to require all alterations to vessels built to ASME Sect. VIII Div. 1, 2021 Edition AND ALL FOLLOWING EDITIONS , be done by design personnel meeting the requirements of Appdx 47.

January 2024 Meeting Action:

TG Graphite Items:

Item Number: NB15-2208	NBIC Location: Part 3	No Attachment

General Description: Develop supplement for repairs and alterations based on international construction standards

Subgroup: Graphite

Task Group: Greg Becherer (PM)

July 2023 Meeting Action: Mr. Viet stated that the task group is still working on a proposal for this item.

Item Number: A23-45	NBIC Location: Part 3, S3.3	Attachment Page 21

General Description: Graphite plate replacement as Routine repair

Subgroup: Graphite

Task Group: J. Wince (PM)

Explanation of Need: In many cases, replacing a plate in a graphite plate heat exchanger is something that can be considered routine, but it is not currently defined as such. This proposal seeks to add this procedure to the list of routine repairs for graphite pressure vessels.

July 2023 Meeting Action: Mr. Viet stated that the Task Group will be doing some additional work to the proposal based on feedback from Subcommittee R&A.

TG FRP Items:
There are currently no FRP items open for Part 3.

TG Historical Items:

Item Number: 20-25	**NBIC Location: Part 3, S2.13**	**No Attachment**
General Description: Repair Procedure for Fire Boxes **Subgroup:** SG Historical **Task Group:** M. Wahl (PM), Robin Forbes, T. Dillon, L. Moedinger, & F. Johnson **Explanation of Need:** In NBIC Part 3, S2.13.10.3, S2.13.11 do not define what to do at a riveted joint. On the tubesheet, or firedoor sheet, where it is flanged to rivet to the firebox, the repairs are silent on what to do at the riveted joint. **July 2023 Meeting Action:** Ms. Moore stated that the task group is still working on a proposal for this item.		

Item Number: 23-62	**NBIC Location: Part 3, S2**	**No Attachment**
General Description: Reusing pressure retaining items under alteration **Subgroup:** SG Historical **Task Group:** None assigned. **Explanation of Need:** Addition to book explaining how a pressure retaining item can be reused on a historical boiler under the guidelines of an alteration.		
January 2024 Action:		

TG Locomotive Items:

There are currently no Locomotive items open for Part 3.

NR Task Group Items:

Item Number: A23-57	**NBIC Location: Part 3, 1.6**	**Attachment Page 22**

General Description: Rename Authorized Nuclear Inspector - NR TG Item

Subgroup: NR TG

Task Group: C. Dinic (PM)

Explanation of Need: Endorsements required may need to be revised based on Category of work. Name of the Inspector may need to be revised.

January 2024 Meeting Action:

Item Number: A23-58	**NBIC Location: Part 3, 1.6.7.1 s) 2)**	**Attachment Page 23**

General Description: Add the applicable requirements for Auditors

Subgroup: NR TG

Task Group: T. White (PM)

Explanation of Need: Add the applicable requirements from ASME "Requirement 2" to the current requirements of audit personnel per 1.6.7.1 s) 2) for Cat. 2 or change it to be specific to Sect. XI

January 2024 Meeting Action:

Item Number: A23-60	**NBIC Location: Part 3, 1.6**	**Attachment Page 24**

General Description: Endorsements required for Nuclear Inspectors based on Category of work

Subgroup: NR TG

Task Group: C. Dinic (PM)

Explanation of Need: Endorsements required for Nuclear Inspectors based on Category of work (1, 2, or 3)

January 2024 Meeting Action:

SG Repairs & Alterations Items:

Item Number: 21-12	**NBIC Location: Part 3, 3.3.3, 3.4.4, Section 9**	**Attachment Page 25**

General Description: Clarify the definitions and examples of "Repair" and "Alteration"

Subgroup: Repairs and Alterations

Task Group: P. Becker (PM), K. Moore, P. Shanks, R. Underwood, M. Chestnut, T. Sieme

Explanation of Need: Clarify the definitions of "Repair" and "Alteration" in the Glossary and revise the list of examples of each to better define the allowable scope of activities.

History: This Item was created as a result of conversation regarding Interp. Item 20-78 and Action Item 20-54

July 2023 Meeting Action: Ms. Moore reported that the task group is still developing on a proposal for this item.

Item Number: 21-31	**NBIC Location: NBIC Glossary**	**Attachment Page 28**

General Description: Revise definition of "Field"

Subgroup: Repairs and Alterations

Task Group: R. Miletti (PM), P. Gilston, M. Toth, J. Walker

Explanation of Need: A "Field" site under the current definition could be multiple rented or leased spaces used for repairs/alterations, where there is no single or specific customer or job, but rather the locations(s) are used for conducting repair/alteration activities by personnel employed by the Certificate Holder on a continual basis.

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on a proposal for this item.

Item Number: 21-43	**NBIC Location: Part 3, Glossary**	**No Attachment**

General Description: Defining and revising "Practicable" and "Practical" within the NBIC

Subgroup: Repairs and Alterations

Task Group: M. Toth (PM), B. Underwood

Explanation of Need: Defining and revising Practicable and Practical within the NBIC and revising where applicable

July 2023 Meeting Action: Ms. Moore said that the task group is still working on a proposal for this item.

Item Number: 21-44	NBIC Location: Part 3, Glossary	No Attachment

General Description: Defining "De-Rating" within Part 3

Subgroup: Repairs and Alterations

Task Group: M. Toth (PM), B. Underwood, J. Walker, M. Wadkinson, L. Dutra

Explanation of Need: Defining de-rating within Part 3

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on this item.

Item Number: 21-45	NBIC Location: Part 3, Supplements	Attachment Page 30

General Description: Add a supplement for engineered repairs and alterations

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

Explanation of Need: There has been interest from companies operating with the Oil, Gas and Chemical industries to address certain types of repairs that may exist in ASME PCC-2 or API. NBIC does not have many of these repair methods within the book.

July 2023 Meeting Action: Ms. Moore asked Mr. Underwood to report on this item. Mr. Underwood stated that there will be a letter ballot sent to Main Committee to vote on the proposed Scope for the new engineered repairs supplement. If the scope is approved, then the task group will begin working on a proposal that will move the engineered repair and alterations methods from the body of Part 3 into the proposed new supplement.

Item Number: 21-53	NBIC Location: Part 3, S8.5 a)	No Attachment

General Description: Post Repair Inspection of weld repairs to CSEF steels

Subgroup: Repairs and Alterations

Task Group: P. Gilston (PM), E. Cutlip, A. Triplett

Explanation of Need: The requirement for Inspector involvement in post-repair inspections to CSEF weld repairs is to ensure future safe operation of the boiler. This is a function of the inservice Authorized Inspection Agency, not the Repair Inspector, whose duties end with completion of repair documentation.

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on a proposal for this item.

Item Number: 21-67	NBIC Location: Part 3, 3.4.9	Attachment Page 52

General Description: Add welding requirements to plugging firetubes

Subgroup: Repairs and Alterations

Task Group: P. Gilston (PM), K. Moore, Trevor Seime, M. Quisenberry

Explanation of Need: The current NBIC does not have enough direction or requirements for welding tube plugs in firetubes.

July 2023 Meeting Action: Ms. Moore asked Mr. Gilston to present this item. Mr. Gilston explained the proposal and then requested that the item be sent as a letter ballot to Main Committee in order to give the Committee time to review the proposed changes.

Note that this item was approved by MC in July and then re-opened to address a comment from Mr. George Galanes. This updated proposal has been approved by the SG and SC.

Item Number: 22-18	NBIC Location: Part 3, 9.1 (and all other Parts)	No Attachment

General Description: Definition of blowdown and blowoff

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM), M. Quisenberry

Explanation of Need: These terms are not consistently used throughout the industry. This is to provide guidance to use the correct term when addressing the equipment or the action.

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on a proposal for this item.

Item Number: 22-19	NBIC Location: Part 3, 5.5.2	No Attachment

General Description: R Certificate Holders with Design Only Scope

Subgroup: Repairs and Alterations

Task Group: J. Ferreira (PM), R. Valdez, G. Scribner, B. Schaefer, M. Schaser

Explanation of Need: To add new paragraphs 5.2.2 d) and 5.2.2 e) which will provide guidance for R Certificate Holders with "Design Only" on which activities they are permitted to perform and how they and the Inspectors shall complete the R-2 Form.

July 2023 Meeting Action: Ms. Moore stated that the proposal for this item will be balloted to Subcommittee R&A prior to the January 2024 NBIC meeting.

Item Number: 22-41	NBIC Location: Part 3, 1.5	No Attachment

General Description: Reference NB-415 in Quality System

Subgroup: Repairs and Alterations

Task Group: P. Davis (PM), M. Carlson, L. Ponce, J. Walker.

Explanation of Need: Requirements in the NB-415 should be included in the R Cert. Holder's QC Manual. Examples: a) Notifying the National Board when an organization changes scope, ownership, name, location, address, or Inspection Agreement and b) Return of the stamp.

July 2023 Meeting Action: Ms. Moore reported that the task group is still working on a proposal for this item.

Item Number: A23-04	NBIC Location: Part 3, 3.3.4.6	Attachment Page 55

General Description: Addressing Flush Patch Plate Weld NDT

Subgroup: Repairs and Alterations

Task Group: J. Ferreira (PM), K. Moore, Added M. Schaser, T. McBee, and F. Johnson

Explanation of Need: NBIC Item to Address Flush Patch Plate Weld NDT.

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on a proposal for this item.

Item Number: A23-13	NBIC Location: Part 3, 3.3.3 s)	Attachment Page 56

General Description: Consistent addressing of the term for weld metal

Subgroup: Repairs and Alterations

Task Group: P. Gilston (PM), W. Sperko, J. Siefert, T. Melfi, F. Johnson

Explanation of Need: Item for addressing consistent addressing of the term for weld metal is being opened based on discussions on A21-82. Weld Metal vs Filler Metal vs Filler Material, etc.

July 2023 Meeting Action: Ms. Moore presented the proposal for this item and stated that it will be balloted to the other three subcommittees for approval.

Item Number: A23-14	NBIC Location: Part 3, Table S9.2	Attachment Page 57

General Description: Extension Instructions for Reports of Repair

Subgroup: Repairs and Alterations

Task Group: M. Quisenberry (PM)

Explanation of Need: Additional text should be added to Instruction (29) of Table S9.2 of Supplement 9 (listing the "R" Cert. of Auth expiration date), to provide instructions on how to document if the "R" Cert. Holder is operating under an extension.

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on a proposal for this item.

Item Number: A23-21	NBIC Location: Part 3, 3.3.4.9	No Attachment

General Description: Boiler tube plug guidelines and inclusion or watertube boilers

Subgroup: Repairs and Alterations

Task Group: E. Cutlip (PM), P. Gilston, K. Moore, A. Triplett

Explanation of Need: Currently both firetube and watertube boilers require a boiler tube be plugged when replacement of a tube is not practicable at the time the defective tube is detected.

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on a proposal for this item.

Item Number: A23-24	NBIC Location: Part 3	No Attachment

General Description: Repairs to quick actuating closures

Subgroup: Repairs and Alterations

Task Group: T. McBee (PM), C. Becker, M. Schaser, A. Khssassi, R. Smith

Explanation of Need: Put safe guidelines for repairs to quick actuating closures.

July 2023 Meeting Action: Ms. Moore stated that the task group is still working on a proposal for this item.

Item Number: A23-29	NBIC Location: Part 3, 1.5.1 s)	No Attachment

General Description: Clarification of Intent

Subgroup: Repairs and Alterations

Task Group: A. Triplett (PM), P. Becker

Explanation of Need: The sentence is unclear as it currently reads. With the new wording it clarifies the intent.

July 2023 Meeting Action: Ms. Moore stated that the task group is still preparing a proposal for this item.

Item Number: A23-35	NBIC Location: All Parts, 9.1	Attachment Page 64

General Description: Definition of "non-load bearing attachment" (All Parts)

Subgroup: Repairs and Alterations

Task Group: T. White (PM), A. Khssassi

Explanation of Need: The term "nonload bearing attachment" is used as a basis for determining a routine repair but is not defined in the NBIC.

July 2023 Meeting Action: Ms. Moore reported that a proposal is still being developed for this item.

Item Number: A23-36 **NBIC Location: Part 3, 4.2 a) and 4.4 b)** **Attachment Page 66**

General Description: Clarifying Rules for Using Alternative NDE Methods

Subgroup: Repairs and Alterations

Task Group: T. White (PM), P. Miller

Explanation of Need: It has been determined that there may be some confusion regarding allowable NDE methods for repairs and alterations. The existing language of 4.2 a) tells the reader that alternative NDE methods acceptable to the Inspector and, where required, the Jurisdiction, may be used provided the requirements of Section 4 are met. However, it is possible that the reader is not familiarizing themselves with all of the requirements of Section 4 prior to proposing an alternative NDE method. This change should help clarify and reinforce the requirements for alternative NDE methods for repairs and alterations.

July 2023 Meeting Action: Ms. Moore stated that Subgroup and Subcommittee R&A voted to close this item with no action and made a motion to officially close this item. This motion was seconded, and Mr. White explained that this item is already being covered by 23-04. Mr. Scribner explained that he submitted this item to help add needed clarity to the section. After discussion, the original motion was withdrawn; the item will go back to the Subgroup for further work.

Item Number: A23-38 **NBIC Location: Part 3, 1.1 a)** **Attachment Page 67**

General Description: Scope Clarification for Part 3

Subgroup: Repairs and Alterations

Task Group: M. Quisenberry (PM), E. Cutlip, J. Walker

Explanation of Need: The owner or user's need to return equipment to service must never compromise the operational safety of the equipment or the process by which the operational safety of the equipment is assured. There is an interpretation that supports this notion by describing subjects permitted to be considered when determining whether a repair or alteration activity is practicable.

July 2023 Meeting Action: Ms. Moore reported that a task group has been assigned to this item to begin work on a proposal.

Item Number: A23-39 **NBIC Location: Part 3, 3.3.1** **Attachment Page 69**

General Description: Strengthening Prevention of Defect Recurrence

Subgroup: Repairs and Alterations

Task Group: M Quisenberry (PM), J. Walker, F. Johnson

Explanation of Need: The existing text recommends, but does not require an investigation of the cause, extent, and likelihood of recurrence of defects. The existing text also has no requirement for anyone to act to prevent the recurrence of defects. Where root and/or proximate causes of defects are known, or could be determined, someone needs to act to prevent catastrophic failure of equipment.

July 2023 Meeting Action: Ms. Moore stated that the proposal for this item is still being developed.

Item Number: A23-40	NBIC Location: Part 3, 3.3.4.1	Attachment Page 70

General Description: Strengthening Requirements to Ensure Defect Removal

Subgroup: Repairs and Alterations

Task Group: L. Dutra (PM), E. Cutlip, A. Renaldo

Explanation of Need: The existing text alludes to the potential need for nondestructive examination (NDE) to ensure complete removal of defects but does not require it. The means to ensure defects have been removed must be understood by all to ensure safety. There is an interpretation of the 2021 NBIC that compounds this issue permitting repair organizations to not follow the requirements of NBIC Part 3, 3.3.4.8 even when the characteristics of the defect cannot be fully established.

July 2023 Meeting Action: Ms. Moore shared that the task group is working on a proposal for this item.

Item Number: A23-41	NBIC Location: Part 3, 3.3.4.6 a) 2)	Attachment Page 72

General Description: Strengthening Requirements for Defect Removal When Patching

Subgroup: Repairs and Alterations

Task Group: A. Khssassi (PM), L. Dutra, A. Renaldo

Explanation of Need: The existing text requires the removal of defective material until sound material is reached but provides no requirements or guidance on means to employ to ensure complete removal of defective material. The means to ensure defects have been removed must be understood by all to ensure safety. There is an interpretation of the 2021 NBIC that compounds this issue permitting repair organizations to not follow the requirements of NBIC Part 3, 3.3.4.8 even when the characteristics of the defect cannot be fully established.

July 2023 Meeting Action: Ms. Moore stated that work is still being done on this item.

iii. New Items:

Item Number: A23-56	NBIC Location: Part 3, 1.3.2	Attachment Page 74

General Description: Alternate Repair Inspectors

Subgroup: Repairs and Alterations

Task Group: A. Triplett (PM), P. Lentzer

Explanation of Need: The 2023 Edition revision to 1.3.2.a makes the use of alternate Inspectors applicable only to AIAs. The language should be revised to include OUIOs and FIAs that perform repairs/alterations on their own equipment, as allowed by 1.3.b.

January 2024 Meeting Action:

Item Number: A23-59 NBIC Location: Part 3, 4.2 a) and b) Attachment Page 75

General Description: NDE Personnel Certifications for Repairs and Alterations

Subgroup: Repairs and Alterations

Task Group: A. Triplett (PM), P. Lentzer

Explanation of Need: The 2023 Edition revision to 4.2.a, which revises language about codes to be used for NDE on repairs/alterations (i.e., to codes other than the original construction code), is not reflected in 4.2.b. This creates conflicting requirements between 4.2.a and 4.2.b; in a case where use of the construction code is practicable, but NDE personnel certification to another Code/standard is desirable, 4.2.a would allow this but 4.2.b would not.

January 2024 Meeting Action:

Item Number: A23-61 NBIC Location: Part 3, S9.3 Attachment Page 76

General Description: Revise NBIC R-2 Report and guide

Subgroup: Repairs and Alterations

Task Group: B. Schaefer (PM), T. LeBeau

Explanation of Need: Updates to the R-2 Report and the guide for completing R Report.

January 2024 Meeting Action:

Item Number: A23-68 NBIC Location: Part 3, 3.4.4 c) and d) Attachment Page 77

General Description: Changes to Examples of Alterations

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), T. McBee

Explanation of Need: The current wording of 3.4.4.d (2023) is open ended and may result in allowing significant design changes to a pressure vessel under the guise of a repair when an alteration is a more appropriate classification. Rewording is required to limit the scope of potential design changes.

January 2024 Meeting Action:

Item Number: A23-69 NBIC Location: Part 3, 9.1 Attachment Page 78

General Description: Update definitions of Field, Shop, and add definition for Temporary Locations

Subgroup: Repairs and Alterations

Task Group: R. Miletti (PM), E. Cutlip, M. Toth, J. Walker

Explanation of Need: This is a definition change to align with the latest NB-415 revision adding definitions for "Shop", "Field Site", and "Temporary Location".

January 2024 Meeting Action:

Item Number: A23-76 NBIC Location: Part 3, 3.3.4.6 a) Attachment Page 80

General Description: Revise paragraph 3.3.4.6 Patches for Clarity.

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: Requirements do not include specific note to ensure sound metal meets minimum design thickness. Further the order of the rules is not logical, starts with finished weld, grinding and NDE, then addresses defect removal, preparation etc.

January 2024 Meeting Action:

Item Number: A23-77 NBIC Location: Part 3, 4.2 a) Attachment Page 82

General Description: Performance of Original NDE During Repairs and Alterations

Subgroup: Repairs and Alterations

Task Group: A. Triplett (PM), S. Frazier, J. Walker, R. Collins, P. Becker

Explanation of Need: The existing language in Part 3, Section 4, Paragraph 4.2.a does not provide enough guidance or flexibility for Repair Organizations and owners to prescribe appropriate NDE for repairs/alterations to existing welds. Based on the limited, often non-specific documentation typically available to these entities during NBIC repairs and alterations, additional allowances and direction should be provided.

January 2024 Meeting Action:

Item Number: A23-78	NBIC Location: Part 3, S8	No Attachment

General Description: Rev. NB-23 Part 3, Supplement 8 & Fig. S8.3-b

Subgroup: Repairs and Alterations

Task Group: P. Becker (PM)

Explanation of Need: Add 'Step 5' to FIGURE S8.3-b. (currently missing). Remove references to 'B9' and 'B87' weld filler metal including Notes A, B, and C in Table S8.2.1

January 2024 Meeting Action:

Item Number: A23-83	NBIC Location: Part 3, New Engineered Repairs and Alteration Supplement	Attachment Page 84

General Description: Relocating Existing Repairs to new Eng. Repair & Alteration Supplement

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

Explanation of Need: In an effort to simplify the main body of Part 3, we are proposing to relocate some of the more complex repair methods to the new Engineered Repair & Alterations supplement. This item proposes to relocate three existing repair methods.

January 2024 Meeting Action:

Item Number: A23-86	NBIC Location: Part 3, S6.5 and S6.6	Attachment Page 91

General Description: Revision to Part 3 DOT Supplement re-write (related to Interpretation I23-55)

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

Explanation of Need: There is a need to revise two sections of Item 20-67 (approved by Main Committee on 3/24/2023) to reflect DOT requirements and bring the sections in line with intent interpretation I23-55.

January 2024 Meeting Action:

b. Subcommittee Pressure Relief Devices

i. Interpretations

There are currently no open interpretations for Part 4.

ii. Action Items – Old Business

Item Number: NB15-0305	NBIC Location: Part 4	Attachment Page 92

General Description: Create Guidelines for Installation of Overpressure Protection by System Design.

Task Group: B. Nutter, A. Renaldo, D. Marek (PM), D. DeMichael, J. Wolf, D. Schirmer

July 2023 Meeting Action: Mr. Renaldo reported that a proposal for this item will be balloted to Subgroup and Subcommittee Installation prior to the January 2024 NBIC meeting.

Item Number: NB15-0307	NBIC Location: Part 4	Attachment Page 94

General Description: Create Guidelines for Repair of Pin Devices.

Task Group: D. McHugh (PM), A. Renaldo, T. Tarbay, J. Simms, C. Beair, C. Chernisky

July 2023 Meeting Action: Mr. Renaldo reported that a proposal for this item will be balloted to Subcommittee PRD prior to the January 2024 NBIC meeting.

Item Number: NB15-0315	NBIC Location: Part 4, 2.5.6 and 2.6.6 and Part 1, 4.5.6 and 5.3.6	No Attachment

General Description: Review isolation Valve Requirements, and reword to allow installation of pressure relief devices in upstream piping.

Task Group: D. DeMichael (PM), B. Nutter, A. Renaldo, D. Marek

July 2023 Meeting Action: Mr. Renaldo stated that the task group is still working on a proposal for this item.

Item Number: 19-83	NBIC Location: Part 4, 4.7.5	No Attachment

General Description: Address Alternate Pressure Relief Valve Mounting Permitted by ASME CC2887-1

Task Group: D. Marek (PM), T. Patel, J. Ball

Explanation of Need: ASME Code Case 2887-1 permits the installation of pressure relief valves below a low mass water tube boiler or water heater under certain conditions. This set of conditions and alternate location should be addressed in the NBIC as the use of low mass water tube boilers and water heaters becomes more widespread.

July 2023 Meeting Action: Mr. Renaldo reported that a proposal for this item will be sent out as a letter ballot to SG PRD.

Item Number: 21-08	NBIC Location: Part 4, S4.4	No Attachment

General Description: Additional guidance for tank vent repairs

Subgroup: PRD

Task Group: D. DeMichael (PM), B. Donalson, B. Nutter, K. Beise, J. Grace

Explanation of Need: The recently approved S4.4, "Weight Loaded Vents," provided new guidance for tank vent repairs. Several additional topics need to be addressed to enhance the guidance. These topics include: 1) Suggested test equipment and configuration for the prescribed tank vent testing. 2) Minimum requirements for replacement parts, 3) Guidance for painting tank vent components.

July 2023 Meeting Action: Mr. Renaldo stated that the task group is still working on the proposal for this item.

Item Number: 21-62	NBIC Location: Part 4, 4.8.5.4 i) 3)	No Attachment

General Description: Verification of existing spring during repair activities

Task Group: A. Donaldson (PM), B. Nutter, E. Creaser, P. Dhobi, T. Patel, J. Simms, J. Grace, D. Gonzales, T. Cardy

Explanation of Need: This requirement has created an administrative requirement that potentially prevents a VR Stamp holder from applying the "VR" stamp to valves they have repaired. The requirement is negatively impacting owners, and jurisdictions that enforce the NBIC Part 4. This clause introduces a unique requirement in the BPV industry to confirm that code material in a Code stamped item be verified and traceable at all time after the item is ASME code stamped but the verification can only be provided by the manufacturer. Historically, any valve received or worked on that was sealed by a VR Stamp holder or in the case of an initial repair the ASME assembler was deemed to be Code compliant, and no further verification was needed recognizing the validity and continuity of the ASME and VR quality programs. It is clearly understood that if a spring, or any other critical part is deemed necessary to be replaced during a repair the manufactures verification is required and justifiable.

July 2023 Meeting Action: Mr. Renaldo reported that the task group is still working on the proposal for this item.

Item Number: 22-08	NBIC Location: Part 4, 2.4.1.6 & 2.4.4.2; Part 1, 3.9.1.6 & 3.9.4.2	No Attachment

General Description: Review and improve guidance for T&P valve installation relating to probe.

Subgroup: PRD

Task Group: D. Marek (PM), J. Ball, J. Wolfe, T. Clark

Explanation of Need: Existing text refers to location of valve connection and does not give guidance that the temperature probe needs to be located in the hottest water in the tank for the valve to actuate at the specified temperature.

July 2023 Meeting Action: Mr. Renaldo reported that the task group is still working on the proposal for this item.

Item Number: 22-09	NBIC Location: Part 4, 4.6.1	No Attachment

General Description: Add language to NBIC Part for valves manufactured to Code Case 2787

Subgroup: PRD

Task Group: A. Donaldson (PM), R. Donalson, B. Nutter, T. Tarbay, J. Simms

Explanation of Need: There are no requirements to address valve repairs that were manufactured or assembled to Code Case 2787 (use of more than one certified capacity on the pressure relief valve or the nameplate).

July 2023 Meeting Action: Mr. Renaldo said that the task group is still working on the proposal for this item.

Item Number: 22-16	NBIC Location: Part 4, 2.4.4 and Part 1, 3.9.4	Attachment Page 141

General Description: Allow the use of pressure relief valves on potable water heaters.

Subgroup: PRD

Task Group: D. Sullivan (PM), J. Ball, T. Clark

Explanation of Need: ASME Section IV, Part HLW-800.1 allows the use of pressure relief valves in place of temperature and pressure relief valves on potable water heaters. NBIC Parts 1 and 4 specifically require temperature and pressure relief valves, which is not consistent with the code of construction. Some manufacturers are shipping HLW stamped potable water heaters with pressure relief valves. Often the physical construction of these units is such that a temperature and pressure relief valve cannot be accommodated.

July 2023 Meeting Action: Mr. Renaldo reported that the proposal is still in development for this item.

Item Number: 22-20	NBIC Location: Part 4, 4.7.4	No Attachment

General Description: Inspection and testing of PRV's located above isolation valves.

Subgroup: PRD

Task Group: D. Marek (PM), K. Beise, J. Ball, E. Creaser, H. Cornett, A. Renaldo

Explanation of Need: Add requirement to make sure the internals of a PRV inlet and outlet are inspected when it is tested, and require tests to be done with a pressure vessel with volume.

July 2023 Meeting Action: Mr. Renaldo stated that the task group is still developing a proposal for this item.

Item Number: 23-18	NBIC Location: Part 4, 4.2.2	Attachment Page 144

General Description: Revision and clarification of Part 4, 4.2.2 for use of ASME Code Cases

Subgroup: PRD

Task Group: A. Donaldson (PM)

Explanation of Need: 4.2.2 requires revision to clarify how ASME Code Cases are applied in the repair and conversion of pressure relief devices. Revision is also necessary to remove the requirement that the NBIC Main Committee adopt individual ASME Code Cases before they may be used in Jurisdictions that have adopted them. The current wording does not allow conversion of a device to no-longer comply with an ASME Code Case.

July 2023 Meeting Action: Mr. Renaldo reported that a proposal for this item will be sent out for ballot to the Main Committee.

Item Number: 23-31	NBIC Location: Part 4, 3.2.5 d) 5) and Part 2, 2.5.7 d) 5)	No Attachment

General Description: Testing of liquid service valves to be water or other suitable liquid

Subgroup: PRD

Task Group: P. Dhobi (PM), K. Beise, T. Tarbay, T. Patel, H. Cornett, D. Marek

Explanation of Need: The intent is that liquid service valves be tested on liquid. The term fluid can mean either liquid or vapor.

July 2023 Meeting Action: Mr. Renaldo stated that the task group is working on a proposal for this item.

Item Number: 23-32	NBIC Location: Part 4, 3.3 and Supp. 6	No Attachment

General Description: Rules for T/O activities related to Nuclear Class Valves

Subgroup: PRD

Task Group: E. Creaser (PM), P. Dhobi, D. McHugh, J. Simms

Explanation of Need: Nuclear facilities that perform repair and T/O activities would by allowing them to use T/O for nuclear class valves that were serviced but not in need of repair but need to be set and sealed again.

July 2023 Meeting Action: Mr. Renaldo announced that a task group has been assigned to this item to begin developing a proposal.

iii. New Items:
None.

c. Subcommittee Installation

i. Interpretations
There are currently no open interpretation items for Part 1.

ii. Action Items – Old Business

Item Number: 20-62	NBIC Location: Part 1, 1.4.5.1	No Attachment

General Description: Update the National Board Boiler Installation Report

Subgroup: SG Installation

Task Group: T. Clark (PM), E. Wiggins, R. Spiker, T. Creacy, P. Jennings, G. Tompkins, and D. Patten.

July 2023 Meeting Action: Mr. Patten reported that the task group is still working on the proposal for this item.

Item Number: 20-86	NBIC Location: Part 1, 2.10.1 a)	No Attachment

General Description: Testing and Acceptance: Boiling-out Procedure

Subgroup: SG Installation

Task Group: E. Wiggins (PM), D. Patten, S. Konopacki, and R. Spiker.

July 2023 Meeting Action: Mr. Patten stated that the task group is still working on a proposal for this item.

Item Number: 22-28	NBIC Location: Part 1, 9.1	No Attachment

General Description: Pool Heater definition and requirements

Subgroup: SG Installation

Task Group: J. Kleiss (PM), R. Spiker, T. Creacy, and M. Byrum

Explanation of Need: The NBIC Installation and Inspection Codes do not have a definition for pool heaters. There is potential for confusion regarding which NBIC requirements, if any, should apply to pool heaters.

July 2023 Meeting Action: Mr. Patten stated that the task group is working on developing a proposal for this item.

Item Number: 22-32	NBIC Location: Part 1, 3.8.1.4 b)	No Attachment

General Description: High pressure limit control requirements for fired jacketed steam kettles

Subgroup: SG Installation

Task Group: R. Adams (PM), D. Patten, T. Clark, and T. Creacy

Explanation of Need: As a safeguard to over pressurizing the fired jacketed steam kettle, the pressure range of the actuated high pressure limit control should not exceed the MAWP of the vessel.

July 2023 Meeting Action: Mr. Patten stated that the task group is currently working on a proposal for this item.

Item Number: 23-52	NBIC Location: Part 1, 2.5.3.2 and 3.5.3	No Attachment
General Description: Harmonize electrical requirements for all types of boilers/water heaters **Subgroup:** SG Installation **Task Group:** T. Clark (PM), S. Konopacki, J. Kleiss, R. Spiker, and John Choitz **Explanation of Need:** Electrical requirements for power boilers, heating boilers, and water heaters are inconsistent, particularly regarding remote emergency shutdown switches. In some cases the requirements are the same, but worded or ordered differently. In order to promote better understanding of code requirements and consistency in their application, I propose making sections 2.5.3 and 3.5.5 as uniform as possible.		
July 2023 Meeting Action: Mr. Patten stated that a task group was assigned to begin working on a proposal for this item.		

iii. Action Items – New Business

Item Number: 23-67	NBIC Location: Part 1, 4.2.2	Attachment Page 145
General Description: Pressure Gage Scale Requirements **Subgroup:** SG Installation **Task Group:** None assigned. **Explanation of Need:** Update pressure gage requirements to reflect industry practice and common ranges. Also, to allow for the use of gage overpressure protectors, which the current wording does not. For systems with an MAWP that greatly exceeds normal operating pressure, it is sometimes necessary to use a gage with a lower scale so that the gauge reads in the middle third of its scale during normal operation. In such a situation, a gage overpressure protector is installed upstream of the gage.		
January 2024 Meeting Action:		

d. Subcommittee Inspection

i. Interpretations

Item Number: 22-40	NBIC Location: Part 2, 4.4.7.2	Attachment Page 146
General Description: Allowable stresses for t(required) calculation **Subgroup:** Inspection **Task Group**: T. Clark (PM), B. Ray, B. Wilson, J. Petersen, J. Roberts, J. Sowinski **Submitted by**: Tom Chen **Explanation of Need:** For the purpose of setting up inspection plans, especially with older equipment, we are calculating t(required) per Part 2, para 4.4.7.2. However, we would like to know if it is permissible to use the higher allowable stresses in later editions of ASME BPV Code.		
July 2023 Meeting Action: Mr. Jim Getter reported that the task group is still working on the proposal for this item.		

Item Number: 23-70	NBIC Location: Part 2, 2.3.6.11	Attachment Page 148
General Description: Inspection of vessels at and above 10,000 PSI (c) & (d) "requalification" **Subgroup:** Inspection **Task Group:** None assigned. **Submitted by:** C. Bierl **Explanation of Need:** Isostatic Pressure Vessel manufacturers are currently "requalifying" pressure vessels through an engineering evaluation without the involvement of the NB Alteration process and therefore an Inspector. This leaves control of this process of a code vessel in the hands of the manufacturer and impairs the code integrity of the vessel.		
January 2024 Meeting Action:		

Item Number: 23-80	NBIC Location: Part 3, S2.6.1 a)	Attachment Page 149
General Description: The Held Pressure for Hydro-static Testing of Heritage Boilers. **Subgroup:** SG Historical **Task Group:** None assigned. **Explanation of Need:** There has been issues in our Jurisdiction of inspectors interpreting that the boiler shall hold hydro static pressure for 10 minutes without the aid of a pump to maintain pressure. Therefore, any weep in valve packing, hand holes, gauge glass gaskets, etc. would be cause for failure of the hydro test.		
January 2024 Action:		

ii. Action Items – Old Business

TG FRP Items:

Item Number: NB16-1402	NBIC Location: Part 2, New Supplement	No Attachment
General Description: Life extension for high pressure FRP vessels above 20 years **Subgroup:** FRP **Task Group:** M. Gorman (PM) **Background:** In 2016, when this item was first opened, it was assigned as an item for Part 3. Recent discussions with SC R&A and the FRP Task Group have revealed that this item is better suited for Part 2. This item has been approved by the FRP Task Group. **Scope:** The goal of this proposal is to provide a method to evaluate whether the service life of high-pressure fiber reinforced plastic pressure vessels can be extended for an additional lifetime. **July 2023 Meeting Action:** Mr. Jim Getter reported that the project manager is still working on the proposal for this item.		

TG Historical Items:

Item Number: 23-74	NBIC Location: Part 2, S2	No Attachment
General Description: Certificate of compliance for new fusible plugs **Subgroup:** SG Historical **Task Group:** None assigned. **Explanation of Need:** To discuss the possibility of requiring a certificate of compliance on all new fusible plugs on historical boilers.		
January 2024 Action:		

Item Number: 23-85	NBIC Location: Part 2, S2.14.7	Attachment Page 150
General Description: Review paragraphs to replace with proper verbiage **Subgroup:** SG Historical **Task Group:** None assigned. **Explanation of Need:** There is some slang and second person (POV) verbiage throughout these paragraphs. Recommend rewording with proper terminology (such that it could be understood internationally) and changing point of view (e.g., changing "you're pulling water" to "water is being pulled"). Since I don't have the technical knowledge to know what is slang and what isn't, what I have proposed will still need to be reworded.		
January 2024 Action:		

TG Locomotive Items:
There are currently no Locomotive items open for Part 2.

SG Inspection Items:

Item Number: 21-25	NBIC Location: Part 2	Attachment Page 151
General Description: Autoclave/Quick opening device PP (submitted by Kevin Hawes) **Subgroup:** Inspection **Task Group:** V. Scarcella (PM), T. Bolden, M. Horbaczewski, J. Peterson, J. Clark, W. Hackworth, M.A. Shah, C. Becker, J. Morgan **Explanation of Need:** Upon our AIA (Intact) QRR I produced a Power point presentation on Autoclave inspections. Your NB team leader Gary Scribner suggested I forward this inspection presentation to the NB for review of content as mention of good reference material for next NBIC edition. I have attached a copy of this PP for your considerations.		
July 2023 Meeting Action: Mr. Getter stated that the proposal for this item has been approved by the subgroup and subcommittee and requested that it be sent to the Main Committee as a letter ballot. Mr. Galanes approved this request.		

Item Number: 21-47	NBIC Location: Part 2, 2.2.4 & 2.2.5	Attachment Page 154

General Description: To provide better guidance as it relates to carbon monoxide

Subgroup: Inspection
Task Group: W. Hackworth (PM), J. Smith, D. Buechel, T. Barker, T. Bolden, M. Sansone, H. Henry, J. Castle, J. Morgan, J. Clark

Explanation of Need: Need to provide more comprehensive items to be reviewed to guide the inspector on carbon monoxide and combustion air.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 22-06	NBIC Location: Part 2, 3.4.9 e)	No Attachment

General Description: Part 2 task group to review Part 3 Item 21-53

Subgroup: Inspection
Task Group: M. Horbaczewski (PM), J. Clark, B. Wilson, J. Mangas, P. Polick, H. Henry, P. Gilston, B. Ray, and T. Bolden
Submitted by: D. Graf

Explanation of Need: Part 2 task group to investigate further changes to Part 2/Part 3 that could be needed because of action item 21-53.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 22-22	NBIC Location: Part 2, 4.2	Attachment Page 156

General Description: Changes and additions to align with part III with in service inspections

Subgroup: Inspection
Task Group: T. Bolden (PM), J. Clark, J. Petersen, M. Sansone, B. Ray, D. Graf, and J. Mangas
Submitted By: V. Scarcella

Background Information: Several areas where part III after repair in service inspections should be aligned with part II.

July 2023 Meeting Action: Mr. Getter stated that a proposal for this item will be sent to the subgroup as a letter ballot.

Item Number: 22-26	NBIC Location: Part 2, 2.3.6.8	No Attachment

General Description: Addition of cast acrylic as a pressure vessel material

Subgroup: Inspection
Task Group: J. Calvert (PM), V. Newton, D. Buechel, D. Rose
Submitted by: J. Calvert

Explanation of Need: Provide inspectors with the criteria necessary to competently inspect vessels like acrylic chromatography columns.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 22-39	NBIC Location: Part 2, 4.4.8.7 g)	No Attachment

General Description: Recommended clarification of requirements for Evaluating Local Thin Areas

Subgroup: Inspection
Task Group: V. Newton (PM), T. Barker, J. Morgan, B. Wilson
Submitted by: L. Ponce

Explanation of Need: The existing text may lead to confusion due to a misplaced comma after 'specified' in the first sentence and no reference to what is being specified in the paragraph. The proposed text is a way to tie in the specified requirement in paragraph (f).

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 23-08	NBIC Location: Part 2	No Attachment

General Description: Part 2 task group to review Part 3 Item 21-67

Subgroup: Inspection
Task Group: M. Horbaczewski (PM), J. Clark, B. Wilson, J. Mangas, P. Polick, H. Henry, P. Gilston, B. Ray, T. Bolden, T. LeBeau, and A. Triplett
Submitted by: D. Graf

Explanation of Need: Part 2 task group to investigate further changes to Part 2/Part 3 that could be needed because of action item 21-67.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 23-17	NBIC Location: Part 2, 2.3.6.4 and 4.4.8.7	No Attachment

General Description: Steel-loss acceptance criteria for pressure-retaining items

Subgroup: Inspection
Task Group: D. Graf (PM), B. Ray, J. Roberts, T. Vandini, C. Becker, J. Sowinski, and J. Hadley
Submitted by: J. Hadley

Explanation of Need: (1) Resolve inconsistencies between the 2021 NBIC's air, ammonia, LPG, and general acceptance criteria.

(2) Provide screening criteria that, if met, would ensure that a pressure-retaining item also meets the conservative criteria in API 579-1/ASME FFS-1, Fitness-For-Service, 2021 edition, "ASME FFS-1", Part 3 Level 1 (brittle fracture) and either Part 4 Level 2 or Part 5 Level 1 (wall thinning). If not met, an owner/user could fall back on more complex, less conservative, ASME FFS-1 assessments.

(3) Describe steel-loss screening criteria in one location within NBIC, and reference this location when needed, to facilitate future revisions.

(4) Coordinate NBIC with ASME FFS-1. They have been referencing each other for some years, so coordinating them seems worthwhile.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 23-26	NBIC Location: Part 2	No Attachment

General Description: Adding verbiage in Part 2 to mention a time limit on tube plugs in vessels

Subgroup: Inspection
Task Group: M. Horbaczewski (PM), J. Clark, B. Wilson, J. Mangas, P. Polick, H. Henry, P. Gilston, B. Ray, T. Bolden, T. LeBeau, and A. Triplett
Submitted by: K. Moore

Explanation of Need: Part 3 is currently revamping 3.3.4.9. We feel like there should be a statement in the NBIC that the Chief or the in-service Inspector can address the operational issues and concerns of plugged tubes.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 23-27	NBIC Location: Part 2, 1.5.1	No Attachment

General Description: Addition of requirement for Inspector to be present for inspections.

Subgroup: Inspection
Task Group: V. Newton (PM), V. Scarcella, T. Bolden, J. Morgan, J. Smith, T. Barker, C. Becker, C. Hartford
Submitted by: D. Kinney

Explanation of Need: While it has always been standard industry practice for inspections to be performed in-person, and there are requirements for remote inspection, currently there is no language in Part 2 or RCI-1 requiring the Inspector to be present at the location of installation while performing an inspection. This requirement is implied, but not stated.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 23-28	NBIC Location: Part 2, 5.3.3	No Attachment

General Description: Revision to NB-136

Subgroup: Inspection
Task Group: J. Clark (PM), D. Graf, J. Petersen, J. Smith
Submitted by: D. Kinney

Explanation of Need: For Line #3, "R" should be added, and should match Line #13.
For Line #13, when filling out the form, there is confusion between Owner or User, and Owner-User. These are two different terms defined in the NBIC. I believe the intention is to use "Owner or User" and not "Owner-User, and this should be clarified on the form.

July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.

Item Number: 23-37	NBIC Location: Part 2, 1.4	No Attachment
General Description: Add comment to further define responsibility of the owner user **Subgroup:** Inspection **Task Group:** V. Scarcella (PM), J. Smith, J. Mangas, T. Barker **Submitted by:** V. Scarcella **Explanation of Need:** Specifically, if the inspector is going to a location where for instance H2S of some harmful pathogen is being handled, those locations have and should provide safety training and equipment needed to complete the inspection. For internals this is already touched on in 1.5.3. "Requirements of occupational safety and health regulations (i.e., federal, state, local, or other), as well as the owner-user's own program and the safety program of the Inspector's employer are applicable."		
July 2023 Meeting Action: Mr. Getter stated that the task group is still working on a proposal for this item.		

iii. New Items:

Item Number: 23-81	NBIC Location: Part 2, 4.4.3 b)	Attachment Page 158
General Description: Evaluate Inspector responsibilities relating to 4.4.3 FFS **Subgroup:** Inspection **Task Group:** None assigned. **Submitted by:** R. Underwood **Explanation of Need:** Currently, 4.4.3-b states the Inspector shall review the condition assessment methodology and ensure the inspection data and documentation are in accordance with Section 4. This proposal would redefine the role and responsibility of the Inspector.		
January 2024 Meeting Action:		

Item Number: 23-84	NBIC Location: Part 2, 2.3.6.4 c) 3), 2.3.6.7 b) 5), and S10.10.6	No Attachment
General Description: Wording Updates for Clarity **Subgroup:** Inspection **Task Group:** None assigned. **Submitted by:** J. Metzmaier **Explanation of Need:** "good repair" is typically an understood term, but with the NBIC being read internationally, we were wondering if that phrase could be understood in the same way on a global scale. Or if a better phrase could be chosen.		
January 2024 Meeting Action:		

12. Liaison Activities

- **i. American Society of Mechanical Engineers BPV Code (ASME BPV)**
  - **a.** Mr. Gary Scribner will provide a brief update.
- **ii. American Welding Society (AWS)**
  - **a.** Mr. Jim Sekely will provide a brief report on recent AWS activities.

13. Future Meetings

- **i.** July 15-18, 2024 – The Brown Hotel in Louisville, KY
- **ii.** January 2025 – TBD

14. Adjournment

Respectfully submitted,

Jonathan Ellis

Jonathan Ellis
NBIC Secretary

NATIONAL BOARD INSPECTION CODE COMMITTEE

ATTACHMENTS

NBIC Main Committee

Last Name	First Name	Interest Category	Role	Exp. Date
Galanes	George	Users	Chair	07/30/2024
Wadkinson	Melissa	Manufacturers	Vice Chair	07/30/2024
Ellis	Jonathan		Secretary	12/30/2099
Barker	Timothy	Authorized Inspection Agencies	Member	07/30/2025
Beise	Kim	National Board Certificate Holders	Member	08/21/2026
Getter	Jim	Manufacturers	Member	01/30/2026
Hopkins	Craig	National Board Certificate Holders	Member	07/30/2025
Kinney	Donald	Jurisdictional Authorities	Member	08/21/2026
Moore	Kathy	National Board Certificate Holders	Member	07/30/2025
Morelock	Brian	Users	Member	01/30/2026
Newton	Venus	Authorized Inspection Agencies	Member	01/30/2026
Patel	Thakor	Manufacturers	Member	01/30/2026
Patten	Don	National Board Certificate Holders	Member	08/21/2026
Polick	Patrick	Jurisdictional Authorities	Member	08/21/2026
Ray	Brent	Users	Member	07/30/2025
Renaldo	Adam	Users	Member	08/21/2026
Richards	H. Michael	General Interest	Member	07/30/2025
Sansone	Matthew	Jurisdictional Authorities	Member	08/21/2026
Schaefer	Benjamin	National Board Certificate Holders	Member	07/30/2025
Seime	Trevor	Jurisdictional Authorities	Member	08/21/2026
Sekely	James	General Interest	Member	08/21/2026
Simmons	Timothy	Labor	Member	11/29/2024
Toth	Marty	General Interest	Member	07/30/2025
Underwood	Robert	Authorized Inspection Agencies	Member	07/30/2025
Wiggins	Edward	Jurisdictional Authorities	Member	07/30/2024

Title	Item Number	CaseStatus	Cycle	NBICEdition	Assigned Subgroup
Define "Fuel Loading" as it pertains to NR activities	21-02	MC Approved	A	2025	Subgroup Repairs/Alterations
Inspection of through stays and diagonal stays	21-03	MC Approved	A	2025	Task Group Historical Boilers
Incorporate new repair methods for through and diagonal stays	21-09	MC Approved	A	2025	Task Group Historical Boilers
Pressure Tests for Pressure Relief Valve Repair Parts	21-18	MC Approved	A	2025	Subgroup Pressure Relief Devices
Parts used in NR Activities	21-37	MC Approved	A	2025	Subgroup Repairs/Alterations
Create example inspection list	22-03	MC Approved	A	2025	Subgroup Inspection
Lost or Destroyed UDS	22-12	MC Approved	A	2025	Subgroup Repairs/Alterations
Lost or Destroyed UDS	22-12	MC Approved	A	2025	Subgroup Repairs/Alterations
Align hot water boiler thermometer requirements with ASME Section IV	22-13	MC Approved	A	2025	Subgroup Installation
Removal of the requirement of AIA audits from the NR program	22-29	MC Approved	A	2025	Subgroup Repairs/Alterations
Removal of the requirement of AIA audits from the NR program	22-29	MC Approved	A	2025	Subgroup Repairs/Alterations
Location of temperature controls	22-31	MC Approved	A	2025	Subgroup Installation
Update duplicate nameplate marking requirements in Supplement 6	22-34	MC Approved	A	2025	Subgroup Pressure Relief Devices
Update reference of Section VIII steam valves to UV designated steam valves	22-35	MC Approved	A	2025	Subgroup Pressure Relief Devices
Clarify that stamping is required prior to signing R Form	23-05	MC Approved	A	2025	Subgroup Repairs/Alterations
Editorial change for Section 3, Para. 3.3.4.8 c) 5 and 6	23-06	MC Approved	A	2025	Subgroup Repairs/Alterations
2.2.4 updated to include not allowing combustibles	23-07	MC Approved	A	2025	Subgroup Inspection
Revisions to Part 3, Supplement 6	20-67	MC Approved	B	2025	Subgroup Repairs/Alterations
Add language to Part 4, 3.2.6 to define test intervals for thermal fluid heater PRDs	20-85	MC Approved	B	2025	Subgroup Pressure Relief Devices
Working Pressure Calculations for Curved Stayed Surfaces	21-34	MC Approved	B	2025	Task Group Historical Boilers
Add Test Details to NBIC Part 4, 3.3.3.4 i) Valve Adjustment and Sealing	21-36	MC Approved	B	2025	Subgroup Pressure Relief Devices
Deferral of inspection due dates (pressure relieving devices NBIC PART IV)	21-59	MC Approved	B	2025	Subgroup Pressure Relief Devices
Examples of Repairs	21-82	MC Approved	B	2025	Subgroup Repairs/Alterations
What is the meaning of "service limitations" as used in Part 4, 2.4.5?	22-15	MC Approved	B	2025	Subgroup Pressure Relief Devices
What is the meaning of "service limitations" as used in Part 4, 2.4.5?	22-15	MC Approved	B	2025	Subgroup Pressure Relief Devices
Drains in equipment rooms with heating boilers containing glycol.	22-30	MC Approved	B	2025	Subgroup Installation
DOT Transport Tank Pressure Testing (Part 2, Supplement 6)	23-19	MC Approved	B	2025	Subgroup Inspection
Changes to Part 3, 2.5.3.4 to clarify intent	23-22	MC Approved	B	2025	Subgroup Repairs/Alterations
Name Plate replacement	23-25	MC Approved	B	2025	Subgroup Repairs/Alterations
References to change of service for LPG vessels incorrectly use "altered"	23-30	MC Approved	B	2025	Subgroup Inspection
References to change of service for LPG vessels incorrectly use "altered"	23-30	MC Approved	B	2025	Subgroup Inspection
Update Table 2.3 to remove dates	23-33	MC Approved	B	2025	Subgroup Repairs/Alterations
Gasket Surface Repair for Graphite Pressure Vessels	23-43	MC Approved	B	2025	Task Group Graphite
Revision to Part 3, S3.5.4 m)	23-44	MC Approved	B	2025	Task Group Graphite
Requirements for Inlays as Routine Repairs	23-46	MC Approved	B	2025	Task Group Graphite
Require separate waterside piping connections for multiple LWCO devices	23-50	MC Approved	B	2025	Subgroup Installation
Require separate waterside piping connections for multiple LWCO devices	23-50	MC Approved	B	2025	Subgroup Installation
Replace "legal" with "company" in 1.5.1 a) Title Page	23-51	MC Approved	B	2025	Subgroup Repairs/Alterations
Requirements for who can make hole plugging repairs on graphite blocks	19-73	MC Approved	C	2025	Task Group Graphite
Audit Requirements for the T/O holder	21-61	MC Approved	C	2025	Subgroup Pressure Relief Devices

PROPOSED INTERPRETATION

Item No.

23-55

Subject/Title

DOT Supplement 6 Intent Interpretation

Project Manager and Task Group

Robert Underwood, Subcommittee Repairs/Alterations

Source (Name/Email)

Robert Underwood / robert_underwood@hsb.com

Statement of Need

This intent interpretation will address the incorrect information in Part 3, Supplement 6, paragraph S6.8.

Background Information

The current wording in S6.8 of the 2021 and 2023 Edition of Part 3 incorrectly requires the National Board Commissioned Inspector to ALSO be a DOT Registered Inspector. The 2025 Edition is removing reference to Registered Inspector (Item 20-67). This Intent Interpretation addresses the incorrect reference to Registered Inspector and the "answer" reflects the approved wording from the 2025 Edition of Supplement 6, paragraph S6.6.

Proposed Question

When performing repair and alteration activities to DOT Transport Tanks in accordance with NBIC Part 3, Supplement 6, is it the intent that the inspection and certification be made by a Registered Inspector meeting the requirements of the Competent Authority?

Proposed Reply

No. Inspection and certification shall be made by an Inspector holding an appropriate National Board Commission as required by NBIC Part 3, 1.3.

Committee's Question 1
When performing repair and alteration activities to DOT Transport Tanks in accordance with NBIC Part 3, Supplement 6, is it the intent that the inspection and certification be made by a Registered Inspector meeting the requirements of the Competent Authority?

Committee's Reply 1
No. Inspection and certification shall be made by an Inspector holding an appropriate National Board Commission as required by NBIC Part 3, 1.3.

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

Relevant Revised Text for Reference:
Item 20-67 – Revisions to Part 3, Supplement 6
Approved by Main Committee in March of 2023

SUPPLEMENT 6

REPAIR, ALTERATION, AND MODIFICATION OF DOT TRANSPORT (CARGO)} TANKS

S6.1 SCOPE

This supplement provides requirements and guidelines for repairs, alterations, or modifications to DOT

Transport Tanks used for the transportation of dangerous goods via highway, rail, air, or water.

S6.2 DEFINITIONS

The definitions specified in NBIC Part 3, Section 9, *Glossary*, shall be used in conjunction with those specified in NBIC Part 2, S6.17. Where conflicts between definitions exist, those identified in NBIC Part 2, S6.17 shall take precedence.

S6.3 CONSTRUCTION STANDARDS

When the standard governing the original construction is the ASME Code or other regulations of the Competent Authority, repairs, alterations, or modifications shall conform, insofar as possible, to the edition of the construction standard or specification most applicable to the work. Where this is not possible or ~~practical~~ practicable, it is permissible to use other codes, standards or specifications, including the ASME Code provided the "R" Certificate Holder has the concurrence of the Inspector and~~,~~ if required, the Competent Authority.

S6.4 ACCREDITATION AND REGISTRATION

Organizations performing repairs, alterations, or modifications shall be accredited in accordance with the National Board “R” Accreditation Program. In addition repair organizations performing repairs, alterations, or modifications to transport tanks shall be registered with DOT as required by 49 CFR Part 180.

S6.5 AUTHORIZATION

The Inspector’s authorization to perform a repair, alteration, or modification shall be obtained prior to initiation of the work to be performed on a transport tank. Additional requirements are specified in NBIC Part 3, 1.3.1 and 1.3.2.

S6.6 INSPECTION

Inspection and certification shall be made by an Inspector holding an appropriate National Board Commission as required by NBIC Part 3, 1.3.

S6.7 MODIFICATIONS

All modifications, as defined in NBIC Part 2, Supplement 6, to the pressure-retaining item shall meet the requirements of NBIC Part 3 for alterations and 49CFR180.413(b).

S6.8 DRAWINGS AND CALCULATIONS

a) Design requirements for repairs, alterations and modifications shall comply with the requirements of NBIC Part 3, 3.2.4.

b) As appropriate, drawings or instructions shall be prepared to describe the repair, alteration, or modification. Drawings shall include sufficient information to satisfactorily perform the activity.

c) The design of alterations and modifications shall be completed by an organization experienced in the design portion of the standard used for the construction of the item and certified by a Design Certifying Engineer as defined in NBIC Part 2, S6.17. Design documents shall be completed prior to the start of any physical work and be available for review by the Inspector accepting the design.

S6.~~9~~5 MATERIALS

The materials used in making repairs, alterations, or modifications shall conform to the original code of construction including the material specification requirements. Carbon or alloy steel having a carbon ~~con- tent~~content of more than 0.35% (0.30% for ton tanks) shall not be welded unless permitted by the original code of construction. The “R” Certificate Holder is responsible for verifying the identification of existing materials from original data, drawings, or unit records and identification of the material to be installed. Materials that have previously been in service, as described in Part 3, 3.2.1 c), are not permitted for alterations or modifications of DOT Transport Tanks per 49 CFR Part 180. Additional material requirements are provided in NBIC Part 3, Section 3.

S6.~~6~~10 REPLACEMENT PARTS

Replacement parts to be used in repairs, alterations, and modifications of DOT Transport Tanks shall comply with the requirements provided in NBIC Part 3, 3.2.2.

~~a) Replacement parts that will be subject to internal or external pressure that consist of new material which may be formed to the required shape by spinning, forging, die forming, and on which no fabrication welding is performed shall be supplied as material. Such parts shall be marked with the material and part identification and the name or trademark of the parts manufactured. In lieu of full identification marking on the material or part, the part manufacturer may use a coded marking system traceable to the original marking. Such markings shall be considered as the part manufacturer's certification that the part complies~~

with the original code of construction. Examples include seamless or welded tube or pipe, forged nozzles, heads or subassemblies attached mechanically.

b) Replacement parts that will be subject to internal or external pressure, that are preassembled by attachment welds, shall have the welding performed in accordance with the original code of construction. This certificate shall be supplied in the form of a bill of material or drawings with statement of certification.

c) Replacement parts subject to internal or external pressure fabricated by welding that require shop inspection by an Authorized Inspector shall be fabricated by an organization having an appropriate ASME *Certificate of Authorization*. The item shall be inspected and stamped as required by the applicable section of the ASME Code and DOT specification requirements. A completed ASME *Manufacturer's Partial Data Report* shall be supplied by the manufacturer.

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 as required by the original code of construction 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 fabricated by an "R" stamp holder shall be documented on Form R-3 and the "R" Stamp applied as described in NBIC Part 3, S6.15.

S6.7 AUTHORIZATION

The Inspector's written authorization to perform a repair, alteration, or modification shall be obtained prior to initiation of the work to be performed on a transport tank. Additional requirements are specified in NBIC Part 3, 1.3.1 and 1.3.2.

S6.8 INSPECTION

Inspection and certification shall be made by an Inspector holding an appropriate National Board Commission as required by NBIC Part 3, 1.3 and shall be a Registered Inspector meeting the requirements of the Competent Authority.

S6.8.1 INSPECTOR DUTIES FOR REPAIRS, ALTERATIONS, AND MODIFICATIONS

a) Inspectors performing repair, alteration, or modification inspections under the requirements of this supplement shall satisfy the requirements of S6.8.1 to be authorized to sign the Form R-1, *Repairs* and Form R-2, *Alterations*.

b) For repairs, alterations, and modifications of transport tanks, the duties of the Registered Inspector performing inspections are detailed in Part 2, S6.10 through S6.15, as required by the Competent Authority.

c) The Registered Inspector shall meet the rules of NB-263, RCI-1, Rules for Commissioned Inspectors. Additional duties are summarized below:

1. Verify the organization performing the repair, alteration or modification activity is properly accredited and in possession of a current valid *Certificate of Authorization* to apply the "R" Stamp issued by the National Board and is working to an accepted Quality Control System;

2. Verify that the design, if required, for the modification of the vessel is approved by a Design Certifying Engineer, or Designated Approval Agency or other applicable individual;

3. Verify the materials to be used to make the repair, alteration, or modification are approved for use and comply with applicable code requirements;

4. Verify the welding procedures and welders or welding operators are properly qualified;

5. Verify that all heat treatments, if required, including PWHT have been performed in accordance with the applicable standards and that the results are acceptable;

6. Verify that all NDE, impact tests, and other tests have been performed when required, and that they are acceptable;

7. Make a visual inspection of the work performed to confirm there are no visible defects or deviations from code requirements;

8. Perform external and internal visual inspections, if the vessel is equipped with a manway, and wit- ness the hydrostatic or pneumatic pressure test and/or leak tightness test when they are required;

9. Verify the correct nameplate is properly attached to the vessel and that the current test and inspection markings are properly attached and displayed on the proper vessel;

10. Sign the Form R-1 and, as appropriate, form R-2 when work is completed.

PROPOSED INTERPRETATION

Item No.

23-63

Subject/Title

Replacement of Heads with Different Types

Project Manager and Task Group

Timothy McBee, Subcommittee Repairs/Alterations

Source (Name/Email)

Mark Kincs / mark.r.kincs@xcelenergy.com

Statement of Need

Interpretation 07-12 identifies replacement of a head as a "change in contour". Revisions to 2023 NBIC Part 3, 3.4.4 d) require further clarification of work classification based on pressure-retaining capability.

Background Information

2023 NBIC revises 3.4.4 d) to effectively remove, as an "Example of Alteration", a change in dimension or contour of a pressure-retaining item that does not decrease an item's pressure retaining capability. Prior to revision, 3.4.4 d) would classify any such changes as "alterations".

Proposed Question

May replacement of a head or end plate of a pressure-retaining item with one of a different design (e.g. flat head to elliptical) be classified as a "repair", if changes in the dimensions or contour of the item do not affect its pressure retaining capability?

Proposed Reply

Yes, with the concurrence of the Inspector and Jurisdiction. Applicable design calculations shall be made available for review by the Inspector prior to start of any physical work.

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED INTERPRETATION

Item No.

23-64

Subject/Title

Review of calculations for a new nozzle per 3.3.3 j)

Project Manager and Task Group

Source (Name/Email)

Paul Shanks / paul.shanks@bureauveritas.com

Statement of Need

Example of repair 3.3.3 j) may allow for limits of reinforcement to over lap in some cases and as such is not conservative.

Background Information

Code case 2695, formerly and Mandatory Appendix 46, currently allow section VIII Div.1 certificate holders to use the opening reinforcement methods as listed in Section VIII Div.2 on Div.1 vessels. Section VIII div.2 stipulates that for a set through nozzle the limit of reinforcement is measure radially from the OD of a nozzle, Given that the limit of reinforcement is nominally equal to the inside diameter of the opening, two set through nozzle openings that have their centers 3 inside diameters apart may have unacceptable overlapping limits of reinforcement.

Proposed Question

In 3.3.3 j) is diameter taken to mean outside diameter?

Proposed Reply

Yes

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED INTERPRETATION

Item No.

23-65

Subject/Title

Returning a vessel to service without repairing known defects

Project Manager and Task Group

Source (Name/Email)

John Swezy / john.swezy@bureauveritas.com

Statement of Need

The vessel is located in the state of Texas whose laws do not address pressure vessels, and there are no jurisdictional inspection requirements. Repairs applied by the R Certificate holder to one part of the vessel are complete and acceptable. The R Certificate holder is not satisfied with leaving another part of the vessel with a known defect at the direction of the owner, who intends to return the vessel to operation in its current state. It has been explained to the repair organization that the owner is ultimately responsible for the condition and safety of the vessel and is accountable to the jurisdiction.

Background Information

The outer chamber of a heat exchanger is repaired in accordance with the NBIC requirements. The repair cannot be pressure tested due to a leak discovered between the inner chamber and the outer chamber. The heat exchanger is of a fully welded construction, and the owner does not want the leakage between chambers to be repaired. The R Certificate Holder may close out their repairs with NDE in lieu of pressure testing by applying NDE under the rules of the NBIC with the approval of the Inspector and the Jurisdiction but is hesitant to prepare and certify an R-1 Form documenting their work with this unrelated defect remaining. The NBIC has rules for returning a vessel to service without repairing a known defect in Part 3, paragraph 3.3.4.8(a). The owner has been notified of these rules, which require acceptance by an Inspector and the jurisdiction. However, the Inspector referenced in these paragraphs is not the Inspector associated with their repairs. It is also believed that Part 3, 3.3.4.8(a) and (b) would probably be better located in Part 2, paragraph 4.4 since they address an unrepaired defect found during an inspection. Doing so would require the removal of references to these rules as being a "repair method" since no actual repairs are being applied. Paragraph 3.3.4.8(c) could remain in Part 3 since it addresses welded repairs which are left incomplete.

Proposed Question

When a repair is completed by an R Certificate Holder in a part of a pressure vessel but an unrelated defect remains unrepaired in another part of the vessel, is it the responsibility of the vessel owner to apply the rules provided in Part 3, 3.3.4.8(a) before returning the vessel to service?

Proposed Reply

Yes.

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

PROPOSED INTERPRETATION

Item No.

23-66

Subject/Title

Applying PWHT to a vessel not previously PWHT for a change of service

Project Manager and Task Group

Source (Name/Email)

John Swezy / john.swezy@bureauveritas.com

Statement of Need

The pressure vessel is to be installed and operated in the state of Texas. The Chief Inspector reports that Texas state laws do not address pressure vessels, and has directed the user to contact the National Board for assistance. The NBIC has issued an interpretation that applying PWHT to a vessel not previously subject to PWHT is an alteration, and we agree. The NBIC does not address whether applying PWHT to such a vessel makes it unsuitable for service since the original WPSs were not qualified with PWHT. The owner intends to apply PWHT and operate the vessel in its new service application by September 1, 2023.

Background Information

An existing vessel not certified for lethal service is proposed for a change to H2S service where the application of PWHT is common practice for improved corrosion resistance. The vessel was constructed and certified by the original Manufacturer as meeting all requirements of Section VIII, Division 1, paragraph UW-2(a) except that PWHT was not applied. Though applying PWHT is widely understood to improve the condition of the welds, the original WPS was not qualified with PWHT as required by Section IX. We also believe a lethal service designation cannot be retroactively applied to an existing vessel, even though it may be positively verified to meet all requirements of Section VIII, Division 1, paragraph UW-2(a).

Proposed Question

Is it acceptable for a pressure vessel to undergo a change of service to contain H2S after receiving PWHT for improved corrosion resistance if it was originally constructed and certified without PWHT being applied?

Proposed Reply

Yes.

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED INTERPRETATION

Item No.

23-71

Subject/Title

New method for tube replacement: is it a repair or alteration?

Project Manager and Task Group

Source (Name/Email)

Robby Troutt / rob.troutt@tdlr.texas.gov

Statement of Need

The repair/alteration method shown is used for tube replacement. This method is being done in Texas, but there is confusion on whether this method of tube replacement should be classified as a repair or an alteration.

Background Information

This method of tube replacement allows for the use of using fillet welds to attach the collar (see attached pictures) to the tubes and header instead of requiring a full penetration weld to replace the tube. Further questions can be sent to Mr. Troutt if additional clarification is needed.

Proposed Question

Question 1: Is the replacement of a boiler tube or tube pup using the attached design considered a repair or alteration? The attachment “Pic for interp question 1” and the 2nd page of attached “RH1 – Header Section” are for this question. Question 2: Is the installation of a replacement tube using the attached fitting considered a repair or alteration? The attachment “Pic for interp question 2” and the 1st page of attached “RH1 – Header Section” are for this question.

Proposed Reply

Reply 1: This is a repair. Reply 2: This is a repair.

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

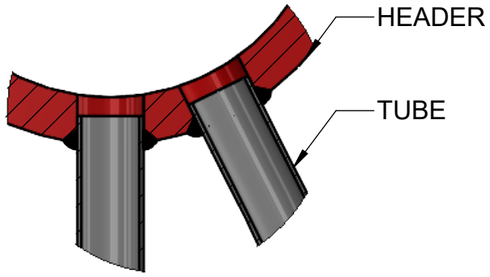
Committee's Reply 2

Rationale

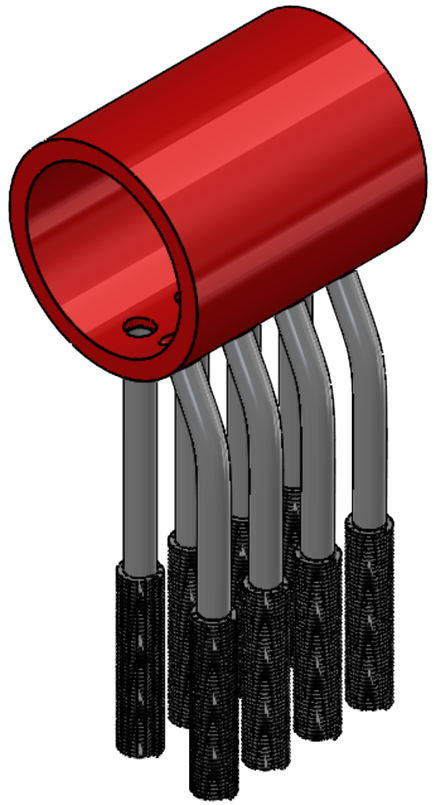

Sleeve used to join two pipes together.


Fitting for attaching
tube to header.

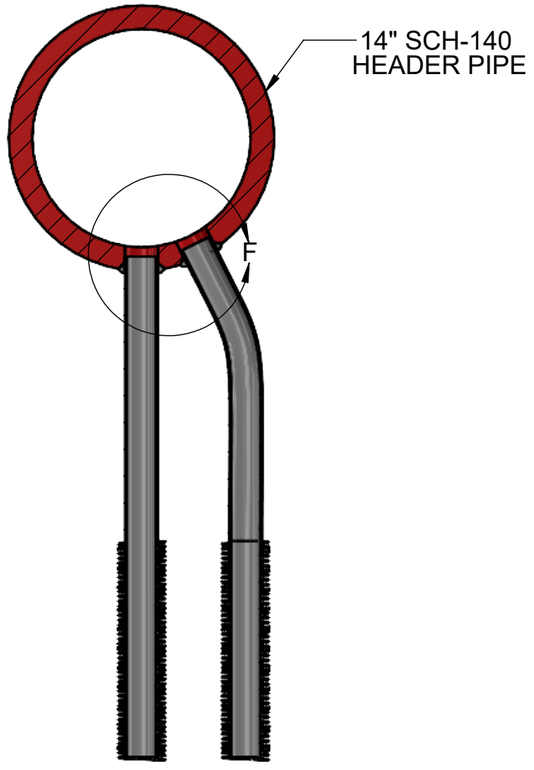
REGULAR CONNECTION



DETAIL F
SCALE 1 : 4

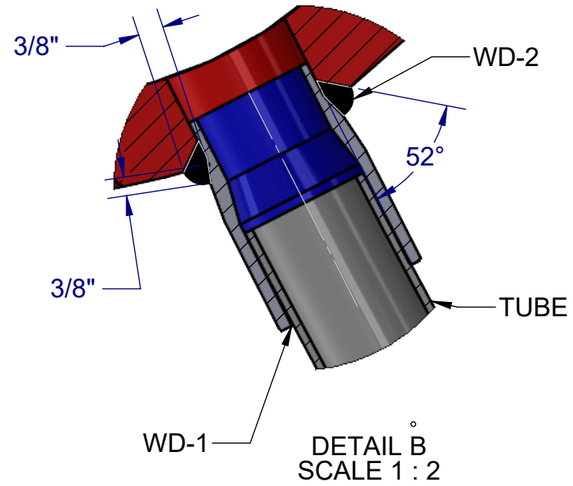


HEADER SECTION

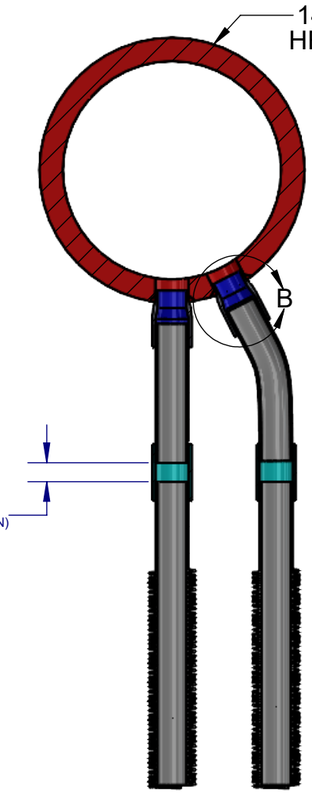


SECTION E-E
SCALE 1 : 8

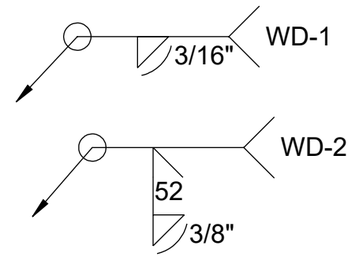
TUBE TRANSITION



DETAIL B
SCALE 1 : 2



SECTION A-A
SCALE 1 : 8



	NAME	DATE	UNLESS OTHERWISE SPECIFIED:
DRAWN	Tony	9/8/2023	DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ±.02 THREE PLACE DECIMAL ±.005
CHECKED	QCM	9/8/2023	

INTERPRET GEOMETRIC TOLERANCING PER: ANSI Y14.5

MATERIAL

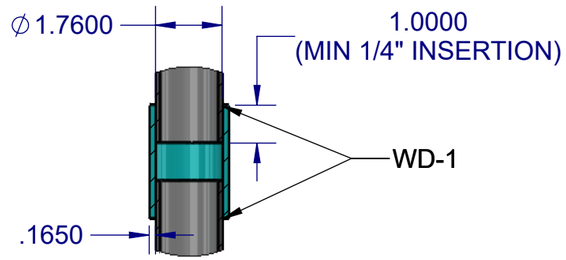
FINISH

TITLE: RH1 HEADER SECTION

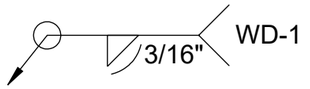
SIZE	DWG. NO.	REV
B	021623-TTT-000 & 1	1

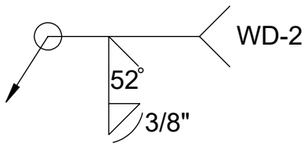
SCALE: 1:12 | WEIGHT: | SHEET 1 OF 2

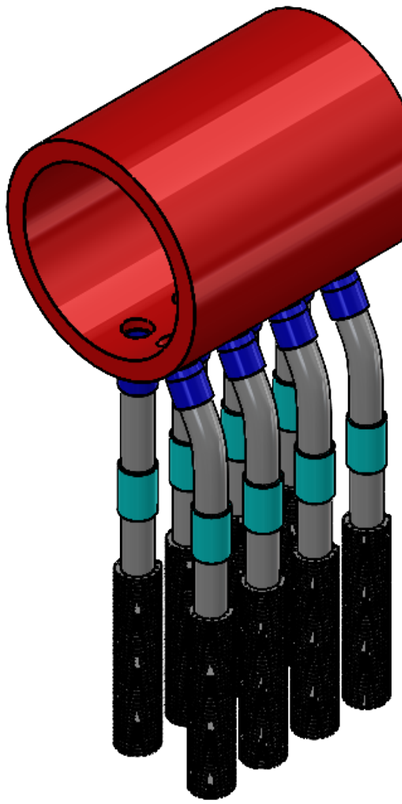
US, INTERNATIONAL PATENT-PENDING



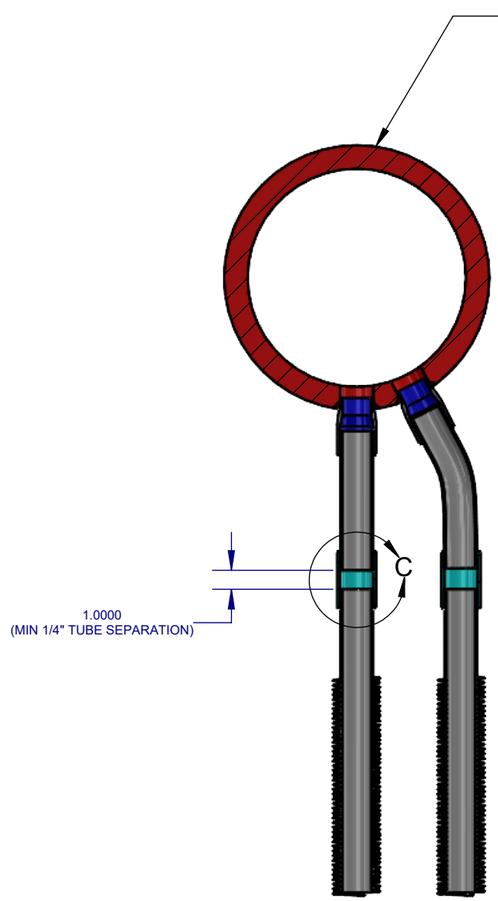
DETAIL C
SCALE 1 : 4







HEADER SECTION



SECTION A-A
SCALE 1 : 8

	NAME	DATE	UNLESS OTHERWISE SPECIFIED:
DRAWN	Tony	9/8/2023	DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ±.02 THREE PLACE DECIMAL ±.005
CHECKED	QCM	9/8/2023	

INTERPRET GEOMETRIC TOLERANCING PER: ANSI Y14.5

MATERIAL

FINISH

TITLE: RH1 HEADER SECTION

SIZE B | DWG. NO. 021623-TTT-001 | REV 1

SCALE: 1:12 WEIGHT: | SHEET 2 OF 2

US, INTERNATIONAL PATENT-PENDING

Action Item: 23-75
Date of Request: 10/17/2023
Requester: Andrew Triplett

Subject of Request: NDE In Lieu of Pressure Testing for Alterations

Location 1: NBIC Part 3, Section 4, Paragraph 4.4.2.c

Location 2: NBIC Part 3, Section 9, Paragraph 9.1, definition of "Practicable"

Existing Text from Location 1: "NDE may be conducted when contamination of the pressure-retaining item by liquids is possible or when pressure testing is not practicable."

Existing Text from Location 2: "Practicable - Capable of being accomplished based on technical consideration of the nature and scope of activities, design, or arrangement."

Statement of Need: The existing language in NBIC Part 3, Section 4, Paragraph 4.4.2.c – in concert with the new definition of "practicable" added in the 2023 Edition of the Code – may confuse Repair Organizations and owners about their options when it comes to verifying a successful alteration to a pressure-retaining item.

Background: The definition of "practicable" added to the 2023 Edition of NBIC potentially makes the use of NDE in lieu of a pressure test unjustifiable during alterations should a pressure test be physically possible on the altered component, even if NDE would actually do a better job of verifying the alteration's integrity.

Question 1: Does the term "practicable" as used in NBIC Part 3, Paragraph 4.4.2.c prohibit the use of NDE in lieu of pressure testing if NDE will provide sufficient information to confirm alteration integrity, given concurrence of the owner, Inspector, and Jurisdiction (as applicable)?

Proposed Reply 1: No.

PROPOSED INTERPRETATION

Item No.

23-79

Subject/Title

Alternative Welding Method 6 - Controlled Fill

Project Manager and Task Group

Source (Name/Email)

Mark Kincs / mark.r.kincs@xcelenergy.com

Statement of Need

There is a lack of clarity as to the current requirement, need, and definition of controlled fill technique for application to Welding Method 6.

Background Information

In 2015 NBIC Part 3, 2.5.3.6 specifically mentions "controlled fill", but 2.5.3 d) calls for "temper bead" for 2.3.5.6. In 2017 NBIC Part 3, "temper bead" was changed to "controlled fill" in 2.5.3 d) for 2.5.3.6, but "controlled fill" was removed from 2.5.3.6 itself. Supplement 8, with specific controlled fill requirement for CSEF material was added in the 2017 NBIC Part 3.

Proposed Question

Does 2.5.3 d) require controlled fill bead placement for Welding Method 6 (2.3.5.6) similar to that described in S8.3?

Proposed Reply

No

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED INTERPRETATION

Item No.

23-82

Subject/Title

Replacement of non-pressure retaining parts in Electrolyzer PEM Stack

Project Manager and Task Group

Source (Name/Email)

Kevin Choi / kevin.choi@accelerazero.com

Statement of Need

Need to determine if our company requires the NB R Certificate holder status.

Background Information

Hydrogenics is a manufacturer of hydrogen electrolyzers which operate on PEM (Proton Exchange Membrane) technology. The PEM stack operates at 30 bar (435 PSIG) pressure and is rated for a MAWP of 40 bar (580 PSIG) and we perform pneumatic pressure tests to ensure structural integrity according to ASME Sec VIII-1. At times we see cell shortage faults occurring which is not a failure of the pressure-retaining components but of components within the pressure vessel failing due to normal wear and tear.

Proposed Question

The engineers determine root cause and replace the damaged non-pressure bearing parts which requires disassembling the pressure vessel mechanically. Welding is not involved during the assembly process. Once the stack is assembled a combination of nuts and threaded rods are torqued to specification to “sandwich” the cells together and a 1.1x MAWP pneumatic test is performed. The non-pressure bearing parts are not described in the ASME U-1A form, but are part of the ITP package. Is this considered a Routine Repair? Is a R-1 form required to be filed for such activities?

Proposed Reply

This (is/ is not) considered a Routine Repair. As a result the R-1 form (is/ is not) required.

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED REVISION OR ADDITION

Item No.

A 23-73

Subject/Title

Revise Interp 21-05 to add later ASME Editions

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: INTERP 21-05 & Section 10; Paragraph: INTERP 21-05

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

Interp 21-05 intended to require all alterations to vessels built to ASME Sect. VIII Div. 1, 2021 Edition AND ALL FOLLOWING EDITIONS , be done by design personnel meeting the requirements of Appdx 47.

Background Information

The words, "or later" were intended to be in the text. This item is intended only to add these words to the existing interp 21-05.

Existing Text	**Proposed Text**
INTERPRETATION 21-05 Subject: ASME Section VIII, Div. 1 Design Personnel Requirements and NBIC Repairs/Alterations Edition: 2021 Question: Are the 2021 ASME Section VIII, Division 1 Mandatory Appendix 47 design personnel requirements applicable to NBIC alterations to ASME Section VIII, Division 1 pressure-retaining items? Reply: Yes, for alterations to vessels built to the 2021 edition of the ASME Code Section VIII Division 1, or if the 2021 edition is used as the Code of Construction for the alteration, the design calculations shall be prepared and certified by design personnel meeting the criteria of ASME Section VIII Division 1 Mandatory Appendix 47.	INTERPRETATION 21-05 Subject: ASME Section VIII, Div. 1 Design Personnel Requirements and NBIC Repairs/Alterations Edition: 2021 Question: Are the 2021 ASME Section VIII, Division 1 Mandatory Appendix 47 design personnel requirements applicable to NBIC alterations to ASME Section VIII, Division 1 pressure-retaining items? Reply: Yes, for alterations to vessels built to the 2021 edition or later of the ASME Code Section VIII Division 1, or if the 2021 edition or later is used as the Code of Construction for the alteration, the design calculations shall be prepared and certified by design personnel meeting the criteria of ASME Section VIII Division 1 Mandatory Appendix 47.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

Item 23-45

Part 3, S3.2 and S3.3 a)

S3.2 Repairs

k) Blind cracks and delaminations ~~may~~ shall not be repaired by cement injection only.

l) Cracks and porosity in tubes ~~may~~ shall not be repaired. Cracked and porous sections may be removed so that the remainder of the tube may be used. Individual tube sections shall not be less than 24 in. (610 mm) in length, and the number of segments in a tube shall not exceed the quantity listed in NBIC Part 3, Table S3.2.

~~r)~~m) ~~-~~Cracks and porosity in graphite plates used in plate and frame exchangers shall not be repaired.

S3.3 Routine Repairs

a)

8) Replacing graphite plate(s) with new plate(s) in a plate and frame exchanger.

PROPOSED REVISION OR ADDITION

Item No.

A 23-57

Subject/Title

Rename Authorized Nuclear Inspector - NR TG Item

NBIC Location

Part: Repairs and Alterations; Section: 1.6; Paragraph: 1.6.1

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

Endorsements required may need to be revised based on Category of work. Name of the Inspector may need to be revised.

Background Information

Endorsements required may need to be revised based on Category of work.

Existing Text	Proposed Text
	Rename Authorized Nuclear Inspector to something else.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-58

Subject/Title

Add the applicable requirements for Auditors

NBIC Location

Part: Repairs and Alterations; Section: 1.6; Paragraph: 1.6.7.1 s) 2)

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

Add the applicable requirements from ASME “Requirement 2” to the current requirements of audit personnel per 1.6.7.1 s) 2) for Cat. 2 or change it to be specific to Sect. XI

Background Information

Add the applicable requirements from ASME “Requirement 2” to the current requirements of audit personnel per 1.6.7.1 s) 2) for Cat. 2 or change it to be specific to Sect. XI

Existing Text	Proposed Text
	Add the applicable requirements from ASME “Requirement 2” to the current requirements of audit personnel per 1.6.7.1 s) 2) for Cat. 2 or change it to be specific to Sect. XI

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-60

Subject/Title

Endorsements required for Nuclear Inspectors based on Category of work

NBIC Location

Part: Repairs and Alterations; Section: 1.6; Paragraph: For all categories

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

Endorsements required for Nuclear Inspectors based on Category of work (1, 2, or 3)

Background Information

Endorsements required for Nuclear Inspectors based on Category of work (1, 2, or 3)

Existing Text	Proposed Text
	Endorsements required for Nuclear Inspectors based on Category of work (1, 2, or 3)

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 21-12

Subject/Title

Revision to modify Term 'Alteration' and to add Guidance on classifying a Repair vs Alteration

NBIC Location

Part: Repairs and Alterations; Section: Section 3

Project Manager and Task Group

P. Becker (PM), K. Moore, B. Underwood, P. Shanks, S. Chestnut, T. Seime

Source (Name/Email)

Pat Becker, pabecker@babcock.com

Statement of Need

Interpretations continue to be received based on confusion in current guidance given in Section 3, Part 3 of Repairs and Alterations. Of particular issue is the heavily relied upon 'List of Examples' of Repairs and Alterations. The lists are considered a 'shortcut' to understanding which activities should be classified as repairs and which should be alterations. However, the examples are not intended to be used without the understanding of the rest of the subject matter in Part 3, Section 3…nor are they all-inclusive or exclusive.

Experience levels can vary widely among all 'stakeholder' categories, i.e. Owner/User, Authorized Inspector, Certificate Holder, In-Service inspector, Jurisdictional Authority etc.

From the Forward: *The general philosophy underlying the NBIC is to parallel those provisions of the original code of construction, as they can be applied to post-construction activities. The NBIC does not contain rules to cover all details of post-construction activities. Where complete details are not given, it is intended that individuals or organizations, subject to the acceptance of the Inspector and Jurisdiction when applicable, provide details for post-construction activities that will be as safe as otherwise provided by the rules in the original code of construction.*

The Intent of any effort is to improve the user experience while being cognizant not to overly restrict. The task group is paying attention to industry concerns and suggestions including the potential impact of any changes to existing equipment and installations. Existing Interpretations are being 'walked thru' the decision tree and otherwise reviewed against the addition of any content. The goal is to provide clearer guidance with less conflicting or overlapping examples or information.

Background Information

Update of Part 3 Section 3 to improve User experience and clarify definition of 'Alteration'. Updated 'problematic' example lists to eliminate 'conflicting examples'.

Existing Text

PART 3, SECTION 3
REPAIRS AND ALTERATIONS — REQUIREMENTS FOR REPAIRS AND ALTERATIONS

3.1 SCOPE

This section provides requirements and guidelines for materials, replacement parts, and methods used when performing repairs and alterations to pressure-retaining items. Specific repair or alteration methods for other types of pressure equipment are in NBIC Part 3, Section 6.

3.2 GENERAL REQUIREMENTS FOR REPAIRS AND ALTERATIONS

(21) 3.2.1 MATERIAL REQUIREMENTS FOR REPAIRS AND ALTERATIONS

Proposed Text

PART 3, SECTION 3
REPAIRS AND ALTERATIONS — REQUIREMENTS FOR REPAIRS AND ALTERATIONS

3.0 INTRODUCTION

This Section provides information on the requirements for repairs and alterations to pressure retaining items. Information on how to classify, perform, verify, and document acceptable repair and alteration activities may be found throughout Part 3 Sections and Supplements (Refer to the Table of Contents for detail on the location of relevant information). It is the intent that this Section be used in cooperation with local jurisdictional authorities and with an understanding of the applicable pressure vessel code regulations relevant to the scope of repair or alteration activity. Note that the guidance herein and the examples given are not all inclusive and are intended to be representative of cases and activities commonly considered either a repair or alteration.

3.1 SCOPE

This section provides requirements and guidelines for materials and methods used when performing repairs and alterations to pressure-retaining items. Specific repair or alteration methods for other types of pressure equipment are in NBIC Part 3, Section 6.

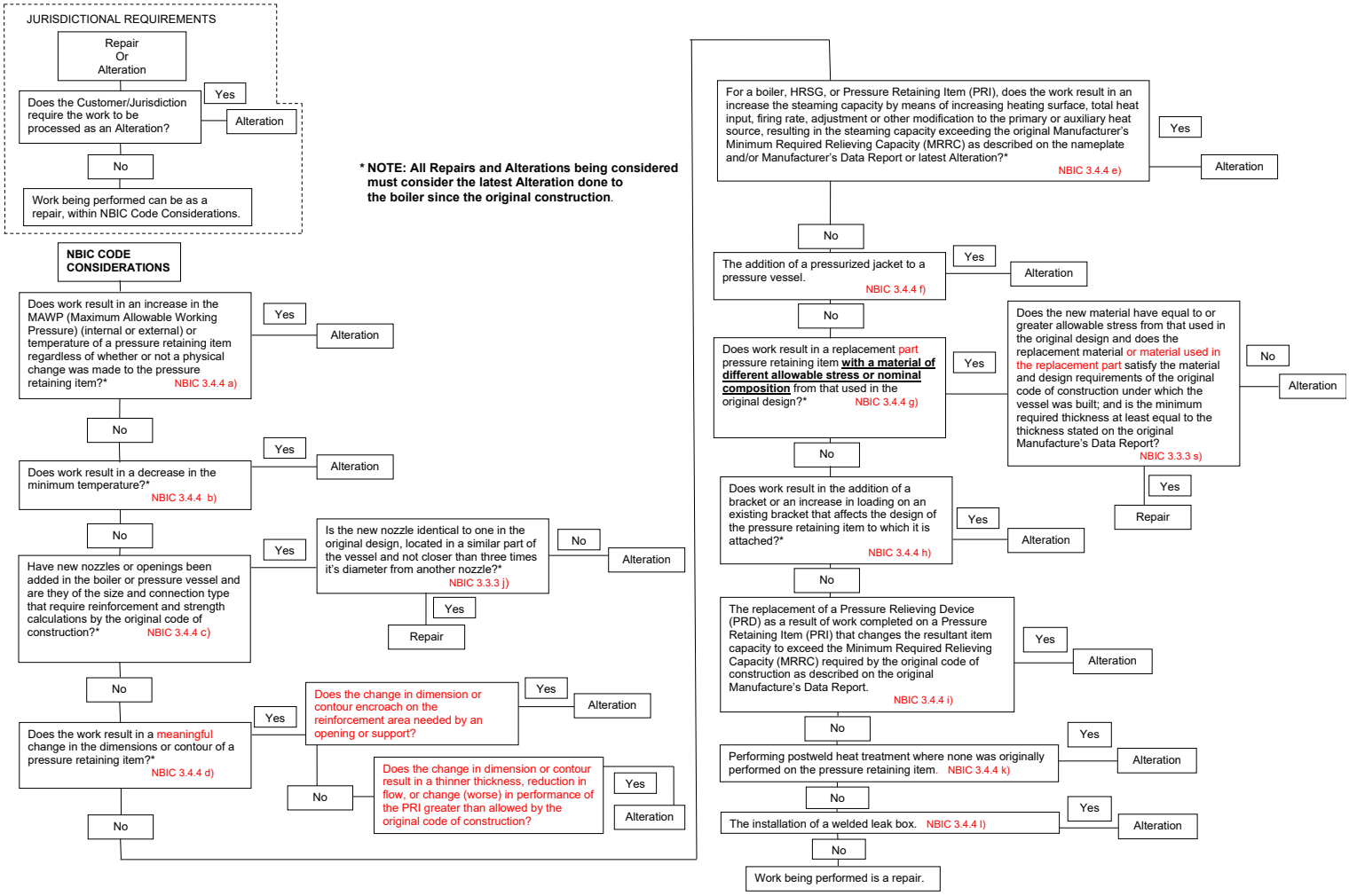
	3.1.1 CLASSIFICATION OF REPAIRS, ALTERATIONS AND REPLACEMENT PARTS When repairing, replacing, or altering existing pressure-retaining items, the activity classification (e.g. Repair vs. Alteration) shall be based on the scope of activity to be performed considering input from the Owner/User, Certificate Holder, AIA, and Jurisdictional Authority. When the scope of activity is complex or there is disagreement related to the classification, the Jurisdictional Authority in the location of the final installation of the repaired, altered or replaced equipment shall be considered the authority. Guidance on determining the activity classification may be found in: SUPPLEMENT X, *CLASSIFYING REPAIRS AND ALTERATIONS* and throughout this section. SUPPLEMENT X, FIGURE SX.1, *DECISION TREE (LOGIC DIAGRAM) FOR DETERMINING REPAIR OR ALTERATION ACTIVITY CLASSIFICATION* is based on the rules and guidance shown throughout Part 3, Section 3 and is provided to aid in determining the activity classification. References to relevant paragraphs may be found following the 'logic' questions throughout the diagram. Replacement Parts may be considered either a repair or alteration. Examples of replacement parts may be found in 3.2.2. Routine Repairs are limited to those listed in 3.3.2, e), 1) thru 5). Repair and Alteration activity examples may be found in 3.3.3 and 3.3.4. **The scope of the work to be performed will determine the classification type. Note that in all cases, the examples of Replacement parts, Routine Repairs, Repairs and Alterations are not all inclusive and should be used along with education, experience, and sound engineering judgment when determining classification type.** **3.2 GENERAL REQUIREMENTS FOR REPAIRS AND ALTERATIONS**
9.1 DEFINITIONS **Alteration —** A change in the item described on the original Manufacturer's Data Report which affects the pressure containing capability of the pressure-retaining item. (See NBIC Part 3, 3.4.3, Examples of Alteration) Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external), increase in design temperature, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration.	**9.1 DEFINITIONS** **Alteration —** A change in the item described on the original Manufacturer's Data Report which decreases the pressure containing capability of the pressure-retaining item. (See NBIC Part 3, 3.4.3, Examples of Alteration) Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external), increase in design temperature, resulting in change of allowable stress of the material, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration. **SUPPLEMENT X** **CLASSIFYING REPAIRS AND ALTERATIONS** **SX.1 SCOPE** **FIGURE SX.1** **DECISION TREE (LOGIC DIAGRAM) FOR DETERMINING REPAIR OR ALTERATION ACTIVITY CLASSIFICATION** **(See Below and Attachment)**

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

SUPPLEMENT X
CLASSIFYING REPAIRS AND ALTERATIONS

SX.1 SCOPE

FIGURE SX.1
DECISION TREE (LOGIC DIAGRAM) FOR DETERMINING REPAIR OR ALTERATION ACTIVITY CLASSIFICATION



THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 21-31 Rev 01

Subject/Title

Temporary Location

NBIC Location

Project Manager and Task Group

Ray Miletti (PM), Eric Cutlip, Marty Toth, Jamie Walker

Source (Name/email)

Statement of Need

"Field" site under the current definition could be multiple rented or leased spaces used for repairs/alterations, where there is no single or specific customer or job, but rather the locations(s) are used for conducting repair/alteration activities by personnel employed by the Certificate Holder on a continual basis.

Background Information

NB-415 has been revised and issued. Section 9.0 has added definitions for Shop Location, Temporary Location and Field Site. Shop Location and Field Site duplicate definitions already in Part 3, Temporary Location is a new definition.

Further Footnote 1 of section 2.2 in NB-415 states: '*A separate application is required for temporary locations (See Section 9.0 of this procedure) as permitted by National Board internal policies*.', and Section 6.4 requires requests for the use of temporary locations to be submitted to NB for approval, further the use of temporary locations not approved is prohibited.

This action proposes to add a new subparagraph h) in section 1.4.1 to provide guidance on making requests to NB for the use of a temporary location.

Existing Text	**Proposed Text**
1.4.1 ACCREDITATION PROCESS	**1.4.1 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, *Accreditation of "R" Repair Organizations*.	a) The National Board administers accreditation programs for authorization of organizations performing repairs and alterations to pressure-retaining items in accordance with NB-415, *Accreditation of "R" Repair Organizations*.
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*.	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. e) 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. f) The Jurisdiction, as defined in Part 3, Section 9, may audit the Quality System and activities of an organization upon a valid request from an owner, user, inspection agency, or the National Board. 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. .	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. e) 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. f) The Jurisdiction, as defined in Part 3, Section 9, may audit the Quality System and activities of an organization upon a valid request from an owner, user, inspection agency, or the National Board. 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. h) **Temporary Locations** Per the requirements of NB-415 temporary locations shall not be used unless approved by the National Board. Request for authorization to use a temporary location shall be made to the National Board using Form NB-481. The organization shall describe the use and control of temporary location within the organization's quality management system (QMS). The activities of the Inspector shall be the same as for the Repair Organizations, plants, shops or field sites.

	VOTE						
Committee	**Approved**	**Disapproved**	**Abstained**	**Not Voting**	**Passed**	**Failed**	**Date**

Item 21-45

The purpose of this proposal is to relocate the **Bullseye PWHT** requirements in 2.5.2(c) and the **Alternative Welding Methods Without PWHT** in 2.5.3 to the new Engineered Repairs and Alterations Supplement, which has been approved by the Main Committee.

The below is relating to revisions to Part 3, Section 2.

2.5.2 POSTWELD HEAT TREATMENT (PWHT)
c) When it is impractical or detrimental to Postweld Heat Treat (PWHT) the entire item or band around the item, ~~the following~~ local PWHT methods as described in SXX may be used. ~~on spherical or cylindrical pressure-retaining items using the time and temperature parameters in the original code of construction and in accordance with a written procedure acceptable to the Inspector and, when required, by the Jurisdiction.~~
~~1) Heat a local area around the nozzle, welded attachment, or repair area such that the area is brought up uniformly to the required PWHT temperature. The application of local PWHT should be performed with controlled heating methods, such as induction or electric resistance heaters, and employing thermocouples to monitor PWHT temperature. The Soak Band (SB) shall extend tangentially and radially from the edge of the nozzle wall, or attachment weld or repair area equally by a minimum distance as defined by the thickness of the shell, t or 2 in. (50 mm), whichever is less. See Figure 2.5.2-b.~~ ~~Soak Band (SB) — this is the region on the spherical or cylindrical shell that will be heated uniformly to the required PWHT temperature. This band encompasses a circular region in the tangential and radial directions starting from the edge of a welded nozzle, or repair area or welded attachment that will be subjected to PWHT.~~ ~~2) The length of the Heating Band (HB) shall consist of the SB distance plus $4\sqrt{R*t}$. In no case shall the distance of the HB that extends beyond the edge of the nozzle weld, attachment weld or repair area be less than $2.5\sqrt{R*t}$.~~ ~~Heating Band (HB) – this is the region that encompasses the application of heat for PWHT and is defined in length by the equation, $SB+4\sqrt{R*t}$ where R is the outer radius of the spherical or cylindrical shell in inches (mm), and t is equal to the nominal thickness of the spherical or cylindrical shell in inches (mm).~~ ~~3) The Gradient Control Band (GCB) shall be kept as low as possible in all directions to avoid harmful temperature gradients adjacent to nozzles or geometric discontinuities.~~ ~~Gradient Control Band – this is the region that encompasses the SB, HB and extends beyond the edge of the HB.~~ ~~4) For PWHT of nozzle welds, repair welds, and external attachment welds on smooth spherical shells, heads, and cylindrical shells, the temperature differential within the GCB measured at the outside edge of the SB and the temperature measured at the outside edge of the HB shall not exceed one-half (1/2) of the peak soak PWHT temperature.~~ ~~5) The term t, as used above to determine SB, HB and GCB shall be the nominal thickness of either a full penetration weld, or the groove weld depth of a partial penetration repair weld. If a fillet weld is used in combination with a groove weld, the nominal thickness for PWHT shall be the depth of the groove weld.~~

Figure 2.5.2-a

LOCAL POSTWELD HEAT TREATMENT TEMPERATURE CONTROL BANDS BUTT WELD IN CYLINDER

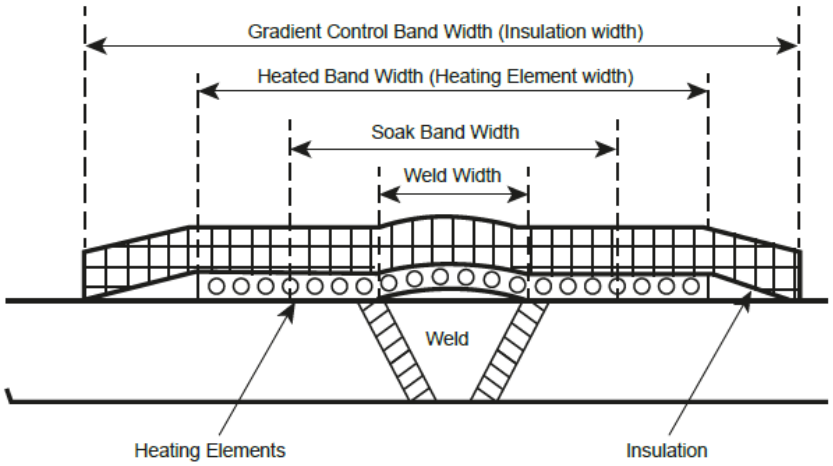
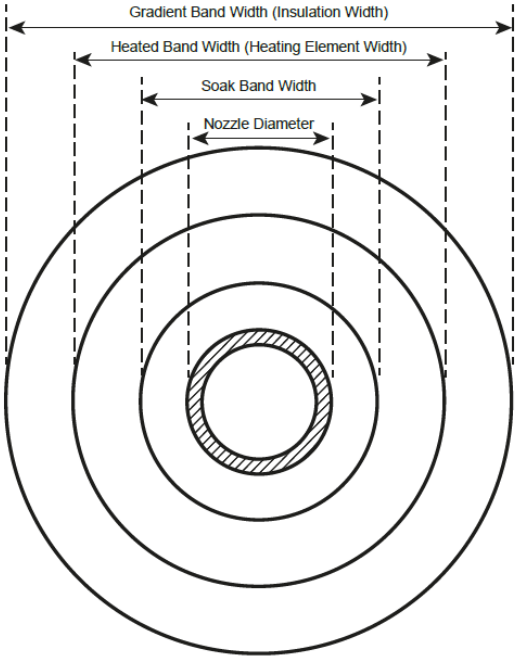


Figure 2.5.2-b

LOCAL POSTWELD HEAT TREATMENT TEMPERATURE CONTROL BANDS NOZZLE WELD OR ATTACHMENT TANGENTIAL DIRECTION HEATING BANDS



2.5.3 ALTERNATIVE WELDING METHODS WITHOUT POSTWELD HEAT TREATMENT

a) Under certain conditions, postweld heat treatment, in accordance with the original code of construction, may be inadvisable or impractical. In such instances, ~~the following~~ alternative methods as described in SXX may be used.~~.~~

~~b) Competent technical advice shall be obtained from the manufacturer of the pressure-retaining item or from another qualified source, such advice being especially necessary if the alternative is to be used in highly stressed areas, if service conditions are conducive to stress corrosion cracking, if materials are subject to hydrogen embrittlement, or are operating at temperatures in the creep range, or if the alternative is being considered for "on-stream" repairs or "hot tapping" on piping systems. Selection of the welding method used shall be based on the rules of the original code of construction together with the above mentioned advice concerning the adequacy of the weld in the as-welded condition at operating and pressure test conditions.~~

~~c) When reference is made in this section to materials by the ASME designation, P-Number and Group Number, the requirements of this section apply to the applicable materials of the original code of construction, either ASME or other, which conform by chemical composition and mechanical properties to the ASME P-Number and Group Number designations.~~

~~d) The detailed welding methods listed in the following subsections may be used as an alternative to postweld heat treatment (PWHT). NBIC Part 3, 2.5.3.1 is a method in which the welding procedure requires an elevation of the preheat temperature. In contrast, NBIC Part 3, 2.5.3.2 through 2.5.3.5, are methods in which the welding procedure requires the use of a temper-bead welding technique. Welding Method 6 as described in 2.5.3.6 requires use of a controlled fill technique. In 2.5.3.5 is a method in which the welding procedure used for joining dissimilar materials requires either an elevation of the preheat temperature or a temper-bead welding technique, depending on the chemical composition of the base metal that is joined to an austenitic steel. Temper-bead welding procedure nomenclature is defined in Section IX of the *ASME Boiler and Pressure Vessel Code*. Typically, this technique minimizes heat input of the initial beads, thus limiting heat beyond the weld heat-affected zone (HAZ) of the base metal. Heat input shall be increased for successive beads in accordance with the rules of QW-290 for temper bead welding in ASME Section IX. The Welding Procedure and Welder Performance Qualifications shall, in all cases, be in accordance with the requirements of the latest Edition of Section IX of the *ASME Boiler and Pressure Vessel Code*.~~

~~e) Nondestructive Examination of Welds~~

~~Prior to welding, the area prepared for welding shall be examined using either the Magnetic Particle (MT) or the Liquid Penetrant (PT) examination method to determine that no defects exist. After the finished weld has reached ambient temperature, and, when required by the specific welding method, the surface temper bead reinforcement layer has been removed substantially flush with the surface of the base metal, the weld shall be examined again by either of the above methods to determine that no defects exist using acceptance standards acceptable to the Inspector or original code of construction. In addition, welds greater than 3/8 in. (10 mm) deep or welds in a pressure retaining item that were originally required to be volumetrically examined by the rules of the original code of construction, shall be examined in accordance with paragraph NBIC Part 3, 4.2.~~

~~f) Methods that may be used as alternatives to postweld heat treatment are described in the following subsections.~~

~~2.5.3.1 WELDING METHOD 1~~

~~When using this method, the following is required:~~

~~a) This method may be used when the applicable rules of the original code of construction did not require notch toughness testing;~~

b) The materials shall be limited to P-No. 1, Groups 1, 2, and 3 and to P-No. 3, Groups 1 and 2 (excluding Mn-Mo steels in Group 2), as permitted for welded construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the Shielded Metal-Arc welding (SMAW), Gas Metal-Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), and Gas Tungsten-Arc Welding (GTAW) processes;

d) The Welders and Welding Operators, Welding Procedures Specifications shall be qualified in accordance with the applicable rules of the original code of construction, except that no postweld heat treatment shall be applied to the test coupon;

e) The weld area shall be preheated and maintained at a minimum temperature of 300˚F (149˚C) during welding. Alternatively, for P-No.1, Groups 1, 2 and 3 materials, the preheat may be reduced to 175˚F (79˚C) provided:

1) Provided the carbon equivalent of the base material to be welded is determined to be 0.40 or less.
2) The electrodes and filler metals are classified by the filler metal specification with a diffusible hydrogen designator of H4 or lower.
3) When shielding gas is used, it shall have a dew point that is -60˚F (-50˚C) or lower.

f) The preheat temperature shall be checked to assure that 4 in. (102 mm) of the material or four times the material thickness (whichever is greater) on each side of the groove (or full thickness of joint for a groove weld) is maintained at the preheat temperature during welding. When the weld does not penetrate through the full thickness of the material, the preheat need only be maintained at a distance of 4 in. (102 mm) or four times the depth of the repair weld, whichever is greater, on each side of the joint.

2.5.3.2 WELDING METHOD 2

When using this method, the following is required:

a) This method shall be used when the applicable rules of the original code of construction required notch toughness testing or shall be used when the applicable rules of the original code of construction did not require notch toughness testing provided the adequacy of the notch toughness of the weld, including the heat-affected zone, in the as-welded condition at operating and pressure test conditions is verified;

b) The materials shall be limited to carbon and low alloy steels permitted for welded construction by the applicable rules of the original code of construction, including those materials conforming to any of the following ASME P-No. designations: P-No. 1, Groups 1, 2, and 3; P-No. 3, Groups 1, 2, and 3; P-No. 4; P-No. 5A; P-No. 9A; P-No. 10A; P-No. 10B; P-No. 10C; P-No. 11A; or P-No. 11B;

c) The welding shall be limited to the Shielded Metal-Arc Welding (SMAW), Gas Metal-Arc Welding (GMAW), Flux Cored-Arc Welding (FCAW), and Gas Tungsten-Arc Welding (GTAW) processes;

d) The Welding Procedures Specifications shall be qualified in accordance with the temper bead procedure qualification requirements in QW-290 of ASME Section IX, and shall include the following additional requirements:

1) For P-No. 1 Groups 1, 2, and 3 and P-No. 3 Groups 1, 2, and 3, the minimum preheat temperature shall be 350°F (177°C), and the maximum interpass shall be 450°F (232°C).

2) For P-No. 9A, P-No. 10A, P-No. 10B, P-No. 10C, P-No. 11A, or P-No. 11B, the minimum preheat and interpass temperature requirements shall be in accordance with the guidelines in NBIC Part 3, 2.5.1.

3) For P-No. 4 and P-No. 5A materials, the minimum preheat, interpass temperature, and technique shall be in accordance with NBIC Part 3, 2.5.3.4. The repair depth for temper bead repairs to pressure retaining items of P-No. 4 and P-No. 5A materials is limited to welds not penetrating through full thickness.

4) Full thickness temper bead weld repairs are permitted to pressure retaining items of P-No 4 and P-No 5A materials under the following conditions:

a. ASME Section VIII, Division 2 pressure vessels, where application of PWHT on in-service vessels has been demonstrated to cause harm to vessel material.

b. For tube-to-header welds in steam service.

Full thickness weld repairs above shall be completed per NBIC Part 3, 3.3.5 with the following requirements:

a. The full thickness repair weld shall be verified as being the full penetration.

b. Volumetric examination of the full thickness weld shall be performed.

e. The test material for the welding procedure qualification shall be of the same material specification (including specification type, grade, class, and condition of heat treatment) as the material being repaired. In the event that the notch toughness of the material to be repaired is unknown, evidence from tests of that material or from another acceptable source (see NBIC Part 3, 2.5.3) may be used for the base metal notch toughness when qualifying the WPS as required in NBIC Part 3, 2.5.3.2 h). In the event that the original material specification is obsolete, the test material used should conform as closely as possible to the original material used for construction based on nominal composition and carbon equivalent (IIW Formula CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; elements are expressed in Weight Percent Amounts), but in no case shall the material be lower in strength;

f. The qualification thickness for the test plates and repair groove depths shall be in accordance with ASME Section IX; for pressure retaining items repaired using this temper bead method, hardness test- ing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure retaining item operates in steam service above 900°F (482°C);

g. The organization making the repair shall include, when qualifying its WPS, sufficient tests to deter- mine that the notch toughness of the weld metal and the heat-affected zone of the base metal in the "as-welded" condition is adequate at the minimum operating and pressure test temperatures (including start-up and shutdown). If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS;

h. Notch toughness shall be determined and evaluated by Charpy impact tests in accordance with the provisions of the original code of construction. Exemptions from impact testing described in the original code of construction are not applicable;

i. For the welding process in NBIC Part 3, 2.5.3.2 c), use of austenitic or ferritic filler metals is permitted. For ferritic filler metals, use only electrodes and filler metals that are classified by the filler metal specifi- cation with a diffusible-hydrogen designator of H8 or lower for the FCAW and SMAW processes. When shielding gases are used with a process, the gas shall exhibit a dew point that is below -60°F (-50°C). Surfaces on which welding will be done shall be maintained in a dry condition during welding and be free of rust, mill scale, and hydrogen producing contaminants such as oil, grease, and other organic materials;

j. After the weld has been deposited flush with the base metal, a surface temper reinforcing weld layer shall be applied;

k. For welds made by SMAW and FCAW, after completion of welding and without allowing the weldment to cool below the minimum preheat temperature, the temperature of the weldment shall be raised to
a temperature of 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018-H4); and

l. After the finished repair weld has cooled to ambient temperature, the surface temper reinforcing layer shall be removed substantially flush with the surface of the base material.

2.5.3.3 WELDING METHOD 3

When using this method, the following is required:

a) This method may be used when the applicable rules of the original code of construction did not require notch toughness testing;

b) The materials shall be limited to any P-No. 1 or P-No. 3 material as permitted for welded construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the SMAW, FCAW, and GTAW processes;

d) The test material for the welding procedure qualification shall be of the same P-No. and Group No. as the base material specification of the repair. In the event that the original material specification is obsolete, the test material used should conform to the nominal composition and carbon equivalent (IIW Formula CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; elements are expressed in Weight Percent Amounts), as the material being repaired, but in no case shall the material be lower in strength;

e) If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS. For pressure retaining items repaired using this temper bead method, hardness testing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure retaining item operates in steam service above 900°F (482°C);

f) The qualification thickness for the test plates and repair groove depths shall be in accordance with ASME Section IX; and

g) The WPS shall be qualified in accordance with the temper bead procedure qualification requirements in QW-290 of ASME Section IX, and shall include the following additional requirements:

1) The minimum preheat temperature for welding shall be 350°F (177°C) and the maximum interpass temperature shall be 450°F (232°C);

2) For the welding processes in NBIC Part 3, 2.5.3.3 c), use of austenitic or ferritic filler metal is permitted. For ferritic filler metals, use only electrodes or filler metals that are classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower for the FCAW and SMAW processes;

3) After completion of welding using SMAW and without allowing the weldment to cool below the mini- mum preheat temperature, the temperature of the weldment shall be raised to a temperature of 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted, provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018-H4); and

4) After the finished repair weld has cooled to ambient temperature, the final temper bead reinforcement layer shall be removed substantially flush with the surface of the base material.

2.5.3.4 WELDING METHOD 4

When using this method, the following is required:

a) This method is limited to repair welds in pressure retaining items for which the applicable rules of the original code of construction did not require notch toughness testing. The repair depth for temper bead repairs to pressure retaining items is limited to welds not penetrating though the full thickness.

Full thickness temper bead weld repairs are permitted under the following conditions:

1) ASME Section VIII, Division 2 pressure vessels, where application of PWHT on in-service vessels has been demonstrated to cause harm to vessel material.

2) For tube-to-header welds in steam service.

Full thickness weld repairs shall be completed per NBIC Part 3, 3.3.5 with the following requirements:

1) The full thickness repair shall be verified as being full penetration.

2) Volumetric examination of the full thickness weld shall be performed.

b) The materials shall be limited to P-No. 4, Groups 1 and 2, and P-No. 5A steels as permitted for welded
construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the SMAW, FCAW, GMAW or GTAW processes using low-hydro- gen electrodes and filler metals classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower, and suitably controlled by maintenance procedures to avoid contamina- tion by hydrogen producing sources. The surface of the metal prepared for welding shall be free of contaminants;

d) The test material for the welding procedure qualification shall be of the same P-No. and Group No. as the base material specification of the repair. In the event that the original material specification is obsolete, the test material used should conform to the nominal composition and carbon equivalent (IIW Formula CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; elements are expressed in Weight Percent Amounts), as the material being repaired, but in no case shall the material be lower in strength;

e) If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS;

f) The qualification thickness for the test plates and repair groove depths shall be in accordance with ASME Section IX. For pressure-retaining items repaired using this temper bead method, hardness test- ing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure-retaining item operates in steam service above 900°F (482°C);

g) The welding procedures (WPS) shall be qualified in accordance with the temper bead procedure qualification requirements in QW-290 of ASME Section IX, and shall include the following additional requirements:

1) The minimum preheat temperature for welding shall be 300°F (150°C) for P-No. 4 material and 400°F (200 °C) for P-No. 5A material. The preheat temperature shall be checked to ensure that 4 in. (102 mm) of the material or four times the material thickness (whichever is greater) on each side of the

groove (or full thickness of joint for a groove weld) is maintained at the minimum temperature during welding. The interpass temperature shall not exceed 800°F (430°C). When the weld does not penetrate through the full thickness of the material, the minimum preheat and maximum interpass temperature need only be maintained for 4 in. (102 mm) or four times the depth of the repair weld (whichever is greater) on each side of the joint;

2) For the welding processes in NBIC Part 3, 2.5.3.4 c), use of austenitic or ferritic filler metal is permitted. For ferritic filler metals, use only electrodes or filler metals that are classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower for the FCAW and SMAW processes;

3) After the weld has been deposited flush with the base metal, a surface temper reinforcing weld layer shall be applied;

4) For welds made by the SMAW and FCAW processes, after completion of welding and without allowing the weldment to cool below the minimum preheat temperature, the temperature of the weldment shall be raised to 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted, provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018 H4); and

5) After the finished repair weld has cooled to ambient temperature, the surface temper reinforcing weld layer shall be removed substantially flush with the surface of the base metal (and for a fillet weld to the required size and suitable contour of the toes).

2.5.3.5 WELDING METHOD 5

When using this method, the following is required:

a) This welding method may be used when the applicable rules of the original code of construction or the construction standard or code selected permit joining dissimilar materials used in pressure-retaining items;

b) The materials shall be limited to ASME P-No. 1, Groups 1, 2, and 3, P-No. 3, Groups 1, 2, and 3, P-No. 4, P-No. 5A, P-No. 9A, P-No. 10A, P-No. 10B, P-No. 10C, P-No. 11A, P-No. 11B joined to either P-No.8, P-No. 42, P-No. 43, or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the SMAW, FCAW, GMAW and machine or automatic GTAW processes. The filler metal used for joining the dissimilar materials shall be either A-No 8 or Nickel-Chrome alloy classification (F-No 43). When selecting a filler metal for dissimilar metal weld joints, determine if the weld joint will be exposed to elevated temperature service. A-No 8 filler metals exposed to service temperatures greater than 800°F (427°C) will exhibit reduced creep life along the fusion zone of the ferritic material due to carbon diffusion. Instead, a low hydrogen, Nickel-Chromium alloy classification filler metal shall be used for dissimilar weld joints exposed to service temperatures at or above 800°F (427°C);

d) The WPS shall be qualified in accordance with the temper bead rules of QW-290 in ASME Section IX. For pressure retaining items fabricated to ASME Section I and repaired using this temper bead method, hardness testing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure retaining item operates in steam service above 900°F (482°C);

e) If the original code of construction did not require notch toughness testing, qualification of welding procedures (WPS) for joining ASME P-No. 1, P-No. 3 ferritic materials to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45 materials shall be in accordance with requirements in either NBIC Part 3, 2.5.3.1, Welding Method 1 or in NBIC Part 3, 2.5.3.3, Welding Method 3;

f) If the original code of construction did not require notch toughness testing, qualification of welding pro- cedures (WPS) for joining ASME P-No. 4, P-No. 5A ferritic materials to either P-No. 8, P-No. 42, P-No. 43, P-No. 45 materials shall be in accordance with the requirements in NBIC Part 3, 2.5.3.4, Welding Method 4; and

g) If the original code of construction required notch toughness testing, qualification of welding procedures (WPS) for joining ferritic materials to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45 materials shall be in accordance with the requirements in NBIC Part 3, 2.5.3.2, Welding Method 2.

2.5.3.6 WELDING METHOD 6

This welding method provides requirements for welding only Grade 91 tube material within the steam boiler setting. When using this welding method, the following applies:

a) This method is limited to butt welds, weld build-up repairs, or attachment weld to 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;

b) Application shall be limited to only boiler tube repairs at a location internal to the boiler setting;

c) Upon the 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.

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

2) The welding shall be limited to the SMAW and/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.

3) The welding procedure qualification test coupon shall be P-No 15 E, Group 1, Grade 91.

4) Qualification thickness limits of base metal and weld deposit thickness shall be in accordance with ASME Section IX, QW-451.

5) The Welding Procedure Specification (WPS) shall be qualified in accordance with the requirements of ASME Section IX. No postweld heat treatment shall be applied to the test coupon. Additionally, the WPS shall include the following requirements:

a) The minimum preheat for the GTAW process shall be 200°F (100°C). The minimum preheat for the SMAW process shall be 300°F (150°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°F (290°C);

b) When the SMAW process is specified for a fill pass layer, 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 shown on the WPS;

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

d) The filler metal shall be limited to an austenitic, nickel-base filler metal to those assigned to F-number 43 in Section IX, QW-432 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), UNS N08087;

e) A martensitic, iron-base filler metal to those assigned to F-number 4 or F-number 6 in ASME Section IX, QW-432 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8; and

f) For weld build-up repairs due to wastage, the filler metal shall be limited to those assigned to F-number 43 in ASME Section IX, QW-432.

2.5.3.7 WELDING METHOD 7

When using this welding method, the following applies:

a) This welding method may be used when the applicable rules of the original code of construction or the construction standard or code selected permit joining dissimilar materials.

b) The materials shall be limited to ASME P-No. 15E, Group 1 joined to either P-No. 5A or P-No. 8, P-No. 42, P-No. 43 or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction.

c) The welding shall be limited to the SMAW and/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.

d) 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 and to non-pressure part welds for which the applicable rules of the original code of construction did not require notch toughness testing.

e) Application shall be limited to a location internal to the boiler setting.

f) Upon the 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.

g) Qualification thickness limits of base metal and weld deposit thickness shall be in accordance with ASME Section IX, QW-451.

h) The welding procedure qualification test coupon shall be ASME P-No. 15 E, Group 1, joined to either P-No. 5A, P-No. 8, P-No. 42, P-No. 43, or P-No. 45.

i) The Welding Procedure Specification (WPS) shall be qualified in accordance with the requirements of ASME Section IX. No postweld heat treatment shall be applied to the test coupon. Additionally, the WPS shall include the following requirements:

1) The minimum preheat for the GTAW process shall be 200°F (93°C). The minimum preheat for the SMAW process shall be 300°F (149°C). The maximum interpass temperature shall be 550°F (288°C).The preheat temperature shall be checked to ensure the minimum preheat temperature is maintained during welding and until welding is completed.

2) When the SMAW process is specified for a fill pass layer, 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 shown on the WPS.

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

4) For the joining of ASME P-No. 15E, Group 1 to P-No. 5A, the filler metal shall be limited to a mar- tensitic, iron-base filler metal to those assigned to F-No. 4 or F-No. 6 in ASME Section IX, QW-432 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.

5) For the joining of ASME P-No. 15E, Group 1 to P-No. 8, P-No. 42, P-No. 43 or P-No. 45, the filler metal shall be limited to an austenitic, nickel-base filler metal to those assigned to F-No. 43 in ASME Section IX, QW-432 and limited to the following consumables: ERNiCr-3, ENiCrFe-3, ENi-CrFe-2, UNS N08087.

6)

The purpose of this proposal is to relocate the **Bullseye PWHT** requirements in 2.5.2(c) and the **Alternative Welding Methods Without PWHT** in 2.5.3 to the new Engineered Repairs and Alterations Supplement, which has been approved by the Main Committee.

The below is the approved Scope (SXX.1) and proposed relocated text from Part 3, Section 2. Any revisions to relocated or new text will be in red font/double underlined.

SUPPLEMENT XX – ENGINEERED REPAIRS AND ALTERATIONS

SXX.1 SCOPE

a) This supplement provides general and specific requirements for engineered repairs and alterations to pressure retaining items. These requirements shall be considered as supplemental requirements to those set forth in the main Parts of the NBIC.

b) Engineered repairs and alterations contained in this supplement will require acceptance by the Inspector and, when required, by the Jurisdiction. Procedures and methodologies established and proven in the industry are leveraged through references to published documents. Supplemental requirements are provided as necessary.

c) Implementation of engineered repairs and alterations will typically require specific inspection procedures, material identification and/or testing, a complete characterization of damage assessment, and knowledge of process conditions, etc. The remaining life and inservice monitoring requirements of any engineered repair or alteration should be established prior to implementation.

d) Careful consideration shall be given to repair or alteration of pressure-retaining items that have been fabricated of either creep strength enhanced ferritic steel materials or ferritic steel materials enhanced by heat treatment. The tensile and creep strength properties of these materials can be degraded by not following specific welding procedure specifications and heat treatment requirements. The user is cautioned to seek technical guidance for welding and heat treating requirements for these materials in accordance with the original code of construction.

e) A safety analysis may be necessary for certain engineered repairs and alteration activities to ensure safe operation of equipment and minimal risk to personnel.

SXX.2 WELDING

a) Welding, brazing and fusing shall be performed in accordance with the original code of construction, Part 3, Section 2, and this supplement.

b) Careful consideration shall be given to pressure-retaining items that have been fabricated of either creep strength enhanced ferritic steel materials or ferritic steel materials enhanced by heat treatment. The tensile and creep strength properties of these materials can be degraded by not following specific welding procedure specification and heat treatment requirements. The user is cautioned to seek technical guidance for welding and heat treating requirements for these materials in accordance with the original code of construction.

SXX.2.1 POSTWELD HEAT TREATMENT BULLSEYE METHOD

a) When it is impractical or detrimental to Postweld Heat Treat (PWHT) the entire item or band around the item, the following local PWHT method may be performed on spherical or cylindrical pressure-retaining items using the time and temperature parameters in the original code of construction and in

accordance with a written procedure acceptable to the Inspector and, when required, by the Jurisdiction:

1) Heat a local area around the nozzle, welded attachment, or repair area such that the area is brought up uniformly to the required PWHT temperature. The application of local PWHT should be performed with controlled heating methods, such as induction or electric resistance heaters, and employing thermocouples to monitor PWHT temperature. The Soak Band (SB) shall extend tangentially and radially from the edge of the nozzle wall, or attachment weld or repair area equally by a minimum distance as defined by the thickness of the shell, t or 2 in. (50 mm), whichever is less. See Figures SXX.2.1-a and S~~2.5.2~~XX.2.1-b.

Soak Band (SB) — this is the region on the spherical or cylindrical shell that will be heated uniformly to the required PWHT temperature. This band encompasses a circular region in the tangential and radial directions starting from the edge of a welded nozzle, or repair area or welded attachment that will be subjected to PWHT.

2) The length of the Heating Band (HB) shall consist of the SB distance plus $4\sqrt{R*t}$. In no case shall the distance of the HB that extends beyond the edge of the nozzle weld, attachment weld or repair area be less than $2.5\sqrt{R*t}$.

Heating Band (HB) – this is the region that encompasses the application of heat for PWHT and is defined in length by the equation, $SB + 4\sqrt{R*t}$ where R is the outer radius of the spherical or cylindrical shell in inches (mm), and t is equal to the nominal thickness of the spherical or cylindrical shell in inches (mm).

3) The Gradient Control Band (GCB) shall be kept as low as possible in all directions to avoid harmful temperature gradients adjacent to nozzles or geometric discontinuities.

Gradient Control Band – this is the region that encompasses the SB, HB and extends beyond the edge of the HB.

4) For PWHT of nozzle welds, repair welds, and external attachment welds on smooth spherical shells, heads, and cylindrical shells, the temperature differential within the GCB measured at the outside edge of the SB and the temperature measured at the outside edge of the HB shall not exceed one-half (1/2) of the peak soak PWHT temperature.

5) The term t, as used above to determine SB, HB and GCB shall be the nominal thickness of either a full penetration weld, or the groove weld depth of a partial penetration repair weld. If a fillet weld is used in combination with a groove weld, the nominal thickness for PWHT shall be the depth of the groove weld.

Figure SXX.2.1-a
LOCAL POSTWELD HEAT TREATMENT TEMPERATURE CONTROL BANDS BUTT WELD IN CYLINDER

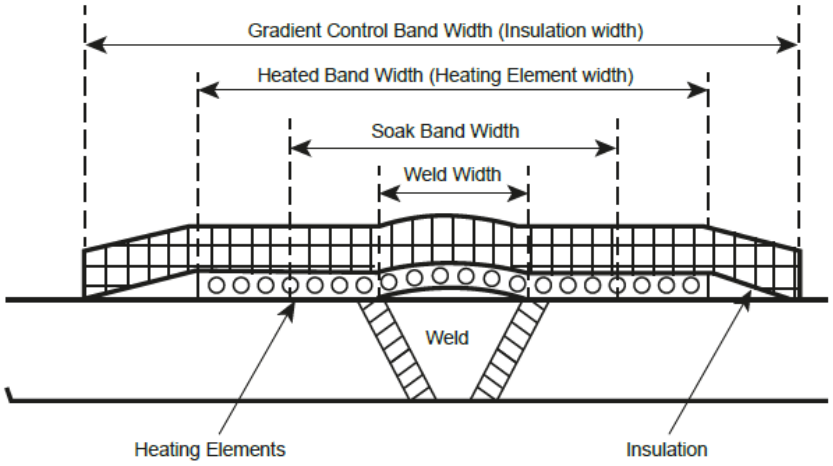
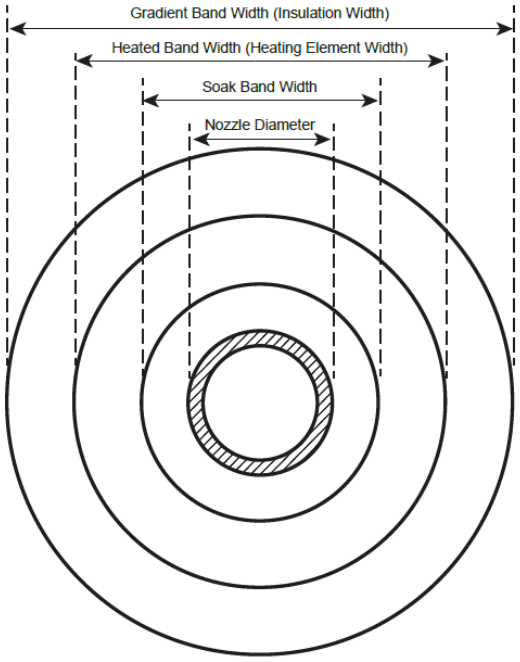


Figure SXX.2.1-b
LOCAL POSTWELD HEAT TREATMENT TEMPERATURE CONTROL BANDS NOZZLE WELD OR ATTACHMENT TANGENTIAL DIRECTION HEATING BANDS



SXX.2.2 ALTERNATIVE WELDING METHODS WITHOUT POSTWELD HEAT TREATMENT

a) Under certain conditions, postweld heat treatment, in accordance with the original code of construction, may be inadvisable or impractical. In such instances, the following alternative methods may be used.

b) Competent technical advice shall be obtained from the manufacturer of the pressure-retaining item or from another qualified source, such advice being especially necessary if the alternative is to be used in highly stressed areas, if service conditions are conducive to stress corrosion cracking, if materials are

subject to hydrogen embrittlement, or are operating at temperatures in the creep range, or if the alternative is being considered for “on-stream” repairs or “hot tapping” on piping systems. Selection of the welding method used shall be based on the rules of the original code of construction together with the above mentioned advice concerning the adequacy of the weld in the as-welded condition at operating and pressure test conditions.

c) When reference is made in this section to materials by the ASME designation, P-Number and Group Number, the requirements of this section apply to the applicable materials of the original code of construction, either ASME or other, which conform by chemical composition and mechanical properties to the ASME P-Number and Group Number designations.

d) The detailed welding methods listed in the following subsections may be used as an alternative to postweld heat treatment (PWHT). NBIC Part 3, ~~2.5.3.1~~ SXX.2.2.1 is a method in which the welding procedure requires an elevation of the preheat temperature. In contrast, NBIC Part 3, ~~2.5.3.2~~ SXX.2.2.2 through ~~2.5.3.5~~ SXX.2.2.5, are methods in which the welding procedure requires the use of a temper-bead welding technique. Welding Method 6 as described in ~~2.5.3.6~~ SXX.2.2.6 requires use of a controlled fill technique. ~~In 2.5.3.5~~ SXX.2.2.5 is a method in which
the welding procedure used for joining dissimilar materials requires either an elevation of the preheat temperature or a temper-bead welding technique, depending on the chemical composition of the base metal that is joined to an austenitic steel. Temper-bead welding procedure nomenclature is defined in Section IX of the *ASME Boiler and Pressure Vessel Code*. Typically, this technique minimizes heat input of the initial beads, thus limiting heat beyond the weld heat-affected zone (HAZ) of the base metal. Heat input shall be increased for successive beads in accordance with the rules of QW-290 for temper bead welding in ASME Section IX. The Welding Procedure and Welder Performance Qualifications shall, in all cases, be in accordance with the requirements of the latest Edition of Section IX of the *ASME Boiler and Pressure Vessel Code*.

e) Nondestructive Examination of Welds

Prior to welding, the area prepared for welding shall be examined using either the Magnetic Particle (MT) or the Liquid Penetrant (PT) examination method to determine that no defects exist. After the finished weld has reached ambient temperature, and, when required by the specific welding method, the surface temper bead reinforcement layer has been removed substantially flush with the surface of the base metal, the weld shall be examined again by either of the above methods to determine that no defects exist using acceptance standards acceptable to the Inspector or original code of construction. In addition, welds greater than 3/8 in. (10 mm) deep or welds in a pressure retaining item that were originally required to be volumetrically examined by the rules of the original code of construction, shall be examined in accordance with paragraph NBIC Part 3, 4.2.

f) Methods that may be used as alternatives to postweld heat treatment are described in the following subsections.

SXX.2.2.1 WELDING METHOD 1

When using this method, the following is required:

a) This method may be used when the applicable rules of the original code of construction did not require notch toughness testing;

b) The materials shall be limited to P-No. 1, Groups 1, 2, and 3 and to P-No. 3, Groups 1 and 2 (excluding Mn-Mo steels in Group 2), as permitted for welded construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the Shielded Metal-Arc welding (SMAW), Gas Metal-Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), and Gas Tungsten-Arc Welding (GTAW) processes;

d) The Welders and Welding Operators, Welding Procedures Specifications shall be qualified in accordance with the applicable rules of the original code of construction, except that no postweld heat treatment shall be applied to the test coupon;

e) The weld area shall be preheated and maintained at a minimum temperature of 300˚F (149˚C) during welding. Alternatively, for P-No.1, Groups 1, 2 and 3 materials, the preheat may be reduced to 175˚F (79˚C) provided:

1) Provided the carbon equivalent of the base material to be welded is determined to be 0.40 or less.
2) The electrodes and filler metals are classified by the filler metal specification with a diffusible hydrogen designator of H4 or lower.
3) When shielding gas is used, it shall have a dew point that is -60˚F (-50˚C) or lower.

f) The preheat temperature shall be checked to assure that 4 in. (102 mm) of the material or four times the material thickness (whichever is greater) on each side of the groove (or full thickness of joint for a groove weld) is maintained at the preheat temperature during welding. When the weld does not penetrate through the full thickness of the material, the preheat need only be maintained at a distance of 4 in. (102 mm) or four times the depth of the repair weld, whichever is greater, on each side of the joint.

SXX2.2.2 WELDING METHOD 2

When using this method, the following is required:

a) This method shall be used when the applicable rules of the original code of construction required notch toughness testing or shall be used when the applicable rules of the original code of construction did not require notch toughness testing provided the adequacy of the notch toughness of the weld, including the heat-affected zone, in the as-welded condition at operating and pressure test conditions is verified;

b) The materials shall be limited to carbon and low alloy steels permitted for welded construction by the applicable rules of the original code of construction, including those materials conforming to any of the following ASME P-No. designations: P-No. 1, Groups 1, 2, and 3; P-No. 3, Groups 1, 2, and 3; P-No. 4; P-No. 5A; P-No. 9A; P-No. 10A; P-No. 10B; P-No. 10C; P-No. 11A; or P-No. 11B;

c) The welding shall be limited to the Shielded Metal-Arc Welding (SMAW), Gas Metal-Arc Welding (GMAW), Flux Cored-Arc Welding (FCAW), and Gas Tungsten-Arc Welding (GTAW) processes;

d) The Welding Procedures Specifications shall be qualified in accordance with the temper bead procedure qualification requirements in QW-290 of ASME Section IX, and shall include the following additional requirements:

1) For P-No. 1 Groups 1, 2, and 3 and P-No. 3 Groups 1, 2, and 3, the minimum preheat temperature shall be 350°F (177°C), and the maximum interpass shall be 450°F (232°C).

2) For P-No. 9A, P-No. 10A, P-No. 10B, P-No. 10C, P-No. 11A, or P-No. 11B, the minimum preheat and interpass temperature requirements shall be in accordance with the guidelines in NBIC Part 3, 2.5.1.

3) For P-No. 4 and P-No. 5A materials, the minimum preheat, interpass temperature, and technique shall be in accordance with NBIC Part 3, ~~2.5.3.4~~ SXX.2.2.4. The repair depth for temper bead repairs to pressure retaining items of P-No. 4 and P-No. 5A materials is limited to welds not penetrating through full thickness.

4) Full thickness temper bead weld repairs are permitted to pressure retaining items of P-No 4 and P-No 5A materials under the following conditions:

a. ASME Section VIII, Division 2 pressure vessels, where application of PWHT on in-service vessels has been demonstrated to cause harm to vessel material.

b. For tube-to-header welds in steam service.

Full thickness weld repairs above shall be completed per NBIC Part 3, 3.3.5 with the following requirements:

a. The full thickness repair weld shall be verified as being the full penetration.

b. Volumetric examination of the full thickness weld shall be performed.

e. The test material for the welding procedure qualification shall be of the same material specification (including specification type, grade, class, and condition of heat treatment) as the material being repaired. In the event that the notch toughness of the material to be repaired is unknown, evidence from tests of that material or from another acceptable source (see NBIC Part 3, ~~2.5.3~~SXX.2.2) may be used for the base metal notch toughness when qualifying the WPS as required in NBIC Part 3, ~~2.5.3.2 h~~SXX.2.2.2 h). In the event that the original material specification is obsolete, the test material used should conform as closely as possible to the original material used for construction based on nominal composition and carbon equivalent (IIW Formula CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; elements are expressed in Weight Percent Amounts), but in no case shall the material be lower in strength;

f. The qualification thickness for the test plates and repair groove depths shall be in accordance with ASME Section IX; for pressure retaining items repaired using this temper bead method, hardness test- ing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure retaining item operates in steam service above 900°F (482°C);

g. The organization making the repair shall include, when qualifying its WPS, sufficient tests to determine that the notch toughness of the weld metal and the heat-affected zone of the base metal in the "as-welded" condition is adequate at the minimum operating and pressure test temperatures (including start-up and shutdown). If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS;

h. Notch toughness shall be determined and evaluated by Charpy impact tests in accordance with the provisions of the original code of construction. Exemptions from impact testing described in the original code of construction are not applicable;

i. For the welding process in NBIC Part 3, ~~2.5.3.2~~SXX.2.2.2-~~-~~c), use of austenitic or ferritic filler metals is permitted. For ferritic filler metals, use only electrodes and filler metals that are classified by the filler metal specifi- cation with a diffusible-hydrogen designator of H8 or lower for the FCAW and SMAW processes. When shielding gases are used with a process, the gas shall exhibit a dew point that is below -60°F (-50°C). Surfaces on which welding will be done shall be maintained in a dry condition during welding and be free of rust, mill scale, and hydrogen producing contaminants such as oil, grease, and other organic materials;

j. After the weld has been deposited flush with the base metal, a surface temper reinforcing weld layer shall be applied;

k. For welds made by SMAW and FCAW, after completion of welding and without allowing the weldment to cool below the minimum preheat temperature, the temperature of the weldment shall be raised to
a temperature of 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018-H4); and

l. After the finished repair weld has cooled to ambient temperature, the surface temper reinforcing layer shall be removed substantially flush with the surface of the base material.

SXX2.2.3 WELDING METHOD 3

When using this method, the following is required:

a) This method may be used when the applicable rules of the original code of construction did not require notch toughness testing;

b) The materials shall be limited to any P-No. 1 or P-No. 3 material as permitted for welded construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the SMAW, FCAW, and GTAW processes;

d) The test material for the welding procedure qualification shall be of the same P-No. and Group No. as the base material specification of the repair. In the event that the original material specification is obsolete, the test material used should conform to the nominal composition and carbon equivalent (IIW Formula CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; elements are expressed in Weight Percent Amounts), as the material being repaired, but in no case shall the material be lower in strength;

e) If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS. For pressure retaining items repaired using this temper bead method, hardness testing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure retaining item operates in steam service above 900°F (482°C);

f) The qualification thickness for the test plates and repair groove depths shall be in accordance with ASME Section IX; and

g) The WPS shall be qualified in accordance with the temper bead procedure qualification requirements in QW-290 of ASME Section IX, and shall include the following additional requirements:

   1) The minimum preheat temperature for welding shall be 350°F (177°C) and the maximum interpass temperature shall be 450°F (232°C);

   2) For the welding processes in NBIC Part 3, ~~2.5.3.3~~SXX.2.2.3 c), use of austenitic or ferritic filler metal is permitted. For ferritic filler metals, use only electrodes or filler metals that are classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower for the FCAW and SMAW processes;

   3) After completion of welding using SMAW and without allowing the weldment to cool below the mini- mum preheat temperature, the temperature of the weldment shall be raised to a temperature of 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted, provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018-H4); and

   4) After the finished repair weld has cooled to ambient temperature, the final temper bead reinforcement layer shall be removed substantially flush with the surface of the base material.

SXX2.2.4 WELDING METHOD 4

When using this method, the following is required:

a) This method is limited to repair welds in pressure retaining items for which the applicable rules of the original code of construction did not require notch toughness testing. The repair depth for temper bead repairs to pressure retaining items is limited to welds not penetrating though the full thickness.

Full thickness temper bead weld repairs are permitted under the following conditions:

1) ASME Section VIII, Division 2 pressure vessels, where application of PWHT on in-service vessels has been demonstrated to cause harm to vessel material.

2) For tube-to-header welds in steam service.

Full thickness weld repairs shall be completed per NBIC Part 3, 3.3.5 with the following requirements:

1) The full thickness repair shall be verified as being full penetration.

2) Volumetric examination of the full thickness weld shall be performed.

b) The materials shall be limited to P-No. 4, Groups 1 and 2, and P-No. 5A steels as permitted for welded construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the SMAW, FCAW, GMAW or GTAW processes using low-hydro- gen electrodes and filler metals classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower, and suitably controlled by maintenance procedures to avoid contamina- tion by hydrogen producing sources. The surface of the metal prepared for welding shall be free of contaminants;

d) The test material for the welding procedure qualification shall be of the same P-No. and Group No. as the base material specification of the repair. In the event that the original material specification is obsolete, the test material used should conform to the nominal composition and carbon equivalent (IIW Formula CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; elements are expressed in Weight Percent Amounts), as the material being repaired, but in no case shall the material be lower in strength;

e) If for reasons of corrosion resistance, special hardness limits are necessary, such limits shall be included when qualifying the WPS;

f) The qualification thickness for the test plates and repair groove depths shall be in accordance with ASME Section IX. For pressure-retaining items repaired using this temper bead method, hardness test- ing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure-retaining item operates in steam service above 900°F (482°C);

g) The welding procedures (WPS) shall be qualified in accordance with the temper bead procedure qualification requirements in QW-290 of ASME Section IX, and shall include the following additional requirements:

1) The minimum preheat temperature for welding shall be 300°F (150°C) for P-No. 4 material and 400°F (200 °C) for P-No. 5A material. The preheat temperature shall be checked to ensure that 4 in. (102 mm) of the material or four times the material thickness (whichever is greater) on each side of the groove (or full thickness of joint for a groove weld) is maintained at the minimum temperature during welding. The interpass temperature shall not exceed 800°F (430°C). When the weld does not penetrate through the full thickness of the material, the minimum preheat and maximum interpass temperature need only be maintained for 4 in. (102 mm) or four times the depth of the repair weld (whichever is greater) on each side of the joint;

2) For the welding processes in NBIC Part 3, ~~2.5.3.4~~SXX.2.2.4 c), use of austenitic or ferritic filler metal is permitted. For ferritic filler metals, use only electrodes or filler metals that are classified by the filler metal specification with a diffusible-hydrogen designator of H8 or lower for the FCAW and SMAW processes;

3) After the weld has been deposited flush with the base metal, a surface temper reinforcing weld layer shall be applied;

4) For welds made by the SMAW and FCAW processes, after completion of welding and without allowing the weldment to cool below the minimum preheat temperature, the temperature of the weldment shall be raised to 450°F (232°C) minimum for a minimum period of two hours. This hydrogen bake-out treatment may be omitted, provided the electrode used is classified by the filler metal manufacturer with a diffusible-hydrogen designator of H4 (e.g., E7018 H4); and

5) After the finished repair weld has cooled to ambient temperature, the surface temper reinforcing weld layer shall be removed substantially flush with the surface of the base metal (and for a fillet weld to the required size and suitable contour of the toes).

SXX.2.2.5 WELDING METHOD 5

When using this method, the following is required:

a) This welding method may be used when the applicable rules of the original code of construction or the construction standard or code selected permit joining dissimilar materials used in pressure-retaining items;

b) The materials shall be limited to ASME P-No. 1, Groups 1, 2, and 3, P-No. 3, Groups 1, 2, and 3, P-No. 4, P-No. 5A, P-No. 9A, P-No. 10A, P-No. 10B, P-No. 10C, P-No. 11A, P-No. 11B joined to either P-No.8, P-No. 42, P-No. 43, or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction;

c) The welding shall be limited to the SMAW, FCAW, GMAW and machine or automatic GTAW processes. The filler metal used for joining the dissimilar materials shall be either A-No 8 or Nickel-Chrome alloy classification (F-No 43). When selecting a filler metal for dissimilar metal weld joints, determine if the weld joint will be exposed to elevated temperature service. A-No 8 filler metals exposed to service temperatures greater than 800°F (427°C) will exhibit reduced creep life along the fusion zone of the ferritic material due to carbon diffusion. Instead, a low hydrogen, Nickel-Chromium alloy classification filler metal shall be used for dissimilar weld joints exposed to service temperatures at or above 800°F (427°C);

d) The WPS shall be qualified in accordance with the temper bead rules of QW-290 in ASME Section IX. For pressure retaining items fabricated to ASME Section I and repaired using this temper bead method, hardness testing and carbon equivalency requirements may be waived for ASME Section IX temper bead procedure qualification provided the pressure retaining item operates in steam service above 900°F (482°C);

e) If the original code of construction did not require notch toughness testing, qualification of welding procedures (WPS) for joining ASME P-No. 1, P-No. 3 ferritic materials to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45 materials shall be in accordance with requirements in either NBIC Part 3, ~~2.5.3.1~~SXX.2.2.1, Welding Method 1 or in NBIC Part 3, ~~2.5.3~~SXX.2.2.3, Welding Method 3;

f) If the original code of construction did not require notch toughness testing, qualification of welding pro- cedures (WPS) for joining ASME P-No. 4, P-No. 5A ferritic materials to either P-No. 8, P-No. 42, P-No. 43, P-No. 45 materials shall be in accordance with the requirements in NBIC Part 3, ~~2.5.3~~SXX.2.2.4, Welding Method 4; and

g) If the original code of construction required notch toughness testing, qualification of welding procedures (WPS) for joining ferritic materials to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45 materials shall be in accordance with the requirements in NBIC Part 3, ~~2.5.3~~SXX.2.2.2, Welding Method 2.

SXX.2.2.6 WELDING METHOD 6

This welding method provides requirements for welding only Grade 91 tube material within the steam boiler setting. When using this welding method, the following applies:

a) This method is limited to butt welds, weld build-up repairs, or attachment weld to 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;

b) Application shall be limited to only boiler tube repairs at a location internal to the boiler setting;

c) Upon the 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.

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

2) The welding shall be limited to the SMAW and/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.

3) The welding procedure qualification test coupon shall be P-No 15 E, Group 1, Grade 91.

4) Qualification thickness limits of base metal and weld deposit thickness shall be in accordance with ASME Section IX, QW-451.

5) The Welding Procedure Specification (WPS) shall be qualified in accordance with the requirements of ASME Section IX. No postweld heat treatment shall be applied to the test coupon. Additionally, the WPS shall include the following requirements:

a) The minimum preheat for the GTAW process shall be 200°F (100°C). The minimum preheat for the SMAW process shall be 300°F (150°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°F (290°C);

b) When the SMAW process is specified for a fill pass layer, 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 shown on the WPS;

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

d) The filler metal shall be limited to an austenitic, nickel-base filler metal to those assigned to F-number 43 in Section IX, QW-432 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), UNS N08087;

e) A martensitic, iron-base filler metal to those assigned to F-number 4 or F-number 6 in ASME Section IX, QW-432 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8; and

f) For weld build-up repairs due to wastage, the filler metal shall be limited to those assigned to F-number 43 in ASME Section IX, QW-432.

SXX.2.2.7 WELDING METHOD 7

When using this welding method, the following applies:

a) This welding method may be used when the applicable rules of the original code of construction or the construction standard or code selected permit joining dissimilar materials.

b) The materials shall be limited to ASME P-No. 15E, Group 1 joined to either P-No. 5A or P-No. 8, P-No. 42, P-No. 43 or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction.

c) The welding shall be limited to the SMAW and/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.

d) 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 and to non-pressure part welds for which the applicable rules of the original code of construction did not require notch toughness testing.

e) Application shall be limited to a location internal to the boiler setting.

f) Upon the 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.

g) Qualification thickness limits of base metal and weld deposit thickness shall be in accordance with ASME Section IX, QW-451.

h) The welding procedure qualification test coupon shall be ASME P-No. 15 E, Group 1, joined to either P-No. 5A, P-No. 8, P-No. 42, P-No. 43, or P-No. 45.

i) The Welding Procedure Specification (WPS) shall be qualified in accordance with the requirements of ASME Section IX. No postweld heat treatment shall be applied to the test coupon. Additionally, the WPS shall include the following requirements:

1) The minimum preheat for the GTAW process shall be 200°F (93°C). The minimum preheat for the SMAW process shall be 300°F (149°C). The maximum interpass temperature shall be 550°F (288°C).The preheat temperature shall be checked to ensure the minimum preheat temperature is maintained during welding and until welding is completed.

2) When the SMAW process is specified for a fill pass layer, 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 shown on the WPS.

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

~~4)~~ For the joining of ASME P-No. 15E, Group 1 to P-No. 5A, the filler metal shall be limited to a mar- tensitic, iron-base filler metal to those assigned to F-No. 4 or F-No. 6 in ASME Section IX, QW-432 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.

~~4)~~

5) For the joining of ASME P-No. 15E, Group 1 to P-No. 8, P-No. 42, P-No. 43 or P-No. 45, the filler metal shall be limited to an austenitic, nickel-base filler metal to those assigned to F-No. 43 in ASME Section IX, QW-432 and limited to the following consumables: ERNiCr-3, ENiCrFe-3, ENi-CrFe-2, UNS N08087.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

21-67

Subject/Title

Removal of reference to mechanical portion and add additional information for welding

NBIC Location

Part 3 Repairs and Alterations, Section 3, Paragraph 3.3.4.9

Project Manager and Task Group

PM – Philip Gilston

TG – Kathy Moore, Trevor Seime, Don Kinney and Steve Frazier

Source (Name/email)

Kathy Moore / kathymoore@joemoorecompany.com

Statement of Need

Removing the mechanical portion of the text. Many Jurisdictions are having a difficult time enforcing that part of the NBIC. Additionally, cracking of ligaments in welded plug is a common issue, the current NBIC does not have enough direction or requirements for welding tube plugs in firetube boiler.

Background Information

Mr. Kinney wrote on the Chief's Forum and asked the Chiefs what they thought of 3.3.4.9. They wanted the mechanical portion dropped.

Improper welding of tube plugs in firetubes often creates ligament cracks.

Originally the part addressing mechanical plugs was action item 21-71, the item has been combined here to make for a clean proposal

Revision 12 Notes, summary of changes, and actions addressing comments made in the ballot:

1. Second sentence of 'a' revised per Mr. Galanes comment. Highlighted below

Existing Text	**Proposed Text**
3.3.4.9 **TUBE PLUGGING IN FIRETUBE BOILERS** When the replacement of a tube in a firetube boiler is not practicable at the time the defective tube is detected, with the concurrence of the owner, Inspector, and when required, the Jurisdiction, the tube may be plugged using the following course of repair: a) The scope of work, type of plug and method of retention; whether welded or mechanical interface, shall be evaluated by the "R" Certificate Holder performing the repair and reviewed with the Inspector, and when	3.3.4.9 **TUBE PLUGGING BY WELDING IN FIRETUBE BOILERS** When the replacement of a tube in a firetube boiler is not practicable at the time the defective tube is detected, with the concurrence of the owner, Inspector, and when required, the Jurisdiction, the tube may be plugged ~~using the following course of repair:~~. ~~a) The scope of work, type of plug and method of retention; whether welded or mechanical~~

required, the Jurisdiction. b) When the method of plugging is by welding, strength calculations for the size of the weld shall be in accordance with the original code of construction. The“R” Certificate Holder performing this repair shall weld the plug to the tube, or to the tube sheet, or a combination of both. c) Plugging a tube in a firetube boiler is recognized as an alternative to the replacement of a firetube and may be further limited as a method of repair by the number of tubes plugged and their location; scattered or clustered. The operational effects on the waterside pressure boundary or membrane and the effects on the combustion process throughout the boiler should be considered prior to plugging. d) The boiler may be returned to service for a period of time agreed upon by the owner, the Inspector, and when required, the Jurisdiction. e) The Form R 1 shall be completed for the plugging of firetubes, identifying the means of plug retention; mechanical or by welding.	~~interface, shall be evaluated by the “R” Certificate Holder performing the repair and reviewed with the Inspector, and when required, the Jurisdiction.~~ ~~b~~a) ~~Plugging a tube in a~~When installing a welded firetube plug, ~~boiler is recognized as an alternative to the replacement of a firetube and~~the repair may be ~~further~~ limited ~~as a method of repair~~ by the number of tubes plugged and their location~~; scattered or clustered~~. The operational effects on the waterside pressure boundary ~~or membrane~~ and reduced heat transfer (e.g. potential for over-heating of remaining tubes) ~~the effects on the combustion process throughout the boiler~~ should be considered prior to plugging. Competent technical advice should be obtained from the manufacturer of the pressure-retaining item or from another qualified source. ~~c~~b) Strength calculations for the size of the weld shall be in accordance with the original code of construction. The “R” Certificate Holder performing this repair shall weld the plug to the tube, or to the tube sheet, or a combination of both. c) Cracking of ligaments due to the use of welded plugs is a common issue. To mitigate this possible occurrence the “R” Certificate Holder performing the repair shall consider actions including but not limited to the following: 1) For P-No. 1 and 3 materials, preheating to 200°F (95°C) minimum. 2) Limiting the maximum weld size to 3/8” (10 mm). 3) Limiting electrode size to 1/8” (3 mm) maximum diameter. 4) Using a stringer bead technique. 5) Using a minimum of two passes. d) NDE in lieu of pressure testing is not permitted. ~~The boiler may be returned to service for a period of time agreed upon by the owner, the Inspector, and when required, the Jurisdiction.~~ ~~e) The Form R 1 shall be completed for the plugging of firetubes, identifying the means of plug retention; mechanical or by welding.~~

For Information, Clean Copy of Proposed Text*, changes from Rev 11 only highlighted*

3.3.4.9 **TUBE PLUGGING BY WELDING IN FIRETUBE BOILERS**

When the replacement of a tube in a firetube boiler is not practicable at the time the defective tube is detected, with the concurrence of the owner, Inspector, and when required, the Jurisdiction, the tube may be plugged.

a) When installing a welded firetube plug, the repair may be limited by the number of tubes plugged and their location. The operational effects on the waterside pressure boundary and reduced heat transfer (e.g. potential for overheating of remaining tubes)~~the effects on the combustion process~~ should be considered prior to plugging. Competent technical advice should be obtained from the manufacturer of the pressure-retaining item or from another qualified source.

b) Strength calculations for the size of the weld shall be in accordance with the original code of construction. The

"R" Certificate Holder performing this repair shall weld the plug to the tube, or to the tube sheet, or a combination of both.

c) Cracking of ligaments due to the use of welded plugs is a common issue. To mitigate this possible occurrence the "R" Certificate Holder performing the repair shall consider actions including but not limited to the following:

1) For P-No. 1 and 3 materials, preheating to 200°F (95°C) minimum.

2) Limiting the maximum weld size to 3/8" (10 mm).

3) Limiting electrode size to 1/8" (3 mm) maximum diameter.

4) Using a stringer bead technique.

5) Using a minimum of two passes.

d) NDE in lieu of pressure testing is not permitted.

	VOTE						
Committee	**Approved**	**Disapproved**	**Abstained**	**Not Voting**	**Passed**	**Failed**	**Date**

Item A-23-04

New proposed 2025 changes

4.2 NONDESTRUCTIVE EXAMINATION

a) The nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the Original Code of Construction for the pressure-retaining item. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used. Where the welds were subject to volumetric NDE during construction, repairs may be made to the base material and weld joints without volumetric examination under the following conditions:

1. The repair depth does not exceed the lesser of 1/8 inch (3 mm) or 25% of the nominal base material thickness.
2. The aggregate repair length is no longer than 6 inches (150 mm);
3. The repair cavity and each layer of deposited weld, including the final weld surface, have been examined by MT or PT.

b) When volumetric NDE is required by the original code of construction but is not possible or practicable, progressive liquid penetrant or magnetic particle examination as described in paragraph 4.2 (b)(1) may be used. This alternative NDE method is subject to the acceptance of the Inspector, owner and when required, the Jurisdiction where the pressure-retaining item is installed, provided that all other requirements of this section are met.

1) Liquid penetrant or magnetic particle examination shall be performed on each layer of the weld to be examined, including the final weld. Prior to performing PT or MT the surface of each layer of weld shall be properly prepared for examination. The final weld may be examined with or without grinding. The NDE report shall include the number of layers examined. This alternative NDE method shall be documented in the remarks section of the applicable R-form.

c) 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. Provisions for training, experience, qualification, and certification of NDE personnel shall be described in the "R" Certificate Holder's written quality system.

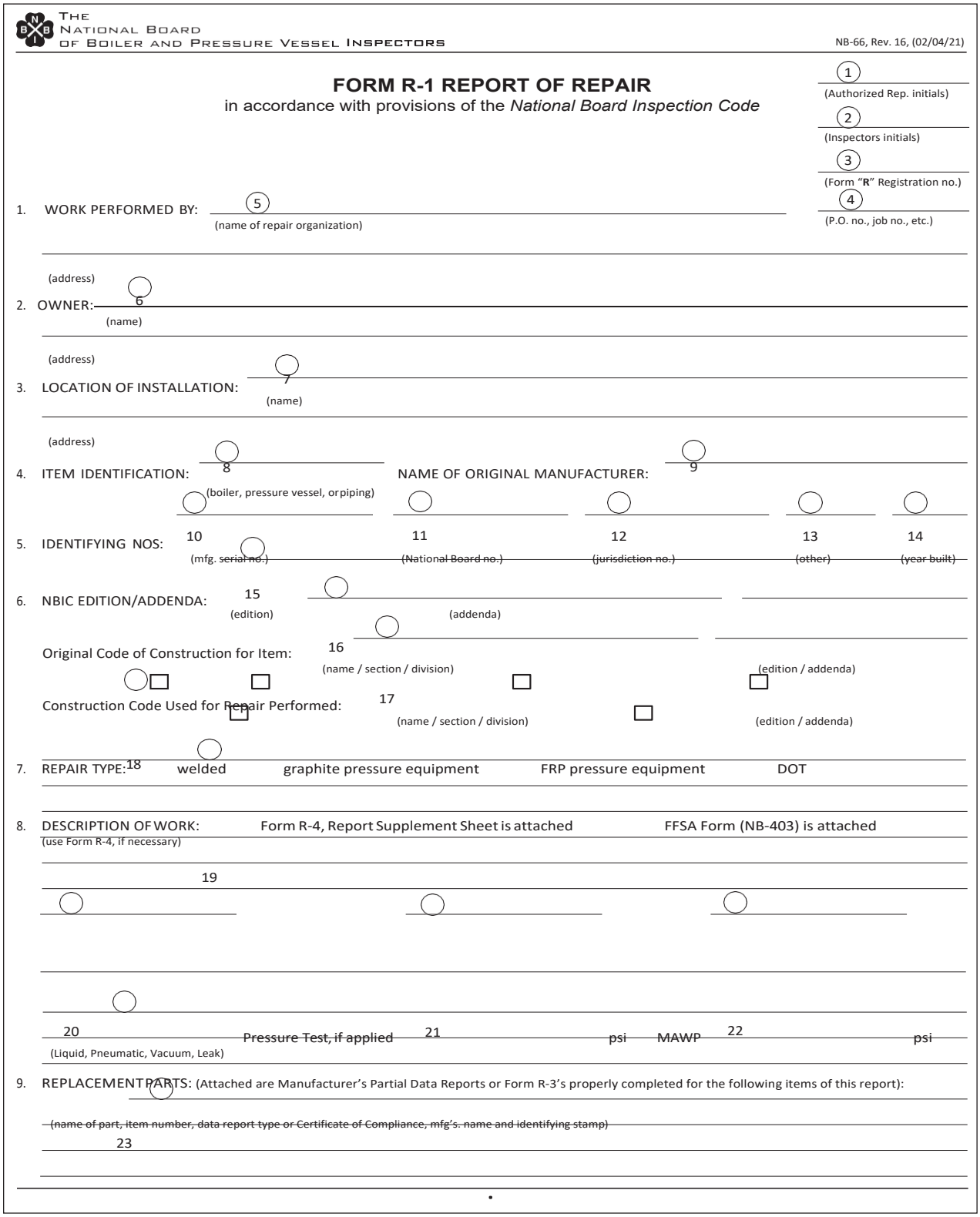
THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No. A 23-13 Rev 02	
Subject/Title **Referencing for Weld Metal, Filler Metal etc.**	
NBIC Location	
Project Manager and Task Group P Gilston (PM), J. Siefert, W. Sperko, M. Vance, T Melfi, F Johnson	
Source (Name/email) January 2023, Sub-Committee Discussion	
Statement of Need Within Part 3, welding consumables are referred to in several different ways e.g., filler metal(s) (52 times), weld metal (11 times), consumable (14 times), welding electrode (once) etc. This item is to review these references, create definitions and bring consistency for reference descriptions.	
Background Information When discussing weld metal, references can be made to the weld consumable itself, or the deposited weld metal. Often we describe the 'nominal composition' for the weld, this is normally based on the actual weld metal deposited in a weld joint. Various factors can influence the chemistry of a deposited weld metal, including, but not limited to dilution with the base metal, protective fluxes, shielding gas etc.	
Existing Text None	**Proposed Text** **9.1 DEFINITIONS** **Weld -** A weld consists of weld metal and heat affected zones (HAZ) **Weld Metal** - Metal in a fusion weld consisting of that portion of the base metal and filler metal melted during welding. When no filler metal is added this is known as an autogenous weld. **Filler Metal** - The metal that is added during a welding, brazing or soldering operation. **Weld Consumable** - Electrodes, wires and fluxes that are melted during a welding operation.

S9.2 FORM R-1, REPORT OF REPAIR, NB-66

FIGURE S9.2.1
FORM R-1, PAGE 1 OF 2



THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 16, (02/04/21)

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

(1) (Authorized Rep. initials)
(2) (Inspectors initials)
(3) (Form "R" Registration no.)
(4) (P.O. no., job no., etc.)

1. WORK PERFORMED BY: (5) (name of repair organization)
(address)
2. OWNER: (6) (name)
(address)
3. LOCATION OF INSTALLATION: (7) (name)
(address)
4. ITEM IDENTIFICATION: (8) (boiler, pressure vessel, or piping) NAME OF ORIGINAL MANUFACTURER: (9)
5. IDENTIFYING NOS: (10) (mfg. ~~serial no.~~) (11) (National Board no.) (12) (jurisdiction no.) (13) (other) (14) (year built)
6. NBIC EDITION/ADDENDA: (15) (edition) (addenda)
Original Code of Construction for Item: (16) (name / section / division) (edition / addenda)
Construction Code Used for Repair Performed: (17) (name / section / division) (edition / addenda)
7. REPAIR TYPE: (18) welded graphite pressure equipment FRP pressure equipment DOT
8. DESCRIPTION OF WORK: Form R-4, Report Supplement Sheet is attached FFSA Form (NB-403) is attached
(use Form R-4, if necessary)
(19)
(20) (Liquid, Pneumatic, Vacuum, Leak) Pressure Test, if applied (21) psi MAWP (22) psi
9. 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)~~
(23)
10. REMARKS: (24)

FIGURE S9.2.2
FORM R-1, PAGE 2 OF 2

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 16, (02/04/21)

(25) (Form "R" Registration no.)

(26) (P.O. no., job no., etc.)

CERTIFICATE OFCOMPLIANCE

I, (27) , certify that to the best of my knowledge and belief the statements made 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. (28) Expiration date: (29)

Repair Organization: (30)

Signed: (31)
(authorized representative)

Date: (32)

CERTIFICATE OF INSPECTION

I, (33) , 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 (34) and employed by (35) of (36)

have inspected the work described in this report on (37), 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.

Commissions: (38)
(National Board and Jurisdiction no. including endorsement)

Signed: (39)
(Inspector)

Date: (40)

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229-1183 Page 2 of 2

TABLE S9.2

GUIDE FOR COMPLETING FORM R-1, REPORT OF REPAIR, NB-66

Reference to Circled Numbers in the Form	Description
(1)	Initials of the authorized representative of the "R" Certificate Holder.
(2)	Initials of the Inspector reviewing the "R" Certificate Holders work.
(3)	When registering a Form R-1 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.
(4)	If applicable, document the unique purchase order, job, or tracking number assigned by the organization performing the work.
(5)	The name and address of the National Board “R” Certificate Holder performing the work as it appears on the “*Certificate of Authorization*”.
(6)	Name and address of the owner of the pressure-retaining item.
(7)	Name and address of plant or facility where the pressure-retaining item is installed.
(8)	Description of the pressure-retaining item, such as boiler or pressure vessel, or piping. Include the applicable unit identification.
(9)	Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, “unknown.”
(10)	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.”
(11)	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.”
(12)	Indicate the jurisdiction number assigned to the pressure retaining item, if available.
(13)	Indicate any other unique identifying nomenclature assigned to the pressure retaining item by the owner or user.
(14)	Identify the year in which fabrication/construction of the pressure retaining item was completed.
(15)	Indicate edition and addenda of the NBIC under which this work is being performed.
(16)	Indicate the name, section, division, edition, and addenda (if applicable) of the original code of construction for the pressure-retaining item.

TABLE S9.2 CONT'D

Reference to Circled Numbers in the Form	Description
(17)	Indicate the name, section, division, edition, and addenda (if applicable) of the construction code used for the work being performed. If code cases are used, they shall be identified in the "Remarks" section.
(18)	Check the repair type performed on the pressure retaining item.
(19)	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 (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 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 required to describe the scope of work, a Form R-4 shall be used and attached (check box). If a FITNESS FOR SERVICE Form (NB-403) is part of the Form R-1 repair package, check box and attach the form. Information determined to be of a proprietary nature need not be included, but shall be stated on the form.
(20)	Indicate type of pressure test applied (Liquid, Pneumatic, Vacuum, Leak). If no pressure test applied, indicate "none."
(21)	Indicate test pressure applied.
(22)	Indicate maximum allowable working pressure (MAWP) for the pressure retaining item, if known.
(23)	As applicable, identify what Replacement 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.
(24)	Indicate any additional information pertaining to the work involved (e.g., routine repairs, code cases).
(25)	When registering a Form R-1 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.
(26)	If applicable, document the unique purchase order, job, or tracking number assigned by organization performing work.
(27)	Type or print name of authorized representative of the "R" Certificate Holder attesting to accuracy of the work described.
(28)	Indicate National Board "R" *Certificate of Authorization* number.
(29)	Indicate month, day, and year that the "R" *Certificate of Authorization* expires. If an Extension of your *Certificate of Authorization* has been granted by the National Board, and during the extension period, work is performed under your *Certificate of Authorization*, you must insert "Under Extension" after the Certificate expiration date on the "R" forms.

TABLE S9.2 CONT'D

Reference to Circled Numbers in the Form	Description
(30)	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.
(31)	Signature of "R" Certificate Holder authorized representative.
(32)	Enter month, day, and year repair certified.
(33)	Type or print name of Inspector.
(34)	Indicate Inspector's Jurisdiction.
(35)	Indicate Inspector's employer.
(36)	Indicate address of Inspector's employer (city and state or province).
(37)	Indicate month, day, and year of final inspection by Inspector. For routine repairs this shall be the month, day, and year the Inspector reviews the completed routine repair package.
(38)	Inspector's National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.
(38)	Signature of Inspector.
(40)	Indicate month, day, and year of Inspector signature

	VOTE						
Committee	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

23-35

Subject/Title

Definition of “non-load bearing attachment” (All Parts)

NBIC Location

Part 3: Repairs and Alterations; Sections 3; Paragraphs: 3.3.2 e), 2) and Section 9; Glossary of Terms

Project Manager and Task Group

PM – Tom White, Aziz Khssassi

Source (Name/email)

Tom White/thomas.white@nrg.com

Statement of Need

The term "non-load bearing attachment" is used as a basis for determining a routine repair but is not defined in the NBIC. NBIC Interpretation 95-33 addresses this term in their reply to the interpretation. *A “non-load bearing attachment” is a generally accepted design term referring to items that transmit an inconsequential load onto the pressure retaining boundary.* It would be beneficial to add this term to Glossary of Terms for all Parts: ***Non-Load Bearing Attachment*** *- A design term referring to items that transmit an inconsequential load onto the pressure retaining boundary.*

Background Information

A Certificate Holder replaces/repairs internal rails/supports for trays or bins that get rolled into an autoclave. These rails/supports are (typically) stitch welded along the inside of the shell. The Certificate Holder believes this is a non-load bearing attachment and performs this work as a routine repair. The attachment of internals is a loading design consideration for ASME Sect. VIII Div.1.

NBIC Interpretation 95-33 addresses this term in their reply to the interpretation. A “non-load bearing attachment” is a generally accepted design term referring to items that transmit an inconsequential load onto the pressure retaining boundary. Need to add the following to the Glossary of Terms for all Parts: ***Non-load bearing attachment - A generally accepted design term referring to items that transmit an inconsequential load onto the pressure retaining boundary.***

Existing Text – None	**Proposed New Text – Section 9 – Glossary of Terms**
	9.1 Non-Load Bearing Attachment - A generally accepted design term referring to items that transmit an inconsequential load onto the pressure retaining boundary.

	VOTE						
Committee	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

AI 23-35

Title:	Definition of "non-load bearing attachment" (All Parts)
Background Information:	A Certificate Holder replaces/repairs internal rails/supports for trays or bins that get rolled into an autoclave. These rails/supports are (typically) stitch welded along the inside of the shell. The Certificate Holder believes this is a non-load bearing attachment and performs this work as a routine repair. The attachment of internals is a loading design consideration for ASME Sect. VIII Div.1.
Explanation of Need:	The term "non-load bearing attachment" is used as a basis for determining a routine repair but is not defined in the NBIC.
Date Opened:	6/5/2023
Date Closed:	

Part 3: 3.3.2 ROUTINE REPAIRS

e) The following repairs may be considered as routine repairs and shall be limited to these categories:

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 required by the original code of construction. This includes their attachments such as clips, lugs, skirts, etc., but does not include nozzles to pressure-retaining items;

2) The addition or repair of non-load bearing attachments to pressure-retaining items where postweld heat treatment is not required;

PROPOSED REVISION OR ADDITION

Item No.

A 23-36

Subject/Title

Clarifying Rules for Using Alternative NDE Methods

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: 4 & 4; Paragraph: 4.2 a) & 4.4 b)

Project Manager and Task Group

Source (Name/Email)

Gary Scribner / gscribner@nbbi.org

Statement of Need

It has been determined that there may be some confusion regarding allowable NDE methods for repairs and alterations. The existing language of 4.2 a) tells the reader that alternative NDE methods acceptable to the Inspector and, where required, the Jurisdiction, may be used provided the requirements of Section 4 are met. However, it is possible that a reader may not familiarize themselves with all of the requirements of Section 4 prior to proposing an alternative NDE method. This change will help clarify and reinforce the requirements for alternative NDE methods for repairs and alterations.

Background Information

This change is being proposed as a result of the U.S. Chemical Safety Bureau's investigation of the Loy Lange Box Company pressure vessel explosion.

Existing Text

4.2 NONDESTRUCTIVE EXAMINATION
a) Nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2). Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used, provided that all other requirements of this section are met.

4.4 Examination and Test for Repairs and Alterations
a) The integrity of repairs, alterations, and replacement parts used in repairs and alterations shall be verified by examination or test;

b) Testing methods used shall be suitable for providing meaningful results to verify the integrity of the repair or alteration. Any insulation, coatings, or coverings that may inhibit or compromise a meaningful test method shall be removed, to the extent identified by the Inspector;

Proposed Text

4.2 NONDESTRUCTIVE EXAMINATION
a) Nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2). Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used, provided that the following requirements are met:~~provided that all other requirements of this section are met.~~
1) Testing methods used shall be suitable for providing meaningful results to verify the integrity of the repair or alteration;

2) Alternative NDE methods used for repairs shall be limited to those listed in Part 3, 4.4.1; and

3) Alternative NDE methods used for alterations shall be limited to those listed in Part 3, 4.4.2.

4.4 Examination and Test for Repairs and Alterations
a) The integrity of repairs, alterations, and replacement parts used in repairs and alterations shall be verified by examination or test;

b) ~~Testing methods used shall be suitable for providing meaningful results to verify the integrity of the repair or alteration.~~ Any insulation, coatings, or coverings that may inhibit or compromise a meaningful test method shall be removed, to the extent identified by the Inspector;

PROPOSED REVISION OR ADDITION

Item No.

A 23-38

Subject/Title

Scope Clarification for Part 3

NBIC Location

Part: Repairs and Alterations; Section: 1; Paragraph: 1.1(a)

Project Manager and Task Group

PM : Michael Quisenberry

Source (Name/Email)

Adam Henson / adam.henson@csb.gov

Statement of Need

The owner or user's need to return equipment to service must never compromise the operational safety of the equipment or the process by which the operational safety of the equipment is assured. There is an interpretation that supports this notion by describing subjects permitted to be considered when determining whether a repair or alteration activity is practicable.

Background Information

On April 3, 2017, an explosion occurred at the Loy-Lange Box Company in St. Louis, Missouri. The incident occurred when the bottom head of a pressure vessel called a semi-closed receiver (SCR), which was used in the company's steam generation system, catastrophically failed. The SCR was launched in the air as the result of the explosion and landed on a neighboring business. One employee of the Loy Lange Box Company and three members of the public were fatally injured. The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated this incident and learned during the investigation that the SCR was repaired by an R stamp organization in 2012 five years prior to the incident. During the repair a wasted area of the bottom head of the SCR was flush patched. The cause of the defect was determined to be oxygen pitting corrosion. Evidence gathered during the investigation suggests that the defects in the head were not fully removed during the repair activity. The R stamp organization stated during the investigation that Loy-Lange requested an "emergency repair" following the discovery of a leak from the SCR. The R stamp organization stated further that they interpreted this to mean the repair needed to be completed immediately, presumably so production could resume as normal. The full effect of the R stamp organization's understanding of an "emergency repair" and what bearing that had on the decision they made were not able to be established through the investigation. External pressure to work faster is however understood anecdotally to be determinantal to safety. Full details of the Loy-Lange Box Company Pressure Vessel Explosion are available at this link: https://www.csb.gov/loy-lange-box-company-pressure-vessel-explosion-/ INTERPRETATION 17-01 Subject: Application of Term "Practicable Edition: 2017 Question: May the desire to save time and/or expense be used solely in determining if a repair and/or alteration activity is practicable? Reply: No. The determination of "practicable" shall be based on technical consideration of the nature and scope of repair and/or alteration activities.

Existing Text	Proposed Text
This part provides requirements and guidelines that apply when performing repairs and alterations to pressure-retaining items.	This part provides requirements and guidelines that apply when performing repairs and alterations to pressure-retaining items. The financial and/or operational concerns of the owner or user associated with loss of use of equipment in need of repair or alteration must not compromise the integrity of the repair or safety of the owner/user.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

Action Item 23-39 Proposed changes

Proposed changes for the 2025 Edition

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.~~ When determining the repair plan for repairing a defect in a welded joint or base metal, a condition assessment to determine the cause, extent, and likelihood of recurrence of the defect is required depending on the complexity of the defect. The owner or user of the pressure-retaining item is responsible for the selection and application of the condition assessment methodology that is performed. When a condition assessment is performed, it shall be documented on the applicable R-form.

Organizations or qualified individuals with experience in inspection, design, construction, repairs, or failure analysis of pressure-retaining items should be consulted to assist in identifying damage mechanisms and to evaluate the condition assessment results of the pressure-retaining item. NBIC Part 2, Section 4.4 should be used as a guide to aid in this assessment.

When a condition assessment results in an increase in the inspection intervals of the pressure-retaining item, the owner or user shall notify the Jurisdiction, where required, of the new inspection interval and the new inspection intervals shall be documented on the applicable R-form. The owner/user has the responsibility to ensure that all items found during the condition assessment are addressed.

PROPOSED REVISION OR ADDITION

Item No.

A 23-40

Subject/Title

Strengthening Requirements to Ensure Defect Removal

NBIC Location

Part: Repairs and Alterations; Section: 3; Paragraph: 3.3.4.1

Project Manager and Task Group

Source (Name/Email)

Adam Henson / adam.henson@csb.gov

Statement of Need

The existing text alludes to the potential need for nondestructive examination (NDE) to ensure complete removal of defects but does not require it. The means to ensure defects have been removed must be understood by all to ensure safety. There is an interpretation of the 2021 NBIC that compounds this issue permitting repair organizations to not follow the requirements of NBIC Part 3, 3.3.4.8 even when the characteristics of the defect cannot be fully established.

Background Information

On April 3, 2017, an explosion occurred at the Loy-Lange Box Company in St. Louis, Missouri. The incident occurred when the bottom head of a pressure vessel called a semi-closed receiver (SCR), which was used in the company's steam generation system, catastrophically failed. The SCR was launched in the air as the result of the explosion and landed on a neighboring business. One employee of the Loy Lange Box Company and three members of the public were fatally injured. The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated this incident and learned during the investigation that the SCR was repaired by an R stamp organization in 2012 five years prior to the incident. During the repair a wasted area of the bottom head of the SCR was flush patched. The cause of the defect was determined to be oxygen pitting corrosion. Evidence gathered during the investigation suggests that the defects in the head were not fully removed during the repair activity. The R stamp organization stated during the investigation that Loy-Lange requested an "emergency repair" following the discovery of a leak from the SCR. The R stamp organization stated further that they interpreted this to mean the repair needed to be completed immediately, presumably so production could resume as normal. To make the repair the R stamp organization cut the SCR shell from the bottom head, leaving the bottom head attached to the skirt. An employee who oversaw the repair stated that they observed pitting corrosion damage in the bottom head. They cut a hole in the center of the head where they believed the corrosion was isolated and applied a flush patch. They believed they removed all corrosion damage through this process. When asked what techniques they relied upon to determine the complete removal of defects the employee replied that they would have been able to see additional pitting and that with the hole cut in the head they were able to match up the patch with the existing metal to verify the thickness of the remaining metal of the head. Besides being able to see differences in the thickness of the patch and the remaining metal of the head, this employee also reported that they would have been able to feel the difference too. Another employee reported measuring the thicknesses of the two pieces with a tape measurer and verified the thickness of both pieces to be ¼ inch. The evidence the CSB gathered demonstrating the likeliness that repair did not remove all defective material from the SCR is discussed in Section 1.6 SCR Post-Failure Examination starting on page 26 of the report. Had all defective material been removed during this repair the incident may not have happened. Full details of the Loy-Lange Box Company Pressure Vessel Explosion are available at this link: https://www.csb.gov/loy-lange-box-company-pressure-vessel-explosion-/ INTERPRETATION 21-13 Subject: Repair of pressure-retaining items without complete removal of defect Edition: 2021 Question: If the characteristics of the defect cannot be fully established, would the provisions of NBIC Part 3, 3.3.4.8 be applicable? Reply: No.

Existing Text	Proposed Text
3.3.4.1 Except as provided in NBIC Part 3, 3.3.4.8, a repair of 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.	**3.3.4.1** Except as provided in NBIC Part 3, 3.3.4.8, a repair of 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. After the defect has been removed, the thickness of the remaining base material shall be measured to confirm thickness complies with the original Code of construction. Measurement results shall be documented. 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.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 23-41

Subject/Title

Strengthening Requirements for Defect Removal When Patching

NBIC Location

Part: Repairs and Alterations; Section: 3; Paragraph: 3.3.4.6 a) 1) & 2)

Project Manager and Task Group

PM - Aziz Khssassi, B.Schaefer, C.Hopkins, P.Shanks, A.Henson, P.Gilston & L.Ponce

Source (Name/Email)

Adam Henson / adam.henson@csb.gov

Statement of Need

The existing text requires the removal of defective material until sound material is reached but provides no requirements or guidance on means to employ to ensure complete removal of defective material. The means to ensure defects have been removed must be understood by all to ensure safety. There is an interpretation of the 2021 NBIC that compounds this issue permitting repair organizations to not follow the requirements of NBIC Part 3, 3.3.4.8 even when the characteristics of the defect cannot be fully established.

Background Information

On April 3, 2017, an explosion occurred at the Loy-Lange Box Company in St. Louis, Missouri. The incident occurred when the bottom head of a pressure vessel called a semi-closed receiver (SCR), which was used in the company's steam generation system, catastrophically failed. The SCR was launched in the air as the result of the explosion and landed on a neighboring business. One employee of the Loy Lange Box Company and three members of the public were fatally injured. The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated this incident and learned during the investigation that the SCR was repaired by an R stamp organization in 2012 five years prior to the incident. During the repair a wasted area of the bottom head of the SCR was flush patched. The cause of the defect was determined to be oxygen pitting corrosion. Evidence gathered during the investigation suggests that the defects in the head were not fully removed during the repair activity. The R stamp organization stated during the investigation that Loy-Lange requested an "emergency repair" following the discovery of a leak from the SCR. The R stamp organization stated further that they interpreted this to mean the repair needed to be completed immediately, presumably so production could resume as normal. To make the repair the R stamp organization cut the SCR shell from the bottom head, leaving the bottom head attached to the skirt. An employee who oversaw the repair stated that they observed pitting corrosion damage in the bottom head. They cut a hole in the center of the head where they believed the corrosion was isolated and applied a flush patch. They believed they removed all corrosion damage through this process. When asked what techniques they relied upon to determine the complete removal of defects the employee replied that they would have been able to see additional pitting and that with the hole cut in the head they were able to match up the patch with the existing metal to verify the thickness of the remaining metal of the head. Besides being able to see differences in the thickness of the patch and the remaining metal of the head, this employee also reported that they would have been able to feel the difference too. Another employee reported measuring the thicknesses of the two pieces with a tape measurer and verified the thickness of both pieces to be ¼ inch. The evidence the CSB gathered demonstrating the likeliness that repair did not remove all defective material from the SCR is discussed in Section 1.6 SCR Post-Failure Examination starting on page 26 of the report. Had all defective material been removed during this repair the incident may not have happened. Full details of the Loy-Lange Box Company Pressure Vessel Explosion are available at this link: https://www.csb.gov/loy-lange-box-company-pressure-vessel-explosion-/ INTERPRETATION 21-13 Subject: Repair of pressure-retaining items without complete removal of defect Edition: 2021 Question: If the characteristics of the defect cannot be fully established, would the provisions of NBIC Part 3, 3.3.4.8 be applicable? Reply: No.

Existing Text	Proposed Text
3.3.4.6 PATCHES a) Flush Patches 1) The weld around a flush patch shall be a full penetration weld and the accessible surfaces shall be ground flush where required by the applicable original code of construction. Examples of welded flush patches are shown in NBIC Part 3, Figure 3.3.4.6-a. Nondestructive examination shall be performed in accordance with the requirements from NBIC Part 3, Section 4.2. 2) Before installing a flush patch, defective material shall be removed until sound material is reached. The patch shall be formed to the proper shape or curvature. The edges shall 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, a minimum radius of not less than three times the material thickness shall be provided at the corners. Square corners are not permitted. The completed welds shall meet the requirements of the original code of construction.	**3.3.4.6 PATCHES** a) Flush Patches 1) Examples of welded flush patches are shown in NBIC Part 3, Figure 3.3.4.6-a. 2) Defects should be evaluated in accordance with 3.3.1 & 3.3.4.1. 3) ~~Before installing a flush patch, defective material shall be removed until sound material is reached~~. The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results (e.g. MT or PT). The remaining material shall be measured to ensure it is at or above the required minimum thickness. 4) ~~Patches shall be made from a material whose composition and thickness meet the intended service.~~ 5) Patches may be any shape or size. If the patch is rectangular, a minimum radius of not less than three times the material thickness shall be provided at the corners. Square corners are not permitted. 6) The patch shall be formed to the proper shape or curvature. 7) The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. A suitable nondestructive examination shall be used to examine the weld preparation faces before assembly and welding. 8) The ~~edges~~ patch shall ~~align~~ be fitted and aligned without overlap. In stayed areas, the weld seams should come between staybolt rows or riveted seams. 9) The weld around a flush patch shall be a full penetration weld ~~and the accessible surfaces shall be ground flush where required by the applicable original code of construction~~. 10) Nondestructive examination shall be performed in accordance with the requirements from NBIC Part 3, Section 4.2. 11) The completed welds shall meet the requirements of the original code of construction.

Commented [LP10]: The goal of this proposal is to provide a means to better understand 3.3.4.6 by:
-separating the paragraph into specific numbered items,
-reordering for a more logical flow,
-adding new item 6) for welding prep and MT/PT requirements, and
-adding an evaluation of existing sound metal for required thickness.

Commented [LP1]: Item 9) on in proposed text

Commented [LP2]: Item 1) in proposed text

Commented [LP3]: Item 10) in proposed text

Commented [LP4]: New item 3) in proposed text. This new item also includes an evaluation of sound metal to ensure tmin is maintained.

Commented [LP5]: New item 7) in proposed text.

Commented [LP6]: New item 8) in proposed text.

Commented [LP7]: New item 4) in proposed text.

Commented [LP8]: New item 5) in proposed text.

Commented [LP9]: New item 11) in proposed text.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-56

Subject/Title

Alternate Repair Inspectors

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: 1 & 1; Paragraph: 1.3.2.a & 1.3.b

Project Manager and Task Group

Source (Name/Email)

Andrew Triplett / triplettal@ornl.gov

Statement of Need

The 2023 Edition revision to 1.3.2.a makes the use of alternate Inspectors applicable only to AIAs. The language should be revised to include OUIOs and FIAs that perform repairs/alterations on their own equipment, as allowed by 1.3.b.

Background Information

The 2023 Edition revision to 1.3.2.a makes the use of alternate Inspectors applicable only to AIAs. The language should be revised to include OUIOs and FIAs that perform repairs/alterations on their own equipment, as allowed by 1.3.b.

Existing Text

Inspections and NBIC Form R Report certifications shall be performed by the same Inspector who authorized the repair or alteration activity. Where this is not possible or practicable, another Inspector may perform these duties; however, in all cases, duties associated within the same scope of work shall be performed by Inspectors employed by the same Authorized Inspection
Agency.

Proposed Text

Inspections and NBIC Form R Report certifications shall be performed by the same Inspector who authorized the repair or alteration activity. Where this is not possible or practicable, another Inspector may perform these duties; however, in all cases, duties associated within the same scope of work shall be performed by Inspectors employed by the same Authorized Inspection Agency, Owner-User Inspection Organization, or Federal Inspection Agency.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-59

Subject/Title

NDE Personnel Certifications for Repairs and Alterations

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: 4 & 4; Paragraph: 4.2.b & 4.2.a

Project Manager and Task Group

Source (Name/Email)

Andrew Triplett / triplettal@ornl.gov

Statement of Need

The 2023 Edition revision to 4.2.a, which revises language about codes to be used for NDE on repairs/alterations (i.e., to codes other than the original construction code), is not reflected in 4.2.b. This creates conflicting requirements between 4.2.a and 4.2.b; in a case where use of the construction code is practicable, but NDE personnel certification to another Code/standard is desirable, 4.2.a would allow this but 4.2.b would not.

Background Information

The 2023 Edition revision to 4.2.a, which revises language about codes to be used for NDE on repairs/alterations (i.e., to codes other than the original construction code), is not reflected in 4.2.b. This creates conflicting requirements between 4.2.a and 4.2.b; in a case where use of the construction code is practicable, but NDE personnel certification to another Code/standard is desirable, 4.2.a would allow this but 4.2.b would not.

Existing Text	**Proposed Text**
NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction.	NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2).

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-61

Subject/Title

Revise NBIC R-2 Report and guide

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: S9.3; Paragraph: Figure 9.3.1

Project Manager and Task Group

Source (Name/Email)

Benjamin Schaefer / bschaefer@aep.com

Statement of Need

Updates to the R-2 Report and the guide for completing R Report.

Background Information

As directed from the July 2023 R&A meeting. This action is to update the R-2 Report and accompanying guideline to include the following changes. Various staff change requests and to include the work associated with A23-22 (Design only changes).

Existing Text	**Proposed Text**
R-2 Report Form	R-2 Report Form

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-68

Subject/Title

Changes to Examples of Alterations

NBIC Location

Part: Repairs and Alterations; Section: 3 & 3; Paragraph: 3.4.4.c & 3.4.4.d

Project Manager and Task Group

Source (Name/Email)

Matt Schaser / mschaser@e2g.com

Statement of Need

The current wording of 3.4.4.d (2023) is open ended and may result in allowing significant design changes to a pressure vessel under the guise of a repair when an alteration is a more appropriate classification. Rewording is required to limit the scope of potential design changes.

Background Information

A recent interpretation request (I23-63) has identified a potential for unintended use of paragraph 3.4.4.d (2023). Current wording suggests major changes (changing the type of head) to a vessel design may be viewed as a repair rather than an alteration. It is believed that this is not the intent of the recent (2023) revisions to 3.4.4.d. Updates are required to both 3.4.4.c and 3.4.4.d to limit the scope of 3.4.4.d. The resolution of this action item will be used to justify the response to interpretation I23-63. These 2 items should be move forward together through the committees.

Existing Text

3.4.4.c The addition of new nozzles or openings in a boiler or pressure vessel except those classified as repairs; 3.4.4.d A change in the dimensions or contour of a pressure-retaining item that decreases its pressure retaining
capability;

Proposed Text

3.4.4.c The addition of new openings or components (nozzle, head, flange, etc.) in a boiler or pressure vessel that were not considered in its original design analysis, except those classified as repairs; 3.4.4.d A change in the dimensions of a pressure-retaining item that decreases its pressure retaining capability;

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 23-69

Subject/Title

Temporary Location

NBIC Location

Project Manager and Task Group

Ray Miletti (PM), Eric Cutlip, Marty Toth, Jamie Walker

Source (Name/email)

Statement of Need

"Field" site under the current definition could be multiple rented or leased spaces used for repairs/alterations, where there is no single or specific customer or job, but rather the locations(s) are used for conducting repair/alteration activities by personnel employed by the Certificate Holder on a continual basis.

Background Information

NB-415 has been revised and issued. Section 9.0 has added definitions for Shop Location, Temporary Location and Field Site. Shop Location and Field Site duplicate definitions already in Part 3, Temporary Location is a new definition.

Further Footnote 1 of section 2.2 in NB-415 states: '*A separate application is required for temporary locations (See Section 9.0 of this procedure) as permitted by National Board internal policies*.', and Section 6.4 requires requests for the use of temporary locations to be submitted to NB for approval, further the use of temporary locations not approved is prohibited.

This action proposes to revise the entries for the definitions of Field and Shop in Section 9.1 and add a new entry for Temporary Location. The definitions will reference NB-415 Section 9.

This action will require balloting for Parts 1, 2, 3 and 4.

Existing Text	**Proposed Text**
9.1 DEFINITIONS	**9.1 DEFINITIONS**
Field - A temporary location, under the control of the Certificate Holder, that is used for repairs and/or alterations to pressure-retaining items at an address different from that shown on the Certificate Holder's *Certificate of Authorization.*	**Field** - See NB-415, Accreditation of "R" Repair Organizations, Section 9.0.~~A temporary location, under the control of the Certificate Holder, that is used for repairs and/or alterations to pressure-retaining items at an address different from that shown on the Certificate Holder's *Certificate of Authorization.*~~
Shop - A permanent location, the address that is shown on the *Certificate of Authorization*, from which a Certificate Holder controls the repair and/or alteration of pressure-retaining items.	**Shop** - See NB-415, Accreditation of "R" Repair Organizations, Section 9.0.~~A permanent location, the address that is shown on the *Certificate of Authorization*, from which a Certificate Holder controls the repair and/or alteration of pressure-retaining items~~.
	Temporary Location - See NB-415, Accreditation of "R" Repair Organizations, Section 9.0.

	VOTE						
Committee	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-76

Subject/Title

Revise paragraph 3.3.4.6 Patches for Clarity.

NBIC Location

Part: Repairs and Alterations; Section: 3; Paragraph: 3.3.4.6 a)

Project Manager and Task Group

Source (Name/Email)

Luis Ponce / lponce@nationalboard.org

Statement of Need

Requirements do not include specific note to ensure sound metal meets minimum design thickness. Further the order of the rules is not logical, starts with finished weld, grinding and NDE, then addresses defect removal, preparation etc.

Background Information

The reason for this change came to light because of the CSB's report at the July 2023 NBIC Meeting in St. Louis, MO and the need to ensure the method for flush patch repairs are clearer for repair organizations and inspectors.

Existing Text

a) Flush Patches 1) The weld around a flush patch shall be a full penetration weld and the accessible surfaces shall be ground flush where required by the applicable original code of construction. Examples of welded flush patches are shown in NBIC Part 3, Figure 3.3.4.6-a. Nondestructive examination shall be performed in accordance with the requirements from NBIC Part 3, Section 4.2. 2) Before installing a flush patch, defective material shall be removed until sound material is reached. The patch shall be formed to the proper shape or curvature. The edges shall 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, a minimum radius of not less than three times the material thickness shall be provided at the corners. Square corners are not permitted. The completed welds shall meet the requirements of the original code of construction.

Proposed Text

a) Flush Patches 1) Examples of welded flush patches are shown in NBIC Part 3, Figure 3.3.4.6-a. 2) Defects should be evaluated in accordance with 3.3.1. 3) Before installing a flush patch, defective material shall be removed until sound material is reached. The sound material shall be evaluated to ensure minimum design thickness is maintained. Sound material is that which is free of corrosion and defects, such as cracks and laminations. 4) Patches shall be made from a material whose composition and thickness meet the intended service. 5) Patches may be any shape or size. If the patch is rectangular, a minimum radius of not less than three times the material thickness shall be provided at the corners. Square corners are not permitted. 6) The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. A suitable nondestructive examination (NDE) method, such as magnetic particle (MT) or liquid penetrant (PT) shall be used to examine the weld preparation faces before assembly and welding. 7) The patch shall be formed to the proper shape or curvature. 8) The patch shall be fitted and aligned without overlap. In stayed areas, the weld seams should come between staybolt rows or riveted seams. 9) The weld around a flush patch shall be a full penetration weld. After welding the accessible surfaces shall be ground flush where required by the applicable original code of construction. 10) Nondestructive examination shall be performed in accordance with the requirements from NBIC Part 3, Section 4.2. 11) The completed welds shall meet the requirements of the original code of construction.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 23-77

Subject/Title

Performance of Original NDE During Repairs and Alterations

NBIC Location

Part: Repairs and Alterations; Section: 4; Paragraph: 4.2.a

Project Manager and Task Group

PM – Andrew Triplett, R. Collins, S. Frazier, J. Walker

Source (Name/Email)

Andrew Triplett / triplettal@ornl.gov

Statement of Need

The existing language in Part 3, Section 4, Paragraph 4.2.a does not provide enough guidance or flexibility for Repair Organizations and owners to prescribe appropriate NDE for repairs/alterations to existing welds. Based on the limited, often non-specific documentation typically available to these entities during NBIC repairs and alterations, additional allowances and direction should be provided.

Background Information

The exact NDE performed on every weld for ASME boilers and pressure vessels is not a required piece of information on most Manufacturer's Data Reports, which is often the only piece of paper available to describe what the Manufacturer did. While some forms, such as the U-1/U-1A, ask for radiography information about specific welds (such as the shell and head longitudinal or circumferential welds), the NDE conducted on other welds (such as nozzles, couplings, attachment welds, etc.) is not mandatory information, as well as non-RT NDE conducted anywhere on the vessel. In addition, the term "requirements" in 4.2.a could easily be read as applying to not only the required NDE from the code, but also whatever additional/alternative NDE was performed under the Manufacturer's quality program. For instance, some Manufacturers elect to perform extra NDE (such as progressive surface NDE on thicker or more complex welds) to ensure the work is progressing as expected, and to preclude rework; this could easily be considered "required" NDE based on what the Manufacturer decided to do during construction, whether called for by the construction code or not.

Existing Text	Proposed Text
4.2 NONDESTRUCTIVE EXAMINATION a) Nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2). Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used, provided that all other requirements of this section are met.	**4.2 NONDESTRUCTIVE EXAMINATION** a) Nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2). Weld repairs and alterations shall be subjected to the same nondestructive examination ~~requirements~~ as the original welds, as determined by the code of construction for the pressure-retaining item, the Manufacturer's Data Report, and any other available documentation. Where this is not possible or practicable, or where there is not enough information available to determine the original NDE, alternative NDE ~~methods~~ acceptable to the Inspector and the Jurisdiction ~~where the pressure-retaining item is installed~~, when required, may be used~~,~~ provided that all other requirements of this section are met.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

Item 23-83

This item proposes to **relocate** three **existing** repair methods and two existing alteration methods to the new Engineered Repairs and Alterations Supplement which was approved by the Main Committee last August.

3.3.4.3 WASTED AREAS

~~e) External Weld Metal Buildup~~

All text in 3.3.4.3(e), including Figure 3.3.4.3-c, will be relocated to paragraph SXX.3.1 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.

~~**3.3.4.8 REPAIR OF PRESSURE-RETAINING ITEMS WITHOUT COMPLETE REMOVAL OF DEFECTS**~~

All text in 3.3.4.8 will be relocated to paragraph SXX.3.2 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.

~~**3.3.5 REPAIR OF ASME SECTION VIII< DIVISION 2 OR 3, PRESSURE VESSELS**~~

All text in 3.3.5 will be relocated to paragraph SXX.3.3 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.

~~**3.4.3 ENCAPSULATION**~~

All text in 3.4.3 will be relocated to paragraph SXX.4.1 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.

~~**3.4.5 ALTERATION OF ASME CODE SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS**~~

All text in 3.4.5 will be relocated to paragraph SXX.4.2 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.

SXX.3 Engineered Repair Methods

SXX.3.1 EXTERNAL WELD METAL BUILDUP

a) Pressure-retaining items that have localized internal thinning due to erosion and/or corrosion and where the internal surface is not readily accessible may be weld repaired by depositing weld metal on the external surface of the item as shown in NBIC Part 3, Figure SXX.3.1-a. This method of repair is subject to approval by the Inspector and the Jurisdiction, where required.

b) All of the following conditions shall apply for this repair method to be permitted:

1) The component to be repaired shall be a ferrous material;

2) The maximum design temperature of the repaired component shall not exceed 650°F (340°C), and the minimum design temperature shall not be less than -20°F (-29°C);

3) The pressure-retaining item shall be volumetrically examined for cracks in the area to be weld repaired. If cracks are detected, this repair method shall NOT be used;

4) The WPS followed shall be qualified for weld metal buildup in accordance with ASME Section IX. The nominal chemical analysis of the deposited weld metal shall be equivalent to the base material that is to be repaired. In addition, the nominal tensile strength of the deposited weld metal shall be equal to or exceed the specified minimum tensile strength and shall be based on the requirements of the welding consumable. If butt welds in the component being overlaid required postweld heat treatment by the code of construction, the WPS followed for the weld buildup shall be qualified with PWHT;

5) The pressure-retaining item shall be taken out of service prior to performing the weld metal buildup. The owner of the pressure-retaining item shall evaluate the flammability, volatility, or potential reaction of the contents that were in the vessel to ensure safe working conditions during weld repair. When required by the results of this evaluation, the pressure-retaining item shall be drained of its contents to the extent necessary to make the repair;

6) This method may be used more than once in the same areas to repair locally thinned areas; however, the cumulative weld buildup for all repairs shall not exceed the thickness (t) of the component at any point; and

7) Repairs using this method shall not cover more than 25% of the circumference of the component.

c) External weld buildup shall be applied in accordance with the following requirements:

1) The area to be repaired shall be ultrasonically scanned for wall thickness, and the location and size of the thinned region shall be mapped;

2) The area requiring repairs and the boundaries of the weld buildup shall be marked on the external surface of the component;

3) The general design of the external weld buildup shall be in accordance with NBIC Part 3, Figure SXX.3.1-a. The finished weld buildup shall be circular, oval, or rectangular in shape;

4) The weld buildup shall extend, at full thickness, a minimum distance B in each direction beyond the boundaries of the thinned base metal area.

a. $B = 3/4 \sqrt{(Rt_{nom})}$

b. R = outer radius of the component, or D/2

c. t_{nom} = nominal wall thickness of the component

The thickness shall be sufficient to maintain the predicted life of the repair. Any corrosion allowance that is determined to be necessary shall be added to the value of B.

5) All edges of the weld buildup shall be tapered to the existing contour of the component, at a maximum angle (a) of 45°;

6) The thickness of the weld buildup shall be uniform except along tapered edges as welded surfaces are acceptable, provided they are free of coarse ridges and valleys and are suitable for any required nondestructive examinations;

7) All corners of the weld buildup shall have a minimum radius (r), not less than the overlay thickness;

8) Any corrosion allowance that is determined to be necessary shall be added to the thickness of the weld buildup;

9) The thickness (W) of the weld deposit plus the remaining wall thickness in the affected area (μ) of the component at its thinnest point shall not exceed the nominal wall thickness (t) of the component. This shall be verified by ultrasonic methods;

10) Final dimension and contour of the weld buildup may be achieved by grinding or machining. This work may be done before or after any PWHT;

11) The weld buildup shall be examined by liquid penetrant inspection or wet fluorescent magnetic particle inspection. If the buttwelds in the component being built up were required to be volumetrically examined during the original construction, the built-up area shall be similarly volumetrically examined;

12) For each repair, the maximum dimension (L, length along axis) compensated by a circular or oval weld buildup shall not exceed the lesser of 1/4 the nominal outside diameter or the component or 8 in. (200 mm). The length of a rectangular patch is not limited; and

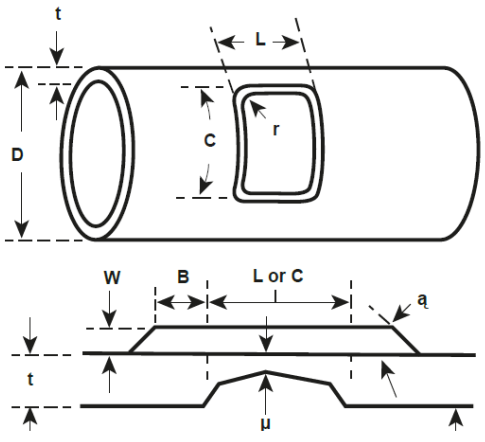
13) The distance between the weld toes of the multiple weld buildup regions on a component's outer diameter surface area shall not be less than 3/4 $\sqrt{}$(Rt).

14) Test and examination methods shall be in accordance with Part 3, Section 4.

15) Documentation and distribution requirements shall be in accordance with Part 3, Section 5.

FIGURE SXX.3.1-a

EXTERNAL OVERLAY TERMS AND DEFINITIONS



L = length of area to be repaired along the axis of the component

C = length of area to be repaired along outside circumference of the component

W = the completed thickness of the overlay

ą = the angle between the component and the overlay (maximum 45°)

B = 3/4 $(Rt)^{0.5}$ minimum

R = nominal outside radius of the component

D = the nominal outside diameter of the component

t = nominal wall thickness of the component

μ = remaining wall thickness of the component shall be 1/16 in. (1.6 mm) or greater

r = minimum radius, not less than the overlay thickness

SXX.3.2 REPAIR OF PRESSURE-RETAINING ITEMS WITHOUT THE COMPLETE REMOVAL OF DEFECTS

a) There may be cases where removal of a defect in a pressure-retaining item is not practical at the time the defect is found. In such cases, with approval of the Inspector and, when required, the Jurisdiction, an engineering evaluation shall be performed to determine the scope of the repair and impact to safety prior to returning the pressure-retaining item to service for a specified period of time. The engineering evaluation shall be performed by an organization with demonstrated competency in defect (and flaw) characterization of pressure-retaining items. The method of defect evaluation and time interval for returning the pressure-retaining item back to service shall be as agreed upon by the Inspector, and when required, the Jurisdiction. The specified period of time the defect can remain in service after weld repair shall be based on no measureable defect growth during subsequent inspections, or a period of time as specified by the Jurisdiction, if applicable. This repair method is not permitted for vessels used in lethal service, vessels designed for high-cycle operation or fatigue service, compressed air storage, and in cases where high stress concentration cannot be reduced by weld repair. This repair method is not permitted for DOT vessels.

b) One or more fitness-for-service engineering evaluation methods as described in NBIC Part 2, 4.4 shall be used to determine whether the defect may remain, either in part or in whole, in the pressure-retaining item. If it is determined that the defect can remain in the item, a risk-based inspection program shall be developed as described in NBIC Part 2, 4.5 to assure inspection of the defect and monitoring of defect growth over time. This program shall be a controlled and documented inspection program that specifies inspection intervals as agreed upon with the Inspector and, when required, the Jurisdiction, and shall be maintained until the defect can be completely removed and the item repaired.

c) The following requirements shall apply to the weld repair of pressure-retaining items without complete removal of defects:

   1) Engineering evaluation of the defect in the pressure-retaining item shall be conducted using one or more fitness-for-service condition assessment method(s) as described in NBIC Part 2, 4.4. Engineering evaluation of the condition assessment results shall be performed by an organization that has demonstrated industry experience in evaluating pressure-retaining items, if the fitness-for-ser- vice engineering evaluation requires finite element analysis (FEA), the requirements in NBIC Part 2, 4.6 and NBIC Part 2, Supplement 11 shall be met.

   2) If engineering evaluation indicates a defect can remain in the pressure-retaining item, a risk-based inspection program shall be developed and implemented based on review and acceptance by the Inspector and, when required, the Jurisdiction. The risk-based inspection program shall be in accordance with the requirements in NBIC, Part 2, 4.4.

   3) The fitness-for-service condition assessment and risk-based inspection programs shall remain in effect for the pressure-retaining item until such time that the defect can be completely removed and the item repaired. The fitness-for-service condition assessment method, results of assessment, and method of weld repair, if applicable, shall be documented on a Report of Fitness for Service Assessment (FFSA) Form as described in NBIC Part 2, 4.4.1 and shall be filed with the Jurisdiction, when required.

   4) When weld repairs are performed without complete removal of the defect(s), this shall be noted on the Form R-1 in the description of the work. The “R” Stamp Holder performing the weld repairs shall provide detailed information on the Form R-1, describing the method, extent, and include the specific location of the weld repair on the item.

   5) The interval to re-inspect or remove the item from service or perform weld repair shall be deter- mined based on a risk-based inspection program developed and implemented as required by

NBIC Part 2, 4.5. The inspection interval shall not exceed the remaining life of the item, and shall be documented on the Form NB-403 and in the Remarks section of the Form R-1. The Form NB-403 shall be affixed to the Form R-1. A National Board Commissioned Inspector holding an "R" endorsement as described in NB-263, RCI-1 shall sign both the Form R-1 and the attached Form NB-403.

6) A copy of the completed Form R-1 with the completed Form NB-403 attached may be registered with the National Board, and when required, filed with the Jurisdiction where the item was installed.

SXX.3.3 REPAIR OF ASME SECTION VIII, DIVISION 2 OR DIVISION 3 PRESSURE VESSELS

a) Scope

The following requirements shall apply for the repair of pressure vessels constructed to the requirements of Section VIII, Division 2 or 3 of the ASME Code.

b) Repair Plan

The user shall prepare or cause to have prepared, a detailed plan covering the scope of repair.

1) Engineer Review and Certification

The repair 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 Data Report. The review and certification shall be such as to ensure the work involved in the repair is compatible with the User's Design Specification and the Manufacturer's Data Report. The certifying requirement may be waived for ASME Section VIII, Division 2, Class 1 vessels that did not require the Manufacturer's Design Report to be certified during initial construction.

Note: The engineer qualification criteria of the Jurisdiction where the pressure vessel is installed should be verified before selecting the certifying repair.

2) Authorized Inspection Agency Acceptance

Following review and certification, the repair plan shall be submitted for acceptance to the Authorized Inspection Agency/Owner-User Inspection Organization whose Inspector will make the acceptance inspection and sign the Form R-1.

SXX.4 ENGINEERED ALTERATION METHODS

SXX.4.1 ENCAPSULATION

Encapsulation is a method used to maintain the pressure retaining capability of piping and valves (with the exception of firetube boilers) by fabricating a new pressure containing boundary over the item in the form of a "welded leak box" as described by ASME PCC-2, Article 204.

a) Except as required in SXX.4.1 c) 1), ASME PCC-2 should be used as a guideline for the design of the welded leak box and fabrication shall be in accordance with the original code of construction, when practicable. Design of the encapsulation shall consider original design conditions, taking into account current service conditions and damage mechanisms. Use of this method shall be acceptable to the inspector and when required, the jurisdiction.

b) The “R” Certificate Holder responsible for the design of the encapsulation shall ensure a Fitness for Service Assessment (FFSA) has been performed on the portion of the item 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 remaining life of the encapsulated portion of the pressure retaining item.

1) 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 and identified in the Remarks section.

2) 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. Wall thickness shall be verified in the area to be welded.

3) A welded leak box shall not be used to encapsulate a crack unless it has been removed and repaired in accordance with Part 3, Paragraph 3.3.4.2 a).

c) 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.

1) When the pressure retaining item will remain in service while implementing this method, the requirements and limitations described within ASME PCC-2, Part-1 shall be used in conjunction with the Welded Leak Box Repair article in ASME PCC-2, Part-2, Article 210.

2) API RP-2201, “Safe Hot Tapping Practices in the Petroleum and Petrochemical Industries” may be used as a guideline for identifying hazards associated with welding to a component that is under pressure, including service restrictions.

d) Visual examination shall be in accordance with the NBIC Part 3, 4.4.1 e).

e) Completion of the Form R-2 shall follow the requirements for preparation, distribution, and registration as described in Part 3, Section 5.

SXX.4.2 ALTERATION OF ASME SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS

a) Alteration Plan

1) Engineer Review and Certification

a. 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.

b. Provided that the alteration does not introduce a condition that would require an engineer to sign the Manufacturer’s Design Report for ASME Section VIII, Division 2, Class 1 vessels, the certifying requirement may be waived for vessels that did not require the Manufacturer’s Design Report to be certified during initial construction.

Note: The engineer qualification criteria of the jurisdiction where the pressure vessel is installed should be verified before selecting the certifying engineer.

2) User’s Design Specification

If the alteration is such that the work is not compatible with, or changes one or more requirement(s) of the original user’s design specification, the user’s design specification shall be revised by the user with the new parameters or changes. The revisions shall be 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.

Note: The engineer qualification criteria of the Jurisdiction where the pressure vessel is installed should be verified before selecting the certifying engineer.

3) Manufacturer's Design Report

   a. The "R" Certificate Holder shall prepare, or cause to have prepared a supplement to the Manufacturer's Design Report to reconcile the new parameters or changes with the User's Design Specification.

   b. The supplement to the Manufacturer's Design Report shall be 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.

      Note: The engineer qualification criteria of the Jurisdiction where the pressure vessel is installed should be verified before selecting the certifying engineer.

4) Authorized Inspection Agency Acceptance

   Following review and certification, the alteration plan shall be submitted for acceptance to the Authorized Inspection Agency/Owner-User Inspection Organization whose inspector will make the acceptance inspection and sign the Form R-2.

PROPOSED REVISION OR ADDITION

Item No.

A 23-86

Subject/Title

Revision to Part 3 DOT Supplement re-write

NBIC Location

Part: Repairs and Alterations; Section: 6; Paragraph: S6.5 and S6.6

Project Manager and Task Group

Source (Name/Email)

Robert Underwood / robert_underwood@hsb.com

Statement of Need

There is a need to revise two sections of Item 20-67 (approved by Main Committee on 3/24/2023) to reflect DOT requirements and bring the sections in line with intent interpretation I23-55.

Background Information

This item relates to the intent interpretation item 23-55.

Existing Text	Proposed Text
S6.5 Authorization The Inspector's authorization to perform a repair, alteration, or modification shall be obtained prior to initiation of the work to be performed on a transport tank. When required by the Competent Authority the Inspector providing the authorization shall be a Registered Inspector. Additional requirements are specified in NBIC Part 3, 1.3.1 and 1.3.2. S6.6 Inspection Inspection and certification shall be made by an Inspector holding an appropriate National Board Commission as required by NBIC Part 3, 1.3.	S6.5 Authorization The Inspector's authorization to perform a repair, alteration, or modification shall be obtained prior to initiation of the work to be performed on a transport tank. Additional requirements are specified in NBIC Part 3, 1.3.1 and 1.3.2. S6.6 Inspection Inspection and certification shall be made by an Inspector holding an appropriate National Board Commission as required by NBIC Part 3, 1.3, and when required by the Competent Authority the Inspector providing the authorization shall be a Registered Inspector.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PART 1

4.5 ~~PRESSURE RELIEF DEVICES~~OVERPRESSURE PROTECTION

See NBIC Part 1, 4.1 for the scope of pressure vessels covered by these requirements.

~~Pressure relief devices protecting pressure vessels shall meet the following requirements.~~When overpressure protection is provided by a pressure relief device or devices, the requirements in 4.5.1 through 4.5.6 apply. If overpressure protection is provided by Overpressure Protection by System Design in lieu of a pressure relief device or devices, the requirements in 4.5.7 apply.

4.5.7 OVERPRESSURE PROTECTION BY SYSTEM DESIGN

See NBIC Part 4, 2.5.8.

PART 2

2.3.5 INSPECTION OF PRESSURE VESSEL PARTS AND APPURTENANCES

2.3.5.2 SAFETY DEVICES

See NBIC Part 2, 2.5 for the inspection of safety devices (pressure relief valves and non-closing devices such as rupture disks) and NBIC Part 2, 2.6 for Overpressure Protection by System Design in lieu of a pressure relief device or devices used to prevent the overpressure of pressure vessels.

2.6 OVERPRESSURE PROTECTION BY SYSTEM DESIGN

See NBIC Part 4, 2.5.8.

PART 4

2.5 PRESSURE VESSEL ~~PRESSURE RELIEF DEVICES~~OVERPRESSURE PROTECTION

See NBIC Part 1, 4.1 for the scope of pressure vessels covered by the requirements of Part 4, 2.5.

When overpressure protection is provided by a pressure relief device or devices the requirements in 2.5.1 through 2.5.7 apply. If overpressure protection is provided by Overpressure Protection by System Design in lieu of a pressure relief device or devices, then the requirements in 2.5.8 apply.~~Pressure relief devices protecting pressure vessels shall meet the following requirements:~~

2.5.8 OVERPRESSURE PROTECTION BY SYSTEM DESIGN

Overpressure protection by system design may be used in lieu of a pressure relief device or devices if permitted by the Jurisdiction and the applicable Section of the ASME BPV Code. Compliance with the pressure vessel code requirements shall be documented in a report that includes as a minimum:

a) For pressure vessels for which the pressure is self-limiting
   1) The signature of the individual in responsible charge of the management of the operation of the vessel
   2) Detailed process and instrument flow diagrams, showing all pertinent elements of the system associated with the vessel
   3) A description of all operating and upset scenarios, including scenarios involving fire and those that result from operator error, and equipment and/or instrumentation malfunctions
   4) An analysis showing the maximum coincident pressure and temperature that can result from each of the scenarios listed in item 3) above does not exceed the MAWP at that temperature

5) For a new vessel, a copy of the vessel's Manufacturer's data report stating that overpressure protection is provided by system design
6) For an existing vessel whose Manufacturer's data report does not state overpressure by system design, a copy of the Manufacturer's data report with an attachment signed by the user indicating that overpressure protection is being provided by system design.

b) For pressure vessels for which the pressure is not self-limiting
1) The signature of the individual in responsible charge of the management of the operation of the vessel
2) Detailed process and instrument flow diagrams (P&IDs), showing all pertinent elements of the system associated with the vessel
3) A description of all operating and upset scenarios, including those involving fire and those that result from operator error, and equipment and/or instrumentation malfunctions
4) A detailed description of any safety critical instrumentation used to limit the system pressure, including the identification of all truly independent redundancies and a reliability evaluation (qualitative or quantitative) of the overall safety system
5) An analysis showing the maximum pressure that can result from each of the scenarios in Item 3) above does not exceed the maximum pressure allowed at the scenario temperature per the vessel code of construction
6) For a new vessel, a copy of the vessel's Manufacturer's data report stating that overpressure protection is provided by system design
7) For an existing vessel whose Manufacturer's data report does not state overpressure by system design, a copy of the Manufacturer's data report with an attachment signed by the user indicating that overpressure protection is being provided by system design

Commented [TB1]: Added from original letter ballot

ACCREDITATION PROGRAMS

The National Board administers four specific accreditation programs as shown below:

"**R**"….....Repairs and Alterations to Pressure-Retaining Items (NB-415)
"**VR**"… .....Repairs to Pressure Relief Valves and Pin Devices (NB-514)
"**NR**"… .....Repair and Replacement Activities for Nuclear Items (NB-417)
"**T/O**"… ....Testing of Pressure Relief Valves (NB-528)

The administrative requirements for the accreditation for these accreditation programs can be viewed on the National Board Website at www.nationalboard.org.

The National Board also administers accredits four specific inspection agency programs as shown below:

New Construction

National Board Acceptance of Authorized Inspection Agencies (AIA) *Accredited by the American Society of Mechanical Engineers* (ASME) (NB-360)

PART 4, SECTION 1
PRESSURE RELIEF DEVICES — GENERAL AND ADMINISTRATIVE REQUIREMENTS

1.1 SCOPE

This Part provides guidelines and requirements for the installation, in-service inspection and testing, and repairs of pressure relief devices.

1.2 CONSTRUCTION STANDARDS FOR PRESSURE RELIEF DEVICES

a) When the standard governing the original construction is the ASME Code, installation and repairs to pressure relief devices shall conform to the ASME Code section and edition most applicable to the work planned.

b) If the pressure relief device was not constructed to the ASME Code, then installation, inspection and repair shall wherever possible reference the original code of construction most applicable to the work.

c) If the pressure relief device was not constructed to any recognized construction code or standard, then installation, inspection, and repair shall reference a construction standard or specification most applicable to the work.

d) Where this is not possible or practicable, it is permissible to use other codes, standards, or specifications, including the ASME Code, provided there is concurrence of the Inspector (if applicable) and the Jurisdiction where the pressure relief device is installed.

1.3 PRESSURE RELIEF DEVICES — DEFINITIONS

Refer to Section 9, *Glossary* for definitions relating to pressure relief devices.

1.3.1 ADDITIONAL DEFINITIONS RELATING TO PRESSURE RELIEF DEVICES

Unless otherwise specified in the NBIC, the definitions relating to pressure relief devices in Section 2 of ASME PTC-25 shall apply.

1.4 ACCREDITATION

a) The National Board administers four specific accreditation

programs:

"**R**" — Repairs and Alterations to Pressure-Retaining Items

"**VR**" — Repairs to Pressure Relief Valves and Pin Devices

"**NR**" — Repair and Replacement Activities for Nuclear Items

"**T/O**" — In-service Testing Only of Pressure Relief Valves

b) Organizations performing repairs and in-service testing to pressure relief valves shall be accredited as described in this section, as appropriate for the scope of work to be performed.

c) Organizations performing repairs and in-service testing to pressure relief valves outside the scope of the NBIC may be accredited and shall meet any additional requirements of the Jurisdiction where the

1.4.1 ACCREDITATION PROCESS

a) The National Board administers accreditation programs for authorization of organizations performing repairs and in-service testing to pressure relief valves and pin devices.

b) Any organization may apply to the National Board to obtain a *Certificate of Authorization* for a 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) National Board procedures provide for the confidential review resulting in recommendations to issue or not issue a *Certificate of Authorization*.

d) The accreditation program provides requirements for organizations performing repairs and in-service testing to pressure relief valves and pin devices. Depending upon the expected scope of activities at the time of review, organizations may be authorized to perform repairs and in-service testing either in the shop only, field only, or shop and field. Repair and in-service testing activities shall be limited to the scope of work authorized.

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

3.2.3 (Also Part 2, 2.5.4) INSPECTION REQUIREMENTS FOR INSTALLATION CONDITION

a) Ensure all covers, caps, plugs, and/or lift lever wires utilized for shipping or transport are removed.

b) Inlet piping shall be inspected to ensure it meets the requirements of the original code of construction. For pressure relief valves and pin devices certified for capacity, the inlet pipe shall be checked to ensure the inlet pipe size is not smaller than the device inlet size. This requirement is not applicable for flow resistance certified pin devices

c) Discharge piping shall be inspected to ensure it meets the original code of construction. For pressure relief valves and pin devices certified for capacity, the discharge pipe shall be checked to ensure the discharge pipe size is not smaller than the device outlet size. This requirement is not applicable for flow resistance certified pin devices

d) The ~~valve~~ drain piping shall be checked to ensure the piping is open.

e) The discharge piping shall be checked to ensure it drains properly.

f) The inlet and discharge piping shall be checked to ensure they are not binding or placing excessive stress on the pressure relief valve or pin device body, which can lead to distortion of the body and leakage or malfunction.

g) The condition and adequacy of the pipe supports shall be inspected. Discharge piping should be supported independent of the device itself.

h) The ~~valve~~ discharge and discharge pipe shall be checked for possible hazards to personnel.

i) The installation shall be checked to ensure that there are no intervening isolation valves between the pressure source and the ~~valve~~ pressure relief device inlet or between the ~~valve~~ pressure relief device outlet and its point of discharge. Isolation valves may be permitted in some pressure vessel service. (See 2.5.6 e)), and Jurisdictional requirements. Isolation valves shall not be used for power boilers, heating boilers, or water heaters.

j) A change-over valve, which is used to install two pressure relief devices on a single vessel location for the purpose of switching from one device to a spare device, is not considered a block valve if it is arranged such that there is no intermediate position that will isolate both pressure relief devices

8) Rupture disks are often used to isolate pressure relief valves from services where fouling or plugging of the valve inlet occurs. This tendency should be considered in establishing the inspection frequency.

9) Since rupture disks are non-reclosing devices, a visual inspection is the only inspection that can be performed. A rupture disk that is removed from its holder shall not be reinstalled unless recommended by the manufacturer. A rupture disk contained in an assembly that can be removed from a system without releasing the force maintaining the contact between the disk and holder, such as pre-torqued, welded, soldered, and some threaded assemblies, may be suitable for reinstallation after visual inspection. The manufacturer should be consulted for specific recommendations.

10) It is recommended that all rupture disks be periodically replaced to prevent unintended failure while in service due to deterioration of the device. Rupture disks should be carefully checked for damage prior to installation and handled by the disk edges, if possible. Any damage to the surface of the ruptured disk can affect the burst pressure.

3.2.5 (Also Part 2, 2.5.7) TESTING AND OPERATIONAL INSPECTION OF PRESSURE RELIEF DEVICES

a) Pressure relief valves and pin devices shall be tested periodically to ensure that they are free to operate and will operate in accordance with the requirements of the original code of construction. Testing should include device set or opening pressure, reclosing pressure, where applicable, and seat leakage evaluation. Tolerances specified for these operating requirements in the original code of construction shall be used to deter- mine the acceptability of test results.

b) Testing may be accomplished by the owner on the unit where the valve is installed or at a qualified test facility. In many cases, testing on the unit may be impractical, especially if the service fluid is hazardous or toxic. Testing on the unit may involve the bypassing of operating controls and should only be performed by qualified individuals under carefully controlled conditions. It is recommended that a written procedure be available to conduct this testing.

   1) The Inspector should ensure that calibrated equipment has been used to perform this test and the results should be documented by the owner.

   2) If the testing was performed at a test facility, the record of this test should be reviewed to ensure the valve meets the requirements of the original code of construction. Valves which have been in toxic, flammable, or other hazardous services shall be carefully decontaminated before being tested. In particular, the closed bonnet of valves in these services may contain fluids that are not easily removed or neutralized. If a test cannot be safely performed, the valve shall be disassembled, cleaned, and decontaminated, repaired, and reset.

   3) If a valve has been removed for testing, the inlet and outlet connections should be checked for blockage by product buildup or corrosion.

c) Valves may be tested using lift assist devices when testing at full pressure may cause damage to the valve being tested, or it is impractical to test at full pressure due to system design considerations. Lift assist devices apply an auxiliary load to the valve spindle or stem, and using the measured inlet pressure, applied load and other valve data allow the set pressure to be calculated. If a lift assist device is used to determine valve set pressure, the conditions of 4.6.3 shall be met. It should be noted that false set pressure readings may be obtained for valves which are leaking excessively or otherwise damaged.

d) If valves are not tested on the system using the system fluid, the following test mediums shall be used:

   1) High pressure boiler pressure relief valves, high temperature hot-water boiler pressure relief valves, low pressure steam heating boilers: steam;

   2) Hot-water heating boiler pressure relief valves: steam, air, or water;

3.2.6 (Also Part 2, 2.5.8) RECOMMENDED INSPECTION AND TEST FREQUENCIES FOR PRESSURERELIEF DEVICES

Frequency of test and inspection of pressure relief devices for pressure vessel and piping service is greatly dependent on the nature of the contents, external environment, and operation of the system, therefore only general recommendations can be given. Inspection frequency should be based on previous inspection history. If, during inspection, ~~valves~~ devices are found to be defective or damaged, intervals should be shortened until acceptable inspection results are obtained. Where test records and/or inspection history are not available, the following inspection and test frequencies are suggested:

3.2.6.1 ESTABLISHMENT OF INSPECTION AND TEST INTERVALS

Where a recommended test frequency is not listed, the ~~valve~~ pressure relief device user and Inspector must determine and agree on a suitable interval for inspection and test. Some items to be considered in making this determination are:

a) Jurisdictional requirements;

b) Records of test data and inspections from similar processes and similar devices in operation at that facility;

c) Recommendations from the device manufacturer. In particular, when the ~~valve~~ pressure relief device includes non-metallic parts such as a diaphragm or soft seat, periodic replacement of those parts may be specified;

d) Operating history of the system. Systems with frequent upsets where a ~~valve~~ pressure relief device pressure has actuated require more frequent inspection;

e) Results of visual inspection of the device and installation conditions. Signs of ~~valve~~ pressure relief device leakage, corrosion or damaged parts all indicate more frequent operational inspections;

f) ~~Installation of a valve in a system with a common discharge header. Valves~~ Pressure relief devices discharging into a common collection pipe may be affected by the discharge of other ~~valves~~ devices by the corrosion of parts in the outlet portion of the ~~valve~~ device or the buildup of products discharged from those ~~valves~~ devices;

g) Ability to coordinate with planned system shutdowns. The shutdown of a system for other maintenance or inspection activities is an ideal time for the operational inspection and test of a pressure relief device ~~valve~~;

h) Critical nature of the system. Systems that are critical to plant operation or where the effects of the discharge of fluids from the system are particularly detrimental due to fire hazard, environmental damage, or toxicity concerns all call for more frequent inspection intervals to ensure devices are operating properly; and

i) Where the effects of corrosion, blockage by system fluid, or ability of the ~~valve~~ pressure relief device to operate under given service conditions are unknown (such as in a new process or installation), a relatively short inspection interval, not to exceed one year or the first planned shutdown, whichever is shorter, shall be established. At that time the device shall be visually inspected and tested. If unacceptable test results are obtained, the inspection interval shall be reduced by 50% until suitable results are obtained.

3.2.6.2 ESTABLISHMENT OF SERVICE INTERVALS

a) The above intervals are guidelines for periodic inspection and testing. Typically, if there are no adverse findings, a pressure relief ~~valve~~ device would be placed back in service until the next inspection. Any unacceptable conditions that are found by the inspection shall be corrected immediately by repair or replacement of the device. Many users will maintain spare pressure relief devices so the process or system is not affected by excessive downtime.

PART 4, SECTION 4
PRESSURE RELIEF DEVICES — REPAIR OF PRESSURE RELIEF VALVES AND PIN DEVICES~~VALVES~~

4.1 SCOPE

This section provides requirements and guidelines that apply to repairs to pressure relief valves and pin devices.

a) Repairs may be required because of defects found during periodic inspection, testing, operation, or maintenance. Since pressure relief devices are provided for safety and the protection of personnel and property, repairs are often regulated by the Jurisdiction where the pressure relief device is installed. The Jurisdiction should be contacted for their specific requirements.

b) This section describes some of the administrative requirements for the accreditation of repair organizations. Additional administrative requirements can be found in NB-514, *Accreditation of "VR" Repair Organizations*. Some Jurisdictions may independently administer a program of authorization for organizations to perform repairs within that Jurisdiction.

c) Requirements for repairs and alterations to pressure-retaining items and repair and replacement activities for nuclear items can be found in NBIC Part 3.

4.2 GENERAL REQUIREMENTS

a) Repair of a pressure relief valves or pin devices is considered to include the disassembly, replacement, re- machining, or cleaning of any critical part, lapping of a seat and disc, replace o-ring and seals reassembly, adjustment, testing, or any other operation that may affect the flow passage, capacity, function, or pressure-retaining integrity.

b) Conversions, changes, or adjustments (excluding those as defined in 3.2.5.2 a) or Part 2 Paragraph 2.5.7.2.a)) affecting critical parts are also considered repairs. The scope of conversions may include changes in service fluid and changes such as bellows, soft seats, and other changes that may affect Type/Model number provided such changes are recorded on the document as required for a quality system and the repair nameplate. (See 4.7.1)

c) The scope of repair activities shall not include changes in ASME Code status.

4.2.1 "VR" REPAIR

a) When a repair is being performed under the administrative requirements for National Board Accreditation, a repair shall consist of the following operations as a minimum:

   1) Complete disassembly, cleaning, and inspection of parts, repair or replacement of parts found to be defective, reassembly, testing as required by 4.6, sealing and application of a repair nameplate. When completed, the pressure relief valve's or pin device's condition and performance shall be equivalent to the standards for new valves.

   2) The administrative requirements for National Board Accreditation apply only to valves that are marked with the ASME Certification Mark and the "V", "UV", "UD" (for pin devices) "HV", or "NV" Designator or the sup- planted ASME "V", "UV", "UD"(for pin devices) "HV" or "NV" Code symbol and have been capacity certified on the applicable fluid by the National Board.

4.2.2 CONSTRUCTION STANDARDS FOR PRESSURE RELIEF DEVICES

For pressure relief devices, the applicable new construction standard to be used for reference during repairs is the ASME Code. ASME Code Cases shall be used for repairs when they were used in the original

construction of the valve. ASME Code Cases may be used when they have been accepted for use by the NBIC Committee and the Jurisdiction where the pressure-retaining item is installed.

a) For pressure relief devices, the Code Case number shall be noted on the repair document and, when required by the code case, stamped on the repair nameplate.

b) The Jurisdiction where the pressure retaining item is installed shall be consulted for any unique requirements it may have established.

4.2.3 INSTALLATION OF PRESSURE RELIEF DEVICES

Installation of a pressure relief device by mechanical methods is not considered to be a repair, as long as no changes or adjustments are made to the device. Seals installed by the device manufacturer or repair organization shall not be removed when the device is installed.

When a pressure relief device is to be installed by welding on an existing pressure retaining item, the requirements of Part 3 of the NBIC for welded repairs shall be followed.

If a pressure relief valve or pin device must be disassembled or its adjustments changed as part of the installation process, the reassembly, resetting, retesting or other such activities shall be done by a qualified organization which meets the requirements of NBIC Part 4. For a new pressure relief valve or pin device, the original ~~valve~~ manufacturer shall perform this activity as required by the original code of construction.

The installation of a non-reclosing pressure relief device or the replaceable element of a non-reclosing pressure relief device such as a rupture disk or pin is not considered to be a repair. The manufacturer's procedures and instruction shall be followed for the installation of these devices.

4.2.4 INITIAL ADJUSTMENTS TO PRESSURE RELIEF VALVES AND PIN DEVICES

The initial installation testing and adjustments of a new pressure relief valve ~~and pin device~~ on a boiler, or a pressure relief valve or pin device on a pressure vessel, are not considered a repair if made by the manufacturer or assembler of the valve ~~and~~or pin device.

4.3 MATERIALS FOR PRESSURE RELIEF VALVE AND PIN DEVICE REPAIR

The materials used in making repairs shall conform to the requirements of the original code of construction. The "VR" Certificate Holder is responsible for verifying identification of existing materials from original data, drawings, or unit records and identification of the materials to be installed.

4.3.1 REPLACEMENT PARTS FOR PRESSURE RELIEF DEVICES

a) Critical parts shall be fabricated by the pressure relief valve or pin device ~~manufacturer~~ or to the manufacturer's specifications. Critical parts are those that may affect the valve flow passage, capacity, function, or pressure-retaining integrity.

b) Critical parts not fabricated by the pressure relief valve or pin device manufacturer shall be supplied with material test certification
for the material used to fabricate the part.

c) Replacement critical parts receiving records shall be attached or be traceable to the pressure relief valve or pin device repair document (see 4.8.5.4 i)).These records shall conform to at least one of the following.

   1) Receiving records documenting the shipping origin of the part fabricated by the relief valve ~~and~~ or pin device manufacturer (such as packing list) from the pressure relief valve ~~and~~ or pin

device -manufacturer or assembler of the pressure relief valve and or pin device type.

2) A document prepared by the “VR” Certificate Holder certifying that the replacement part used in the repair has the manufacturer’s identification on the part or is otherwise labeled or tagged by the

manufacturer and meets the manufacturer's acceptance criteria (e.g., critical dimensions found in maintenance manual).

3) Receiving records for replacement critical parts obtained from a source other than the pressure relief valve or pin device ~~valve~~ manufacturer or assembler of the pressure relief valve or pin device ~~valve~~ type shall include a document that provides as a minimum:

   a. The part manufacturer and part designation.

   b. A certifying statement that either:

      1. The part was fabricated by the pressure relief valve and pin device ~~valve~~ manufacturer and meets the manufacturer's accep- tance criteria (e.g., critical dimensions found in maintenance manual), or

      2. The part meets the manufacturer's specifications and was fabricated from material as identified by the attached material test report.

   c. The signature of an authorized individual of the part source.

   d. The name and address of the part source for whom the authorized individual is signing.

d) Material for bolting shall meet the manufacturer's specification, but does not require material test certification if marked as required by the material specification.

4.4 WELDING FOR PRESSURE RELIEF VALVES AND PIN DEVICES

When welding is used as a repair technique during a pressure relief valve or pin device repair, the following requirements shall apply.

a) Welding shall be performed in accordance with the requirements of the original code of construction used for the pressure relief valve or pin device.

b) Cast iron and carbon or alloy steel having a carbon content of more than 0.35% shall not be welded.

c) Defects in pressure relief valve ~~and~~or pin device parts such as cracks, pits, or corrosion that will be repaired by welding shall be completely removed before the weld repair of the part is performed. Removal of the defect shall be verified by suitable NDE as required.

d) Consideration shall be given to the condition of the existing material, especially in the weld preparation area.

4.4.1 WELDING PROCEDURE SPECIFICATIONS

Welding shall be performed in accordance with Welding Procedure Specifications (WPS) qualified in accordance with the original code of construction. When this is not possible or practicable, the WPS may be qualified in accordance with Section IX of the ASME Code.

4.4.2 STANDARD WELDING PROCEDURE SPECIFICATIONS

A "VR" Certificate Holder may use one or more applicable Standard Welding Procedure Specifications shown in NBIC Part 3, 2.3.

4.4.3 PERFORMANCE QUALIFICATION

Welders or welding operators shall be qualified for the welding processes that are used. Such qualification shall be in accordance with the requirements of the original code of construction or Section IX of the ASME

Code.

4.4.4 WELDING RECORDS

The "VR" Certificate Holder shall maintain a record of the results obtained in welding procedure qualifications, except for those qualifications for which the provisions of 4.4.2 are used, and of the results obtained in welding performance qualifications. These records shall be certified by the "VR" Certificate Holder and shall be available to the National Board.

4.4.5 WELDER'S IDENTIFICATION

The "VR" Certificate Holder shall establish a system for the assignment of a unique identification mark to each welder/welding operator qualified in accordance with the requirements of the NBIC. The "VR" Certificate Holder shall also establish a written procedure whereby welded joints can be identified as to the welder or welding operator who made them. This procedure shall use one or more of the following methods and shall be described in the quality control system written description. The welder's or welding operator's identification mark may be stamped (low stress stamp) adjacent to welded joints made by the individual, or the "VR" Certificate Holder may keep a documented record of welded joints and the welders or welding operators used in making the joints.

4.4.6 WELDER'S CONTINUITY

The performance qualification of a welder or welding operator shall be affected when one of the following conditions occur:

a) When the welder or welding operator has not welded using a specific process during a period of six months or more, their qualifications for that process shall expire.

b) When there is specific reason to question their ability to make welds that meet the specification, the qualification that supports the welding that is being performed shall be revoked. All other qualifications not questioned remain in effect.

4.4.7 WELD REPAIRS TO PRESSURE RELIEF VALVE AND PIN ~~DEVICE PARTS~~DEVICE PARTS BY AN "R" STAMP HOLDER

a) The quality system manual may include controls for the "VR" Certificate Holder to have the pressure relief valve part repaired by a National Board "R" Certificate Holder, per this section provided the following documentation is provided to the "R" Certificate Holder:

   1) Code of construction, year built;

   2) Part identification;

   3) Part material specified; and

   4) "VR" Certificate Holder's unique identifier for traceability as required by the repair inspection program.

b) Prior to performing weld repairs to pressure relief valve or pin device ~~(PRV)~~ parts, the "R" Certificate Holder shall receive repair information required by 4.4.7 a) from the "VR" Certificate Holder responsible for the pressure relief valve ~~and~~ or pin device repair.

   1) Pressure relief valve ~~and~~ or Pin Device ~~PRV~~ part weld repairs shall be performed under the "R" Certificate Holder's quality system; how- ever, the requirements for in-process involvement of the Inspector (see Part 3, 2.2.2) may be waived. The requirement for stamping is waived.

   2) The process of identifying and controlling repairs shall be documented in the "R" Certificate

Holder's quality system.

3) Pressure relief valve and Pin Device ~~PRV~~ part repairs shall be documented on a Form R-1 with a statement under the "Remarks" section Pressure Relief Valve ~~and~~ or Pin Device ~~"PRV~~ Part Repair." The owner's name and location of installation shall be that of the "VR" Certificate Holder. The information received from the "VR" Certificate Holder as required in 4.4.7 a) shall be noted under the "Description of Work" section.

4) Upon completion of the repair, the repaired part and completed Form R-1 shall be returned to the "VR" Certificate Holder responsible for completing the Pressure Relief Valve or Pin Device ~~PRV~~ repair.

4.5 HEAT TREATMENT

4.5.1 PREHEATING

Preheating may be employed during welding to assist in completion of the welded joint in accordance with NBIC Part 3, 2.5.1. The need for and the temperature of preheat are dependent on a number of factors, such as chemical analysis, degree of restraint of the items being joined, material thickness, and mechanical properties. The welding procedure specification for the material being welded shall specify the preheat temperature requirements.

4.5.2 POSTWELD HEAT TREATMENT

Postweld heat treatment shall be performed as required by the original code of construction in accordance with a written procedure. The procedure shall contain the parameters for postweld heat treatment. A time and temperature report or temperature record shall be maintained to document the work performed.

4.6 PRESSURE RELIEF VALVE AND PIN DEVICE PERFORMANCE TESTING AND TESTING EQUIPMENT

Each pressure relief valve and pin device to which the "VR" repair symbol stamp is to be applied shall be subjected to the following tests by the repair Certificate Holder.

4.6.1 TEST MEDIUM AND TESTING EQUIPMENT

Valves marked for steam service, or having special internal parts for steam service, shall be tested on steam. Valves marked for air, gas, or vapor service shall be tested with air or gas. Valves marked for liquid service shall be tested with water or other suitable liquid. ASME Code, Section IV hot-water valves, shall be tested on water, steam, or air. Pin devices shall be tested in accordance with the manufacturer's specified procedures and with the test media specified by the manufacturer.

a) Each pressure relief valve or pin device shall be tested to demonstrate the following:

1) Set pressure (as defined by the ~~valve~~ manufacturer and as listed in NB-18, *Pressure Relief Device Certifications);*

2) Response to blowdown, when required by the original code of construction;

3) Seat tightness; and

4) For pressure relief valves and pin devices designed to discharge to a closed system, the tightness of the secondary pressure zone shall be tested as required by the original code of construction.

b) The equipment used for the performance testing prescribed above shall meet the following

requirements:

1) The performance testing equipment shall include a pressure vessel of adequate volume and pressure source capacity to ensure compliance with 4.6.1 a) 1);

2) Prior to use, all performance testing equipment shall be qualified by the Certificate Holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment. This qualification may be accomplished by benchmark testing, comparisons to equipment used for verification testing as specified in the quality system, or comparisons to field performance. This qualification shall be documented. Documentation of this qualification shall be retained in accordance with Table 4.8.5.4 s). Documentation of this qualification shall include but not be limited to:

   a. Schematic of the performance test equipment;

   b. Size and pressure ranges of valves and pin devices to be tested and the test fluid to be used;

   c. Dimensions of test vessels;

   d. Accuracy of pressure measuring equipment;

   e. Size and design type of valves used to control flow; and

   f. Method of qualifying.

3) Prior to the implementation of any addition or modification to the testing equipment that would alter the contents of the document required in 4.6.1 b) 2), the Certificate Holder shall re-qualify the performance test equipment in accordance with 4.6.1 b) 2). If the equipment changed was used to satisfy the requirements of verification testing, the Certificate Holder shall notify the National Board and additional verification testing, in accordance with the quality system, may be required.

Commented [AC1]: You cannot TEST a Non-Reclosing PRD.
IS THIS GOING TO BE IN ACCORDANCE WITH ASME SEC VIII-1, UG-138(d)(4)?

Commented [CB2R1]: I hope I am not missing the point here - A non-reclosing "Buckling Pin" PRD can be manually closed and install a new pin for service or for VR testing.

Commented [CB3R1]:

4.6.2 OWNER-USER ASME CODE SECTION VIII STEAM TESTING

When ASME Code Section VIII valves are repaired by the owner for the owner's own use, valves for steam service may be tested on air for set pressure and, if possible, blowdown adjustment, provided the valve manufacturer's corrections for differential in set pressure between steam and air are applied to determine the test pressure as follows:

a) The test pressure using air as the test medium shall be the product of the Manufacturer's correction factor for the differential between steam and air multiplied by the set pressure. If a cold differential test pressure is applicable due to superimposed back pressure and/or service temperature, then the manufacturer's correction factor shall be applied to the cold differential test pressure. The test pressure shall be recorded on the valve repair document described in 4.8.5.4 i).

b) The correction factor between steam and air shall not be included in the cold differential test pressure marked on the valve repair nameplate per 4.7.2 b) 8).

4.6.3 LIFT ASSIST TESTING

a) A device may be used to apply an auxiliary lifting load on the spring of a repaired valve to establish the set pressure in lieu of the tests required in 4.6.1 a) 1) when such testing at full pressure:

   1) May cause damage to the valve being tested; or

   2) Is impractical when system design considerations preclude testing at full pressure.

b) While actual valve blowdown and valve performance characteristics cannot be verified using this testing technique, valve set pressure may be determined to an acceptable degree of accuracy if, as a mini- mum:

   1) Equipment utilized is calibrated as required in the quality system; including, but not limited to:

a. System pressure measurement equipment;

b. Lifting force measurement equipment; and

c. Other measuring elements required by the device manufacturer.

2) the device and test procedures that have proved to give accurate results are used and followed;

3) A static inlet pressure is applied with the test medium specified in 4.6.1; and

4) Adjustments are made in accordance with the valve manufacturer's recommendations to ensure proper lift and blowdown.

c) Prior to use, all lift assist devices shall be qualified by the Certificate Holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment used for verification testing as specified in the quality system or comparisons to field performance. This qualification shall be documented and provisions made to retain such documentation in accordance with Table 4.8.5.4 s). Documentation of this qualification shall include but not be limited to:

1) A description of the lift assist device including model number, serial number and manufacturer;

2) Size and pressure ranges of valves to be tested with the lift assist device and the test fluid to be used;

Note: Maximum set pressure is determined by available lift force and system pressure.

3) Accuracy of pressure measuring equipment; and

4) Method of qualifying.

d) After initial qualification of the device the device shall be re-qualified if:

1) Modifications or repairs to the device are made which would affect test results; or

2) The manufacturer issues a mandatory recall or modification to the device which will affect test results.

Commented [AC4]: Insert space between "and" & "manufacturer."

4.6.4 PRESSURE TEST OF PARTS

a) Parts used in repaired pressure relief valves and pin devices shall be pressure tested and documentation provided according to the following categories:

1) Replacement Parts

The "VR" Certificate Holder is responsible for documentation that the appropriate pressure test has been completed as required by the original code of construction.

2) Parts Repaired by Welding

These parts shall be subjected to a pressure test required by the original code of construction. The "VR" Certificate Holder shall be responsible for documentation of such test.

b) Parts repaired by re-machining within part specifications, lapping, or polishing do not require a pressure test.

4.7 STAMPING REQUIREMENTS FOR PRESSURE RELIEF DEVICES

4.7.1 NAMEPLATES

Proper marking and identification of tested or repaired pressure relief valves and pin devices is critical to ensuring acceptance during subsequent inspections, and also provide for traceability and identification of any changes made to the pressure relief valve and pin device. All operations that require pressure relief valve's and pin device's seals to be replaced shall be identified by a nameplate as described in 4.7.2 or 4.7.4.

(19) 4.7.2 REPAIR NAMEPLATE

When a pressure relief valve and pin device is repaired, a metal repair nameplate stamped with the information required below shall be securely attached to the valve and pin device adjacent to the original manufacturer's stamping or nameplate. If not installed directly on the pressure relief valves and pin device the nameplate shall be securely attached to the valve and pin device independent of the external adjustment seals in a manner that does not interfere with valve and pin device operation and sealed in accordance with the quality system.

a) Prior to attachment of the repair nameplate, the previous repair nameplate, if applicable, shall be removed from the repaired valve.

b) As a minimum, the information on the pressure relief valve and pin device repair nameplate (see Figure 4.7.2-a) shall include:

1) The name of the repair organization preceded by the words "repaired by";

2) The "VR" repair symbol stamp and the "VR" certificate number;

3) Unique identifier (e.g., repair serial number, shop order number, etc.);

4) Date of repair;

5) Set pressure;

6) Capacity and capacity units (if changed from original nameplate due to set pressure or service fluid change)

7) Type/Model number (if changed from original nameplate by a conversion. See 4.2); and

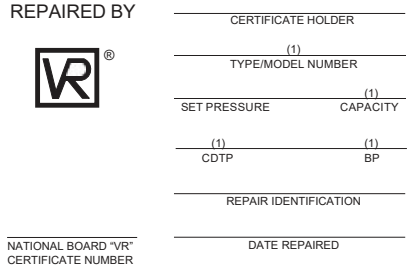
8) When an adjustment is made to correct for service conditions of superimposed back pressure and/or temperature or the differential between popping pressure between steam and air (see 4.6.2), the information on the valve repair nameplate shall include the:

a. Cold Differential Test Pressure (CDTP); and

b. Superimposed Back Pressure (BP) (only when applicable).

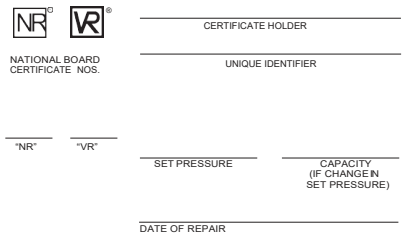
FIGURE 4.7.2-a

REQUIRED MARKINGS FOR REPAIR OF ASME/NATIONAL BOARD "V," "UV,", " UD" AND "HV"-STAMPED PRESSURE RELIEF VALVES **AND PIN DEVICES**



Note:. To be indicated only when changed.

FIGURE 4.7.2-b
REQUIRED MARKINGS FOR REPAIR OF NUCLEAR PRESSURE RELIEF VALVE **AND PIN DEVICE**



4.7.3 CHANGES TO ORIGINAL PRESSURE RELIEF VALVE AND PIN DEVICE NAMEPLATE INFORMATION

a) If the set pressure is changed, the set pressure, capacity, and blowdown, if applicable, on the original nameplate or stamping shall be marked out but left legible. The new capacity shall be based on that for which the pressure relief valve **or** pin device was originally certified.

b) If the service fluid is changed, the capacity, including units, on the original nameplate or stamping shall be marked out but left legible. The new capacity shall be based on that for which the pressure relief valve **or** pin device was originally certified, or if a conversion has been made, as described in 4.2 on the capacity certification for the pressure relief valve **or** pin device as converted. Similarly, the certified flow resistance for pin device shall be updated if effected by of change in service fluid.

c) If the Type/Model number is changed, the Type/Model number on the original nameplate or stamping shall be marked out but left legible.

d) If the blowdown is changed, the blowdown, if shown on the original nameplate or stamping, shall be marked out but left legible. The new blowdown may be based on the current ASME Code requirements.

e) Repair organizations shall verify the Type/Model number, inlet size, set pressure, and capacity on the original nameplate or stamping that is not marked out. Incorrect information on the original manufacturer's nameplate or stamping shall be marked out but left legible. Corrected information shall be indicated on the repair nameplate and noted on the document as required by the quality system.

4.7.4 REPLACEMENT OF ILLEGIBLE OR MISSING NAMEPLATES

The VR Certificate Holder shall not perform repairs under the VR Program on any pressure relief valve (PRV) or pin device that cannot be positively identified by the manufacturer or through in-house sources. Such identification shall include the verification of the original ASME Stamping. Pressure relief valves or Pin Devices that have missing or illegible nameplates and can be positively identified shall be equipped with a nameplate marked "DUPLICATE", which contains all original nameplate data. The duplicate nameplate shall not bear the "NB" Mark or the ASME Certification Mark with the "V", "HV", ~~or~~ "UV" or "UD" Designator or the supplanted "V", "HV", ~~or~~ "UV" or "UD" Symbol. Instead, the nameplate shall be stamped "Sec. I", "Sec. IV", or "Sec. VIII", as applicable, to indicate the original stamping. Illegible nameplates, if applicable, shall not be removed.

4.8 ACCREDITATION OF "VR" REPAIR ORGANIZATIONS

4.8.1 SCOPE

a) This section provides requirements that must be met for an organization to obtain a National Board *Certificate of Authorization* to use the "VR" Symbol Stamp for repair activities of pressure relief devices constructed in accordance with the requirements of the ASME Code.

b) For administrative requirements to obtain or renew a National Board "VR" *Certificate of Authorization* and "VR" Symbol Stamp, refer to NB-514, *Accreditation of "VR" Repair Organizations*.

4.8.2 JURISDICTIONAL PARTICIPATION

The National Board member Jurisdiction in which the "VR" organization is located is encouraged to participate in the review and demonstration of the applicant's quality system. The Jurisdiction may require participation in the review of the repair organization and the demonstration and acceptance of the repair organization's quality system manual.

4.8.3 ISSUANCE AND RENEWAL OF THE "VR" *CERTIFICATE OF AUTHORIZATION*

4.8.3.1 GENERAL

Authorization to use the stamp bearing the official National Board "VR" symbol as shown in Figure 4.7.2-a, will be granted by the National Board pursuant to the provisions of the following administrative rules and procedures.

4.8.3.2 ISSUANCE OF CERTIFICATE

Repair organizations, manufacturers, assemblers, or users that make repairs to the ASME Code symbol stamped or marked pressure relief valves **and pin devices** and National Board capacity certified pressure relief valves **and pin devices** may apply to the National Board for a *Certificate of Authorization* to use the "VR" symbol.

4.8.4 USE OF THE "VR" *CERTIFICATE OF AUTHORIZATION*

4.8.4.1 TECHNICAL REQUIREMENTS

The administrative requirements of 4.8 for use of the "VR" stamp shall be used in conjunction with the technical requirements for valve repair as described in sections 4.1 through 4.7. Those requirements shall be mandatory when a "VR" repair is performed.

4.8.4.2 STAMP USE

Each "VR" symbol stamp shall be used only by the repair firm within the scope, limitations, and restrictions under which it was issued.

4.8.5 QUALITY SYSTEM

4.8.5.1 GENERAL

Each applicant for a new or renewed "VR" *Certificate of Authorization* shall have and maintain a quality system which shall establish that all of these rules and administrative procedures and applicable ASME Code requirements, including material control, fabrication, machining, welding, examination, setting, testing, inspection, sealing, and stamping will be met.

4.8.5.2 WRITTEN DESCRIPTION

A written description, in the English language, of the system the applicant will use shall be available for review and shall contain, as a minimum, the features set forth in 4.8.5.4. This description may be brief or voluminous, depending upon the projected scope of work, and shall be treated confidentially. In general, the quality system shall describe and explain what documents and procedures the repair firm will use to validate a valve repair.

4.8.5.3 MAINTENANCE OF CONTROLLED COPY

Each applicant to whom a "VR" *Certificate of Authorization* is issued shall maintain thereafter a controlled copy of the accepted quality system manual with the National Board. Except for changes that do not affect the quality system, revisions to the quality system manual shall not be implemented until such revisions are accepted by the National Board.

(19) 4.8.5.4 OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM

The following establishes the minimum requirements of the written description of the quality system. It is required that each valve repair organization develop its own quality system that meets the requirements of its organization. For this reason it is not possible to develop one quality system that could apply to more than one organization. The written description shall include, as a minimum, the following features:

a) Title Page

The title page shall include the name and address of the company to which the National Board *Certificate of Authorization* is to be issued.

b) Revision Log

A revision log shall be included to ensure revision control of the quality system manual. The log should contain sufficient space for date, description and section of revision, company approval, and National Board acceptance.

c) Contents Page

The contents page shall list and reference, by paragraph and page number, the subjects and exhibits contained therein.

d) Statement of Authority and Responsibility

A statement of authority and responsibility shall be dated and signed by an officer of the company. It shall include:

1) A statement that the "VR" stamp shall be applied only to pressure relief valves and pin devices that meet both ofthe following conditions:

a. Are marked with the ASME Certification Mark and the "V", "UV", "HV"," UD" or "NV" Designator or the supplanted ASME "V", "UV", "HV", "UD" or "NV" Code symbol and have been capacity certified by the National Board; and

b. Have been disassembled, inspected, and repaired by the Certificate Holder such that the pressure relief valves and pin devices condition and performance are equivalent to the standards for new pressure relief valves and pin devices.

2) The title of the individual responsible to ensure that the quality system is followed and who has authority and freedom to effect the responsibility;

3) A statement that if there is a disagreement in the implementation of the written quality system, the matter is to be referred to a higher authority in the company for resolution; and

4) The title of the individual authorized to approve revisions to the written quality system and the method by which such revisions are to be submitted to the National Board for acceptance before implementation.

e) Organization Chart

A chart showing the relationship between management, purchasing, repairing, inspection, and quality control personnel shall be included and shall reflect the actual organization in place.

f) Scope of Work

1) The scope of work section shall indicate the scope and type of valve repairs, including conversions the organization is capable of and intends to perform. The location of repairs (shop, shop and field, or field only), ASME Code Section(s) to which the repairs apply, the test medium (air, gas, liquid, or

steam, or combinations thereof), and special processes (machining, welding, postweld heat treatment, or nondestructive examination, or combinations thereof) shall be specifically addressed.

2) The types and sizes of valves to be repaired, pressure ranges and other limitations, such as engineering and test facilities, should also be addressed.

g) Drawings and Specification Control

The drawings and specification control system shall provide procedures assuring that the latest applicable drawings, specifications, and instructions required are used for valve repair, including conversions, inspection, and testing.

h) Material and Part Control

The material and part control section shall describe purchasing, receiving, storage, and issuing of parts.

1) The title of the individual responsible for the purchasing of all material shall be stated.

2) The title of the individual responsible for certification and other records as required shall be stated.

3) All incoming material and parts shall be checked for conformance with the purchase order and, where applicable, the material specifications or drawings. Indicate how material or part is identified and how identity is maintained by the quality system.

i) Repair and Inspection Program

The repair and inspection program section shall include reference to a document (such as a report, traveler, or checklist) that outlines the specific repair and inspection procedures used in the repair of pressure relief valves and pin devices. Repair procedures shall require verification that the critical parts meet the pressure relief valves and pin devices manufacturer's specification. Supplement 4 outlines recommended procedures covering some specific items. This document shall be retained in accordance with Table 4.8.5.4 s).

1) Each pressure relief **valves and pin devices** or group of pressure relief valves and pin devices shall be accompanied by the document referred to above for processing through the plant. Each pressure relief valves and pin devices shall have a unique identifier (i.e., repair serial number, shop order number, etc.) appearing on the repair documentation and repair nameplate such that traceability is established.

2) The document referred to above shall describe the original nameplate information, including the ASME Code symbol stamping and the repair nameplate information, if applicable. In addition, it shall include material checks, replacement parts, conversion parts (or both), reference to items such as the welding procedure specifications (WPS), fit up, NDE technique, heat treatment, and pressure test methods to be used. Application of the "VR" stamp to the repair nameplate shall be recorded in this document. Specific conversions performed with the new Type/Model number shall be recorded on the document. There shall be a space for "signoffs" at each operation to verify that each step has been properly performed.

3) The system shall include a method of controlling the repair or replacement of critical pressure relief valves and pin devices parts. The method of identifying each spring shall be indicated on the repair document described in **4.8.5.4** i). Such identification shall be based on the Manufacturer's spring chart current at the time of the repair, except that the spring removed from the valve during the repair bearing different identification may be reinstalled provided the "VR" Certificate Holder has verified the spring is acceptable to the Manufacturer. Such verification shall be documented on the repair document described in 4.8.5.4 i).

4) The system shall also describe the controls used to ensure that any personnel engaged in the repair of pressure relief valves and pin devices are trained and qualified in accordance with this section.

j) Welding, NDE, and Heat Treatment (when applicable)

The quality system manual shall indicate the title of the person(s) responsible for and describe the system used in the selection, development, approval, and qualification of welding procedure specifications, and the qualification of welders and welding operators in accordance with the provisions of 4.4.

1) The quality system manual may include controls for the "VR" Certificate Holder to have a part of a the pres- sure relief valves and or pin devices part repaired by a National Board "R" Certificate Holder, per 4.4.7.

2) The completed Form R-1 shall be noted on and attached to the "VR" Certificate Holder's document required in 4.8.5.4 i). Similarly, NDE and heat treatment techniques must be covered in the quality system manual. When outside services are used for NDE and heat treatment, the quality system manual shall describe the system whereby the use of such services meet the requirements of the applicable section of the ASME Code.

k) Pressure Relief valves and pin devices Testing, Setting, and Sealing

The system shall include provisions that each pressure relief valves and pin devices shall be tested, set, and all external adjustments sealed according to the requirements of the applicable ASME Code Section and the National Board. The seal shall identify the "VR" Certificate Holder making the repair. Abbreviations or initials shall be permit- ted, provided such identification is acceptable to the National Board.

l) Pressure relief valves and pin devices Repair Nameplates

An effective pressure relief valves and pin devices stamping system shall be established to ensure proper stamping of each pressure relief valves and pin devices as re-
quired by 4.7.2. The manual shall include a description of the nameplate or a drawing.

m) Calibration

1) The manual shall describe a system for the calibration of examination, measuring, and test equip- ment used in the performance of repairs. Documentation of these calibrations shall include the standard used and the results. Calibration records shall be retained in accordance with Table 4.8.5.4 s).

2) All calibration standards shall be calibrated against certified equipment having known valid relation- ships to nationally recognized standards.

n) Manual Control

The quality system shall include:

1) Measures to control the issuance of and revisions to the quality system manual;

2) Provisions for a review of the system in order to maintain the manual current with these rules and the applicable sections of the ASME Code;

3) The title(s) of the individual(s) responsible for control, revisions, and review of the manual;

4) Provision of a controlled copy of the written quality system manual to be submitted to the National Board; and

5) Revisions shall be submitted for acceptance by the National Board prior to being implemented.

o) Nonconformities

The system shall establish measures for the identification, documentation, evaluation, segregation, and disposition of nonconformities. A nonconformity is a condition of any material, item, product, or process

in which one or more characteristics do not conform to the established requirements. These may include,

TABLE 4.8.5.4 s)

Reports, Records, or Documents for "VR" Certificate Holders	Instructions	Minimum Retention Period
Form "R" reports associated with a pressure relief valve that required welding as part of the repair	Record retention shall be in accordance with Part 3, Table 1.5.1	Refer to Part 3, Table 1.5.1
Record of repair or inspection	The repair and inspection program section shall include reference to a document (such as a report, traveler, or checklist) that outlines the specific repair and inspection procedures used in the repair of pressure relief valves and pin devices	5 years
Records related to equipment qualification and instrument calibration	Prior to use, all performance testing equipment shall be qualified by the certificate holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment. This qualification may be accomplished by benchmark testing, comparisons to equipment used for verification testing as specified in the quality system, or comparisons to field performance.	5 years after the subject piece of equipment or instrument is retired.
Record of lift assist device qualification	Prior to use, all lift assist devices shall be qualified by the certificate holder to ensure that the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment used for verification testing as specified in the quality system or comparisons to field performance. This qualification shall be documented.	5 years after the lift assist device is retired.
Records of employee training and qualification	Each repair organization shall establish minimum qualification requirements for those positions within the organization as they directly relate to pressure relief valves and pin devices repair. Each repair organization shall document the evaluation and acceptance of an individual's qualification for the applicable position.	5 years after termination of employment.

4.8.6 FIELD REPAIR

Repair organizations may obtain a "VR" *Certificate of Authorization* for field repair, either as an extension to their in-shop/plant scope, or as a field-only scope, provided that:

a) Qualified technicians in the employ of the Certificate Holder perform such repairs;

b) An acceptable quality system covering field repairs, including field audits, is maintained; and

c) Functions affecting the quality of the repaired valves are supervised from the address of record where the "VR" certification is issued.

4.8.6.1 AUDIT REQUIREMENTS

Upon issuance of a *Certificate of Authorization*, provided field repairs are performed, annual audits of the work carried out in the field shall be performed to ensure that the requirements of the Certificate Holder's quality system are met. The audit shall include, but not be limited to performance testing in accordance with 4.6 of valve(s) that were repaired in the field. The audits shall be documented.

4.8.6.2 USE OF OWNER OR USER PERSONNEL

For the repair of pressure relief valves and pin devices at an owner or user's facility for the owner or user's own use, the "VR" Certificate Holder may utilize owner or user personnel to assist Certificate Holder technician(s) in the performance of repairs provided:

a) The use of such personnel is addressed in the "VR" Certificate Holder's quality system;

b) The owner or user personnel are trained and qualified in accordance with Supplement 3;

c) Owner or user personnel work under direct supervision and control of the "VR" Certificate Holder's technician(s) during any stage of the repair when they are utilized;

d) The "VR" Certificate Holder shall have the authority to assign and remove owner or user personnel at its own discretion; and

e) The names of the owner or user personnel utilized are recorded on the document as required for a quality system.

4.9 TRAINING AND QUALIFICATION OF PERSONNEL

4.9.1 CONTENTS OF TRAINING PROGRAM

The repair organization shall establish a documented in-house training program. This program shall establish training objectives and provide a method of evaluating training effectiveness. As a minimum, training objectives for knowledge level shall include:

a) Applicable ASME Code and NBIC requirements;

b) Responsibilities within the organization's quality system; and

c) Knowledge of the technical aspects and mechanical skills for the applicable position held.

SUPPLEMENT 4
RECOMMENDED PROCEDURES FOR REPAIRING PRESSURE RELIEF VALVES

S4.1 INTRODUCTION

a) It is essential that the repair organization establish basic, specific procedures for the repair of pressure relief valves and pin devices. The purpose of these recommended procedures is to provide the repair organization with guidelines for this important aspect of pressure relief valve and pin devices repair. It is realized that there are many types of pressure relief valves and pin devices and conditions under which they are repaired and, for this reason, the specific items in these recommended procedures may not apply, or they may be inadequate for each of those types or to the detailed repairs that may be required for each pressure relief valves and pin devices.

b) Prior to removal, repair, or disassembly of a pressure relief valve and pin device ensure that all sources of pressure have been removed.

c) S4.2 contains recommended procedures for the repair of spring-loaded pressure relief valves. ~~and pin devices and~~ S4.3 contains recommended procedures for the repair of pilot operated types of pressure relief valves. ~~,~~ S4.4 contains recommended procedures for the repair of pin devices. Information on packaging, shipping and transportation is included as S4.5.

S4.2 SPRING-LOADED PRESSURE RELIEF VALVES

a) Visual inspection as received

1) This information is to be recorded:

a. Record user (customer) identification number;

b. Complete original PRV nameplate data, previous repair nameplate data, plus any important information received from customer;

c. Check external adjustment seals for warranty repair;

d. Check bonnet for venting on bellows type valves; and

e. Check appearance for any unusual damage, missing, or misapplied parts.

2) If sufficient damage or other unusual conditions are detected that may pose a safety risk during preliminary testing, then proceed directly to S4.2 c).

3) Valves that are to be repaired in place proceed to S4.2 c) unless preliminary testing has been authorized by the owner.

b) Preliminary test as received

1) Information from the recommended preliminary performance test and subsequent disassembly and inspections will provide a basis for any repair interval change that should be necessary to ensure that the valve will function as intended.

2) Determine set pressure or Cold Differential Test Pressure (CDTP) in accordance with manufacturer's recommendations and appropriate ASME Code Section. Do not allow test pressure to exceed 116% of set pressure unless otherwise specified by the owner. A minimum of three tests is usually required to obtain consistent results.

3) If results do not correlate with field performance, then steps to duplicate field conditions (fluid and temperature) may be necessary.

4) Record preliminary test results and test bench identification data.

g) Nameplate

The repairer will place a repair nameplate on each repaired valve. The nameplate, as a minimum, shall meet the requirements of 4.7.1.

S4.4 Pin Devices:

Prior to removal of A pin device from a system for a repair or any disassembly, ensure that all sources of pressure have been removed from the pin device.

a) Visual inspection as received
   1. This information is to be recorded:
      a. Record user (customer) identification number.
      b. Complete original pin device nameplate data, previous repair nameplate data, plus any important information received from customer.
      c. Check tamper proof seals are intact.
      d. Check bonnet top, columns and buckling pin screw for any damage or bending. Bent columns will result in a misalignment of the upper and lower pin holders and cause valve to malfunction and shall be removed from service.
   2. Check appearance for any unusual damage, missing, or misapplied parts per manufacturers assembly drawing.
   3. If sufficient damage or other unusual conditions are detected that may pose a safety risk during preliminary testing, then proceed directly to S4.4 c)
   4. For Pin devices that are to be repaired in place, proceed to S4.4 c) unless preliminary testing has been requested by the owner.
b) Preliminary test as received
   1. Information from the recommended preliminary performance test and subsequent disassembly and inspections will provide a basis for any repair interval change that should be necessary to ensure that the pin device will function as intended.
   2. One of ~~T~~the following tests should be done on Pin Device.
      a. Measure lift force to move plug from closed position to open position. This can be done with pull gage or by using pressure WITHOUT pin~~.~~. Repeat 3 times and record the data. Review with manufacturer's original data.
      b. Reseat the plug fully into seat following manufacturer guidelines. Some manufacturers supply a tool for this purpose. This usually can be done by turning the adjuster Buckling Pin Screw on top by hand. If this cannot be done by hand, apply a torque wrench onto the pin adjuster hex and measure the torque required to fully seat. Compare the required torque to seat with manufacturer's original data.
      c. Conduct one(1) set pressure tests using the manufacturer's pin designated for this specific valve. Do not allow test pressure to exceed 110% of set pressure unless otherwise specified by the owner.
   3. If test results from S4.4b) 2 are outside the manufacturer's recommendation, and set pressure tests are outside the ASME limits or agreed upon tolerance as stated on tag, proceed to S4.4 c) Disassembly.
   4. Record test results and test bench identification data.

c) Disassembly

Commented [AC5]: *Is this for a PIN Device?*

Commented [AC6]: *Is this for a PIN Device?*

1. Remove Buckling Pin Protective Cage(screen), if applicable

2. Prior to any disassembly, ensure that the plug is re-seated following manufacturer guidelines . Reseating may require torque wrench as specified in S4.4b)2.a Once seated, remove any gag or shipping pin if applicable.

3. Remove the required seals on bonnet flange bolts, if applicable.

~~3.~~4. 4. Remove the bonnet flange bolts.
5. Remove the bonnet “Flange Assembly - with bonnet flange, columns, upper pin holder top and buckling pin adjuster screw”. Lift the bonnet Flange Assembly straight up vertically using a strap on the upper pin holder top.
6. Remove the bonnet/plug assembly out of seat using thread or nut on top of plug assembly. Be careful not to damage top of plug assembly where buckling pin sets.
    a. As the plug assembly is lifted out of body, handle the assembly carefully and lay it on clean surface. Be careful to not damage plug seat area during this step.
7. Remove the plug from the bonnet. Inspect all seals and replace per manufacturer’s instructions. Check bonnet bore for cleanliness and for wear and scratches. In the event there is minor scratches you may polish this bore. Pay special attention as not to remove material from this bore as this is a critical dimension.

8. Remove plug seat, if applicable, in body and clean and replace seals per manufacturer’s instructions.

d) Cleaning

1. Clean Adjusting screw or holding nut.
2. Thoroughly clean all small parts (Caution: do not use a cleaning method that will damage the parts.)
3. Do not clean in a chemical solution except under acceptable circumstances.
4. Protect seating surfaces and nameplates prior to cleaning.
5. Clean inside of valve body as needed.

e) Inspection

1. Check all parts for corrosion
2. Check nozzle for cracks (NDE as applicable) or unusual wear.
3. Check plug and stem assembly for cracks (NDE as applicable) or unusual wear.
4. Check bonnet guide for wear
5. Check adjusting screw or holding nut free of galling or damage.
6. Check flange gasket facings for wear and cuts.
7. Check pin bearing points for fit and engagement.

f. Assembly

1. Intall the Seat to the body.
2. Install the plug back into bonnet with new seals and ensure plug is moving freely per manufacturer’s instructions. If moving freely install nut on the piston/plug and set aside for reinstalling the assembly back onto the valve body.

bonnet plug assembly

Commented [AC7]: manufacturer

reinstalling the assembly back onto the valve body.

3. Install bonnet plug assembly back into the body carefully

4. Make sure the plug is inserted and fully seated into the plug seat and moving freely after installing the bonnet flange and tightening up the flange studs. This is where centering is very important to get the free movement of plug inside the plug seat per manufacturer's instructions
5. Use pressure for measuring the open pressure without pin. The manufacturer to supply the original manufacturer's load or pressure measurements

g. Testing

1. Test data shall be recorded. Testing will be done in accordance with manufacturer's recommendations and appropriate ASME Code section. To preclude unsafe and unstable pin device ~~valve~~ operations or erroneous performance test results, it is recommended that low volume testing equipment (e.g., gas cylinders with- out a test vessel, hand pumps, tubing) should be avoided.

h .Sealing

1. After final adjusting and acceptance by quality control inspection, all external adjustments shall be sealed with a safety seal providing a means of identification of the organization performing the repair.

i. Nameplate

1. The repairer will place a repair nameplate on each repaired pin device ~~valve~~. The nameplate shall, as a minimum, meet the requirements of 4.7.1.

j. Installation of new pin

a. For pin devices with shipping pins, with zero pressure on the inlet or outlet, the shipping pin shall be removed and replaced with pin tagged and traceable to the manufacturer and matches the set pressure, service and -pin device ~~valve~~ name plate information.

b. Install pins that are straight and without any deflection, visual defect or damage.

~~b.~~c. c. Ensure Pin device piston assembly moves freely without excessive resistance or force.

d. Piston assemble will be reseated and pin installed per manufacturer recommendations.

S4.~~5~~4 PACKAGING, SHIPPING AND TRANSPORTATION OF PRESSURE RELIEF DEVICES

a) The improper packaging, shipment, and transport of pressure relief devices can have detrimental effects on device operation. Pressure relief devices should be treated with the same precautions as instrumentation, with care taken to avoid rough handling or contamination prior to installation.

b) The following practices are recommended:

1) Pressure relief **valves and applicable pin devices** ~~Valves~~ should be securely fastened to pallets in the vertical position to avoid side loads on guiding surfaces except threaded and socket-weld pressure relief valves and pin device ~~valves~~ up to NPS 2 (DN 50) may be securely packaged and cushioned during transport.

2) ~~Pressure relief valves and pin devices~~ Iinlet and outlet connection, drain connections, and bonnet vents should be protected during shipment and storage to avoid internal contamination ~~of the valve~~. Ensure all covers and/or plugs are removed prior to installation.

3) ~~The~~ pPressure relief **valves and pin devices** ~~should~~**valves should** not be picked up or carried

Commented [AC8]: *Is this in accordance with UG-138(d)(4)? Will the VR Shop need to do the multipl PIN Tests?*

Commented [CB9R8]: Yes

Commented [CB10R8]:

Commented [AC11]: *Is this for Pin Devices?*

Commented [CB12R11]: Yes, this is for Pin Devices. However, I do not understand the issue with low volume test equipment and how this can produce unsafe or unstable operations or erroneous performance results. These tests are done in the VR shop.

Commented [CB13R11]:

Commented [CB14R11]:

Commented [AC15]: *Is this for a Pin Device?*

Commented [CB16R15]: Yes

Commented [CB17R15]:

Commented [AC18]: *Is this in Lieu of actual testing of the Device? If so, I do NOT agree. There is NO test performed.*

Commented [CB19R18]: No, this installation instruction is for installing a new buckling pin for service. The term "piston assembly" is the term used for reseating the valve prior to installing a new pin for service. If the valve seat is dirty or the plug is not aligned properly, this will affect the operation of the PRD.

Commented [CB20R18]:

Commented [AC21]: *Is this for a PIN Device?*

Commented [CB22R21]: Yes

Commented [CB23R21]:

using the lifting lever. Lifting levers should be wired or secured so they cannot be moved while the valve is being shipped or stored. These wires shall be removed before the valve is placed in service.

4) Pilot valve tubing should be protected during shipment and storage to avoid damage and/or

breakage.

5) Pressure relief **valves and pin devices** for special services, including but not limited to oxygen, chlorine, and hydrogen perox-ide, should be packaged in accordance with appropriate standards and/or owner procurement requirements.

National Board Commissioned Inspector — An individual who holds a valid and current National Board Commission.

NBIC — The *National Board Inspection Code* published by The National Board of Boiler and Pressure Vessel Inspectors.

Nuclear Items — Items constructed in accordance with recognized standards to be used in nuclear power plants or fuel processing facilities.

Original Code of Construction — Documents promulgated by recognized national standards writing bodies that contain technical requirements for construction of pressure-retaining items or equivalent to which the pressure-retaining item was certified by the original manufacturer.

Overfire Air — Air admitted to the furnace above the grate surface /fuel bed. Used to complete the combustion of fine particles, in suspension. Also aids in reducing NOx formation.

Owner or User — As referenced in lower case letters means any person, firm, or corporation legally responsible for the safe operation of any pressure-retaining item.

Owner-User Inspection Organization — An owner or user of pressure-retaining items that maintains an established inspection program, whose organization and inspection procedures meet the requirements of the National Board rules and are acceptable to the Jurisdiction or Jurisdictional Authority wherein the owner or user is located.

Owner-User Inspector — An individual who holds a valid and current National Board Owner-User Commission.

Piecing — A repair method used to remove and replace a portion of piping or tubing material with a suitable material and installation procedure.

Pilot Operated Pressure Relief Valve — A pressure relief valve in which the disk is held closed by system pressure, and the holding pressure is controlled by a pilot valve actuated by system pressure.

Pin Device: A pin device is a nonreclosing pressure relief device actuated by inlet static or differential pressure and designed to function by the activation of a load bearing section of a pin that supports a pressure-containing member. A pin is the load bearing activation component of a pin device its crosssectional area is not limited to a circular shape. A pin device body is the structure that encloses the pressure-containing members.

Pin Device – Capacity Certified: Pin device certified in accordance with ASME BPVC Section XIII par 9.7.3 thru 9.7.6.

Pin Device – Flow Resistance certified: Pin device certified in accordance with ASME BPVC Section XIII par. 9.7.7

Plate Heat Exchanger (PHE) — An assembly of components consisting of heat transfer plates and their supporting frame. The frame provides structural support and pressure containment and may consist of fixed endplates, moveable endplates, an upper carrying bar and lower guide bar which provide plate alignment, and frame compression bolts.

Pneumatic Test — A pressure test which uses air or another compressible gas as the test medium.

Potable Water Heaters — A corrosion resistant appliance that includes the controls and safety devices to supply potable hot water at pressure not exceeding 160 psig (1,100 kPa) and temperature not in excess of 210°F (99°C).

Fired Storage Water Heater — A potable water heater in which water is heated by electricity, the combustion of solid, liquid, or gaseous fuels and stores water within the same appliance.

Indirect Fired Water Heater — A potable water heater in which water is heated by an internal coil or heat exchanger that receives its heat from an external source. Indirect fired water heaters provide water

Part 4, 2.4.4 and Part 1, 3.9.4

Explanation of Need:
ASME Section IV, Part HLW-800.1 allows the use of pressure relief valves in place of temperature and pressure relief valves on potable water heaters. NBIC Parts 1 and 4 specifically require temperature and pressure relief valves, which is not consistent with the code of construction. Some manufacturers are shipping HLW stamped potable water heaters with pressure relief valves. Often the physical construction of these units is such that a temperature and pressure relief valve cannot be accommodated.

Suggested revisions to current text

Part 4

2.4.4 ~~TEMPERATURE AND~~ PRESSURE RELIEF VALVE REQUIREMENTS FOR POTABLE WATER HEATERS

a) Each water heater shall have at least one ~~-~~ spring-loaded National Board capacity ~~-~~ certified temperature and pressure relief valve ~~.~~ or pressure relief valve. No ~~temperature and~~ pressure relief valve shall be smaller than NPS 3/4 (DN 20).

Note: Temperature and pressure relief valves are recommended for fired storage water heaters ~~because of~~ due to the additional temperature relief function ~~they~~ provided. ~~, and o~~Other standards for this equipment may require the use of temperature and pressure relief valves. The design or size of the water heater may not be compatible with the use of a temperature and pressure relief.

a)

b) The pressure setting shall be less than or equal to the maximum allowable working pressure of the water heater. However, if any of the other components in the hot-water supply system (~~such as~~e.g., valves, pumps, expansion or storage tanks, or piping) have a ~~lesser~~ lower working pressure rating than the water heater, the pressure setting for the ~~temperature and~~ pressure relief valve(s) shall be based upon the component with the lowest maximum allowable working pressure rating. If more than one ~~temperature and~~ pressure relief valve is used, the additional valve(s) may be set within a range not to exceed 110% ~~above~~ of the set pressure of the first valve.

c) The required relieving capacity ~~in Btu/hr (W)~~ of the ~~temperature and~~ pressure relief valve in Btu/hr (W) shall not be less than the maximum ~~allowable~~ rated heat input unless the rated burner input capacity ~~the water heater~~ is marked on the water heater casing in a readily visible location. ~~with the rated burner input capacity of the water heater on the casing in a readily visible location, i~~In ~~which~~this case, the rated burner input capacity may be used as a basis for sizing the temperature and pressure relief valves. The relieving capacity for electric water heaters shall be 3500 Btu/hr (1.0 kW) per kW of input. In every case, the ~~following requirements shall be met. T~~temperature and p~~P~~ressure relief valve capacity for each water heater shall be such that, with the fuel burning equipment installed and operating at maximum capacity, the pressure cannot ~~rise more than~~ exceed 110% ~~above~~of

the maximum allowable working pressure.

Many temperature and pressure relief valves have a National Board capacity- -certified rating which was determined according to ASME Code requirements, and a lower Canadian Standards Association (CSA) rating value. Where the ASME Code is the only referenced code of construction the National Board capacity- -certified rating may be used. If the water heater is not an ASME vessel, or the CSA rating is required by another standard, (such as a plumbing or building code,) then that rating shall be used.

d) If operating conditions are changed or additional heating surface is installed, the temperature and pressure relief valve capacity shall be increased, if necessary, to meet the new conditions and shall be in accordance with the above provisions. In no case shall the increased input capacity exceed the maximum allowable input capacity. The Any additional valves required, on account ofresulting from changed conditions, may be installed on the outlet piping provided ing there is no intervening valve.

Part 1

3.9.4 PRESSURE RELIEF VALVE REQUIREMENTS FOR POTABLE WATER HEATERS

a) Each water heater shall have at least one spring-loaded National Board capacity- -certified temperature and pressure relief valve or pressure relief valve. No temperature and pressure relief valve shall be smaller than NPS 3/4 (DN 20). Note: Temperature and pressure relief valves are recommended for fired storage water heaters because of the additional temperature relief function they provide, and other standards for this equipment may require temperature and pressure relief valves.

Note: Temperature and pressure relief valves are recommended for fired storage water heaters due to the additional temperature relief function provided. Other standards for this equipment may require the use of temperature and pressure relief valves. The design or size of the potable water heater may not be compatible with the use of a temperature and pressure relief.

a)

b) The pressure setting shall be less than or equal to the maximum allowable working pressure of the water heater. However, if any of the other components in the hot-water supply system (such ase.g., valves, pumps, expansion or storage tanks, or piping) have a lowerlesser working pressure rating than the water heater, the pressure setting for the temperature and pressure relief valve(s) shall be based upon the component with the lowest maximum allowable working pressure rating. If more than one temperature and pressure relief valve is used, the additional valve(s) may be set within a range not to exceed 110% over of the set pressure of the first valve.

c) The required relieving capacity in Btu/hr (W) of the temperature and pressure relief valve

in Btu/hr (W) shall not be less than the maximum ~~allowable~~ rated heat input unless the rated burner input capacity ~~the water heater~~ is marked on the water heater casing in a readily visible location. ~~with the rated burner input capacity of the water heater on the casing in a readily visible location,~~ ~~i~~In ~~which~~this case, the rated burner input capacity may be used as a basis for sizing the temperature pressure relief valves. The relieving capacity for electric water heaters shall be 3,500 Btu/hr (1.0 kW) per kW of input. In every case, ~~the following requirements shall be met. T~~temperature and pressure relief valve capacity for each water heater shall be such that, with the fuel burning equipment installed and operated at maximum capacity, the pressure cannot ~~rise more than~~exceed 110% ~~above~~ of the maximum allowable working pressure.

Many temperature and pressure relief valves have a National Board capacity-~~-~~certified rating which was determined according to ASME Code requirements, and a lower Canadian Standards Association (CSA) rating value. Where the ASME Code is the only referenced code of construction the National Board capacity-~~-~~certified rating may be used. If the water heater is not an ASME vessel, or the CSA rating is required by another standard, ~~(~~such as a plumbing or building code,~~)~~ then that rating shall be used.

d) If operating conditions are changed or additional heating surface is installed, the ~~temperature and~~ pressure relief valve capacity shall be increased, if necessary, to meet the new conditions and shall be in accordance with the above provisions. In no case shall the increased input capacity exceed the maximum allowable input capacity. ~~The~~ Any additional valves required~~, on account of~~ resulting from changed conditions~~,~~ may be installed on the outlet piping provided~~ing~~ there is no intervening valve.

4.2.2 CONSTRUCTION STANDARDS FOR PRESSURE RELIEF DEVICES

For the repair of pressure relief devices, the following construction standards shall apply:

a) T~~t~~he applicable new construction standard ~~to be~~ used for reference during repairs shall be the original code of construction.~~is the ASME Code.~~

b) Applicable ASME Code Cases shall be used for reference during repairs when:

1) The device complies with an ASME Code Case or, can ~~they were used in the original construction of the valve.~~

2) The device undergoes a conversion to comply with an ASME Code Case. ~~ASME Code Cases may be used when they have been accepted for use by the NBIC Committee and the Jurisdiction where the pressure retaining item is installed.~~

c) A device that complies with an ASME Code Case may be converted to comply with the original code of construction.

d) For pressure relief devices repaired per 4.2.2 b)1 or converted per 4.2.2 b)2, the ASME Code Case number shall be noted on the repair document and~~, when required by the code case,~~ stamped on the repair nameplate.

e) For pressure relief devices converted per 4.2.2 c), the ASME Code Case number shall be noted on the repair document but shall not be stamped on the repair nameplate. References to that ASME Code case shall be marked out but left legible on the original nameplate.

f) ~~b)~~ The Jurisdiction where the pressure retaining item is installed shall be consulted for any unique requirements it may have established including construction standards and ASME Code Cases.

PROPOSED REVISION OR ADDITION

Item No.

A 23-67

Subject/Title

Pressure Gage Scale Requirements

NBIC Location

Part: Installation; Section: 4; Paragraph: 4.2.2

Project Manager and Task Group

Source (Name/Email)

Adam Renaldo / adam.renaldo@linde.com

Statement of Need

Update pressure gage requirements to reflect industry practice and common ranges. Also, to allow for the use of gage overpressure protectors, which the current wording does not. For systems with an MAWP that greatly exceeds normal operating pressure, it is sometimes necessary to use a gage with a lower scale so that the gauge reads in the middle third of its scale during normal operation. In such a situation, a gage overpressure protector is installed upstream of the gage.

Background Information

Industry practice on 500 psig MAWP pressure vessels is to install a 0-600 psig gage. There are tens of thousands of such vessels that do not comply with the current wording. Similarly, there are thousands of 2450 psig receiver vessels with 0-3000 psig gages that do not comply with the current wording. Most Pressure gages are designed with a proof pressure at 130% of full scale. For a typical relief valve with 10% allowable overpressure, even if the gage's scale were at set pressure, the proof pressure of the gage would not be exceeded. Having the scale 20% above set pressure still leaves plenty of safety margin.

Existing Text

4.4.2 PRESSURE INDICATING DEVICES The need for pressure indicating devices should be considered in the design of the pressure vessel, and when required, the scale on the dial of the pressure gage shall be at least 25% above the highest set pressure of the pressure relief
device.

Proposed Text

4.4.2 PRESSURE INDICATING DEVICES The need for pressure indicating devices should be considered in the design of the pressure vessel. When required, the scale on the dial of the pressure gage shall be at least: a) 25% above the highest set pressure of the pressure relief device, for set pressures below 500 psig. b) 20% above the highest set pressure of the pressure relief device, for set pressures of 500 psig or greater c) The set pressure of the upstream gage overpressure protector, if installed. ~~and when required, the scale on the dial of the pressure gage shall be at least 25% above the highest set pressure of the pressure relief_device~~

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED INTERPRETATION

Item No.
22-40

Subject/Title
Allowable stresses for t(required) calculation

Project Manager and Task Group

Source (Name/Email)
Tom Chen / tom.chen@chemours.com

Statement of Need
For the purpose of setting up inspection plans, especially with older equipment, we are calculating t(required) per Part 2, para 4.4.7.2. However, we would like to know if it is permissible to use the higher allowable stresses in later editions of ASME BPV Code.

Background Information
Part 3, para 3.4.2, titled "Alterations Based on Allowable Stress Values" states "...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...". The paragraph goes on to give some requirements. It seems to imply that recalculating a new min wall thickness per new Code allowable stresses is considered an alteration. While Part 2, Para 4.4.7.2 does not reference allowable stress values, interpretation 07-13 and 95-19 states that it is permissible to use later editions of the original code of construction.

Proposed Question
Question 1: When calculating the t(required), as defined in NBIC Part 2, Para 4.4.7.2, is it permissible to use a later edition/addenda of the original code of construction?
Question 2: If the reply to Question No. 1 is yes, is it permissible to use higher allowable material stress values than were used in the original construction when calculating the t(required)?
Question 3: If the reply to Question No. 2 is yes, is it considered an alteration to use higher allowable material stress values than were used in the original construction to calculate the t(required) per NB23 Part 3, para 3.4.2?

Proposed Reply
Proposed Reply 1: Yes. See Interpretations 07-13 and 95-19.
Proposed Reply 2: Yes, if the requirements of NB23 Part 3, paragraph 3.4.2, subparagraphs (b), (c), (d), (e), and (f) are met.
Proposed Reply 3: No, unless required by the jurisdiction.

Committee's Question 1
When calculating the t(required), as defined in NBIC Part 2, Para 4.4.7.2, is it permissible to use a later edition/addenda of the original code of construction that permits higher allowable material stress values than the original code of construction?

Committee's Reply 1
No.

Rationale
Part 2 does not specifically allow for the use of a later edition/addenda of the original code of construction that permits higher allowable material stress values than the original code of construction. However, Part 2 Para. 4.4.7.2 (a) allows for the inspection interval to be determined by other industry methods (see Part 2, Para. 1.3) as accepted by the Jurisdiction. Interpretation 07-13 directs to Interpretation 95-19 which only directly addresses repairs and alterations.

Committee's Question 2

Committee's Reply 2

Rationale

CODE INTERPRETATIONS

Requests for code Interpretations shall provide the following:

a) Inquiry
Provide a condensed and precise question, omitting superfluous background information and, when possible, composed in such a way that a "yes" or a "no" reply, with brief provisos if needed, is acceptable. The question should be technically and editorially correct.

b) Reply
Provide a proposed reply that clearly and concisely answer the inquiry question. Preferably the reply should be "yes" or "no" with brief provisos, if needed.

c) Background Information
Provide any background information that will assist the committee in understanding the proposed Inquiry and Reply Requests for Code Interpretations must be limited to an interpretation of the particular requirement in the code. The Committee cannot consider consulting type requests such as:

A review of calculations, design drawings, welding qualifications, or descriptions of equipment or Parts to determine compliance with code requirements;

A request for assistance in performing any code-prescribed functions relating to, but not limited to, material selection, designs, calculations, fabrication, inspection, pressure testing, or installation; or

A request seeking the rationale for code requirements.

PROPOSED INTERPRETATION

Item No.

23-70

Subject/Title

Inspection of vessels at and above 10,000 PSI (c) & (d) "requalification"

Project Manager and Task Group

Source (Name/Email)

Craig Bierl / craig.bierl@chubb.com

Statement of Need

Isostatic Pressure Vessel manufacturers are currently "requalifying" pressure vessels through an engineering evaluation without the involvement of the NB Alteration process and therefore an Inspector. This leaves control of this process of a code vessel in the hands of the manufacturer and impairs the code integrity of the vessel.

Background Information

c) Vessels constructed for a set number of cycles, as defined by the code of construction, which have reached the end of those cycles, must be removed from service or requalified for continued use. Any requalification for continued service must be completed in accordance with the requirements of the jurisdiction where applicable. The Inspector shall verify that documentation of any requalification is retained. d) Requalification of any vessel shall either be completed by the original manufacturer or a manufacturer familiar with the construction of pressure vessels at and above 10,000 PSI (68.95 MPa). Guidance for completing requalification can be found in ASME PCC-3, Inspection Planning and Using Risk-Based Methods. It is not clear in the new Part 2 guidance and I have already had a manufacturer question this. I would like this interpretation to also consider the prior interpretation 19-15 INTERPRETATION 19-15 Subject: PV Cycles of operations change as an alteration (Part 3, 3.4.4). Edition: 2019 Question: When the design of a pressure retaining item (PRI) includes cyclic loading data, should an adjustment, modification or change in analysis of the original design data be considered an alteration? Reply: Yes.

Proposed Question

Is the “requalification for continued service” of a vessel constructed for a set number of cycles, as defined by the code of construction, which has reached the end of those cycles, required to be completed as an alteration?

Proposed Reply

Yes, requalification of a pressure vessel requires an alteration.

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED INTERPRETATION

Item No.

23-80

Subject/Title

The Held Pressure for Hydro-static Testing of Heritage Boilers.

Project Manager and Task Group

Source (Name/Email)

Robin Forbes / robin.a.forbes@outlook.com

Statement of Need

There has been issues in our Jurisdiction of inspectors interpreting that the boiler shall hold hydro static pressure for 10 minutes without the aid of a pump to maintain pressure. Therefore any weep in valve packing, hand holes, gauge glass gaskets, etc. would be cause for failure of the hydro test.

Background Information

There was a situation where it took the owner of a traction engine 8 days to complete a hydro. Any drop in the pressure over the 10 minutes and the inspector would fail the boiler. He would reference the above clause from the NBIC as evidence the boiler must hold hydro static pressure (unaided) for 10 minutes.

Proposed Question

S2.6.1.a states a hydro static pressure between MAWP and 1.25 MAWP shall be "held for a minimum of 10 minutes or as required to preform a complete visual inspection" Is the intent that the boiler shall hold a set hydro static pressure for a minimum of 10 minutes, without the aid of a pump to maintain the pressure? Or, is it permissible to use a pump to maintain the hydro static pressure for a minimum of 10 minutes?

Proposed Reply

Given that the wording is "held" and not "hold" the use of a pump to maintain the hydro static pressure is permissible. The intent that the pressure be held a minimum of 10 minutes is to allow time for leaks to present themselves along seams, tubes, stay bolts, etc.

Committee's Question 1

Committee's Reply 1

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED REVISION OR ADDITION

Item No.

A 23-85

Subject/Title

Review paragraphs to replace with proper verbiage

NBIC Location

Part: Inspection; Section: Supplement 2; Paragraph: S2.14.7

Project Manager and Task Group

Source (Name/Email)

Michelle Vance / mvance@nationalboard.org

Statement of Need

There is some slang and second person (POV) verbiage throughout these paragraphs. Recommend rewording with proper terminology (such that it could be understood internationally) and changing point of view (e.g., changing "you're pulling water" to "water is being pulled"). Since I don't have the technical knowledge to know what is slang and what isn't, what I have proposed will still need to be reworded.

Background Information

N/A?

Existing Text

a) A foaming boiler is usually caused by dirty or impure water in the boiler. Oils, detergent, etc., are the biggest problems and have no business being on the waterside of a boiler. A good rule of thumb is, “If you wouldn’t drink it, don’t put it in your boiler.” Foaming can be especially bad because you have no way of discerning your water level. The water glass and try-cocks will appear full. Foaming is usually really intensified with a heavy fire and a heavy engine load. Reduce or stop your engine load and reduce your fire until it settles down, steam down, wash out your boiler, and refill it with clean water. The first indication of a foaming or priming boiler is usually a “wet stack” and a discernable difference in the exhaust sound. Open cylinder cocks immediately and close throttle and determine your water level. b) Priming is similar to foaming; you’re pulling water into your engine. This is especially bad because it can wash the oil from valves and cylinders and risk severe damage to the engine. Priming is caused more from carrying too-high a water level. It also occurs from working steam while ascending and descending hills. Know the machine you are operating, and what the safe water level is. c) If an engine starts priming (it will show a wet stack), open cylinder cocks, reduce throttle, get engine to level area, and determine the water level. If possible, safely blowdown boiler to proper water level. Ensure no bystanders are close-by for safety.

Proposed Text

a) A foaming boiler is usually caused by impure water in the boiler. Oils, detergent, etc., cause many issues and should not be on the waterside of a boiler. Furthermore, when foaming occurs, the water level cannot be discerned. The water glass and try-cocks will appear full. Foaming is usually intensified with a heavy fire and a heavy engine load. Reduce or stop the engine load and reduce the fire until it settles down; then steam down, wash out the boiler, and refill it with clean water. The first indication of a foaming or priming boiler is usually a “wet stack” and a discernable difference in the exhaust sound. Open cylinder cocks immediately, close throttle, and determine the water level. b) Priming is similar to foaming; water is being pulled into the engine. This is especially bad because it can wash the oil from valves and cylinders, risking severe damage to the engine. Priming is caused more from carrying too high a water level. It also occurs from working steam while ascending and descending hills. One should be knowledgeable of the machine they are operating, including the proper water level. c) If an engine starts priming (it will show a wet stack), open cylinder cocks, reduce throttle, get engine to level area, and determine the water level. If possible, safely blow down boiler to the proper water level. Ensure no bystanders are close
by.

2.3.6.5 INSPECTION OF PRESSURE VESSELS WITH QUICK-ACTUATING CLOSURES

~~a)~~ ~~This~~ This section describes guidelines for inspection of pressure vessels equipped with quick-actuating closures. ~~Due to the many different designs of quick-actuating closures, potential failures of components that are not specifically covered should be considered. The scope of inspection should include areas affected by abuse or lack of maintenance and a check for inoperable or bypassed safety and warning devices.~~ Pressure vessels with quick actuating closures have a higher likelihood of personnel being in close proximity of the vessel during opening.

a) ~~.~~ Accidents have occurred when gaskets became stuck and released suddenly when pried open. Wear and fatigue damage caused by the repetitive actuation of the mechanism and pressure cycles are also a source of accidents.

b) ~~Temperatures above that for which the quick-actuating closure was designed can have an adverse effect on the safe operation of the device. If parts are found damaged and excessive temperatures are suspected as the cause, the operating temperatures may have exceeded those temperatures recommended by the manufacturer.~~ Rapid fluctuations in temperatures due to rapid start-up and shutdown may lead to cracks or yielding caused by excessive warping and high thermal stress. An ~~careful observation~~ inspection ~~should~~ shall be made of the condition of the complete installation~~,~~. Review shall ~~including~~ include maintenance, ~~and~~training records, operation, and non-destructive examination records. This review shall serve as a guide ~~in forming an opinion of~~ for evaluating the care the equipment receives. The construction history of the vessel should be established, including~~:~~ year built, materials of construction, extent of post weld heat treatment, previous inspection results, and repairs or alterations performed. Any leak should be thoroughly investigated. ~~and the necessary corrective action initiated~~taken by an "R" Certificate ~~Holder.~~

1) Inspection of parts and appurtenances

The owner/user shall adhere to the items below, and the items shall be verified by the inspector if applicable.

a) ~~.~~ Seating surfaces of the closure device, including but not limited to the gaskets, O-rings, or any mechanical appurtenance, shall be inspected to ensure proper alignment. ~~of the closure to the seating surface, should be inspected. This inspection can be made by using powdered chalk or any substance that will indicate that the closure is properly striking the seating surface of the vessel flange. If this method is used, a check should be made to ensure that:~~

~~1. Material used shall not contaminate the gasket or material with which it comes into contact; and~~
~~2. The substance used shall be completely removed after the examination.~~

b) ~~.~~ The closure mechanism of the device ~~should~~ shall be inspected for freedom of movement and proper contact with the locking elements. This inspection should indicate that the movable portions of the locking mechanism are striking the locking element in such a manner that full stroke can be obtained. Inspection should be made to ensure that the seating surface of the locking mechanism is free of metal burrs and deep scars, which would indicate misalignment or improper operation. A check should be made for proper alignment of the door hinge mechanisms to ensure that adjustment screws and locking nuts are properly secured.

c. When deficiencies are noted, the following corrective actions ~~should~~ shall be initiated:

1. If any ~~deterioration~~ defect of the gasket, O-ring, etc., is found, the gasket, O-ring, etc., ~~should~~ shall be removed from service and replaced immediately. Replacements ~~should~~ shall be in accordance with the vessel manufacturer's specifications;

Commented [JM1]: Can this sentence be changed? Since it is straight out of SECTION VIII, I wasn't sure if we could change it. I think the word "because" should be removed.

Also is this paragraph supposed to be "a."?

a. Accidents have occurred when gaskets became stuck and released suddenly when pried open.

Commented [JCP2R1]: I think the word BECAUSE could be removed.

Commented [JM3]: Editorial - I believe the colon can be removed here.

Commented [JCP4R3]: I agree

Commented [JM5]: I changed this to Certificate Holder

Commented [JCP6R5]: Ok Looks good.

2. If any cracking or excessive wear is discovered on the closing mechanism, the owner or user ~~should~~ shall contact the original manufacturer of the device for spare parts or repair information. If this cannot be accomplished, the owner or user should contact an organization competent in quick-actuating closure design and construction prior to implementing any repairs;
3. Defective safety or warning devices ~~should~~ shall be repaired or replaced prior to further operation of the vessel;
4. Deflections, wear, or warping of the sealing surfaces may cause out-of-roundness and misalignment. The manufacturer of the closure ~~should~~ shall be contacted for acceptable tolerances for out-of-roundness and deflection; and
5. The operation of the closure device through its normal operating cycle should be observed while under control of the operator. ~~This should indicate if the operator is following posted procedures and if the operating procedures for the vessel are adequate~~.

Commented [JCP7]: Jodi: This needs to be added back to this paragraph. Venus lined this out, but I think the working group wanted it left in.

2) Gages, safety devices, and controls

The owner/user shall adhere to the items below, and the items shall be verified by the inspector as applicable.

~~a. The required pressure gage should be installed so that it is visible from the operating area located in such a way that the operator can accurately determine the pressure in the vessel while it is in operation. The gage dial size should be of such a diameter that it can be easily read by the operator. This gage should have a pressure range of at least 1-1/2 times, but not more than four times, the operating pressure of the vessel. There should be no intervening valve between the vessel and gage.~~

~~b.~~a. The pressure gage should be of a type that will give accurate readings, especially when there is a rapid change in pressure. It should be of rugged construction and capable of withstanding severe service conditions. Where necessary, the gage should be protected by a siphon or trap.

~~c.~~b. Pressure gages intended to measure the operating pressure in the vessel are not usually sensitive or easily read at low pressures approaching atmospheric. It may be advisable to install an auxiliary gage that reads inches of water (mm of mercury) and is intended to measure pressure from atmospheric through low pressures. This ensures that there is zero pressure in the vessel before opening. It would be necessary to protect the auxiliary ~~low pressure~~low-pressure gage from the higher operating pressures.

~~d.~~c. Provisions should be made to calibrate pressure gages or to have them checked against a master gage as frequently as necessary.

~~e.~~d. A check should be made to ensure that the closure and its holding elements must be fully engaged in their intended operating position before pressure can be applied to the vessel. A safety interlock device ~~should~~ shall be provided that prevents the opening mechanism from operating unless the vessel is completely depressurized.

~~f.~~e. Quick-actuating closures held in position by manually operated locking devices or mechanisms, and which are subject to leakage of the vessel contents prior to disengagement of the locking elements and release of the closure, shall be provided with an audible and/or visible warning device to warn the operator if pressure is applied to the vessel before the closure and its holding elements are fully engaged, and to warn the operator if an attempt is made to operate the locking device before the pressure within the vessel is released. Pressure tending to force the closure clear of the vessel must be released before the closure can be opened for access.

3. If required by the authority having jurisdiction, a Risk Based Inspection Assessment (RBIA) program, managed by the owner/user, shall be developed by an ~~professional~~ engineer familiar with the design and

applications of quick actuating closures. See NBIC Part 2, Section 4. The RBIA shall be made available for review by the inspector.

PART 2, SUPPLEMENT 15

Concerns Regarding Carbon Monoxide During Boiler Inspections

S15.1 SCOPE

a) This supplement provides specific requirements and guidelines for evaluating potential carbon monoxide concerns.

b) It is well documented and internationally recognized[1] that carbon monoxide is a serious health concern. Annually, there are over 40,000 cases of CO poisoning in North America[2]. Boiler and fired pressure vessel inspections involve equipment that is an exposure to the inspector and occupants of buildings. National Board Inspection Code Part 1 calls for carbon monoxide detectors (NBIC Part 1, 1.6.9) where required. A review of service and maintenance records (NBIC Part 2, 2.2.11), verification that combustion air is supplied to the boiler room (NBIC Part 2, 2.2.20.6 c and NBIC Part 1, 1.6.6) and inspecting for combustion air leaks (NBIC Part 2, 2.2.5 d) are important parts of the inspection that help prevent carbon monoxide from becoming a problem. Installers must follow manufacturers and the jurisdictions requirements for the installation of the equipment.

S15.2 Inspection points that should be included in the inspection of the object

a) Assessment of conditions that may indicate a carbon monoxide condition exists outside of the combustion chamber include:

- unstable pilot or main flame
- Yellow flame
- Smoke from stack
- Discoloration around burner or casing
- The presence of soot on any surface
- Any flue leakage or blockage
- Fresh air intake blocked.
- Negative pressure in boiler room, resistance when you go to open door, air rushes in when you open door.
- Lack of maintenance on burner/boiler
- Condensation in boiler room
- Any changes to the combustion load or reconfigurations that may impact combustion should be considered in the inspection.

b) If leakage of flue gas or in any case a condition indicates a lack of combustion air, further investigation by boiler service technician is required. (ASME CSD-1, CG 700 qualified individual, or persons deemed qualified by the authority having jurisdiction)

S15.3 Equipment recommended to inspect the objects safely.

a) It is highly recommended that inspectors carry a carbon monoxide detector. They are inexpensive and easy to use.

Note 1 https://www.who.int/teams/environment-climate-change-and-health/air-quality-and-health/health-impacts/types-of-pollutants,

Note 2 https://www.ncbi.nlm.nih.gov/books/NBK430740/

Item 22-22
Bolden – May 30, 2023

4.2 NONDESTRUCTIVE EXAMINATION METHODS (NDE)

a) Listed below ~~is~~ are a variety of ~~nondestructive examination~~ NDE methods that may be employed to assess the condition of pressure-retaining items. ~~The skill, experience, and integrity of the personnel performing these examinations are essential to obtain meaningful results.~~ The Inspector ~~should~~ shall review the methods and procedures to be employed to ensure compliance with the codes, standards, and/or jurisdictional requirements.

b) ~~Generally, some form of surface preparation will be required prior to use of these examination metho~~When there is doubt as to the extent of a defect or detrimental condition found in a pressure-retaining item, the Inspector ~~is cautioned~~ ~~encouraged to~~ should seek competent technical advice for further evaluation of the finding. Additionally, ~~and~~ supplemental NDE~~.~~ ~~M~~may be used to further evaluate the finding.

c) ~~Personnel performing examination and test methods shall have proper training and certification, as required by the owner and acceptable to the Inspector and Jurisdiction, if required.~~For the ~~assign~~The NDE requirement shall include ~~, the following shall be stated~~technique, the extent of coverage, procedures, personnel, and acceptance criteria. The acceptance criteria shall be in accordance with the original code of construction, standard, or specification. If the original code of construction, standard, or Specification is not possible or practical an ~~the application of the assigned NDE~~ alternative NDE methods may be used~~,~~ if all other requirements are met. The alternative NDE method(s) shall be acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required.

d) ~~NDE Personnel shall be qualified to the requirements of ASME Section V T-120, which references national and internationally accepted standards~~NDE Personnel shall be qualified to the requirements of ASME Section V paragraph T-120, which references national and internationally accepted standards. When this is not possible, NDE personnel may be qualified and certified in accordance with their employer's written practice.

1) The employer's written practice shall be established by using ASNT SNT-TC1A, *Recommended Practice Non-destructive Testing Personnel Qualification and Certification,* or ANSI/ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel*, as a guideline.

2) Personnel performing the examination and test methods shall have proper training and certification, as required by the owner and acceptable to the Inspector and Jurisdiction (where

required). Such training and certification shall be maintained by the employer of the NDE personnel.

PROPOSED REVISION OR ADDITION

Item No.

A 23-81

Subject/Title

Evaluate Inspector responsibilities relating to 4.4.3 FFS

NBIC Location

Part: Inspection; Section: 4; Paragraph: 4.4.3-b

Project Manager and Task Group

Source (Name/Email)

Robert Underwood / robert_underwood@hsb.com

Statement of Need

Currently, 4.4.3-b states the Inspector shall review the condition assessment methodology and ensure the inspection data and documentation are in accordance with Section 4. This proposal would redefine the role and responsibility of the Inspector.

Background Information

There has been confusion on what the Inspector is responsible for when signing an NB-403 Form for Fitness for Service. Inspectors are not trained in the various FFS or condition assessment methodology referenced in Section 4 and should not be responsible for ensuring that these methods are correct.

Existing Text

4.4.3 RESPONSIBILITIES a) Owner or User The owner or user of the pressure-retaining item is responsible for the selection and application of a suitable fitness for service or condition assessment methodology described in this section, subject to review and approval by the Jurisdiction, if required. b) Inspector The Inspector shall verify the condition assessment methodology selected by the owner or user has been completed and ensure inspection data and documentation are available.

Proposed Text

4.4.3 RESPONSIBILITIES a) Owner or User The owner or user of the pressure-retaining item is responsible for the selection and application of a suitable fitness for service or condition assessment methodology described in this section, subject to review and approval by the Jurisdiction, if required. b) Inspector The Inspector shall verify the condition assessment methodology selected by the owner or user has been performed and ensure inspection data and documentation are available.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date