Date Distributed:

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE SUBGROUP REPAIRS & ALTERATIONS

MINUTES

Meeting of January 18th, 2022
San Diego, CA

These minutes are subject to approval and are for the committee use only. They are not to be duplicated or quoted for other than committee use.

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**
   Chairmen Boseo called the meeting to order at 8:00 AM Pacific Time in the Versailles Ballroom on the second floor of the hotel.

2. **Roll call of Members and Introduction of Visitors**
   Secretary Hellman called roll of the Members and held introduction of visitors. (**Attachment**)

3. **Check for a Quorum** : Secretary Hellman verified a Quorum was achieved.

4. **Awards/Special Recognition**

5. **Announcements**
   - The National Board will be hosting a reception on Wednesday evening from 5:30pm to 7:30pm at The Smoking Gun.

   - The National Board will be hosting a breakfast and lunch for the Main Committee meeting on Thursday. Breakfast will be served from 7:00am to 8:00am, and lunch will be served from 11:30am to 12:30pm. Both meals will be served at the hotel in Le Fontainebleau.

   - A coffee station will be provided outside of the meeting rooms on each floor.

6. **Adoption of the Agenda:**
   The agenda was revised to add 3 Interpretation Items and add Mr. Cutlip's nomination and the Resignations from the SG R&A. The Agenda as revised was unanimously accepted (UA).

7. **Approval of the Minutes of the July 13th, 2021 Meeting**
   The minutes are available for review on the National Board website, www.nationalboard.org. The Minutes were motioned, seconded, and unanimously approved.

8. **Review of Rosters**
   a. **Membership Nominations**
      i. Mr. Raymond Spuhl would like to be considered for Subgroup R&A membership/ He is currently Chair of the NR Task Group. – He was UA
      ii. Mr. Eric Cutlip would like to be considered for Subgroup R&A membership – He was UA

   b. **Membership Reappointments**

   c. **Officer Nominations**

   d. **Resignations**
      i. Paul Shanks announced his resignation from INTERP. TG and SG R&A
      ii. Ray Miletti announced his resignation from SG R&A

9. **Presentation**
   - **a.** Discuss the manufacturers' and team leaders' responsibilities pertaining to Appendix 47 by Luis Ponce. (10-15 min)
   - **b.** Definitions of the vote categories by Marty Toth
   - **c.** Workflow and expectations
     - **i.** Participation and progress on items
     - **ii.** Membership requirements
     - **iii.** Attendance in meetings, on TG and letter balloting
     - **iv.** Go over the newer numbering system
     - **v.** Expectation of work in between meetings

10. **Interpretation Items**

Item Number: I21-64	**NBIC Location: Part 3, 1.3.1**	**Attachment**

General Description: Repair or Alteration activity allowed prior to Certification

Subgroup: Repairs and Alterations

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

Explanation of Need:
Applicants for the "R" Certificate are unclear if the NBIC allows for any activities to be performed prior to certification, especially since ASME does allow it.

INT TG January 2022 Meeting Action: M. Toth presented. Proposal was approved at INT TG but will be on the agenda for SG. Passed UA.

January 2022 Meeting Action: M. Toth presented a proposal revised at the meeting and it was UA.

Item Number: I21-74	NBIC Location: Part 3, 1.3.1	Attachment

General Description: ASME Sect VIII, Div 1 Design Personnel Requirements and NBIC Repairs/Alts

Subgroup: Repairs and Alterations

Task Group: T. McBee (PM)

Explanation of Need:
Many have asked what, if any, impact the new ASME VIII-1 Appendix 47 design personnel requirements will have on NBIC repairs and alterations.

SG R&A January 2022 Meeting Action: T. McBee presented. A proposal was reviewed addressing design personnel qualification criteria required for vessels built to ASME ’21 or altered in accordance with the ’21 Code edition. The proposal was UA as revised.

Item Number: I21-81	NBIC Location: Part 3, 3.3.6	Attachment

General Description: Repairs/Alterations of Impact Tested Vessels (Intent Interp)

Subgroup: Repairs and Alterations

Task Group: B. Undewood (PM), W. Sperko, G. Galanes

Explanation of Need: There is an urgent need to address these concerns as the repair firms cannot comply with the existing wording in 3.3.6. The purpose of this Intent Interpretation is to take the approved revisions to the 2023 NBIC Part 3 and provide immediate guidance to users involved in the repair and alteration activities of impact tested vessels.

INT TG January 2022 Meeting Action: Related to 21-77. This was a PR to be discussed at SG R&A

SG R&A January 2022 Meeting Action: B. Underwood presented A21-77 first, as it was related to this interp. A21-77 was presented and was discussed, revised and was UA

I21-81 was presented by B. Underwood and the proposal was revised based on Item A21-77 approved verbiage. The proposal was further revised to 2 separate questions and answers. The proposal was UA

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11. Action Items

Item Number: A19-60	**NBIC Location: Part 3, 1.5.1**	**Attachment**

General Description: Quality System For Qualification For The National Board "R" Certificate

Subgroup: Repairs and Alterations
Task Group: K. Moore (PM), Paul Davis, B. Boseo, M. Toth, P. Shanks, M. Quisenberry, R. Sturm, T. Seime

Explanation of Need: Part 3, 1.5.1 provides a good outline for a Quality Systems Manual. However, the remaining elements of a Quality System, outside of the one's currently being addressed in Item 19- 47 and 19-4 need to be embellished to provide a more auditable description of each element.

July Meeting Action: K. Moore presented. Mr. J. Sekely pointed out that comments made on the last version submitted via LB were not addressed on the current proposal. The item was taken back to make the appropriate revisions. **This was a PR.**

Update: This item is currently being balloted to SC R&A.

SG R&A January 2022 Meeting Action: K. Moore presented that J. Sekely changed his negative vote to approved 1/18/2022. Passed SC R&A via LB (16-0).

Item Number: A19-61	**NBIC Location: Part 3, 3.3.4**	**No Attachment**

General Description: Threaded Inserts as Alterations Example

Subgroup: Repairs and Alterations

Task Group: Paul Shanks (PM), J. Walker, T. McBee

Explanation of Need: Threaded insert are being used to fix a bolt that has broken off on certain types of boilers (autoclaves) which hold the heating elements in the water side of the boiler. When this happens, the technician correcting the problem will simply drill out the broken bolt with an over sized bit and inset a metallic insert. NBIC does address this this type of alteration.

July SG R&A Action: Progress Report
July SC ACTION: Mr. Shanks presented a Progress Report.

SG R&A January 2022 Meeting Action: P. Shanks presented and this item will be closed w/no action. The motion to Close w/No Action was UA.

Item Number: A20-48	**NBIC Location: Part 3, 1.6**	**No Attachment**

General Description: Review NR Program (1.6) to 2015 NQA-1 Edition

Subgroup: NR TG

Task Group: R. Spuhl (PM)

Explanation of Need: Latest NQA-1 revision to be compared to NR program (1.6) for consistency.

July SG R&A Action: Progress Report

July SC ACTION: Mr. Edwards presented a **Progress Report.**

July Meeting Action: Mr. Edwards presented a **Progress Report.**

SG R&A January 2022 Meeting Action: R. Spuhl presented a **Progress Report** regarding NQA-1 and Sect. III**.**

Item Number: A20-52	**NBIC Location: Part 3, 1.6.2 a) 2)**	**No Attachment**

General Description: Rvw NR requirements for ASME Section XI Div. 2 potential applications

Subgroup: NR TG

Task Group: T. Roberts (PM),

Explanation of Need: This was created based on discussion from Item 20-47 dealing with ANIA requirements.

July Meeting Action: Mr. Edwards presented a **Progress Report.**

SG R&A January 2022 Meeting Action: R. Spuhl presented a **Progress Report**

Item Number: A20-53	NBIC Location: Part 3, 3.3.5.2 a) & 3.4.5.1 b)	No Attachment

General Description: Certification of Repair or Alteration Plans

Subgroup: Repairs and Alterations

Task Group: S. Chestnut (PM), B. Schaefer

Explanation of Need: The Clarification of the Certifying Engineer requirements.

July Meeting Action: Scott Chestnut presented a **Progress Report** – Ben Schaefer volunteered forTG. During discussion, B. Underwood stated the 2021 ASME Sect. VIII may address this.

SG R&A January 2022 Meeting Action: S. Chestnut presented that this will be Closed w/No Action and open another item dealing Appdx 47 qualification criteria for design personnel. Closed w/No Action was UA.

Item Number: A20-60	NBIC Location: Part 3, 3.3.4.8	No Attachment

General Description: Part 3 Supplement for FFS Guidelines

Subgroup: Repairs and Alterations

Task Group: J. Siefert (PM)

Explanation of Need: The NBIC provides little guidance related to FFS activities and repairs in part 3.

July SG R&A Action: Progress Report

July SC ACTION: Mr. Siefer presented that EPRI will be drafting a FFS Supplement for consideration in the future. This was a **Progress Report**.

July Meeting Action: Mr. Siefert presented that EPRI will be drafting a FFS Supplement for consideration in the future. This was a **Progress Report**.

SG R&A January 2022 Meeting Action: Mr. Siefert presented that EPRI will be drafting a FFS Supplement for consideration in the future, and another item may be opened to address these changes in the future. The motion to Close w/No Action was UA.

Item Number: A20-67	**NBIC Location: Part 3, S6**	**No Attachment**

General Description: Revisions to Part 3, Supplement 6

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM), T. McBee, G. Galanes

Explanation of Need: Supplement 6 was implemented into the 2007 Edition of the NBIC Part 3 to provide requirements and guidelines for repairs, alterations and modifications to DOT Transport Tanks using the National Board's "TR" Program (which was never implemented). S6 has been revised over the years to remove reference to the "TR" Program, but still contains many requirements that are not correct. This purpose of this proposal is to review the entire Supplement and make appropriate revisions that comply with NBIC Part 3 and DOT requirements.

July SG R&A Action: Progress Report

July SC ACTION: Mr. Underwood presented a **Progress Report.**

July Meeting Action: Mr. Underwood presented a Progress Report.

SG R&A January 2022 Meeting Action: Mr. Underwood presented a Progress Report.

Item Number: A20-73	**NBIC Location: Part 3, 4.4.2 a) 2)**	**No Attachment**

General Description: Pressure Testing of Connecting Welds (Part 3, 4.4.2(a)(2)

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM), B. Morelock, T. White, P. Davis, B. Schaefer

Explanation of Need: To clarify what the term "replacement part" as used in 4.4.2(a)(2) of Part 3 means.

July Meeting Action: B. Underwood presented a **PR**, as he is waiting on related Item 21-12 outcome which may address this revision.

SG R&A January 2022 Meeting Action: B. Underwood presented a **PR**,

Item Number: A20-83	NBIC Location: Part 3, 1.5.1 s) & 9.1	Attachment

General Description: Revision to Part 3, 3.2.2 e)

Subgroup: Repairs and Alterations

Task Group: B. Boseo (PM)

Explanation of Need: Action Item 19-60 is proposing revisions/additions to all of 1.5.1. This proposal is to move the definition of "Nonconformance" out of the current 1.5.1 s) paragraph and into the glossary.

July SG R&A Meeting Action: T. Hellman presented a proposal that was unanimously approved and was sent to Parts 1, 2, 3, and 4 SC as a Rvw and Comment LB

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July Meeting Action: T. Hellman presented a proposal to go to a **Review and Comment LB to all SC (Parts 1-4) and Main Committee**.

Update: The proposal was balloted, and passed Parts 1, 2 and 3, but failed Part 4.

SG R&A January 2022 Meeting Action: B. Boseo presented and will have a meeting with Part 4. This was a PR.

Item Number: A21-02	NBIC Location: Part 3, 1.6	No Attachment

General Description: Define "Fuel Loading" as it pertains to NR activities

Subgroup: NR TG

Task Group: P. Edwards (PM), R. Spuhl appointed as PM in Dec. 2021.

Explanation of Need: The NR TG would like to clarify "Fuel Loading" as used to determine Category 1, 2 or 3 NR activities.

July Meeting Action: P. Edwards – PR

SG R&A January 2022 Meeting Action: R. Spuhl presented a PR.

Item Number: A21-06 **NBIC Location: Part 3, 4.4.2** **No Attachment**

General Description: Concessions with pressure testing associated with replacement parts

Subgroup: Repairs and Alterations

Task Group: M. Quisenberry (PM), R. Miletti, P. Becker, P. Davis, R. Underwood, M. Winters

Explanation of Need: When replacement parts are manufactured and not tested as required by the original code of construction, there needs to be concessions or considerations associated with the pressure testing requirements as to not detrimentally effect the existing pressure retaining item.

July Meeting Action: D. Kinney presented - T. Sieme and B. Wielgozinski had several comments and volunteered to join the TG. After discussion, Mr. Kinney pulled the proposal back for more work. This was a PR

SG R&A January 2022 Meeting Action: M. Quisenberry presented a PR

Item Number: A21-07 **NBIC Location: Part 3, 1.3.2 a)** **Attachment**

General Description: NBIC Report Form certification clarification and NDE witnessing requirements.

Subgroup: Repairs and Alterations

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

Explanation of Need: The intent is to clarify which Inspector must certify R forms, specifically when there are different AIA's signing the certifications on the R-2 Form, and if they must be present to witness any pressure test or any acceptable alternative test method applied.

July Meeting Action: D. Kinney presented a **PR**. T. Seime volunteered to join the TG to assist Mr. Kinney on this item.

SG R&A January 2022 Meeting Action: D. Kinney presented a proposal revised based on an earlier Rvw & Comment LB. The Proposal was UA.

Item Number: A21-10	NBIC Location: Part 3, 5.2 &5.4	Attachment

General Description: Add a time frame for R forms (for completion of and submittal of forms)

Subgroup: Repairs and Alterations

Task Group: D. Kinney (PM), B. Schaefer, B. McGuire

Explanation of Need: Currently, the NBIC is silent on how much time may go by after work is completed before the applicable R Form is accepted by the inspector after work is completed. The NBIC is also silent on how much time may go by before the applicable R Form is submitted to the NB and Jurisdictions (as applicable).

July SG R&A Meeting Action – New TG: D. Kinney (PM), B. Schaefer, B. McGuire, - this was a PR

July Meeting Action – With Mr. Troutt stepping down from the SG R&A, a new TG for this item was established with the following volunteers: D. Kinney (PM), B. Schaefer, B. McGuire, - this was a **PR.**

SG R&A January 2022 Meeting Action: D. Kinney presented a proposal that was revised based on when work was considered "complete". A timeframe of 90 days following the completion of the construction work and a timeframe of 30 days for the Cert Holder to submit completed Reports of Repair was agreed on. The proposal was motioned, seconded and was UA.

Item Number: A21-12	NBIC Location: Part 3, 3.3.3, 3.4.4, Section 9	No Attachment

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. Seime

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 Meeting Action: P. Becker presented a presentation (placed on SG R&A Cloud).- This was a PR.

SG R&A January 2022 Meeting Action: P. Becker was not able to present. This was a PR

Item Number: A21-14 **NBIC Location: Part 3, 3.4.3** **Attachment**

General Description: ASME PCC-2 article references are incorrectly formatted

Subgroup: Repairs and Alterations

Task Group: P. Shanks (PM)

Explanation of Need: The 2018 edition of ASME PCC-2 has a different article numbering system than that used in the 2019 NBIC.

July Meeting Action – P. Shanks presented a PR.

SG R&A January 2022 Meeting Action: P. Shanks presented. The proposal was UA.

Item Number: A21-15 **NBIC Location: Part 3, Section 5** **Attachment**

General Description: Corrections and revisions to "R" Forms.

Subgroup: Repairs and Alterations

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

Explanation of Need: NBIC Part 3 is silent on controls for corrections or revisions to "R" Forms. The NBIC requires quality systems to provide revision controls, and I believe the NBIC should be clear on this as well.

July Meeting Action: D. Kinney presented: The proposal was revised and taken back for more work. M. Toth was added to the TG **– This was a PR**

SG R&A January 2022 Meeting Action: D. Kinney presented. The proposal was UA.

Item Number: A21-27 **NBIC Location: Part 3, 4.2 a)** **Attachment**

General Description: Provision of Exemption for original COC NDE requirements

Subgroup: Repairs and Alterations

Task Group: W. Sperko (PM)

Explanation of Need: Repair organizations that perform shop refurbishment and repair of LPG storage tanks (ASME Section VIII Div 1) encounter repetitive, typical defects that require repair. Many of the typical defects requiring repair meet the definition and could be considered Routine Repair. This being the case one of the frequently observed issues requiring weld repair is defects in original manufacturing butt welds at the head to shell joint with defects that include cold lap, and pinholes. The typical repair involves the excavation of the defect and confirmation of removal via PT. Then the excavation is welded with a typical repair length being less than 6" long. While the CoC in many cases in LPG storage tanks requires a spot RT of the head to shell join, performing RT on the minimal amount of welding typically performed on isolated defects serves no practical purpose in enhancing safety especially when the length of deposited weld metal would be less that the length of the length of the radiographic film used capture the image.

July Meeting Action: W. Sperko presented. The proposal was revised and will be sent to **Letter Ballot to all SC and MC.**

Update: The proposal was balloted to SC R&A and received several comments that the PM will discuss during the meeting.

SG R&A January 2022 Meeting Action: W. Sperko presented. The proposal was revised and approved with 1 abstention (Phil Gilston).

Item Number: A21-31 **NBIC Location: NBIC Glossary** **No Attachment**

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 SG R&A Meeting Action: The proposal was revised, and a TG was assigned: R. Miletti (PM), P. Gilston, M. Toth, - PR

July Meeting Action: R. Miletti presented that this was a new Item and adding a definition of "shop" may provide more clarity on this. J. Walker volunteered to be on the TG, - This was a **PR**

SG R&A January 2022 Meeting Action: R. Miletti presented definitions (from ASME) of Temporary Location and Field Site. This was a PR.

Item Number: A21-33	NBIC Location: Part 3, 1.2 f)	Attachment

General Description: Use of code cases pertaining to repairs and alterations

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

Explanation of Need: The NBIC Part 3 already references code cases in various paragraphs such as NR quality requirements, welding method 7, and R Form instructions, but there is no direct reference to acceptance of their use. I think it's always been an unwritten rule that they are permitted to be used with acceptance of the Inspector and Jurisdiction. This proposal will address this in a new paragraph 1.2(f).

July SG R&A Meeting Action: R. Underwood presented – The proposal was revised and a motion to send to Rvw & Comment LB to SG and SC R&A was UA.

July Meeting Action: R. Underwood presented – The proposal will be sent to **Rvw & Comment LB to SG and SC R&A**.

SG R&A January 2022 Meeting Action: R. Underwood presented a revised proposal based on comments from the Rvw & Comment LB. The proposal was UA.

New Items:

Item Number: A21-37	NBIC Location: Part 3, 1.6	No Attachment

General Description: Parts used in NR Activities

Subgroup: NR TG

Task Group: B. Wielgoszinski (PM), R. Spuhl assigned as PM in Dec. 2021.

Explanation of Need: Clarification that parts used in NR activities are fabricated by NR Certificate Holders and inspected by appropriately endorsed National Board commissioned Inspectors.

SG R&A January 2022 Meeting Action: B. Wielgoszinski presented a PR

Item Number: A21-43	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, B. Wielgoszinski

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

SG R&A January 2022 Meeting Action: M. Toth **presented a PR**. B. Underwood and B. Wielgoszinski volunteered for the TG.

Item Number: A21-44	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, B. Wielgoszinski

Explanation of Need: Defining de-rating within Part 3

SG R&A January 2022 Meeting Action: M. Toth **presented a PR**. B. Underwood and B. Wielgoszinski volunteered for the TG.

Item Number: A21-45	NBIC Location: Part 3, Supplements	Attachment

General Description: Add a supplement to address oil, gas and chemical repair & alteration scope

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.

January 2022 Meeting Action: R. Underwood presented a proposal with a motion to **LB to SG and SC for a Vote** was motioned, seconded, and UA.

Item Number: A21-53 **NBIC Location: Part 3, S8.5 a)** **Attachment**

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

Subgroup: Repairs and Alterations

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

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.

SG R&A January 2022 Meeting Action: P. Gilston presented. A motion to **LB to Part 3 and Part 2 SGs** was UA.

Item Number: A21-67 **NBIC Location: Part 3, 3.4.9** **Attachment**

General Description: Add welding requirements to plugging firetubes

Subgroup: Repairs and Alterations

Task Group: P. Gilston (PM), K. Moore, M. Quisenberry, T. Sieme

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

SG R&A January 2022 Meeting Action: P. Gilston presented. Discussion took place on if omitting mechanical plugging of firetubes and changing 3.3.4.9 to be specific to plugging by welding would be received as "mechanical repairs" would not be allowed by the NBIC (as opposed to just not addressed). Trevor Sieme and M. Quisenberry volunteered to join the Task Group. The proposal was taken back for work. **This was a PR.**

Item Number: A21-68 **NBIC Location: Part 3, S9** **Attachment**

General Description: Removal of "final inspection" date from all Form R Report certifications.

Subgroup: Repairs and Alterations

Task Group: D. Kinney (PM)

Explanation of Need: To remove the unnecessary date requirement and eliminate confusion regarding what is the "final inspection" as it relates to repairs and alterations. The term "final inspection" is not defined in the NBIC, and the corresponding date has no bearing on the act and intent of the form certification.

SG R&A January 2022 Meeting Action: D. Kinney presented and gave background on the item. Discussion on the value of the "Inspection Date" (Item 37 on Form R-1 instructions) vs "Inspector Signature Date" (Item 40 on Form R-1 instructions). The proposal was motioned was voted on and failed:

- 11 Disapprovals (M. Quisenberry, P. Gilston, B. Boseo, T. Sieme, B. Underwood, M. Toth, S. Frazier, W. Sperko, P. Shanks, J. Waker, J. Sekely)
- 1 Abstention (R. Miletti)]
- Secretary will email all other members for confirmation of "Approval" vote.
    - 11 Approvals (C. Hopkins, F. Johnson, D. Kinney, T. McBee, R. Miletti, K. Moore, J. Siefert, R. Valdez, S. Chestnut, P. Davis, B. Schaefer) **Still needing Tom White vote**

Vote Failed.

Item Number: A21-70 **NBIC Location: Part 3, Table 2.3** **Attachment**

General Description: Updating Table 2.3 in Part 3 with newest SWPSs

Subgroup: Repairs and Alterations

Task Group: J. Sekely (PM)

Explanation of Need: 13 SWPSs have been updated and approved by AWS, and the list of SWPSs in Table 2.3 will need to be updated to reflect these changes.

SG R&A January 2022 Meeting Action: Mr. Sekely was unable to present – The item will be LB

Item Number: A21-71 **NBIC Location: Part 3, 3.4.9** **Attachment**

General Description: Remove the mechanical portion of tube plugging from 3.3.4.9. Only address i

Subgroup: Repairs and Alterations

Task Group: P. Gilston (PM), K. Moore

Explanation of Need: Removing the mechanical portion of the text. Many Jurisdictions are having a difficult time enforcing that part of the NBIC

SG R&A January 2022 Meeting Action: P. Gilston motioned to close this item as it will be included in A21-67. The motion to Close w/No Action was UA.

Item Number: A21-77 **NBIC Location: Part 3, 2.2.1.1** **Attachment**

General Description: Repairs/Alterations of Impact Tested Vessels

Subgroup: Repairs and Alterations

Task Group: J. Siefert (PM).

Explanation of Need: There is an urgent need to address these concerns as the repair firms cannot comply with the existing wording in 3.3.6. The plan is to incorporate this item into the 2023 Edition of Part 3 and propose a corresponding Intent Interpretation that would provide guidance to NBIC users as soon as possible.

SG R&A January 2022 Meeting Action: B. Underwood presented A21-77 with I21-81 first, as it was related to this Action Item. A21-77 was presented and was discussed, revised and location updated from 3.3.6 to 2.2.1.1 and was UA

Item Number: A21-80 **NBIC Location: Part 3, 3.3.3(h)(2)** **Attachment**

General Description: Mechanical Replacement of Shell or Head

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

Explanation of Need: This Code revision and corresponding interpretation (I21-79) would provide clarity to NBIC users and address whether mechanical replacement of these components is considered a repair.

SG R&A January 2022 Meeting Action: R. Underwood presented a proposal. The proposal was UA.

Item Number: A21-82	NBIC Location: Part 3, 3.3.3(s)	No Attachment

General Description: Examples of Repairs

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM), P. Gilston, P. Davis, J. Ferreira, J. Walker, E. Cutlip

Explanation of Need: Adding "repair" to 3.3.3(s) would then address use of different weld material. Currently 3.3.3(s) only addresses replacement of the part, not repair (Repair is addressed in 3.3.3(r)).

SG R&A January 2022 Meeting Action: R. Underwood presented a PR. P. Gilston, P. Davis, J. Ferreira, J. Walker, E. Cutlip, volunteered for the TG

12. Future Meetings

- July 2022 – TBD
- January 2023 – TBD

13. Adjournment:

Chair Boseo adjourned the meeting at 4:16 PM

Respectfully submitted,

Terrence Hellman

Terrence Hellman

SG R&A Secretary

SubGroup R&A Attendance - January 18, 2022

MEMBERS:	In Person	Remote	Not In Attendance
Brian Boseo - Chair	X		
Benjamin Schaefer - Vice Chair			
Scott Chestnut	X		
Paul Davis	X		
Steven Frazier		X	
Philip Gilston	X		
Craig Hopkins		X	
Frank Johnson	X		
Donald Kinney	X		
Timothy McBee		X	
Ray Miletti		X	
Kathy Moore	X		
Brian Morelock		X	
Michael Quisenberry	X		
Trevor Seime	X		
James Sekely		X	
Paul Shanks		X	
John Siefert		X	
Walter Sperko	X		
Rick Sturm			X
Marty Toth	X		
Robert Underwood	X		
Rick Valdez	X		
Jamie Walker		X	
Tom White			X

VISITORS:	In Person	Remote
Galanes, George	X	
Simmons, Timothy		
Spuhl, Raymond		X
Wadkinson, Melissa		
Moedinger, Linn		X
Bantolo, Pierre		
Dutra, Louis	X	
Ferreira, Jon	x	
FISHER, SHELLEY		
Johnson, Herbert		
Melfi, Teresa		
Ponce, Luis		
Sendek, Dennis		
Skiles, Sean		
Carter, Nathan		
Dacanay, Julius		
eshraghi, Hamed		
khssassi, aziz		
Murray, Patrick		x
Natale, Michael		
Schaser, Matt	X	
Vazquez, Matt		x
Carlson, Mike		x
Spuhl, Raymond		x
Blados, Jonathan		x
Frazier, Steve		x
Derby, Bob		x
Bob W.	x	
Troutt, Robb	x	
Shah, M.A.		x

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

21-64

Subject/Title

Repair or Alteration activity allowed prior to Certification

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

Applicants for the "R" Certificate are unclear if the NBIC allows for any activities to be performed prior to certification, especially since ASME does allow it.

Background Information

Below are references from the NB-415 and 2019 NBIC supporting A1 and A2. Per NB-415: 3.8 When all requirements have been met, a Certificate of Authorization will be issued evidencing permission to use the “R” Symbol Stamp. The Certificate of Authorization shall expire on the triennial anniversary date. Per NBIC: 1.4 ACCREDITATION a) Organizations performing repairs or alterations to pressure-retaining items shall be accredited as described in this section, as appropriate for the scope of work to be performed. 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. 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. 1.5.1 OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM FOR QUALIFICATION FOR THE NATIONAL BOARD “R” CERTIFICATE OF AUTHORIZATION d) Statement of Authority and Responsibility A dated Statement of Authority and Responsibility, signed by a senior management official of the organization, shall be included in the manual. Further, the Statement shall include: 1) A statement that all repairs or alterations carried out by the organization shall meet the requirements of the NBIC and the Jurisdiction, as applicable; n) Acceptance and Inspection of Repair or Alteration 1) The manual shall specifically indicate that before the work is started, acceptance of the repair/alteration shall be obtained from an Inspector who will make the required inspections and confirm NBIC compliance by signing and dating the applicable NBIC Report Form upon completion of the work.

Proposed Question

Q1 - Can a new applicant's demonstration item be a welded repair to a PRI in accordance with the original code of construction prior to the applicant holding the "R" Certificate of Authorization? Q2 - Can the demonstration item in Q1 be stamped with the "R" Stamp pending a successful review if the Repair/Alteration activity is authorized by and has the required in-process involvement of the company's Repair Inspector?

Proposed Reply

A1 - No. No Repair/Alteration activities can be performed prior to holding an "R" Certificate of Authorization. A2 - No.

Committee's Question 1

Can the demonstration or implementation of the Quality System of a new “R” Certificate of Authorization applicant be conducted on work in process prior to the applicant holding the "R" Certificate of Authorization?

Committee's Reply 1

Yes, provided all the following apply:

(a) The activities are done with the participation and acceptance of the Authorized Inspection Agency of record;

(b) The activities shall have been performed in conformance with the Applicant’s accepted quality Control program; and

(c) The pressure retaining item is marked with the “R” stamp and certified only after the Applicant receives the National Board “R” Certificate of Authorization.

Rationale

NB-415 allows for "…current work, a demonstration mock-up, or a combination of both.", and NB-57 (*The National Board & ASME Guide for reviews (Guide)*) encourages "*The demonstration will be conducted on work in-process whenever possible…*"

Committee's Question 2

Committee's Reply 2

Rationale

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

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.

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

21-74

Subject/Title

ASME Sect VIII, Div 1 Design Personnel Requirements and NBIC Repairs/Alts

Project Manager and Task Group

Tim McBee (PM) Philip Gilston, Kathy Moore

Source (Name/Email)

Luis Ponce / lponce@nationalboard.org

Statement of Need

Many have asked what, if any, impact the new ASME VIII-1 Appendix 47 design personnel requirements will have on NBIC repairs and alterations.

Background Information

Paragraphs 3.3.5 (Repairs to VIII-2 PRIs) and 3.4.5 (Alterations to VIII-2 PRIs) contain the statement that reads in part, "The repair/alteration plan shall be reviewed and certified by an engineer meeting the criteria of ASME Section VIII, Division 2 or 3, as appiicable...". The argument can be made that this would also apply to ASME Section VIII Division 1 alterations too in light of new Appendix 47, but not to repairs because there are no design functions associated with repairs in the NBIC.

Proposed Question

1. Are the 2021 ASME Section VIII, Division 1 Mandatory Appendix 47 design personnel requirements applicable to NBIC alterations to ASME Section VIII, Division 1 PRIs ?

2. Are the 2021 ASME Section VIII, Division 1 Mandatory Appendix 47 design personnel requirements applicable to NBIC repairs to ASME Section VIII, Division 1 PRIs ?

Proposed Reply

1 Yes, same as the NBIC requirements for ASME Section VIII, Division 2 or 3 alterations.

2 No, there are no design functions associated with repairs.

Committee's Question 1
1. Are the 2021 ASME Section VIII, Division 1 Mandatory Appendix 47 design personnel requirements applicable to NBIC alterations to ASME Section VIII, Division 1 PRIs ?

Committee's Reply 1
1. 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 alteration plan shall be reviewed and certified by design personnel meeting the criteria of ASME Section VIII Division 1 Mandatory Appendix 47.

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

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.

Intent Interpretation

Subject: Repair and Alterations of Impact Tested Pressure Vessels
NBIC Part 3
Section 3, Paragraph 3.3.6
Submitted by: Bob Underwood, HSB

Q1: When performing repair and alteration activities to pressure retaining items that have been impact tested, is it the intent that the test coupon material used to qualify the welding procedure be of the same heat treated condition of the material being repaired?

A1: No, qualification of the welding procedure shall be in compliance with the following minimum requirements:

a) Welding procedures used for repairs shall be qualified with impact testing when required by the original code of construction. The requirements for impact testing shall be in accordance with the rules of the original code of construction except that vessel (production) impact testing is not required.

b) The test coupon material does not need to be in the same heat-treated condition as the existing material prior to welding.

Q2: Is it the intent that the notch toughness of the material to be repaired be verified prior to performing a repair/alteration activity on a pressure retaining item that has been impact tested?

A2: No.

1.5 QUALITY SYSTEM

A holder of a National Board *Certificate of Authorization* shall have and maintain a written Quality System. The Quality System shall identify the processes necessary to satisfactorily meet the requirements of the NBIC and shall be available for review. The Quality System may be in the form of a manual orand may consist of several documentsbrief or voluminous, depending on the projected scope of work. The Quality SystemIt shall be treated confidentially by the National Board.

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

The following is a guide for identifying features is a guide for required features which should be covered in the written Quality System as outlined in this section and of a Quality System which shall be included in the organization's Quality System Manual. As a minimum, each organization shall be address documented the required features relative to the scope of work to be performed bywithin the Certificate Holder's within, the Oorganization's Quality System. shall explain theirThe intent, capability and applicability for each required feature shall be stated.outlined in this section. Work may be subcontracted provided the necessary controls are clearly defined for maintaining full responsibility for code compliance by the National Board repair organizationCertificate Holder certifying the work.

a) Title Page

The title page shall contain the organization's Certificate Holder's legal name, accepted abbreviation, physical address, and scope of activitiesScope of Work.

The scope of work shall clearly indicate the type of repairs and/or alterations the Certificate Holder is capable of and intends to carry out. The scope of work indicated shall include the following, as applicable.

- Repairs Only at either Shop or Field or Both
- Alterations Only at either Shop or Field or Both
- Repairs and Alterations at either Shop or Field or Both
- Metallic Repairs
- Non-Metallic Repairs
- Design Only

b) Content Page

The Quality System shall contain a page listing the contents of the manual by section, number (if applicable), revision level, and date of each section, as required for manual control. The content page shall list the activities described for in the Quality System so that each subject or document, number (if applicable), and revision level is clearly identified.

c) Scope of Work

The scope of work shall clearly indicate the type of repairs and/or alterations the Certificate Holder organization is capable of and intends to carry out. The scope of work indicated shall include the following, as applicable.

Repairs Only at either Shop or Field or Both
Alterations Only at either Shop or Field or Both
Repairs and Alterations at either Shop or Field or Both
Metallic Repairs
Non-Metallic Repairs
Design Only

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~~d~~c) Statement of Authority and Responsibility

A dated ~~dated~~ *Statement of Authority and Responsibility*, ~~signed by a senior management official of the organization,~~ shall clearly identify that the ~~be included in the~~ Quality System has the full support of management and endorsed by signature of a senior management official. ~~Further, the~~The *Statement* shall also include:

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

2) The title of the individual who has the authority and responsibility charged with the development and ~~ensuring the Quality System is~~ implementation~~ed~~ of the Quality System and ~~as described, and confirming~~ the freedom to identify quality problems, and to initiate, recommend and provide solutions and when required, stop or prohibit work from continuing.

3) A statement that ~~if there are~~ conflicts or~~is a~~ disagreements with ~~in~~ the implementation of the Quality System, ~~will~~shall be brought to the attention of the Certificate Holder's ~~organization's~~ senior management official~~the matter is to be referred~~ for a resolution ~~to a higher authority and shall be resolved in a manner~~ that will not conflict with code, jurisdiction/regulatory authority or Quality System requirements~~; and~~.

~~e~~d) ~~Manual~~ Quality System Control

The Quality System~~manual~~ shall define how~~include the necessary provisions for~~ revisionsg of individual s~~ubjects~~sections, exhibits or documents will be identified, and how distribution and retrieval~~issuing documents~~ will be achieved to ensure~~keep the manual current~~ only the latest accepted revisions are available for use. In addition, the following shall be documented:

1) The title of the individual responsible for the preparation and~~authorized to~~ approval~~e~~ of the Quality System including review of code editions, standards, and jurisdictional requirements.

2) ~~revisions shall be included in the manual.~~ Acceptance from the ~~Revisions must be accepted by the~~ Authorized Inspection Agency prior to issuance and implementation of the Quality System~~manual and its implementation~~.

~~f~~e) Certification

When electronic certification of documents is used, the Quality System shall include provisions describing the controls and safe guards that are employed to ensure the integrity of the certification.

~~g~~f) Organization

The Quality System shall include A~~a~~n organizational chart which~~shall be described included for in the manual. It shall~~ reflects actual levels of authority~~-~~ and lines of communication associated with ~~the~~ functional job titles identified.~~:~~ In addition, roles and responsibilities associated with ~~the~~ functional job titles identified within the ~~organizational chart~~Quality System, ~~include the title of the heads of all departments or divisions that perform functions~~ that can affect the quality of the repair or alteration, shall be clearly defined and documented.~~: and it shall show the relationship between each department or division. The manual shall identify the title of those individuals responsible for preparation, implementation, or verification of the Quality System. The responsibilities shall be clearly defined and the~~

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~~individuals shall have the organizational freedom and authority to fulfill those responsibilities. The following activities shall be documented :~~

~~Responsibilities associated with the Authorized Inspection Agency (AIA) of record.~~
~~Protocol describing when the AIA of record cannot provide coverage.~~
~~Personnel performing supervisory activities for procedure and performance qualifications shall:~~

~~(a) be designated by the organization with responsibility for certifying qualification documents.~~

~~(b) have a satisfactory level of competence in accordance with the organization's quality program.~~

~~(c) have a record, maintained by the organization, containing objective evidence of the qualifications, training, or experience.~~

~~g~~hg) Drawings, Design and Specifications

The ~~manual~~Quality System shall contain controls to ensure that all applicable design information, ~~applicable~~ drawings, ~~design~~ calculations, specifications, and instructions are prepared or obtained, controlled, and interpreted in accordance with the scope of work and the original code of construction, including: ~~-~~

- ~~I~~nitiation of ~~jo~~bunique identifying ~~-~~numbers ~~and control of associated work.~~
- ~~Define~~Description of the ~~-~~scope of work.
- Performance and approval of design including title of approver.
- Drawings, and other pertinent information (i.e., Code Edition, pressure, temperature, minimum design metal temperature, nondestructive examination (~~-ND~~ENDE), heat treatment, weld details, etc.)
- Review of design calculations, drawings, material specifications and process control sheets with Inspector to obtain acceptance.
- Revision and distribution control of design documents

~~i~~hh) Repair and Alteration Methods

~~The manual~~Quality System ~~shall include controls for repairs and alterations, including mechanical assembly procedures, materials, nondestructive examination methods, pre-heat, and postweld heat treatment, as applicable. Special requirements such as nonmetallic repairs and alterations to graphite and fiber-reinforced thermosetting plastic pressure-retaining items including bonding or mechanical assembly procedures shall be addressed, if applicable.~~The Quality System shall describe the methods for performing and documenting repairs and alterations in sufficient detail to permit the Inspector to determine at what stages specific inspections are to be performed. The method of repair or alteration must have prior acceptance of the Inspector, and when required, the jurisdiction. ~~-~~

~~j~~ii) Materials

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

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kj) Method of Performing Work

The Quality Systemmanual shall describe the methods for performing and documenting repairs and alterations in sufficient detail to permit the Inspector to determine at what stages specific inspections are to be performed. The method of repair or alteration must have prior acceptance of the Inspector. It is also essential that the Quality System include provisions to ensure safe working conditions during welding, testing, and all activities related to repairs and alterations.

jlk) Welding, NDE and Heat Treatment

The manual Quality System shall describe controls for welding, nondestructive examinationNDE, and heat treatment.

Welding –

The Quality Systemmanual is to shall indicate identify the title(s) of the individual(s) responsible for development of the welding procedure specification (WPS) and its qualification, and the qualification of welders and welding operators. It is essential that onlyOnly qualified welding procedure specificationWPS's and welders or welding operators qualifiedwillshall , as required by the NBIC, be used in the repair or alteration of pressure-retaining items. It is also essential that welders and welding operators maintain their cContinuity for welders and welding operators will be maintainedproficiency as required by the NBIC, while engaged in the repair or alteration of pressure-retaining items. The manualQuality System shall also describe controls for ensuring that the required WPS or Standard Welding Procedure Specification (SWPS) is available to the welder or welding operator prior to welding and establish the basis for welder to weld traceability.

NOTE: For qualification of welders and welding procedures to the 2019 ASME Code or later, the Quality System shall identify the title and qualifications of personnel performing supervisory activities as defined in ASME Section IX as applicable. Similar responsibility for nondestructive examination and heat treatment shall be described in the manual.

k) Nondestructive examinationNDE –

The title(s) of the individual(s) responsible to determine the type and extent of NDE required for the repair and/or alteration shall be identified. It is also essential that this manualThe Quality System shall indicateidentifys the title(s) of the individual(s) responsible for the review and acceptance of subcontracted NDE procedures and personnel. When NDE is performed in-house, the title(s) of the individual(s)l responsible for the written practice and the standard used for the basis of training, qualification, and records shall be documented.

l) Heat treatment

The manualQuality System shall indicatedentify the title(s) of the individual(s) responsible to ensure that a proper heat treatment has been applied to the repair and/or alteration. The Quality System shall indicatedentify the title(s) of the individual(s) responsible for the review and acceptance of subcontracted heat treatment procedures and personnel. It is also essential that theThe use of alternative welding methods per the NBIC, Part 3, 2.5.3 shall be described in the Quality System.

lmkm) Examinations and Tests

The Quality SystemReference shall describe the process used to ensure that all required examinations and tests have been successfully performed and made available to the Inspector for acceptance be made in the manual for examinations and tests upon completion

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of the repair or alteration, prior to signing the Form "R" Report and accepted by the Inspector.

mnln) Calibration

The Quality Systemmanual shall describe a system for the calibration of examination, measuring, and test equipment used in the performance of repairs and alterations. At a minimum, it shall include:

1) Examination, measuring, and test equipment, subject to calibration, shall have a unique identification number and a calibratedion date as well as a specified next calibration due date.

2) The methodology of how the various equipment will be calibrated.

3) The title of the person(s) responsible for the the calibration system of the equipment.

4) A statement that all calibrations will be tracible to the National Institute of Standards and Technology (NIST) or another nationally recognized Standards Organization, as much as practical.described

omon) Approval, Inspection,Authorization and Acceptance and Inspection of Repair and/or Alteration

The Quality Systemmanual shall specifically indicate state that before the work is started, acceptance authorization of the repair/alteration plan and acceptance of the method(s) used shall be obtained from an the Inspector who will make the required inspections.

and confirm NBIC compliance by signing and dating the applicable NBIC Form "R" Report Form upon completion of the work. In addition,

Tthe Quality Systemmanual shall specifically address allowance for acceptance of the inspector for application of the "R" symbol stamp to a pressure retaining item and .

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

pnpo) Inspections and InspectionsDocument Review

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

pqoq) Control of the "R" Symbol Stamp

The Quality System shall provide adequate control of the "R" Symbol Stamp. In addition, the Quality System shall make provisions for Inspector acceptance for the application of the "R" Symbol Stamp to the pressure retaining item or nameplate.

The accepted abbreviation of the "R" Certificate Holder's name shall be included in the manual.

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prpq)r) Report of Repair or Alteration Form

The Quality Systemmanual shall indicate the title of the individuals responsible for preparing, signingcertifying, and presenting the NBIC Report Forms to the Inspector. The Inspector shall confirm NBIC compliance by certifying and dating the applicable NBIC Form "R" Report upon completion of the work. The distribution of the NBIC Form "R" Report shall be described in the Quality System.

The distribution of the NBIC Form "R" Report Forms shall be described in the manual.

qs)qs) Exhibits

Any formsForms referenced in the Quality Systemmanual shall be included and. The form may be a part of the referencing document or included as an exhibit or appendix. For clarity, the forms may be completed and identified as examples. When forms are identified as examples, a statement shall clearly define the acceptable modifications to the examples without requiring Inspector acceptance.Different forms may be utilized without the need for acceptance by the Inspector as long as they contain the same information as the exhibited forms.The name and accepted abbreviations of the "R" Certificate Holder shall be included in the manual.

rtrs) Construction Code

The Quality Systemmanual shall include provisions for addressing the requirements that pertain to the specific construction codecode of construction for the equipment being repaired or altered to include any applicable code cases or interpretations. with acceptance of the jurisdiction.

sustt) Nonconformances
ing Items

AThere shall be a system shall be established to identify and control a product or service serviceprocess a nonconformance ocurrs any characteristics do not conform in adherencewhich does not conform to the applicable rules of the NBIC, code of construction code, or jurisdictional requirements, or the Quality System to prevent their use. acceptable to the Inspector for the correction of nonconformities. A nonconformance is any condition that does not comply with the applicable rules of the NBIC, construction code, jurisdictional requirements, or the quality system. In addition, theThe title(s) of the individual(s) who has responsibility and authority for the disposition and resolution disposition of a nonconformance nonconforming itemsshall be defined including provisions for Inspector involvementNonconformance must be corrected or eliminated before the repaired or altered component can be considered in compliance with the NBIC. Handling of programmatic concerns which do not affect product or service may be addressed in the Quality System.It is also essential that systemic or programmatic nonconformances be identified and corrected and when necessary, corrected within the Quality System.

tvtuu) Records Retention

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

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1) Records may represent any information ~~used to further substantiate the statements~~ used to provide documented evidence ~~to describe the scope~~ of the quality of items and quality control activities of the work completed to a pressure-retaining item (PRI), and documented on a Form "R" report as applicable.~~.~~

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

3) The record retention schedule described in the Quality System ~~Manual is to~~shall ~~follow~~ the instructions identified in NBIC Part 3, Table 1.5.1.

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

20-83

Subject/Title

Definition of Nonconformance

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: 9 & 1.5; Paragraph: Glossary & 1.5.1 s)

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

Action Item 19-60 is proposing revisions/additions to all of 1.5.1. This proposal is to move the definition of "Nonconformance" out of the current 1.5.1 s) paragraph and into the glossary.

Background Information

Current text in 1.5.1 s) that is being revised via Action Item 19-60: s) Nonconforming Items There shall be a system acceptable to the Inspector for the correction of nonconformities. A nonconformance is any condition that does not comply with the applicable rules of the NBIC, construction code, jurisdictional requirements, or the quality system. Nonconformance must be corrected or eliminated before the repaired or altered component can be considered in compliance with the NBIC.

Existing Text

Proposed Text

Nonconformance – A condition of product or service in which any characteristics do not conform with the applicable rules of the NBIC, construction code, jurisdictional requirements, or the quality system.

	VOTE:						
COMMITTEE	Appr oved	Disapproved	Abs taine d	Not Voting	Passed	Faile d	Date

e) For Transport Tanks, the Competent Authority, i.e. the U.S. Department of Transportation (DOT), shallbe consulted for any requirements which it has established since they take precedence for repairs.

1) Transport tanks manufactured prior to the adoption of ASME Section XII by the Competent Authority(DOT) were constructed in accordance with ASME Section VIII, Division 1. Certain transport tanks manufactured to this code were required to be stamped in accordance with Section VIII, Division 1, if the design pressure of the transport tank was 241 kPa (35 psi) (depending on material being transported) and greater. If the design pressure was less than 241 kPa (35 psi) (depending on material being transported), the transport tank was manufactured in accordance with Section VIII,Division 1, but not required by the Competent Authority (DOT) to be stamped.

2) ASME stamped transport tanks are subject to the requirements of NBIC Part 3, for continued inservice repairs, alterations, or modifications, unless exempted by the Competent Authority (DOT).

1.3 INSPECTOR

a) Inspection and certification shall be made by an Inspector holding a valid commission with the appropriate endorsement issued by the National Board and employed by an Authorized Inspection Agency (seeNBIC Part 3, Section 9, Glossary of Terms for definition of Authorized Inspection Agency).

b) An Inspector employed by an Owner-User Inspection Organization or a Federal Inspection Agency mayauthorize and accept work only on pressure-retaining items owned or used by the respective organization. Each accredited Owner-User Inspection Organization's quality program shall have specific approval of the Jurisdiction as required.

1.3.1 AUTHORIZATION

a) The Inspector's authorization to perform a repair or alteration shall be obtained by the repair organization prior to initiation of a repair or alteration to a pressure-retaining item. The Inspector shall determine that the repair or alteration methods are acceptable.

b) Subject to acceptance of the Jurisdiction, the Inspector may give approval for routine repairs prior to thestart of work, provided the Inspector ensures that the "R" Certificate Holder has adequately addressed routine repairs in the quality program.

~~1.3.2 ACCEPTANCE INSPECTION~~ 1.3.2 INSPECTIONS AND CERTIFICATIONS

a) ~~The Inspector making the acceptance inspection~~ Inspections and NBIC Report Form 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 the acceptance inspection~~; however, in all cases, the ~~Inspector who performs the acceptance inspection shall be an employee of the same organization as the Inspector who authorized the repair or alteration.~~ duties associated within the same scope of work shall be performed by Inspectors employed by the same AIA.

b) Before signing the appropriate NBIC Report Form, the Inspector shall: ~~review the drawings, ensure the repair or alteration was performed in accordance with the accepted code of construction or standard, witness any pressure test or any acceptable alternative test method applied, ensure that the required nondestructive examinations have been performed satisfactorily, and that the other functions necessaryto ensure compliance with the requirements of this code have been satisfactorily performed.~~

1) Verify the repair or alteration activity was performed in accordance with the NBIC and original code of construction or standard,

2) Verify any other functions necessary to ensure compliance with the requirements of the NBIC have been satisfactorily performed,

3) Verify all applicable Inspector duties have been performed as required in NB-263 RCI-1.

4) Verify the required stamping or nameplate is correct and where applicable, the nameplate has been properly attached.

~~b) The Inspector shall verify the stamping or nameplate is correct and where applicable, the nameplatehas been properly attached.~~

PART 3, SECTION 5
REPAIRS AND ALTERATIONS —
CERTIFICATION/DOCUMENTATION AND STAMPING

5.1 SCOPE

This section provides requirements for certification, stamping, and documentation of repairs and alterations to pressure-retaining items. Applicable forms are provided in this section for reference. Forms may be obtained from the National Board website.

5.2 DOCUMENTATION

a) Repairs that have been performed in accordance with the NBIC shall be documented on a Form R-1, *Report of Repair*, as shown in Supplement S9.2. A Form R-4, *Report Supplement Sheet*, as shown in Supplement S9.5, shall be used as needed to record additional data when the space provided on Form R-1 is not sufficient.

b) Alterations performed in accordance with the NBIC shall be documented on a Form R-2, *Report of Alteration*, as shown in Supplement S9.3. A Form R-4, *Report Supplement Sheet*, as shown in Supplement S9.5, shall be used as needed to record additional data when the space provided on Form R-2 isnot sufficient.

c) The organization performing repairs and alterations shall retain a copy of the completed Form “R” Report on file and all records and documentation substantiating the summary of work as described throughout Section 5, and as identified in the “R” Certificate Holder’s Quality System Manual.

d) Unless otherwise required by the Jurisdiction, Form R Reports shall be completed and certified by the Certificate Holder and the Inspector no more than 90 days following the completion of construction activities or the completion of design activities when no construction work is performed.

5.2.1 PREPARATION OF FORM R-1 (REPORT OF REPAIR)

a) Using the instructions found in Table S9.2 of Supplement 9, preparation of Form R-1 shall be the responsibility of the “R” Certificate Holder performing the repair.

b) Information describing the scope of work used to repair a pressure-retaining item (PRI) shall be documented on a Form R-1 and extended to a Form R-4 as needed to fully describe the repair activitiescompleted per the instructions at in Table S9.2 of Supplement 9.

c) An Inspector shall indicate acceptance by signing Form R-1, and Form R-4, if attached.

d) The Form R-3, *Report of Parts Fabricated by Welding,* Manufacturer’s Data Reports, and Certificates of Compliance described in this section shall be a part of the completed Form R-1 and shall be attached thereto.

5.2.2 PREPARATION OF FORM R-2 (REPORT OF ALTERATION)

a) Using the instructions found in Table S9.3 of Supplement 9, initial preparation of Form R-2 shall be the responsibility of the “R” Certificate Holder responsible for the design portion of the alteration. The design organization shall complete and sign the “Design Certification” section of the Form R-2. An Inspector shall indicate acceptance of the design by signing the “Certificate of Design Change Review” section of the Form R-2.

(21)

5.4 DISTRIBUTION OF FORM R-2

a) Distribution of completed Form R-2 shall be the responsibility of the "R" Certificate Holder who performed the construction portion of the alteration. When no construction work is performed (e.g., a re-rating with no physical changes), the "R" Certificate Holder responsible for the design shall distribute the form.

b) Legible copies of the completed Form R-2, together with attachments, shall be distributed to the owner-user, the "R" Certificate Holder responsible for design, and the Jurisdiction, if required, and shall be provided to the Inspector and inservice Authorized Inspection Agency of the pressure retaining item upon request.

5.5 REGISTRATION OF FORMS — GENERAL

a) When registration of the forms are required, the Certificate Holder performing a repair or alteration shall submit the completed form, meeting the requirements of the NBIC, to the National Board no more than 30 days following certification.

b) When registration of the forms is not required, the Certificate Holder may register the completed form, meeting the requirements of the NBIC, with the National Board.

c) The "R" or "NR" Certificate Holder should be aware that some Jurisdictions may require registration of repairs and alterations with the National Board.

5.5.1 REGISTRATION FOR REPAIRS

Form R-1 may be registered with the National Board as noted in NBIC Part 3, 5.5.

5.5.2 REGISTRATION FOR ALTERATIONS

a) If the pressure-retaining item is originally registered with the National Board, an original Form R-2, together with attachments, shall be registered with the National Board.

b) If the item was not registered with the National Board, one original Form R-2, together with attachments, may be registered with the National Board or retained as required by the Quality System Manual.

5.5.3 REGISTRATION FOR FIBER-REINFORCED VESSELS

Organizations performing repairs or alterations under an "R" stamp program shall register such repairs or alterations with the National Board.

5.5.4 REGISTRATION FOR NUCLEAR REPAIR/REPLACEMENT ACTIVITIES

Organizations performing repair/replacement activities under the "NR" or "NVR" stamp program shall register forms with the National Board.

5.5.5 REGISTRATION FOR GRAPHITE VESSELS

Organizations performing repair/replacement activities under the "R" stamp program shall register such repairs or alterations with the National Board.

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d) The pressure-retaining item has been pressure tested, as required, for the new service conditions. Any insulation, coatings, or coverings that may inhibit or compromise a meaningful pressure test shall be removed, to the extent identified by the Inspector. The pressure test may be waived if the original pressure test as recorded on the Manufacturer's Data Report is at least equal to the calculated test pressure required to verify the integrity of the pressure-retaining item for the new conditions. If the pressure test is waived it shall be documented on Form R-2 with this statement in the Remarks section: "Pressure test waived in accordance with NBIC Part 3, 3.4.1 d)";

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

3.4.2 ALTERATIONS BASED ON ALLOWABLE STRESS VALUES

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

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

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

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

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

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

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

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

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

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

3.4.3 ENCAPSULATION

Encapsulation is a method used to maintain the pressure retaining capability of pipe, nozzles, fittings and valves (with the exception of fire tube 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 ~~2.4.~~

a) Except as required in 3.4.3 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

Replace 2.4 with 204

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 ASME PCC-2, Part-2, Article ~~2.10~~.

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.

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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.

3.4.4 EXAMPLES OF ALTERATIONS

(21)

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

b) A decrease in the minimum temperature;

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

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

e) An increase in the steaming capacity by means of increasing heating surface, total heat input, firing rate, adjustment, or other modification to the primary or auxiliary heat source, resulting in the steaming capacity exceeding the original Manufacturer's Minimum Required Relieving Capacity (MRRC) as described on the nameplate and or Manufacturer's Data Report (MDR);

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

ASME PCC-2–2018
SUMMARY OF CHANGES

Following approval by the ASME PCC Committee and ASME, and after public review, ASME PCC-2–2018 was approved by the American National Standards Institute on August 8, 2018.

ASME PCC-2–2018 includes the following changes identified by a margin note, (18). In addition, articles and all associated appendices have been redesignated with a new identifying article number. Paragraphs now carry that unique number as a prefix, with the figures and tables identified with the specific paragraph number to which they belong. For example, Figure 1 in former Article 2.1 is now designated as Figure 201-3.5-1.

Page	*Location*	*Change*
xv	Foreword	Updated and second paragraph added
xviii	Correspondence With the PCC Committee	Former "Preparation of Technical Inquiries" replaced with "Correspondence With the PCC Committee
1	101-1	First sentence revised and third paragraph added
1	101-2	(1) Subparagraph (a) revised
		(2) Former Table 1 deleted
2	101-3.4	Revised in its entirety
2	101-3.7	Second and third sentences revised
4	201-3.8	Subparagraph (b) revised
5	Figure 201-3.8-1	Note (5) revised
6	Figure 201-3.8-2	Note (5) revised
15	202-7	Updated
16	203-1.1	First sentence revised
16	203-1.3	Fourth sentence revised
16	203-2.3	Second sentence revised
17	203-5	Revised in its entirety
18	203-7	Updated
23	Article 205	Added
29	Figure 206-1.1.1-1	Callouts "Carrier pipe" and "Groove weld optional" added
30	Figure 206-1.1.2-1	Callout "Carrier pipe" added
29	206-2.10	Title revised
29	206-3.2	Revised
30	206-3.5	Subparagraph (b) revised
32	Figure 206-3.5-1	Revised
32	Figure 206-3.5-2	Revised
33	206-4.6	First sentence revised
33	206-4.7	Title and paragraph revised
33	206-5.3	Revised
33	206-5.5	Revised
33	206-6	Revised

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33	206-7	Updated
37	207-3.2	In nomenclature below eq. (1), unit of measure for *P* revised
40	207-7	Updated
44	208-7	Updated
49	209-7	Updated
58	210-7	Updated
67	211-7	Updated
70	212-3.2	In nomenclature below eq. (1), unit of measure for *P* revised
71	212-3.4	Equation (4) revised
72	212-7	Updated
75	213-7	Updated
81	214-7	Updated
85	Article 215	Former Article 2.15 published in ASME PCC-2S-2015, incorporated into PCC-2 and revised editorially
	215-7	Updated
96	Article 216	Added
109	301-7	Updated
118	303-7	Updated
129	304-7	Updated
135	305-7.1	Updated
139	306-7	Updated
141	307-5.1.2	Editorially revised
142	307-7	Updated
144	308-3.1	Editorially revised
149	308-7	Updated
157	311-7	Updated
165	312-7	Updated
170	Article 313	Added
175	Article 401	Revised in its entirety
192	Mandatory Appendix 401-I	In the Component Repair Data Sheet, under Risk Assessment, Repair type revised
195	401-II-1	Subparagraph (b) revised
195	401-II-2	Subparagraphs (h) and (i) revised
195	401-II-3	Revised
197	401-III-2	Subparagraph (a) revised
199	401-IV-3	In subpara. (c), equations numbered and subsequent equations in subparas. (d) and (e) renumbered
201	401-V-2.1	Subparagraphs (e) and (f) revised
201	401-V-2.2	Subparagraph (f) revised
202	401-V-2.3	Subparagraphs (e) and (f) revised
204	401-VII-1	Last sentence above Note revised
204	401-VII-2	Subparagraph (a)(1) revised
205	401-VII-4	Subparagraph (d) revised
206	401-VIII-5	Subparagraph (e)(5) revised
208	401-A-1	Definition of *batch* added
209	401-A-2	Revised

210 only an update

Article 2.4
Welded Leak Box Repair

1 DESCRIPTION

(a) A welded leak box consists of an enclosure used to seal off or reinforce a component. An example of a leak box is illustrated in Fig. 1.

(b) Leak boxes are commonly used to seal repair-leaking components or reinforce damaged components.

(c) Leak repair boxes can have a variety of shapes (e.g., cylindrical, rectangular, with either flat or formed heads), often following the contour of the pipe or component being repaired. Leak repair boxes can also be used to enclose components such as flanges and valves or fittings, branches, nozzles, or vents and drains.

(d) Leak repair boxes are typically custom-made by welding split pipe, pipe caps, or plates.

(e) The annular space between the leak repair box and the repaired component can be left empty, or filled or lined with epoxy, sealant, fiber, refractory materials, or other compounds.

(f) A leak box can be nonstructural (designed to contain leaks) or structural (designed to reinforce and hold together a damaged component).

2 LIMITATIONS

2.1 General

Part 1 of this Standard, "Scope, Organization, and Intent," contains additional requirements and limitations. This Article shall be used in conjunction with Part 1.

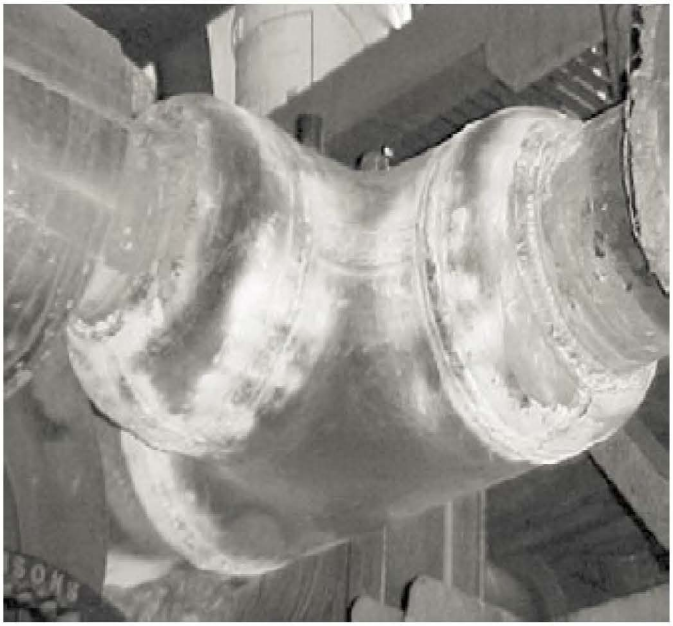
2.2 Crack Repair

Normally, leak boxes are used to contain leaks at packings, and at flange and gasketed joints, or to contain leaks (or potential leaks) due to local thinning. Since the leak box may not prevent the propagation of a crack in the pipe or component, leak repair boxes shall not be used when cracks are present, unless

(a) the conditions that led to the crack formation and propagation have been eliminated so that the crack will not grow during the planned life of the repair

(b) a fitness-for-service assessment shows that the crack growth during the planned life is acceptable, and that the crack will not propagate across the leak repair box closure weld

Fig. 1 Example of a Welded Leak Box Repair of a Tee



Article 204
Welded Leak Box Repair

204-1 DESCRIPTION

(a) A welded leak box consists of an enclosure used to seal off or reinforce a component. An example of a leak box is illustrated in Figure 204-1-1.

(b) Leak boxes are commonly used to seal repair-leaking components or reinforce damaged components.

(c) Leak repair boxes can have a variety of shapes (e.g., cylindrical, rectangular, with either flat or formed heads), often following the contour of the pipe or component being repaired. Leak repair boxes can also be used to enclose components such as flanges and valves or fittings, branches, nozzles, or vents and drains.

(d) Leak repair boxes are typically custom-made by welding split pipe, pipe caps, or plates.

(e) The annular space between the leak repair box and the repaired component can be left empty, or filled or lined with epoxy, sealant, fiber, refractory materials, or other compounds.

(f) A leak box can be nonstructural (designed to contain leaks) or structural (designed to reinforce and hold together a damaged component).

204-2 LIMITATIONS

204-2.1 General

Part 1 of this Standard, "Scope, Organization, and Intent," contains additional requirements and limitations. This Article shall be used in conjunction with Part 1.

204-2.2 Crack Repair

Normally, leak boxes are used to contain leaks at packings, and at flange and gasketed joints, or to contain leaks (or potential leaks) due to local thinning. Since the leak box may not prevent the propagation of a crack in the pipe or component, leak repair boxes shall not be used when cracks are present, unless

(a) the conditions that led to the crack formation and propagation have been eliminated so that the crack will not grow during the planned life of the repair

(b) a fitness-for-service assessment shows that the crack growth during the planned life is acceptable, and that the crack will not propagate across the leak repair box closure weld

(c) the crack is circumferential and the repair is a structural leak box, where the leak box and its welds are designed for the case of full circumferential break of the pipe, or separation of the cracked component

(d) the leak box fully encapsulates a cracked vent or drain

204-2.3 Qualifications

Installation, welding and sealant injection, where necessary, shall be performed by personnel qualified under conditions representative of the field application.

204-2.4 Safety

Personnel shall be aware of hazards in welding on degraded components, and shall take the necessary precautions to avoid unacceptable risks.

(a) A hazard review should be undertaken prior to starting the work to address all credible problems that could arise.

(b) If the component is leaking or has the potential to leak during installation, and if the contents are hazardous, additional precautions should be taken and they should be addressed during the prejob hazard review meeting (e.g., need for fresh air suit, etc.).

204-3 DESIGN

204-3.1 Materials

Materials for the leak box shall be listed in the construction or post-construction code, and be compatible with the fluid, pressure, and temperature, with due consideration for the stagnant condition created by a leak of fluid into the box. Generally, the material of construction of the leak box should be similar to the repaired component and weldable to the existing pressure boundary. The leak box design and construction, including material selection, shall be done considering the deterioration mode that led to the need for the repair. The leak box shall be suitable for resisting this deterioration mode for the life of the repair.

204-3.2 Design Life

The design life of the repair shall be based on the remaining strength of the repaired component, the corrosion resistance, and mechanical properties of the leak box and welds.

Article 2.10, Mandatory Appendix I
In-Service Welding Procedure/Welder Performance Qualification Setup

The intent of producing a simulated in-service welding procedure qualification is to make welds that will be more likely to produce hydrogen cracking during the qualification than in the field. This can be done by making welds on higher carbon equivalent carbon steel, by using a higher cooling potential, or by incorporating both variables to have a more conservatively qualified procedure.

The simulated in-service setup used for the in-service procedure qualification can be any applicable joint configuration, but it is imperative that the in-service procedure qualification weld coupon be more susceptible to hydrogen cracking. It is good practice to simulate the actual field weld that will be made using the in-service welding procedure. It is common for the in-service production qualification weld to be made using a higher carbon equivalent carbon steel pipe with water backing because water has been shown to cool welds faster than any other cooling medium. It is important to note that using water as the cooling medium may make the welding procedure overly conservative to the point of making it impossible to successfully qualify the weld coupon.

The in-service procedure qualification coupon should have sufficient length to remove all of the required test specimens. More than one assembly may be used if all the required specimens cannot be removed from a single assembly. The cooling medium should be circulated through the test assembly prior to welding. The simulated in-service setup should be prepared as follows:

(a) The simulated in-service setup for an in-service fillet weld should be prepared in a manner similar to Fig. I-1 or an alternative position that would simulate the in-service welding application. The sleeve should have a close fit to the carrier pipe unless a special design sleeve fitting is to be qualified. The sleeve longitudinal groove welds should be welded prior to the in-service fillet welds to improve fit-up [see Note to Fig. I-1].

(b) The simulated in-service setup for an in-service attachment weld should be prepared in a manner similar to Fig. I-2 or an alternative position that would simulate the in-service welding application. The tack welds should be ground to assure complete fusion along the entire length of the weld. No test samples shall be taken from the tack locations.

(c) The simulated in-service setup for an in-service weld metal buildup weld should be prepared in a manner similar to Fig. I-1 but without using the sleeve. The weld will be deposited directly onto the pipe wall. It is common to mechanically remove a specified amount of wall to simulate corrosion loss. The probability of burn-through shall be evaluated before weld metal buildup is performed using the qualified procedure in the field.

After completion of the procedure qualification weld, the cooling medium shall continue until the entire assembly has achieved a uniform equilibrium temperature.

Article 210
In-Service Welding Onto Carbon Steel Pressure Components or Pipelines

210-1 DESCRIPTION

This Article addresses the requirements and precautions associated with welding onto pressure components or pipelines while the system is still in operation. In-service pressure components or pipelines include pressure equipment and piping and are defined as systems in which the contents may or may not be pressurized and/or flowing but affect the way the weld cools. This Article is intended to be used in conjunction with Part 2 of this Standard or another applicable construction code or post-construction code.

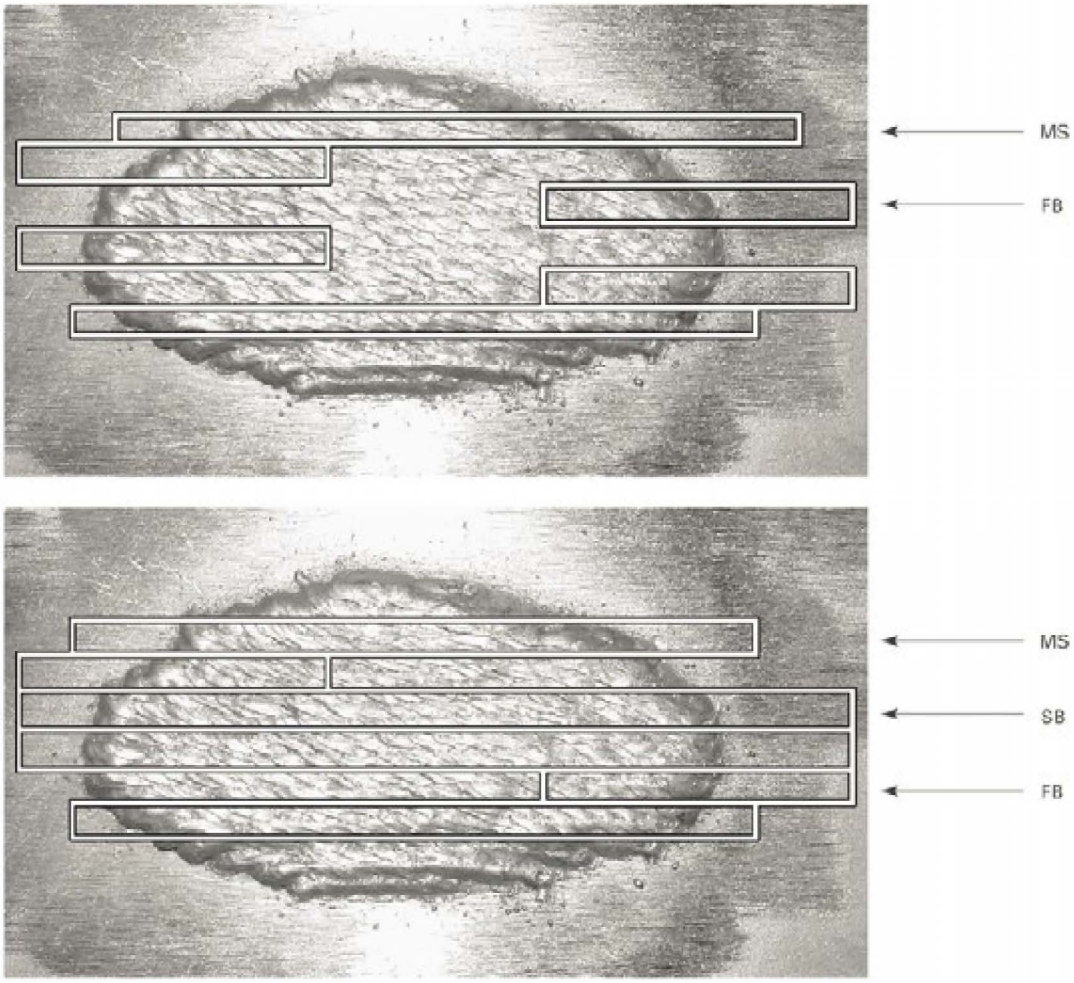
There are two primary concerns when performing in-service welding. The first concern is "burn-through," also referred to as "blowout." A burn-through occurs when the unmelted base material under the weld pool loses the ability to contain the contents of the pressure components or pipeline allowing the contents to be expelled. Welding onto pressure components or pipelines with thin walls [e.g., 4.8 mm (0.188 in.) or less] is possible as long as precautions are taken. Such precautions include controlling the heat input or penetration of the welding process and using smaller diameter electrodes [e.g., 2.4 mm (0.094 in.)] when the wall thickness is less than 6.4 mm (0.250 in.). Safety aspects and contingency planning aspects for an occurrence of burn-through should be planned for in accordance with company practices, industry standards (e.g., API Recommended Practice 2201), or post-construction code.

The second concern is hydrogen cracking. Hydrogen cracking occurs when tensile stresses are acting on the weld, hydrogen is present in the weld and, when the weld solidifies, the resultant weld microstructure is crack susceptible. If any of the three conditions is eliminated or reduced below a threshold level, then hydrogen cracking will not occur. Tensile stresses can always be assumed due to the shrinkage of the weld upon cooling. Hydrogen, typically, cannot be eliminated but can be reduced by using proper low hydrogen welding processes such as shielded metal arc welding with EXX18 or EXX15 type electrodes. Crack-susceptible microstructures typically have high microstructure hardness and are controlled by the carbon equivalence of the material and the rate at which the weld cools.

The likelihood of developing microstructures susceptible to hydrogen cracking can be high because in-service welds tend to have accelerated cooling rates due to the ability of the pressure components or pipeline contents to pull heat from the weld region. The chance of developing a crack-susceptible microstructure can be reduced by using welding procedures that overcome the cooling effect of the pressure components or pipeline contents or by altering the pressure components or pipeline operating conditions during in-service welding. Such welding procedures include using sufficiently high heat input levels or by using specific weld deposition sequences. The most common in-service welding practices used to reduce hydrogen cracking concerns incorporate both a low-hydrogen welding process and a welding procedure that reduces the susceptibility of forming a crack-susceptible microstructure. The use of preheat is another technique that is commonly used to reduce the susceptibility of forming a crack-susceptible microstructure but it may be difficult to apply to in-service welding applications because of the ability of the pressure components or pipeline contents to cool the pipe wall especially for thin-walled applications. The cooling effect of the pressure components or pipeline contents can interfere with achieving the proper preheating temperature.

Successful application of in-service welding procedures requires a balance between the probability of burn-through and reducing the probability of hydrogen cracking. For example, when welding onto a pipeline less than 6.4 mm (0.250 in.) thick it may be necessary to reduce the welding heat input to lower the probability of burn-through; however, the lower welding heat input could result in a weld microstructure that is susceptible to hydrogen cracking. When the maximum required welding heat input to eliminate the probability of burn-through is lower than the minimum required heat input to protect against hydrogen cracking then alternative precautions need to be taken (e.g., welding procedure that included a temper bead deposition sequence).

Figure 210-4.2.2-3 Test Sample Locations for In-Service Weld Metal Buildup Welding Procedure Qualification



GENERAL NOTES:
(a) SB = side bend test sample; FB = face bend test sample; MS = metallographic test sample.
(b) The figure is not to scale.

(18) **210-7 REFERENCES**

The following is a list of publications referenced in this Article. Unless otherwise specified, the latest edition shall apply.

AGA Pipeline Repair Manual, December 31, 1994
Publisher: American Gas Association (AGA), 400 North Capitol Street NW, Suite 450, Washington, DC 20001 (www.aga.org)

API Recommended Practice 2201, Safe Hot Tapping Practices in the Petroleum & Petrochemical Industries
API Recommended Practice 579-1
API 579-1/ASME FFS-1, Fitness-For-Service
API Standard 1104, Welding of Pipelines and Related Facilities
Publisher: American Petroleum Institute (API), 1220 L Street, NW, Washington, DC 20005 (www.api.org)

ANSI/AWS A3.0, Standard Definitions; Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying
ANSI/AWS B4.0, Standard Methods for Mechanical Testing Welds
ANSI/NB-23–2007, National Board Inspection Code

Publisher: American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036 (www.ansi.org)

ASME B31.1, Pressure Piping
ASME B31.3, Process Piping
ASME B31.4, Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids
ASME B31.8, Gas Transmission and Distribution Piping Systems
ASME Boiler and Pressure Vessel Code, 2007 Edition, Section IX, Welding and Brazing Qualifications; Article II — Welding Procedure Qualifications; Article III — Welding Performance Qualifications
Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

ASTM E3, Standard Practice for Preparation of Metallographic Specimens
ASTM E384, Standard Test Method for Microindentation Hardness of Materials
Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 (www.astm.org)

CSA Standard Z662, Oil and Gas Pipeline Systems
Publisher: Canadian Standards Association (CSA), 178 Rexdale Boulevard, Toronto, Ontario M9W 1R3, Canada (www.csagroup.org)

Action Item 21-15- Prepared by Don Kinney

New addition to NBIC Supplement 9

** This addition is requested to address the correction of *R Forms*, which the National Board and NBIC Part 3 are currently silent on. See attached NB document regarding corrections to *data reports*, for reference.

Part 3, Supplement 9- S9.8 Corrections to Completed National Board Report Forms

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a) Corrections to completed National Board Report ~~Forms (R Forms)~~Form R Reports shall not be made without acceptance from the Inspector.
b) Corrected copies of ~~R Forms~~Form R Reports shall be distributed in the same manner as the original, in accordance with NBIC Part 3, and the jurisdiction when applicable.
c) For ~~R Forms~~Form R Reports ~~that have been~~ previously distributed, the words "Corrected Copy" shall be placed on the top of the first page of the corrected ~~R Form~~Form R Report. Do not mark "Corrected Copy" on a corrected Form R Report if the original had not been previously distributed.
d) Methods for correcting ~~R Forms~~Form R Reports:
    1) Complete a new, corrected ~~R Form~~Form R Report with revised certifications. The requirements in NBIC Part 3, 1.3.2 shall apply when completing a ~~n R Form~~Form R Report with revised certifications. A brief description of changes including line number shall be listed in the "Remarks" section of the ~~R From~~Form R Report.
    2) Correcting by strike-through; Place a single line through the incorrect data and insert the correct data in the appropriate block on the ~~R Form~~Form R Report. The Certificate Holder and Inspector shall indicate acceptance of the correction(s) by legibly placing their initials and date adjacent to the correction(s).
e) At the time corrections are made to a ~~n R Form~~Form R Report, if the Inspector or AIA differ from that which is indicated on the original ~~R Form~~Form R report, a new corrected Form R Report shall be generated. ~~t~~The new Inspector shall certify the corrected ~~R Form~~Form R Report. ~~,~~ The new Inspector certification on the corrected Form R Report is for documentation purposes only, and not for acceptance of the work performed. ~~and t~~The following shall be noted in the "Remarks" section of the corrected ~~R Form~~Form R Report;
    1. A brief description of changes including line number.
    2. The original ~~AIA,~~certifying Inspector's name and National Board commission number, and the name of the original AIA if applicable.
    3. The statement "Inspector signature for documentation purposes only".

    ~~Note: It is not intended that the new Inspector, when accepting the correction(s) to the R Form also accepts the activity or activities previously certified by an Inspector employed by a different AIA.~~

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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. 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.

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.

PROPOSED REVISION OR ADDITION

Item No. 21-33

Subject/Title: Use of code cases pertaining to repairs and alterations

NBIC Location Part: Repairs and Alterations; Section: 1; Paragraph: 1.2(a)

Project Manager and Task Group: Robert Underwood, Subcommittee Repairs/Alterations

Source (Name/Email): Robert Underwood / robert_underwood@hsb.com

Statement of Need: The NBIC Part 3 already references code cases in various paragraphs such as NR quality requirements, welding method 7, and R Form instructions, but there is no direct reference to acceptance of their use. I think it's always been an unwritten rule that they are permitted to be used with acceptance of the Inspector and Jurisdiction. This proposal will address this in a new paragraph 1.2(a).

Background Information: Section IX approved Code Case 3002 which addresses qualification of WPS and WPQ relating to the Explosion Welding Process for Tube Plugging. This Code Case was specifically written for NBIC use. This proposal will clarify that use of code cases are permitted with Inspector and Jurisdiction approval, when required.

Existing Text :

Proposed Text:

1.2(a) When the standard governing the original code of construction is the ASME Code or ASME RTP-1, repairs and alterations to pressure-retaining items shall conform, insofar as possible, to the section and edition of the ASME Code most applicable to the work planned. ASME Code Cases may be used for repairs and alterations of pressure retaining items with acceptance of the Inspector, and when required, the Jurisdiction. Use of the ASME Code Case shall be noted on the appropriate Form R Report.

Item NB21-45, add "SUPPLEMENT XX - REPAIR METHODS OF PRESSURE VESSELS AND PIPING EXCLUSIVE TO OIL, GAS, AND CHEMICAL INDUSTRIES"

SXX.1 SCOPE

This supplement provides methods for repair of pressure vessels and piping, outside the boiler setting, exclusive to oil, gas, and chemical industries.

SXX.2 CONSTRUCTION STANDARDS

Repairs shall conform, insofar as possible, to the relevant requirements of the edition of the code of construction. Where this is not practicable, it is permissible to use other codes, standards, or specifications, provided the "R" Certificate Holder has the concurrence of the Inspector and the jurisdiction, where required.

SXX.3 LIMITATIONS

Repairs will be limited to pressure retaining items which comply with the following conditions:

a) Operates at or below 650°F (345°C) for carbon steels or below the time dependent service temperatures for low alloy steel.

b) Impact testing was not required.

~~b)~~c) Not used in lethal service.

~~c)~~d) No environmental or service-related cracking conditions exist. Service-related cracks may remain in the item when a Fitness for Service Assessment (FFSA) in accordance with NBIC, Part 2, 4.4.1, has been performed supporting the continued service of the item.

SXX.4 JURISDICTIONAL REQUIREMENTS

Repairs will require notification to the jurisdiction and where required, jurisdictional approval prior to performing work.

SXX.5 REPAIR METHODS

a) WELDED LAP PATCH

A fillet welded patch is a repair method used to maintain the structural integrity of the pressure retaining item by providing an external boundary over the area exhibiting damage in the form of a "fillet welded patch" as described by ASME PCC-2, Full Encirclement Steel Reinforcing Sleeves for Piping, Fillet Welded Lap Patches with Reinforcing Plug Welds, or Fillet Welded Lap Patches.

1) Welded lap patches shall be further restricted as follows:

a. A lap patch~~es~~ installed over an existing lap patch is prohibited.

b. The distance between patches shall not be less than $2\sqrt{(Rt)}$ where R is the outside radius of the spherical or cylindrical shell in inches (mm), and t is equal to the nominal wall thickness of the spherical or cylindrical shell in inches (mm).~~.~~

2) Except as required in Part 3, Paragraph SXX.5 a)4)a), ASME PCC-2 shall be used for the design of the fillet welded patch and shall be in accordance with the original code of construction, when practicable. Design of the fillet welded patch shall consider original design conditions, taking in to account current service conditions and damage mechanisms. Use of this method shall be acceptable to the inspector and when required, the jurisdiction and shall be limited to pressure containing equipment owned and operated by an Owner-User.

a. Replacement of a pressure-retaining part with a material of different nominal composition and, equal to or greater in allowable stress from that used in the original design, provided the replacement material satisfies the material and

design requirements of the original code of construction under which the vessel was built. The minimum required thickness shall be at least equal to the thickness stated on the original Manufacturer's Data Report.

3) The "R" Certificate Holder responsible for the design of the fillet welded patch shall ensure a Fitness for Service Assessment (FFSA) has been performed on the portion of the item being patched in accordance with NBIC, Part 2, 4.4.1, supporting the continued service of the item. The fillet welded patch repair method shall not remain in place beyond the calculated remaining life of the covered portion of the pressure retaining item.
   a) The remaining life of the pressure retaining item shall be documented on the ~~Report of FFSA~~Form NB-403 in the Remarks section. The ~~Report of FFSA~~Form NB-403 ~~Form~~ shall be affixed to the Form R-1 and identified in the Remarks section. 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 NB-403.
   b) The thinned or leaking area shall be fully covered, 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.
   c) A fillet welded patch method shall not be used where cracks are present unless the cracks have been removed and repaired in accordance with Part 3, 3.3.4.2 a); the condition that led to the crack formation and propagation have been eliminated.
4) 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.
   a) When the pressure retaining item will remain in service while implementing a fillet welded patch, the requirements and limitations described within ASME PCC-2, Part-1 shall be used in conjunction with ASME PCC-2, Part-2, Full Encirclement Steel Reinforcing Sleeves for Piping, Fillet Welded Lap Patches with Reinforcing Plug Welds, or Fillet Welded Lap Patches as applicable.
   b) 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.
5) Test or examination methods shall be in accordance with NBIC, Part 3, 4.4.1.
   a) Visual examination shall be in accordance with the NBIC, Part 3, 4.4.1 e).

SXX.6 Post Repair Inspection

a) After the completion of weld repairs, post repair inspection requirements shall be established in accordance with Part 3, 3.3.4.8.

SXX.7 Documentation

a) Completion of the Form R-1 shall follow the requirements for preparation, distribution, and registration as described in Part 3, Section 5.

Additional actions required by accepting this item:

Revise the succeeding paragraph numbering order (ref.2021-edition) to:

3.3.3 EXAMPLES OF REPAIRS

v) The installation of a fillet welded patch.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No. A21-53
Subject/Title Supplement 8 Weld and Post Repair Inspection of Creep Strength Enhanced Ferritic Steel Pressure Equipment
NBIC Location NBIC Part 3 Repairs and Alterations Supplement 8 S8.5 a)
Project Manager and Task Group Philip Gilston
Source (Name/email) Mark Kincs / mark.r.kincs@xcelenergy.com
Statement 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 in service Authorized Inspection Agency, not the Repair Inspector, whose duties end with completion of repair documentation.
Background Information The post-repair inspection requirements specified in S8.5 are unique. There is no other mention of such inspections elsewhere in NBIC–Part 3. Presumably, Welding Method 6 repairs don't require post-repair inspection due to the perceived low-level of associated risk (inside the boiler setting).

S8.5 POST REPAIR INSPECTION	**S8.5 POST REPAIR INSPECTION**
a) After the completion of weld repairs to CSEF steels, post inspection requirements shall be developed and implemented based on acceptance from the Inspector, and if applicable, the Jurisdiction.	a) After the completion of weld repairs to CSEF steels, post inspection requirements shall be developed and implemented based on acceptance from the ~~Inspector~~inservice Authorized Inspection Agency of the pressure retaining item, and if applicable, the Jurisdiction.
b) Post-repair inspection intervals and methods of examination shall be implemented to ensure safe operation and margin to locate and monitor defect growth in the weld repair area. The selected non-destructive examination method shall provide meaningful results and shall follow NBIC Part 3, Section 4.	b) Post-repair inspection intervals and methods of examination shall be implemented to ensure safe operation and margin to locate and monitor defect growth in the weld repair area. The selected non-destructive examination method shall provide meaningful results and shall follow NBIC Part 3, Section 4.
c) Post repair inspection shall be on-going until the component reaches end of life or is replaced. The Owner/User may revise the re-inspection interval based on inspection results from previous inspections.	c) Post repair inspection shall be on-going until the component reaches end of life or is replaced. The Owner/User may revise the re-inspection interval based on inspection results from previous inspections.

	VOTE						
Committee	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

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: (use Form R-4, if necessary) ☐ Form R-4, Report Supplement Sheet is attached ☐ FFSA Form (NB-403) is attached
(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)

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SUPPL. 9

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 OF COMPLIANCE

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)~~ 37
(National Board and Jurisdiction no. including endorsement)

Signed: ~~(39)~~ 38
(Inspector)

Date: ~~(40)~~ 39

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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.

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)~~ 37	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)~~ 38	Signature of Inspector.
~~(40)~~ 39	Indicate month, day, and year of Inspector signature

SUPPL. 9

S9.3 FORM R-2, REPORT OF ALTERATION, NB-229

FIGURE S9.3.1
FORM R-2, PAGE 1 OF 2

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-229, Rev. 8, (03/04/21)

FORM R-2 REPORT OF ALTERATION
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.)

1a. DESIGN PERFORMED BY: (5) (name of "R" organization responsible for design)

(address)

1b. CONSTRUCTION PERFORMED BY: (6) (name of "R" organization responsible for construction)

(address)

2. OWNER OF PRESSURE RETAINING ITEM: (7) (name)

(address)

3. LOCATION OF INSTALLATION: (8) (name)

(address)

4. ITEM IDENTIFICATION: (9) (boiler, pressure vessel, or piping) NAME OF ORIGINAL MANUFACTURER: (10)

5. IDENTIFYING NOS: (11) (mfg. serial no.) (12) (National Board no.) (13) (jurisdiction no.) (14) (other) (15) (year built)

6. NBIC EDITION/ADDENDA: (16) (edition) (16) (addenda)

Original Code of Construction for Item: (17) (name / section / division) (17) (edition / addenda)

Construction Code Used for Alteration Performed: (18) (name / section / division) (18) (edition / addenda)

7a. DESCRIPTION OF DESIGN SCOPE: ☐ Form R-4, Report Supplement Sheet is attached

(19)

7b. DESCRIPTION OF CONSTRUCTION SCOPE: ☐ Form R-4, Report Supplement Sheet is attached

(20)

(21) Pressure Test, if applied (22) psi MAWP (23) psi

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FIGURE S9.3.2
FORM R-2, PAGE 2 OF 2

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-229, Rev. 8, (03/04/21)

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

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

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

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

(26)

9. REMARKS: (27)

DESIGN CERTIFICATION

I, (28), certify that to the best of my knowledge and belief the statements in this report are correct and that the Design Change described in this report conforms to the *National Board Inspection Code*. National Board "**R**" Certificate of Authorization No. (29) expires on (30)

Date (31), (32) (name of design organization) Signed (33) (authorized representative)

CERTIFICATE OF DESIGN CHANGE REVIEW

I, (34), holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspector and certificate of competency, where required, issued by the jurisdiction of (35) and employed by (36) of (37) have reviewed the design change as described in this report and state that to the best of my knowledge and belief such change complies with the applicable requirements of the *National Board Inspection Code*.

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

Date (38) Signed (39) (inspector) Commissions (40) (National Board and jurisdiction no. including endorsement)

CONSTRUCTION CERTIFICATION

I, (41), certify that to the best of my knowledge and belief the statements in this report are correct and that all material, construction, and workmanship on this Alteration conforms to the National Board Inspection Code. National Board "**R**" Certificate of Authorization No. (42) expires on (43)

Date (44), (45) (name of alteration organization) Signed (46) (authorized representative)

CERTIFICATE OF INSPECTION

I, (47), 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 (48) and employed by (49) of (50) have inspected the work described in this report on (51), and state that to the best of my knowledge and belief, this work complies with the applicable requirements of the National Board Inspection Code. By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage, or loss of any kind arising from or connected with this inspection.

Date (52) 51 Signed (53) ~~51~~ 52 (inspector) (54) ~~53~~ 53 (National Board and jurisdiction no. including endorsement)

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SUPPL. 9

TABLE S9.3
GUIDE FOR COMPLETING FORM R-2, REPORT OF ALTERATION, NB-226

Reference to Circled Numbers in the Form	Description
(1)	Initials of the National Board "R" Certificate of Authorization authorized representative who registers the Form R-2.
(2)	Initials of the Inspector who certified the completed Form R-2 for registration.
(3)	When registering a Form R-2 with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board. For rerating only, the Design Organization registers the Form R-2.
(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 of Authorization* holder performing the design as it appears on the "*Certificate of Authorization*".
(6)	The name and address of the National Board "R" Certificate of Authorization holder performing the construction activity as it appears on the "Certificate of Authorization."
(7)	Name and address of the owner of the pressure-retaining item.
(8)	Name and address of the plant or facility where the pressure-retaining item is installed.
(9)	Description of the pressure-retaining item, such as boiler or pressure vessel, or piping. Include the applicable unit identification.
(10)	Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, "unknown."
((11)	Document the serial number of the pressure-retaining item if assigned by the original manufacturer. If there is no serial number assigned or it is unknown, indicate "unknown."
(12)	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."
(13)	Indicate the jurisdiction number assigned to the pressure retaining item, if available.
(14)	Indicate any other unique identifying nomenclature assigned to the pressure retaining item by the owner or user.
(15)	Identify the year in which fabrication/construction of the pressure retaining item was completed.

TABLE S9.3 CONT'D

Reference to Circled Numbers in the Form	Description
(16)	Indicate edition and addenda of the NBIC under which this work is being performed, as applicable.
(17)	Indicate the name, section, division, edition, and addenda (if applicable) of the original code of construction for the pressure-retaining item.
(18)	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.
(19)	Provide a detailed summary of the scope of design that was performed. When additional space is required to describe the design scope, a Form R-4 shall be used and attached (check box if needed).
(20)	The information to be considered when describing the construction scope of work should include such items as, the nature of the alteration (i.e. welding, bonding, cementing), the specific location of the work performed to the pressure retaining item, the steps taken to remove a defect or as allowed by NBIC Part 3, Paragraph 3.3.4.8 to remain in place, and the method of alteration described as listed in the examples of NBIC Part 3, Paragraph 3.4.4 or applicable supplement. When additional space is required to describe the construction scope, a Form R-4 shall be used and attached (check box if needed).
(21)	Indicate type of pressure test applied (liquid, pneumatic, vacuum, leak). If no pressure test applied, indicate "none."
(22)	Indicate test pressure applied.
(23)	Indicate maximum allowable working pressure (MAWP) for the pressure retaining item. (As altered)
(24)	When registering a Form R-2 with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board. For rerating only, the Design Organization registers the Form R-2.
(25)	If applicable, document the unique purchase order, job, or tracking number assigned by organization performing work.
(26)	As applicable, identify what parts manufactured by welding or bonding were introduced as needed to complete the scope of work. Indicate part, item number, manufacturer's name, stamped identification, and data report type or Certificate of Compliance.
(27)	Indicate any additional information pertaining to the work involved (e.g. code cases, interpretations used).
(28)	Type or print name of the National Board "R" *Certificate of Authorization* authorized representative responsible for design certification.

TABLE S9.3 CONT'D

Reference to Circled Numbers in the Form	Description
(29)	Indicate National Board "R" *Certificate of Authorization* number.
(30)	Indicate month, day, and year that the "R" *Certificate of Authorization* expires.
(31)	Indicate month, day, and year the alteration was certified.
(32)	Record the name of National Board "R" *Certificate of Authorization* holder who performed the design portion of the work, using full name as shown on the "*Certificate of Authorization*" or an abbreviation acceptable to the National Board.
(33)	Signature of National Board "R" *Certificate of Authorization* authorized representative for the design change.
(34)	Type or print the name of Inspector certifying the design review.
(35)	Indicate Inspector's Jurisdiction.
(36)	Indicate Inspector's employer.
(37)	Indicate address of Inspector's employer (city and state or province).
(38)	Indicate the month, day and year of the design certification by the Inspector.
(39)	Signature of the Inspector certifying the design review.
(40)	Inspectors 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.
(41)	Type or print name of the National Board "R" *Certificate of Authorization* authorized representative responsible for any construction.
(42)	Indicate the National Board "R" *Certificate of Authorization* number.
(43)	Indicate month, day, and year the National Board "R" *Certificate of Authorization* expires.
(44)	Indicate the date the alteration was certified.
(45)	Record the name of National Board "R" *Certificate of Authorization* holder who performed the construction portion of the described work, using full name as shown on the *Certificate of Authorization* or an abbreviation acceptable to the National Board.
(46)	Signature of National Board "R" *Certificate of Authorization* authorized representative.
(47)	Type or print the name of Inspector certifying the construction inspection.
(48)	Indicate the Inspector's Jurisdiction.
(49)	Indicate Inspector's employer.
(50)	Indicate address of Inspector's employer (city and state or province).

TABLE S9.3 CONT'D

Reference to Circled Numbers in the Form	Description
~~(51)~~	~~Indicate the month, day and year of the final inspection by the Inspector.~~
~~(52)~~ 51	Indicate the month, day and year the completed Form R-2 was signed by the Inspector.
~~(53)~~ 52	Signature of the Inspector certifying the construction inspection.
~~(54)~~ 53	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.

S9.4 FORM R-3, REPORT OF PARTS FABRICATED BY WELDING, NB-230

FIGURE S9.4.1

FORM R-3, PAGE 1 OF 2

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-230, Rev. 4 (12/08/16)

FORM R-3 REPORT OF PARTS FABRICATED BY WELDING

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

(1) (Authorized Rep. initials)

(2) (Inspectors initials)

(3) (Form "R-3" Registration no.)

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

1. MANUFACTURED BY: (4) (name of "R" certificate holder)

(address)

2. MANUFACTURED FOR: (6) (name)

(address)

3. DESIGN CONDITION SPECIFIED BY: (7) CODE DESIGN BY: (8)

4. DESIGN CODE: (9) (10) (11) (12)

5. REPAIR/ALTERATION/MODIFICATION ACTIVITIES

Name of Part	Qty.	Line No.	Manufacturer's Identifying No.	Manufacturer's Drawing No.	MAWP	Shop Hydro PSI	Year Built
(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)

6. DESCRIPTION OF PARTS

	(a) Connections other than tubes			Heads or Ends			(b) Tubes		
Line No.	Size and Shape	Material Spec. No.	Thickness (in.)	Shape	Thickness (in.)	Material Spec. No.	Diameter (in.)	Thickness (in.)	Material Spec. No.
(15)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)

7. REMARKS: (30)

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Page 1 of 2

FIGURE S9.4.2
FORM R-3, PAGE 2 OF 2

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-230, Rev. 4 (12/08/16)

(31) _____
(Form "R-3" Registration no.)

(32) _____
(P.O. no., job no., etc.)

CERTIFICATE OF COMPLIANCE

I, (33) _____, certify that to the best of my knowledge and belief the statements made in this report are correct and that all material, fabrication, construction, and workmanship of the described parts conforms to the *National Board Inspection Code* and the standards of construction cited.

National Board "**R**" *Certificate of Authorization* No. (34) _____ expires on: (35) _____, _____

Date (36) _____, _____ (37) _____ Signed (38) _____

(name of "R" Certificate holder) (Authorized Representative)

CERTIFICATE OF INSPECTION

I, (39) _____, 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 (40) _____ and employed by (41) _____ of (42) _____ have inspected the part described in this report on (43) _____, _____ and state that to the best of my knowledge and belief the parts comply with the applicable requirements of the *National Board Inspection Code*.

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

Date (44) 43, _____ Signed (45) 44 Commissions (46) 45

(inspector) (National Board and jurisdiction No. including endorsement)

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SUPPL. 9

TABLE S9.4

GUIDE FOR COMPLETING FORM R-3, REPORT OF PARTS FABRICATED BY WELDING, NB-230

Reference to Circled Numbers in the Form	Description
(1)	Initials of the National Board "R" *Certificate of Authorization* authorized representative who registers the Form R-3.
(2)	Initials of the Inspector who certified the completed Form R-3 for registration.
(3)	When registering a Form R-3 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, indicated so by "N/A". As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board.
(4)	The name and address of the National Board "R" Certificate Holder who manufactured the welded parts as it appears on the "*Certificate of Authorization*."
(5)	If applicable, document the unique purchase order, job, or tracking number assigned by organization performing work.
(6)	Document name and address of organization that purchased the parts for incorporation into the repair or alteration. If the part's origin is unknown or the part was built for stock, so state.
(7)	Document name of organization responsible for specifying the code design conditions, if known. If origin of design conditions are not known, state "unknown."
(8)	Document name of organization responsible for performing the code design, if known. If code design organization is not known, state "unknown."
(9)	Name, section, and division of the design code, if known. If the design is not known, state "unknown."
(10)	Indicate code edition year used for fabrication.
(11)	Indicate code addenda date used for fabrication, if applicable.
(12)	Indicate the code paragraph reference for formula used to establish the MAWP, if known. If the code reference of the formula is not known, state "unknown."
(13)	If available, identify component by part's original name, function, or use the original equipment manufacturer's "mark or item number."
(14)	Indicate quantity of named parts.
(15)	Match line number of part references for Identification of Parts in item 5 and the Description of Parts in item 6.
(16)	Indicate manufacturer's serial number or identification number for the named part.

TABLE S9.4 CONT'D

Reference to Circled Numbers in the Form	Description
(17)	Indicate drawing number for the named part.
(18)	Indicate maximum allowable working pressure (MAWP) for the part, if known.
(19)	Indicate test pressure, if applied.
(20)	Identify the year in which fabrication/construction of the item was completed.
(21)	Use inside diameter for size: indicate shape as square, round, etc.
(22)	Indicate the complete material specification number and grade.
(23)	Indicate nominal thickness of plate and minimum thickness after forming.
(24)	Indicate shape as flat, dished, ellipsoidal, or hemispherical.
(25)	Indicate minimum thickness after forming.
(26)	Indicate the complete material specification number and grade for the head or end.
(27)	Indicate outside diameter.
(28)	Indicate minimum thickness of tubes.
(29)	Indicate the complete material specification number and grade for tubes.
(30)	Indicate any additional information pertaining to the work involved (e.g. code cases). The part manufacturer is to indicate the extent he has performed any or all of the design function. If only a portion of the design, state which portion.
(31)	When registering a Form R-3 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, indicated so by "N/A". As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board.
(32)	If applicable, document the unique purchase order, job, or tracking number assigned by organization performing work.
(33)	Type or print name of authorized representative of the "R" Certificate Holder attesting to accuracy of the work described.
(34)	Indicate National Board "R" Certificate of Authorization number.
(35)	Indicate month, day, and year that the "R" Certificate of Authorization expires.
(36)	Indicate the date the repair was certified.
(37)	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.

TABLE S9.4 CONT'D

Reference to Circled Numbers in the Form	Description
(38)	Signature of National Board "R" Certificate of Authorization authorized representative.
(39)	Type or print name of Inspector.
(40)	Indicate Inspector's Jurisdiction.
(41)	Indicate Inspector's employer.
(42)	Indicate address of Inspector's employer (city and state or province).
~~(43)~~	~~Indicate month, day, and year of final inspection by Inspector.~~
~~(44)~~ 43	Indicate the month, day and year the completed Form "R" was signed by the Inspector.
~~(45)~~ 44	Signature of Inspector.
~~(46)~~ 45	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.

S9.5 FORM R-4, REPORT SUPPLEMENT SHEET, NB-231

FIGURE S9.5.1

FORM R-4, PAGE 1 OF 1

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-231, Rev. 3, (12/08/16)

FORM R-4 REPORT SUPPLEMENT SHEET

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

(1) _____ (form "R" referenced)

(2) _____ (P.O. no., job no., etc.)

1. WORK PERFORMED BY: (3) _____ (name)

_____ (address)

2. OWNER: (4) _____ (name)

_____ (address)

3. LOCATION OF INSTALLATION: (5) _____ (name)

_____ (address)

REFERENCE LINE NO. (7)	CONTINUED FROM FORM R– (6) (8)

Date (9) _____, _____ Signed (10) _____ (authorized representative) Name (11) _____ (Name of "R" certificate holder)

Date (12) _____, _____ Signed (13) _____ (inspector) Commissions (14) _____ (National Board and jurisdiction no. including endorsement)

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TABLE S9.5
GUIDE FOR COMPLETING FORM R-4, REPORT SUPPLEMENT SHEET, NB-231

Reference to Circled Numbers in the Form	Description
(1)	When registering a Form "R" Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicate so by "N/A". As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board. Complete information identical to that shown on the Form "R" to which this sheet is a supplement.
(2)	If applicable, document the unique purchase order, job, or tracking number, assigned by the organization performing work.
(3)	The name and address of the Certificate Holder performing the work as it appears on the "Certificate of Authorization."
(4)	Name and address of the owner of the pressure-retaining item.
(5)	Name and address of plant or facility where the pressure-retaining item is installed.
(6)	Indicate the Form "R" type to which this report is supplementary. Example: Form R-1, Form R-2, Form R-3
(7)	Indicate the reference line number from the Form "R" to which this report is supplementary.
(8)	Complete information for which there was insufficient space on the reference Form "R".
(9)	Indicate the date certified.
(10)	Signature of the repair organizations authorized representative.
(11)	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.
(12)	Indicate the date the form was completed by the Inspector.
(13)	Signature of the Inspector.
(14)	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.

S9.6 FORM NR-1, REPORT OF REPAIR/REPLACEMENT ACTIVITIES FOR NUCLEAR FACILITIES, NB-81

FIGURE S9.6.1
FORM NR-1, PAGE 1 OF 3

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-81, Rev. 8, (03/04/21)

FORM NR-1, REPORT OF REPAIR/REPLACEMENT ACTIVITIES FOR NUCLEAR FACILITIES

CATEGORY OF ACTIVITY: 1 ☐ 2 ☐ 3 ☐

☐ REPAIR/REPLACEMENT ☐ RE-RATING

(2) (NR Form Registration No.)

(3) (R/R Plan No., Job No., etc.)

1. WORK PERFORMED BY: (1) (name of "NR" certificate holder)

(address)

2. OWNER: (4) (name)

(address)

3. NAME, ADDRESS, AND IDENTIFICATION OF NUCLEAR FACILITY:

(5) (name)

(address)

(unit identification)

4. SYSTEM/COMPONENT: (6) ORIGINAL DESIGN SPECIFICATION NO./REV.: (7)

5. CONSTRUCTION CODE, SECTION & EDITION/ADDENDA AND APPLICABLE CODE CASES USED FOR THE SYSTEM OR COMPONENT: (8)

6. NBIC EDITION USED FOR PERFORMING REPAIRS/REPLACEMENT OR RE-RATING ACTIVITY: (9)

7. DESIGN RESPONSIBILITY: (10) CODE and ED/AD: (11)

8. TESTS CONDUCTED: ☐ Hydrostatic ☐ Pneumatic ☐ System Leakage ☐ Pressure _____ psi (MPa)
(12) ☐ Exempt ☐ Other _____

9. NUMBER OF COMPONENTS REPAIRED/REPLACED AND/OR RE-RATED (refer to page 2): (13)

10. DESCRIPTION OF WORK (use of properly identified additional sheet[s] or sketch[es] is acceptable):
(14)

11. REMARKS: (15)

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FIGURE S9.6.2
FORM NR-1, PAGE 2 OF 3

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-81, Rev. 8, (03/04/21)

(2) (NR Form Registration No.)

(3) (R/R Plan No., Job No., etc.)

WORK PERFORMED BY: (1)

(Name of "NR" certificate holder)

(Address of "NR" certificate holder)

COMPONENT IDENTIFICATION

No. (16)	Type of Item (17)	Mfg. Name (18)	Serial No. (19)	Nat'l Bd No. (20)	Code Class (21)	Code Section (22)	Year/ Addenda (23)	Code Case (24)	Revised Design Specification No./Rev. or Design Reconciliation No./Rev. (25)

FIGURE S9.6.3
FORM NR-1, PAGE 3 OF 3

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-81, Rev. 8, (03/04/21)

(**NR** Form Registration No.)

(R/R Plan No., Job No., etc.)

CERTIFICATE OF COMPLIANCE

I, (26) _____, employed by (27) _____

certify that to the best of my knowledge and belief the statements made in this report are correct and the repair/replacement activities or re-rating described above conform to (28) _____ and the *National Board Inspection Code* "**NR**" rules.

National Board *Certificate of Authorization* No. (29) _____ Expiration date: (30) _____

Signed: (31) _____ Date: (32) _____

Title: (33) _____
(authorized representative)

CERTIFICATE OF INSPECTION

I, (34) _____, 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 (35) _____ and employed by (36) _____ have inspected the repair/replacement and/or re-rating activities described in this report on (37) _____ and state that to the best of my knowledge and belief, these activities have been completed in accordance with the Code specified and the *National Board Inspection Code* "**NR**" rules.

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.

Signed: ~~(38)~~ 37 Date: ~~(39)~~ 38 Commissions ~~(40)~~ 39
(inspector) (National Board and endorsement)

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors • 1055 Crupper Avenue, Columbus, Ohio 43229-1183 Page 3 of 3

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TABLE S9.6

GUIDE FOR COMPLETING FORM NR-1, REPORT OF REPAIR/REPLACEMENT ACTIVITIES FOR NUCLEAR FACILITIES, NB-81

Reference to Circled Numbers in the Form	Description
	Title Block: Check type of activity, repair/replacement and/or rerating, as applicable.
	Check category of activity, 1, 2, or 3, as described in Part 3, Paragraph 1.6.2.
(1)	Name and address of the organization, as shown on the National Board "NR" Certificate of Authorization, which performed the activity.
(2)	Indicate NR Form Registration Number.
(3)	Indicate the repair/replacement plan, job number, etc., as applicable, assigned by the organization that performed the work for traceability to documentation.
(4)	Name and address of the owner of the nuclear facility.
(5)	Name and address of the nuclear power plant and, if applicable, identification of the unit.
(6)	Identify the system or component (e.g., residual heat removal, reactor coolant) with which the repair/replacement and/or re-rating activity is associated.
(7)	Identify the original design specification number and revision for the system or component listed in line 4.
(8)	Identify the original construction code, section, edition/addenda and applicable code cases used for the system or component identified in line 4.
(9)	NBIC Edition used for performing activities specified on this form.
(10)	Organization having responsibility for design when there is a change from the original design specification.
(11)	Identify code, section, edition/addenda and applicable code cases used for design, when applicable.
(12)	Check the type of test conducted (e.g., hydrostatic, pneumatic, system leakage, exempt, or other) and indicate the pressure applied when applicable.
(13)	Indicate the number of components where work was performed. Each component shall be indicated on page 2 of the form NR-1.
(14)	Provide a detailed summary describing the scope of work completed. Information to be considered should include type of work (welding, brazing, fusing), location, steps taken for removal or acceptance of defects, examinations, testing, heat treat, and other special processes or methods utilized. If Necessary, attach additional data, sketch, drawing, Form R-4, etc. In the remarks section state if additional data is attached.
(15)	Indicate any additional information pertaining to the work, including manufacturer's data reports.

TABLE S9.6 CONT'D

Reference to Circled Numbers in the Form	Description
(16)	Number in sequence beginning with No. 1 to identify each component work was performed. This number may be used to correspond with the detailed description of work performed.
(17)	Identify the type of item. i.e. piping, pump, valve, etc.
(18)	Identify the manufacturer's name of component.
(19)	Identify the manufacturer's serial no. or other assigned number for traceability.
(20)	Identify the National Board registration number, if previously assigned.
(21)	Identify the code class criteria, as assigned for each component.
(22)	Identify the code section used to perform work.
(23)	Identify Code section year and/or addenda used to perform work.
(24)	Identify any code cases used for work performed.
(25)	Identify any revisions to be made to the design specifications or if any design reconciliations were performed.
(26)	Type or print name of authorized representative from the certificate holder.
(27)	Name of the organization that performed the identified work, using the full name as shown on the Certificate of Authorization, or an abbreviation acceptable to the National Board.
(28)	Indicate code section as applicable to the repair/replacement activity and/or re-rating activity performed.
(29)	Indicate National Board Certificate of Authorization number.
(30)	Indicate month, day, and year the certificate expires.
(31)	Signature of authorized representative from the NR certificate holder.
(32)	Indicate month, day and year of signature by the Authorized Representative.
(33)	Title of authorized representative as defined in the Quality Program.
(34)	Type or print name of Authorized Nuclear Inspector.
(35)	Indicate the Jurisdiction where the activity is performed, when required.
(36)	Indicate Authorized Nuclear Inspector's employer.
~~(37)~~	~~Indicate month, day, and year of inspection by the Authorized Nuclear Inspector.~~

TABLE S9.6 CONT'D

Reference to Circled Numbers in the Form	Description
~~(38)~~ 37	Signature of Authorized Nuclear Inspector.
~~(39)~~ 38	Indicate month, day, and year of signature by the Authorized Nuclear Inspector.
~~(40)~~ 39	National Board Commission number and required endorsements.

S9.7 FORM NVR-1, REPORT OF REPAIR/REPLACEMENT ACTIVITIES FOR NUCLEAR PRESSURE RELIEF DEVICES, NB-160

FIGURE S9.7.1
FORM NVR-1, PAGE 1 OF 3

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-160, Rev. 8, (03/30/17)

FORM NVR-1, REPORT OF REPAIR/REPLACEMENT ACTIVITIES FOR NUCLEAR PRESSURE RELIEF DEVICES

(2) _____ (NVR Form Registration No.)

(3) _____ (R/R Plan No., Job No., etc.)

CATEGORY OF ACTIVITY: 1 ☐ 2 ☐ 3 ☐

☐ REPAIR/REPLACEMENT ☐ RE-RATING

1. WORK PERFORMED BY: (1) _____ (name of "NVR" authorized organization)

_____ (address)

2. WORK PERFORMED FOR: (4) _____ (name)

_____ (address)

3. OWNER: (5) _____ (name)

_____ (address)

4. NAME, ADDRESS, AND IDENTIFICATION OF NUCLEAR FACILITY: (6) _____ (name)

_____ (address)/ (unit identification)

5. CODE APPLICABLE FOR INSERVICE INSPECTION: (7) _____ (edition) _____ (addenda) _____ (code case(s))

6. CODE USED FOR REPAIR/REPLACEMENT ACTIVITY: (8) _____ (edition) _____ (addenda) _____ (code case(s))

7. NBIC USED FOR REPAIR/REPLACEMENT ACTIVITY: (9) _____ (edition)

8. DESIGN RESPONSIBILITY: (10) _____

9. **REPAIRED PRESSURE RELIEF DEVICE: SEE PAGE 2**

10. OPENING PRESSURE: (11) _____ BLOWDOWN (if applicable): (12) _____

11. SET PRESSURE AND BLOWDOWN ADJUSTMENT MADE AT: (13) _____ USING: (14) _____

12. DESCRIPTION OF WORK: (include name and identifying number of replacement parts):
(15) _____

12. REMARKS: (16) _____

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SUPPL. 9

FIGURE S9.7.2
FORM NVR-1, PAGE 2 OF 3

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-160, Rev. 8, (03/30/17)

(2) (**NR** Form Registration No.)

(3) (R/R Plan No., Job No., etc.)

WORK PERFORMED BY: (1)

(Name of "**NR**" certificate holder)

(Address of "**NR**" certificate holder)

PRESSURE RELIEF DEVICE

Name of Mfg.	Type	Mfg. Serial No.	Nat'l Bd No.	Service	Size	Year Built
(17)	(18)	(19)	(20)	(21)	(22)	(23)

CONSTRUCTION CODE

Section	Class	Edition	Addenda	Code Case(s)
(24)	(25)	(26)	(27)	(28)

NAME AND IDENTIFYING NUMBER OF REPLACEMENT PARTS

No.	Part Name	Part Number	Quantity	Serial Number/Traceability No.
1.	(29)	(30)	(31)	(32)
2.				
3.				
4.				
5.				
6.				
7.				

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FIGURE S9.7.3
FORM NVR-1, PAGE 3 OF 3

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-160, Rev. 8, (03/30/17)

(form "NVR" registration no.)

(R/R Plan No., Job No., etc.)

CERTIFICATE OF COMPLIANCE

I, (33) _____, certify that to the best of my knowledge and belief the statements made in this report are correct and the repair/replacement of the pressure relief devices described above conform to (34) _____ and the *National Board Inspection Code* "**VR**" & "**NR**" rules.

National Board *Certificate of Authorization* No. (35) _____ to use the "**VR**" stamp expires (36) _____

National Board *Certificate of Authorization* No. (37) _____ to use the "**NR**" stamp expires (38) _____

Date (39) _____ Signed (40) _____ (41) _____

(authorized representative) (title)

CERTIFICATE OF INSPECTION

I, (42) _____, 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 (43) _____ and employed by (44) _____ of (45) _____ have inspected the repair/replacement described in this report on (46) _____ and state that to the best of my knowledge and belief, this repair/replacement has been completed in accordance with the Code specified and the *National Board Inspection Code* "**VR**" & "**NR**" rules.

By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the repair/replacement 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.

Signed (47) 46 Date (48) 47 (49) 48

(inspector) (National Board and endorsement)

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SUPPL. 9

TABLE S9.7

GUIDE FOR COMPLETING FORM NVR-1, REPORT OF REPAIR/REPLACEMENT ACTIVITIES FOR NUCLEAR PRESSURE RELIEF DEVICES, NB-160

Reference to Circled Numbers in the Form	Description
	Title Block: Check type of activity, repair/replacement and/or rerating, as applicable.
	Check category of activity, 1, 2, or 3, as described in Part 3, Paragraph 1.6.2.
(1)	Name and address of the organization, as shown on the National Board "VR" and "NR" Certificates of Authorization, which performed the activity.
(2)	Indicate NVR Form Registration Number.
(3)	Indicate the repair/replacement plan number, job number, etc., as applicable for traceability, assigned by the organization that performed the work.
(4)	Name and address of the organization for which the work was performed.
(5)	Name and address of the owner nuclear facility.
(6)	Name and address of the nuclear facility and, if applicable, identification of the unit.
(7)	Identify the edition, addenda, and as applicable, code cases of the code used for the inservice inspection activity.
(8)	Identify the edition, addenda, and as applicable, code cases of the code used for the repair/replacement activity.
(9)	Identify the NBIC edition used for the repair/replacement activity.
(10)	Identify the organization responsible for design or design reconciliation, if applicable.
(11)	Indicate the set pressure of the valve.
(12)	Indicate the blowdown, if applicable, as a percentage of set pressure.
(13)	Indicate the location of testing.
(14)	Indicate medium (steam, air, etc.) used for the adjustment of the set pressure and, if applicable, blowdown.
(15)	Provide a detailed summary describing the scope of work completed. Information to be considered should include type of work (welding, brazing, fusing), location, steps taken for removal or acceptance of defects, examinations, testing, heat treat, and other special processes or methods utilized. If Necessary, attach additional data, sketch, drawing, Form R-4, etc. If additional data is attached, so state in the remarks section.
(16)	Indicate any additional information pertaining to the work, such as, additional documentation that is attached to this form to further support item 15.
(17)	Manufacturer's name of the affected item.

TABLE S9.7 CONT'D

Reference to Circled Numbers in the Form	Description
(18)	Describe the type of pressure relief device (e.g., safety valve, safety relief valve, pressure relief valve).
(19)	Manufacturer's serial number of the affected item.
(20)	National Board number, if applicable, of the affected item.
(21)	Indicate the service as steam, liquid, air/gas, etc.
(22)	Indicate the pressure relief device by inlet size, in inches.
(23)	Indicate the year the affected item was manufactured.
(24)	Indicate the name, section and division of the original construction code for the affected item.
(25)	Indicate the code class for the affected item as applicable, i.e. Class 1, 2 or 3.
(26)	Indicate the construction code edition for the affected item.
(27)	Indicate the construction code addenda, as applicable, for the affected item.
(28)	Indicate any applicable code cases used for manufacturing of the affected item.
(29)	Name of the replacement part.
(30)	Identifying number of the replacement part.
(31)	Number/quantity of each replacement part used.
(32)	Indicate the Serial number or other traceability used by the manufacturer of the replacement part.
(33)	Type or print name of authorized representative from the certificate holder.
(34)	Indicate code as applicable to the repair/replacement activity performed.
(35)	Indicate National Board Certificate of Authorization number, if applicable for the "VR" Stamp.
(36)	Indicate month, day, and year the certificate expires, if applicable for the "VR" Stamp.
(37)	Indicate National Board Certificate of Authorization number, if applicable for the "NR" Stamp.
(38)	Indicate month, day, and year the certificate expires, if applicable for the "NR" Stamp.
(39)	Signature of authorized representative from the certificate holder defined in item 27 above.

TABLE S9.7 CONT'D

Reference to Circled Numbers in the Form	Description
(40)	Indicate month, day, and year of signature by the authorized representative.
(41)	Title of authorized representative as defined in the Quality Program.
(42)	Type or print name of Authorized Nuclear Inspector.
(43)	Indicate the Jurisdiction where the activity is performed, when required.
(44)	Indicate Authorized Nuclear Inspector's employer.
(45)	Indicate address of Authorized Nuclear Inspector's employer (city and state or province).
~~(46)~~	~~Indicate month, day, and year of inspection by the Authorized Nuclear Inspector.~~
~~(47)~~ 46	Signature of Authorized Nuclear Inspector defined in item 42 above.
~~(48)~~ 47	Indicate month, day, and year of signature by the Authorized Nuclear Inspector.
~~(49)~~ 48	National Board Commission number and required endorsements.

ITEM 21-XX: Update Table 2.3

2.3 STANDARD WELDING PROCEDURE SPECIFICATIONS (SWPSs)

a) One or more SWPSs from NBIC Part 3, Table 2.3 may be used as an alternative to one or more WPS documents qualified by the organization making the repair or alteration, provided the organization accepts by certification (contained therein) full responsibility for the application of the SWPS in conformance with the Application as stated in the SWPS. When using SWPSs, all variables listed on the Standard Welding Procedure are considered essential and, therefore, the repair organization cannot deviate, modify, amend, or revise any SWPS. US Customary Units or metric units may be used for all SWPSs in NBIC Part 3, Table 2.3, but one system shall be used for application of the entire SWPS in accordance with the metric conversions contained in the SWPS. The user may issue supplementary instructions as allowed by the SWPS. Standard Welding Procedures Specifications shall not be used in the same product joint together with the other Standard Welding Procedure Specifications or other welding procedure specifications qualified by the organization. SWPSs may be purchased at the AWS Bookstore at http://pubs.aws.org.

b) The AWS reaffirms, amends or revises SWPSs in accordance with ANSI procedures.

c) The use of previous versions of the listed SWPSs is permitted. Previous versions include Amended, Reaffirmed Revised or Superseded SWPSs regardless of the publication date.

TABLE 2.3

SWPS DESIGNATION: YEAR

B2.1-1-001: 2020	B2.1-1-201: 2019	B2.1-8-215: 2012	B2.1-1/8-229: 2013
B2.1-1-002: 2020	B2.1-1-202: 2019	B2.1-8-216: 2012	B2.1-1/8-230: 2013
B2.1-1-016: 2018	B2.1-1-203: 2019	B2.1-4-217: 2021	B2.1-1/8-231: 2015
B2.1-1-017: 2018	B2.1-1-204: 2019	B2.1-4-218: 2021	B2.1-1-232: 2020
B2.1-1-018: 2021	B2.1-1-205: 2019	B2.1-4-219: 2021	B2.1-1-233: 2020
B2.1-1-019: 2018	B2.1-1-206: 2019	B2.1-4-220: 2021	B2.1-1-234: 2021
B2.1-1-020: 2018	B2.1-1-207: 2019	B2.1-4-221: 2021	B2.1-1-235: 2021
B2.1-1-021: 2018	B2.1-1-208: 2019	B2.1-5A-222: 2021	
B2.1-1-022: 2018	B2.1-1-209: 2019	B2.1-5A-223: 2021	
B2.1-8-023: 2018	B2.1-1-210: 2012	B2.1-5A-224: 2021	
B2.1-8-024: 2012	B2.1-1-211: 2012	B2.1-5A-225: 2021	
B2.1-8-025: 2012	B2.1-8-212: 2012	B2.1-5A-226: 2021	
B2.1-1-026: 2018	B2.1-8-213: 2012	B2.1-1/8-227: 2013	
B2.1-1-027: 2018	B2.1-8-214: 2012	B2.1-1/8-228: 2013	

STATUS:
2022 14 SWPSs: All have been updated and are presently being balloted in committee
2021 13 SWPSs: Approved and at the Printers targeting a December 2021 release
2020 4 SWPSs Done
2019 9 SWPSs Done
2018 9 SWPSs Done

TOTAL: 49 SWPSs

Terry,
This table represents where we are and where we are going with Table 2.3. I will prepare a ballot in the Fall to correct a typo and delete the word table and submit (hopefully) 13 SWPSs for NBIC adoption.
Jim Sekely

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 21-71

Subject/Title

Remove the mechanical portion of tube plugging from 3.3.4.9. Only address i

NBIC Location

Part: Repairs and Alterations; Section: 3; Paragraph: 3.4.9

Project Manager and Task Group

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

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.

Existing 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 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.

Proposed Text

Where it is not practicable to mechanically plug a tube in a firetube boiler, the plug may be secured to the tube and/or tubesheet by welding with the concurrence of the owner, the Inspector, and the Jurisdiction where the pressure-retaining item is installed, where required. The following course of repair shall be followed: a) The scope of work, type of plug and method of retention, shall be evaluated by the “R” Certificate Holder performing. b) Strength calculations for the size of the weld shall be performed in accordance with the original code of construction. c) 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 as this may limit the quantity of tubes plugged. d) The boiler may be returned to service for a period of time agreed upon by the owner, the Inspector, and the Jurisdiction where the pressure-retaining item is installed, where required. e) The Form R-1 shall be completed for the welded plugging of
firetubes.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

2.2.1.1 PROCEDURE SPECIFICATIONS WITH IMPACT TESTING

a) Welding procedures shall be qualified with impact testing when required by the original code of construction. The requirements for impact testing shall be in accordance with the rules of the original code of construction except that vessel (production) impact testing is not required.

b) The test material does not need to be in the same heat treated condition as the existing material.

Background Info:

Existing paragraph 3.3.6 contains some requirements that the repair firm cannot comply with such as determining the heat treated condition and the notch toughness characteristics of the material to be repaired. It also contains references to dead links in the NBIC that provide no guidance to the repair firm. This proposal would eliminate the requirements of knowing the heat treated condition and the notch toughness characteristics of the material to be repaired and simply refer back to the original construction code in regards to WPS qualification. The proposal also would move the location of these requirements from paragraph 3.3.6 (which addresses repair only) to 3.2.8 which addresses repairs and alterations. Alternatively, this paragraph could be moved to 2.6 in the Welding section.

Statement of Need:

There is an urgent need to address these concerns as the repair firms cannot comply with the existing wording in 3.3.6. The plan is to incorporate this item into the 2023 Edition of Part 3 and propose a corresponding Intent Interpretation that would provided guidance to NBIC users as soon as possible.

Current Wording in 2021 Edition – Part 3

3.3.6 PRESSURE VESSEL IMPACT TESTING (21)

a) Welding procedures used for repairs shall be qualified with impact testing when required by the original code of construction. The requirements for impact testing shall be in accordance with the rules of the original code of construction except that vessel (production) impact testing is not required.

b) The test material for the welding procedure qualification with impact testing shall be of the same P-number and Group number, and heat-treated condition as the material being repaired.

1) 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).

2) In the event that the original material specification is obsolete, the material used for the test coupon 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), and heat-treated condition, but in no case shall the material be lower in strength.

Item 21-80, Replacement of Shell/Heads per 3.3.3(h)
Jon Ferriera, Hartford Steam Boiler

3.3.3 Examples of Repairs

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

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

2) Welded or mechanical replacement of a shell or head in accordance with the original design;

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

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

Background: There are two conflicting NBIC interpretations relating to mechanical replacement of parts. Interpretation 01-29 states that NBIC neither requires nor prohibits documenting mechanical repair installation on a Form R-1. Recently passed interpretation 19-11 states that mechanical replacement of pressure retaining components in ASME Section VIII, Div. 3 vessels are considered a repair activity. 19-11 cites paragraph 3.3.3 which provides examples of repairs. Paragraph 3.3.3(h)(2) specifically states that replacement of head or shell in accordance with the original design. It does not specify whether head was replaced by welding or mechanical attachment.

Statement of Need: This interpretation and corresponding Code revision would provide clarity to NBIC users and address whether mechanical replacement of these components is considered a repair.