THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE SUBCOMMITTEE REPAIRS & ALTERATIONS

MINUTES

Meeting of July 17th, 2024
Louisville, KY

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

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Vessel Inspectors 1055 Crupper Avenue
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1. **Call to Order**
   Chair Moore called the meeting to order at 8:00 a.m. Eastern Time in the Gallery Ballroom at the hotel.

2. **Roll call of Members and introduction of Visitors**
   Members and visitors were introduced, and attendance taken.

3. **Check for a Quorum**
   A quorum was established based on Attendance taken (**Attachment 1**)

4. **Announcements**
   - This meeting marks the end of Cycle D for the 2025 NBIC edition. This meeting marks the end of the 2025 NBIC development cycle and is the last opportunity for code revisions to be approved for the 2025 NBIC.
   - The National Board will be hosting a reception on Wednesday evening from 5:30 p.m. to 7:30 p.m. at the Rooftop Garden on the 16th floor of the hotel.
   - The National Board will be hosting breakfast and lunch on Thursday in Citation A/B for those attending the Main Committee meeting. Breakfast will be served from 7:00 a.m. to 8:00 a.m. and lunch will be served from 11:30 a.m. to 12:30 p.m.
   - Meeting schedules, meeting room layouts, and other helpful information can be found on the National Board website under the **NBIC** tab → NBIC Meeting Information.
   - Remember to add any attachments that you'd like to show during the meeting (proposals, reference documents, power points, etc.) to the NBIC file share site (nbfileshare.org) **prior to the meeting**.
     - Note that access to the NBIC file share site is limited to committee members only.
     - ALL power point attachments/presentations must be sent to the NBIC Secretary prior to the meeting for approval.
     - Contact Jonathan Ellis (*nbicsecretary@nbbi.org*) for any questions regarding NBIC file share access.
   - When possible, please submit proposals in Word format showing "strike through/underline". Project Managers: please ensure any proposals containing text from the 2021 NBIC are updated to contain text from the 2023 NBIC.
   - If you'd like to request a new Interpretation or Action item, this should be done on the National Board Business Center.
     - Anyone, member or not, can request a new item.
   - As a reminder, anyone who would like to become a member of a group or committee:
     - Should attend at least two meetings prior to being put on the agenda for membership consideration. The nominee will be on the agenda for voting during their third meeting.
     - The nominee must submit the formal request along with their resume to the NBIC Secretary **PRIOR TO** the meeting. *nbicsecretary@nbbi.org*
     - If needed, we can also create a ballot for voting on a new member between meetings.
   - Thank you to everyone who registered online for this meeting. The online registration is very helpful for planning our reception, meals, room set up, etc. Please continue to use the online registration for each meeting. It is also a good way to make sure we have the most up-to-date contact information.

5. **Awards and Special Recognition: None**

6. **Adoption of the Agenda**
   The Agenda was revised to add items and make editorial corrections to items listed:
   - **Added I24-10**
   - **Added I24-70**
   - **Added A24-28**
   - **Revised I24-39 & A24-43**
   - **Added A24-67**

   The agenda was adopted as revised

7. **Approval of the Minutes of the January 10, 2024, Meeting**
The minutes were unanimously approved (UA) as posted.

8. **EPRI Presentation – Update on the Use of Alternative Weld Repair Processes Using Welding Methods 6 and 7 and Supplement 8 (Attachment 2)**

9. **Review of Rosters**
   a. **Membership Nominations**
      i. Mr. Aziz Khssassi (Jurisdictional Authorities) was UA to join the NR TG.
      ii. Mr. Tim LeBeau (NB Certificate Holders) was UA to join the SG R&A
      iii. Mr. Robert McGuire (Manufacturers) was UA to join the SG R&A.

   All membership nominations were UA by the SC R&A.

   b. **Membership Reappointments**
      i. The following **Subgroup R&A** memberships will expire prior to the January 2025 NBIC meetings: Mr. Steven Frazier, Mr. Michael Quisenberry, Mr. Jim Sekely, and Mr. John Siefert. – **All members were UA to be reappointed to the SG by SC Membership**
      ii. The following **Subcommittee R&A** memberships will expire prior to the January 2025 NBIC meetings: Ms. Kathy Moore, Mr. Marty Toth, Mr. Brian Boseo, Mr. Steven Frazier, and Mr. Jim Sekely. – **All members were UA to be reappointed to the SC by the Membership.**

   c. **Officer Nominations**
      i. Ms. Moore's and Mr. Toth's terms as Chair and Vice Chair are set to end on July 31, 2024. Both are eligible for reappointment, as this would be the end of their first term. – **Both were UA to be reappointed to their respective officer positions: K. Moore – Chair; M. Toth – Vice Chair**.

   d. **Resignations: None**

10. Interpretations

Item Number: I23-79	NBIC Location: Part 3, 2.5.3 d) and 2.5.3.6	No Attachment

General Description: Alternative Welding Method 6 - Controlled Fill

Subgroup: Repairs and Alterations

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

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

January 2024 Meeting Action: T. Seime presented that this proposal will go to LB for the INTERP TG when ready. This was a **PR**.

July 2024 Meeting Action:

Item Number: I23-82	NBIC Location: Part 3, 3.3.2 e) 2)	Attachment 3

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

Subgroup: Repairs and Alterations

Task Group: M. Toth (PM), E. Creaser, M. Quisenberry, R. Collins, P. Shanks

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

January 2024 Meeting Action: New Item. Task group to be selected. This was a PR. Update at MC – Task Group selected - M. Toth (PM), E. Creaser, M. Quisenberry, R. Collins, P. Shanks

INTERP TG July 2024 Meeting Action: M. Toth presented the proposal was revised and **UA.**

July 2024 Meeting Action: M. Toth presented the proposal was **UA.**

New Interpretations Requests:

Item Number: I24-10	**NBIC Location: Part 3, 1.6.4 d), 1.6.6.2 t), 1.6.7.2 t), and 1.6.8.2 t)**	**Attachment 4**

General Description: Qualification requirements for AIA Audit

Subgroup: NR TG

Task Group: C. Dinic (PM)

Explanation of Need: The 2023 Edition of the NBIC added the requirement for the ANI performing NR activities to have the N, R, and I endorsements. This raises the question as to the intent of the NBIC as to what endorsements are required for the Supervisor that oversees the ANI's work and performs the audit of the NR CH.

NR TG July 2024 Meeting Action: This proposal is under review by the CQI, as this impacts RCI-1.
Discussion, by C. Dinic, Annual audits by the AIA, may not be required to be conducted by a Supervisor per NBIC, however ASME audits are all required to be conducted by a "Supervisor". Interp 01-05 may need to be revised, as it already addresses audits of the Inspector. Quality programs may already have qualifications for auditors. 1.6.4 d) already allows for someone other than supervisors to conduct audits of the NR program. Auditor qualifications may be determined by an AIA based on the Category/scope of the Cert. Holder.
An action item will be opened to change 1.6.4 d) (or elsewhere) to require audits to be performed by Supervisors. The revised proposal was **UA**.

July 2024 Meeting Action: R. Spuhl presented a proposal that was **UA.**

Item Number: I24-16 **NBIC Location: Part 3, 2.5.3 e)** **No Attachment**

General Description: Volumetric Examination when using alternative welding methods without PWHT

Subgroup: Repairs and Alterations

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

Explanation of Need: The existing language, in its current form, does not make it clear whether volumetric examination is required when using alternative welding methods. The last phrase in the sentence sends the user to paragraph 4.2 which in turn sends the user back to the original code of construction. If a weld greater than 3/8 in. did not require volumetric examination at construction, then what purpose does the last sentence serve? The phrase on the other side of "or" where volumetric examination was required at construction is self-explanatory, but 4.2 permits using alternative NDE methods, suggesting MT or PT. These two methods are currently mandated "shall be" requirements in the first sentence of 2.5.3 e). If the intent is to require volumetric examination for welds greater than 3/8 in., and welds that required volumetric examination at construction, then there should be a firm statement to this effect.
INTERP TG July 2024 Meeting Action: M. Schaser presented a **PR.**

July 2024 Meeting Action: M. Schaser presented a **PR.**

Item Number: I24-19 **NBIC Location: Part 3, 4.2** **No Attachment**

General Description: NB-23 2023 Part 3, section 4, article 4.2 - Volumetric NDE on weld

Subgroup: Repairs and Alterations

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

Explanation of Need: The inquirer has a corroded zone of about 3 feet by 6 feet on a shell and head, and the depth does not exceed the corrosion allowance. The corrosion zone included a weld that was 100% RT. Is it ok with just MT NDE or need also Volumetric NDE of all the buildup area include base metal?

INTERP TG July 2024 Meeting Action: L. Dutra presented a **PR.**

July 2024 Meeting Action: L. Dutra presented a **PR.**

Item Number: I24-25	NBIC Location: Part 3, 4.4.1 e) and 4.4.2 c)	No Attachment

General Description: 4.4.1 (e) and 4.4.2 (c) NDE Methods

Subgroup: Repairs and Alterations

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

Explanation of Need: 4.4.1 (e) and 4.4.2 (c) permit the use of NDE to verify the integrity of the repair of alteration. NDE methods other than what is listed in the original code of construction are being used for repair and alterations in some locations throughout the US. For example, Acoustic Emission Testing (AE) in accordance with ASME Section V Article 12 has been used on power boiler (HRSG) repairs. Acoustic Emission Testing is not an NDE method that is addressed in ASME Section I or Section VIII Div.1, but it is an NDE method in the reference code ASME Section V. Some inspectors are questioning this as AE is not an NDE method used in the original code of construction.

INTERP TG July 2024 Meeting Action: J. Ferreria presented a proposal which was revised. To go out as **Rvw & Comment LB to INTERP TG.**

July 2024 Meeting Action: J. Ferreria presented a **PR** to SC, as this will **go to INTERP TG for a Rvw & Comment LB.**

Item Number: I24-29	NBIC Location: Part 3, 4.2 a)	Attachment 5

General Description: Volumetric NDE requirements for welded repairs to pressure vessels

Subgroup: Repairs and Alterations

Task Group: M. Toth (PM), R. Derby, M. Quisenberry

Explanation of Need: Specific vessel currently in question is a refinery Coke Drum (1.5" plate thickness with 0.100" corrosion resistant clad. Vessel has highly localized corrosion due to cladding damage. Once excavated for repair the corroded locations will exceed the 4.2a size restrictions. Original welds were RT inspected. Weld repairs will be completed via temperbead procedure with elevated preheat.

INTERP TG July 2024 Meeting Action: M. Toth presented **a** proposal which was revised and **UA.**

July 2024 Meeting Action: M. Toth presented **a** proposal which was revised and **UA.**

Item Number: I24-33 **NBIC Location: Part 3, 3.4.1 b)** **Attachment 6**

General Description: Proof Testing by a non-manufacturing R Certificate Holder

Subgroup: Repairs and Alterations

Task Group: G. Galanes (PM), A. Triplett

Explanation of Need: Wrightspec LLC is planning to apply for an 'R' Certificate in order to support field & shop Repairs & Alterations (Rerating) of cast iron paper machine dryers. We hold an AIA service agreement with Arise Boiler Inspection & Insurance Company and are hopeful to have an R-stamp by end of summer 2024.

INTERP TG July 2024 Meeting Action: G. Galanes presented a motion to **Close w/ Letter to Inquirer this is consulting. - UA**

July 2024 Meeting Action: G. Galanes presented a motion to **Close w/ Letter to Inquirer this is consulting. - UA**

Item Number: I24-34 **NBIC Location: Part 3, 3.4.1** **Attachment 7**

General Description: Rerating using OEM's design data to waive proof testing

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM), B. Hrubala

Explanation of Need: A PV built in 1990 contains heads made of Class 40 cast iron. The heads were proof tested by the OEM and determined to be suitable for 160 psi MAWP. However, the OEM certified the vessel for only 125 psi due to customer requirements. Fast forward to present day, and the vessel owner now wants to Rerate the vessel to a higher pressure. The OEM is no longer in business, but the 'R' Holder is able to obtain a copy of the original proof test report by the OEM. Can it be acceptable for the 'R' Holder to Rerate the head above 125 psi, based on OEM records stating the design is good for higher pressure, without the 'R' Holder having to perform their own separate proof test?

The 'R' Holder would not be using the OEM proof test record for any new manufacturing, only for the purposes of altering an existing vessel or part within the confines of the original design.

INTERP TG July 2024 Meeting Action: Proposal was **passed with 1 abstention (J. Ferreira)**

July 2024 Meeting Action: Proposal was **passed with 1 negative vote (Stacy Marks standing in for P. Shanks) and 3 abstentions (B. Boseo, P. Gilston, B. Schaefer).**

Item Number: I24-36	NBIC Location: Part 3, 3.4	No Attachment

General Description: Alteration of Plate Heat Exchanger

Subgroup: Repairs and Alterations

Task Group: T. Seime (PM)

Explanation of Need: This question is asked frequently by Repair firms that want to increase the number of heat transfer plates.

INTERP TG July 2024 Meeting Action: Proposal was revised and **accepted with 3 abstentions (G. Galanes, J. Ferreira, M. Toth)**

July 2024 Meeting Action: T. Seime presented a **PR** to revise based on INTERP TG comments

Item Number: I24-39	NBIC Location: Part 3, 1.3.2 b)	Attachment 8

General Description: Certification of NR-1 without stamping (INTENT INTERP - TIED TO A24-43)

Subgroup: Repairs and Alterations

Task Group: M. Vogt (PM), R. Spuhl

Explanation of Need: Clarity is needed for NR work where the lack of NR stamping due to a practical matter, not necessarily a jurisdictional reason, may preclude certifying an NR-1. This Intent Interpretation is tied to Action Item A24-43.

SG R&A July 2024 Meeting Action: M. Vogt presented a proposal which was **UA**

July 2024 Meeting Action: M. Vogt presented a proposal which was revised and **UA**

Item Number: I24-40	NBIC Location: Part 3, 3.3.2 e)	No Attachment

General Description: Routine repair vs Alteration

Subgroup: Repairs and Alterations

Task Group: M. Carlson (PM), D. Kinney

Explanation of Need: Some people use rules of thumb outside of the NBIC definition to make decision, these rules of thumb do not align with the written rules and cause project delays and extended outages.

INTERP TG July 2024 Meeting Action: M. Carlson presented a **PR.**

July 2024 Meeting Action: M. Carlson presented a **PR.**

Item Number: I24-41 **NBIC Location: Part 3, 4.4.2 a)** **Attachment 9**

General Description: 4.4.2 (a) Pressure testing Connection Welds

Subgroup: Repairs and Alterations

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

Explanation of Need: There seem to be some different opinions among inspectors and R certificate holders when 4.4.2 (a)(1&) refers to replacement parts. Some inspectors and R certificate holders have the opinion that those replacement parts referenced in 4.4.2 (a) are only welded replacement parts, while others have the opinion that the replacement parts are not limited to just welded parts, but apply to all replacement parts.

INTERP TG July 2024 Meeting Action: M. Toth presented**. The proposal was UA.**

July 2024 Meeting Action: M. Toth presented a proposal which was **UA**

Item Number: I24-44 **NBIC Location: Part 3, 2.5.3** **No Attachment**

General Description: Alternative weld methods and special services

Subgroup: Repairs and Alterations

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

Explanation of Need: In section VIII Div.1 construction some special service conditions as described in UW-2 make mandatory PWHT when it is not otherwise required for the actual thickness of material and P-number. This subtlety leads some to believe that the use of the Alternative weld methods is either not allowed or that they can only be conducted as an alteration.

INTERP TG July 2024 Meeting Action: P. Gilston presented a **PR.** To be LB to INTERP TG when ready.

July 2024 Meeting Action: P. Gilston presented a **PR.**

Item Number: I24-45 **NBIC Location: Part 3, 5.7.2 c)** **Attachment 10**

General Description: Correct method for reporting Date Repaired on R form

Subgroup: Repairs and Alterations

Task Group: T. Seime (PM)

Explanation of Need: Repair stampings are often encountered in the field with "Date Repaired" indicated by "month and year" as well as with "month, day and year." Repair Organizations and Inspectors occasionally disagree as to whether "month and year" is sufficient.

***Note that this item was approved by the INTERP TG on May 30, 2024. ***

July 2024 Meeting Action: T. Seime presented a proposal that was **UA**.

Item Number: I24-50 **NBIC Location: Part 3, 2.2.1 and 2.2.3** **No Attachment**

General Description: Post Qualification of Welders and WPS/PQR

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM), B. Hrubala

Explanation of Need: There are numerous instances in our organization where welders and WPS/PQR are being qualified after repairs have been done and the equipment were put back into service. The argument they give is that if the results pass then it's acceptable.

INTERP TG July 2024 Meeting Action: A motion was UA to **Close w/Letter to Inquirer that this is outside the scope of the NBIC.**

July 2024 Meeting Action: K. Moore presented a **PR,** as this will be revised based on INTERP TG discussions.

Item Number: I24-51 **NBIC Location: Part 3, 3.3.4.6** **Attachment 11**

General Description: NBIC Part 3, 3.3.4.6 Flush Patches that Intersect Existing Welds (INTENT INTERP w/A23-41)

Subgroup: Repairs and Alterations

Task Group: J. Ferreira (PM), B. Boseo, T. McBee, M. Schaser

Explanation of Need: NBIC Part 3 paragraph 3.3.4.6 details controls for flush patches but does not appear to address controls for flush patches that intersect a new or existing weld.

SG R&A July 2024 Meeting Action: A. Khssassi presented the Intent Interp (I24-51) was UA approved by the SG to be discussed tomorrow at SC. The related A23-41 was UA.

July 2024 Meeting Action: A. Khssassi presented the Intent Interp (I24-51) was **UA**.

Item Number: I24-52 **NBIC Location: Part 3, 3.3.2 e) 5)** **Attachment 12**

General Description: Clarification of Routine Repair classification of welded in diaphragms.

Subgroup: Repairs and Alterations

Task Group: T. Seime (PM)

Explanation of Need: Clarification of Routine Repair classification of welded in diaphragms. Because of the confusion regarding this repair vs routine repair classification, we have faced multiple delays at different power plants over the past three years.
***Note that this item was approved by TG Interpretations via letter ballot on June 26, 2024. ***

July 2024 Meeting Action: T. Seime presented a proposal that was **UA.**

Item Number: I24-53 **NBIC Location: Part 3, 3.3.4** **Attachment 13**

General Description: NBIC Part 3, 3.3.4 in relation to ASME PCC-2 Article 212

Subgroup: Repairs and Alterations

Task Group: J. Ferreira (PM), M. Schaser, B. Boseo, T. McBee

Explanation of Need: As this sort of configuration is compliant with the original Code Of Construction and guidance is supplied by an industry-recognized document on repair of pressure equipment, it isn't clear why it would be prohibited. When properly engineered and correctly installed, this sort of alteration could extend the life of damaged vessels.

INTERP TG July 2024 Meeting Action: J. Ferreira presented a Proposal which was revised and **UA.**

July 2024 Meeting Action: : J. Ferreira presented a Proposal which was revised and **UA.**

Item Number: I24-70 **NBIC Location: Part 3, 2.5.3.2 f)** **Attachment 14**

General Description: Waiving of hardness testing and carbon equivalency requirements

Subgroup: Repairs and Alterations

Task Group: G. Galanes (PM)

Explanation of Need: Waiving of hardness and Carbon Equivalent check in steam service at design temperature of 480 C in superheater coils in boilers designed to temperature of 480 C

INTERP TG July 2024 Meeting Action: T. Seime presented a **PR.** G. Galanes selected as PM

July 2024 Meeting Action: G. Galanes presented a motion to **Close w/ Letter to Inquirer this is consulting. – UA (See Attachment 14, Page 2 for draft Response Letter.)**

11. Action Items

a. Task Group Graphite

Item Number: NB15-2208 **NBIC Location: Part 3** **Attachment 15**

General Description: Investigate repair options for graphite block heat exchangers

Subgroup: Graphite

Task Group: Greg Becherer (PM)

Explanation of Need: The last item in paragraph 3.3.2 e) reads, "5) Seal welding a mechanical connection for leak tightness where by design, the pressure retaining capability is not dependent on the weld for strength and requires no PWHT." A repair organization used this paragraph as justification to document a seal welded tube plug on a watertube boiler as routine.

January 2024 Meeting Action: This was a PR.
July 2024 Meeting Action – A. Veit presented a proposal that was **UA.**

Item Number: A23-45 **NBIC Location: Part 3, S3.3** **Attachment 16**

General Description: Graphite plate replacement as Routine repair

Subgroup: Graphite

Task Group: J. Wince (PM)

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

January 2024 Meeting Action: This was a PR.

July 2024 Meeting Action – A. Veit presented a proposal that was **UA.**

Item Number: A24-67	NBIC Location: Part 3, S3.3	No Attachment
General Description: Graphite plate replacement as Routine repair **Subgroup:** Graphite **Task Group:** A Viet, J. Wince, S. Mehrez **Explanation of Need:** Clarifying requirements for use of graphite pressure vessel replacement parts for repairs or alterations. **July 2024 Meeting Action:** A. Veit presented a **PR**.		

b. Task Group FRP

There are currently no open FRP items related to Part 3.

c. Task Group Historical

Item Number: A20-25	NBIC Location: Part 3, S2.13	No Attachment
General Description: Repair Procedure for Fire Boxes **Subgroup:** SG Historical **Task Group:** M. Wahl (PM), R. Forbes, T. Dillon, L. Moedinger, C. Jowett, F. Johnson **Explanation of Need:** In NBIC Part 3, S2.13.10.3, S2.13.11 do not define what to do at a riveted joint. On the tubesheet, or firedoor sheet, where it is flanged to rivet to the firebox, the repairs are silent on what to do at the riveted joint. **January 2024 Action:** This was a **PR.** **July 2024 Meeting Action:** This was a **PR.**		

Item Number: 23-62	NBIC Location: Part 3, S2	Attachment 17
General Description: Reusing pressure retaining items under alteration **Subgroup:** SG Historical **Task Group:** Chris Jowett (PM), F. Johnson, J. Smith, M. Whal, R. Bryce, L. Moedinger, D. Rupert **Explanation of Need:** Addition to book explaining how a pressure retaining item can be reused on a historical boiler under the guidelines of an alteration. **January 2024 Action:** This was a **PR.** **July 2024 Meeting –** T. Seime presented a proposal that was **UA.**		

d. Task Group Locomotive

There are currently no TG Locomotive items open for Part 3.

e. NR Task Group

Item Number: A23-57	NBIC Location: Part 3, 1.6	No Attachment

General Description: Rename Authorized Nuclear Inspector - NR TG Item

Subgroup: NR TG

Task Group: C. Dinic (PM)

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

NR TG January 2024 Meeting Action: Presentation by C. Dinic. NBIC Proposals to be submitted to the NR TG for Rvw & Comment LB prior to CoQ meeting in March 2024 for consideration/direction. Intent Interp & supporting Action Item may need to be opened to clarify current ANI and ANIS qualifications/requirements for A23-60. – This was a PR.

NR TG July 2024 Meeting Action: This proposal is under review by the CQI, as this impacts RCI-1**.** Meetings will be scheduled with NBBI, Canadian jurisdictions, and NR TG members (e.g. Tom Roberts) to clarify what is needed. This item is addressed by A23-60 so a motion to **Close w/No Action -** UA

July 2024 Meeting Action: R. Spuhl presented this item is addressed by A23-60 and made a motion to **Close w/No Action -** UA

Item Number: A23-60	NBIC Location: Part 3, 1.6	No Attachment

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

Subgroup: NR TG

Task Group: C. Dinic (PM)

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

January 2024 Meeting Action: R. Spuhl will provide a proposal and Intent Interp based on this proposal. – This was a PR.

NR TG July 2024 Meeting Action: This proposal is under review by the CQI, as this impacts RCI-1. Meetings will be scheduled with NBBI, Canadian jurisdictions, and NR TG members (e.g. Tom Roberts) to clarify what is needed. This was a **PR**.

July 2024 Meeting Action: Tom Roberts presented a **PR**

New Items:

Item Number: A24-06	**NBIC Location: Part 3, 1.6.6.2 o)**	**Attachment 18**

General Description: Owners vs NR Cert Holders stamping and certification criteria for Cat. 1

Subgroup: NR TG

Task Group: R. Spuhl (PM)

Explanation of Need: Stamping requirements for Category 2 and 3 (allowing for the waiving of applying the "NR" stamp or repair plate), will need to be addressed via Action Item and Intent Interp. Owners vs NR Cert Holders may have different criteria for NR-1 form alternatives and stamping reqs (ie. NIS-2 or RR-1 per Non-Mand. Appdx T per Sect. XI).

NR TG July 2024 Meeting Action: Discussion regarding if using a different form other than the NR-1 form may be used if the same technical information is present. Consideration of an online registration from(s) via EDT may also be used in the future. The proposal was revised for Cat. 1 and will be duplicated to Cat 2 and 3 for SG R&A vote tomorrow. The proposal was **UA**.

July 2024 Meeting Action: R. Spuhl presented a proposal that was revised and **UA**.

Item Number: A24-07	**NBIC Location: Part 3, 1.6.7.2 o)**	**Attachment 19**

General Description: Owners vs NR Cert Holders stamping and certification criteria for Cat. 2

Subgroup: NR TG

Task Group: T. Roberts (PM)

Explanation of Need: Stamping requirements for Category 2 and 3 (allowing for the waiving of applying the "NR" stamp or repair plate), will need to be addressed via Action Item and Intent Interp. Owners vs NR Cert Holders may have different criteria for NR-1 form alternatives and stamping reqs (ie. NIS-2 or RR-1 per Non-Mand. Appdx T per Sect. XI).

July 2024 Meeting Action: R. Spuhl presented a proposal that was revised and **UA**.

Item Number: A24-08 **NBIC Location: Part 3, 1.6.8.2 o)** **Attachment 20**

General Description: Owners vs NR Cert Holders stamping and certification criteria for Cat. 3

Subgroup: NR TG

Task Group: A. Khssassi (PM)

Explanation of Need: Stamping requirements for Category 2 and 3 (allowing for the waiving of applying the "NR" stamp or repair plate), will need to be addressed via Action Item and Intent Interp. Owners vs NR Cert Holders may have different criteria for NR-1 form alternatives and stamping reqs (ie. NIS-2 or RR-1 per Non-Mand. Appdx T per Sect. XI).

July 2024 Meeting Action: R. Spuhl presented a proposal that was revised and **UA**.

Item Number: A24-09 **NBIC Location: Part 3, 1.6.1 – 1.6.5** **No Attachment**

General Description: Update and revise NR Scope in 1.6.1 - 1.6.5

Subgroup: NR TG

Task Group R. Spuhl (PM)

Explanation of Need: Scope and update and revision to 1.6.1 - 1.6.5.

NR TG July 2024 Meeting Action: R. Spuhl presented a **PR**. Other changes have impacted this item.

July 2024 Meeting Action: R. Spuhl presented a **PR**.

Item Number: A24-54 **NBIC Location: Part 3, 1.6** **No Attachment**

General Description: Revise NR Section with QMS Verbiage

Subgroup: NR TG

Task Group: None assigned.

Explanation of Need: This proposal was deemed substantive by the Part 3 NR Editorial Advisory Group. Changes were initially proposed to match the verbiage QAI uses (QMS vs. quality system). See Gary Scribner for details.

NR TG July 2024 Meeting Action: To be Closed w/No Action based on existing ASME verbiage complications when referring to nuclear quality programs (e.g. **assurance** vs **control** vs **management**) **Closed w/No Action -UA**

July 2024 Meeting Action: Closed w/No Action - UA, based on existing ASME verbiage complications when referring to nuclear quality programs (e.g. **assurance** vs **control** vs **management**)

f. Subgroup Repairs & Alterations

Item Number: A21-12	NBIC Location: Part 3, 3.3.3, 3.4.4, Section 9	Attachment 21

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

Subgroup: Repairs and Alterations

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

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.

Jan. 2024 SG and SC R&A Meeting Action: P. Becker presented a PR and asked for any feedback from the group or visitors, as this will be submitted for a LB to SG R&A soon.

SG R&A July 2024 Meeting Action: P. Becker presented a revised proposal which passed SG R&A UA.

July 2024 Meeting Action: P. Becker presented a proposal which was **UA.**

Item Number: A21-43	NBIC Location: Part 3, Glossary	Attachment 22

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

Subgroup: Repairs and Alterations

Task Group: M. Toth (PM), B. Underwood, L. Dutra, R. Collins, P. Davis, T. White, L. Moedinger, A. Triplett

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

Jan. 2024 SG and SC R&A Meeting Action: M. Toth presented a PR. Taskgroup updated to add: L. Dutra, R. Collins, P. Davis, T. White, L. Moedinger, A. Triplett

SG R&A July 2024 Meeting Action: M. Toth presented a proposal that **Passed w/4 neg votes** (R. Spuhl, A. Triplett, J. Seifert, B. Schaefer)

July 2024 Meeting Action: M. Toth presented a proposal. 17 members were present; 7 members voted Disapproval. 2/3 of the 17 members present needed to pass this is 12 members (11.33). Only 10 members voted to approve. This vote is DISAPPROVED. – **Close w/No Action - UA**.

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, M. Wadkinson, L. Dutra, J. Ferreira, M. Schaser, D. Kinney

Explanation of Need: Defining de-rating within Part 3

Jan. 2024 SG and SC R&A Meeting Action: M. Toth presented a PR. Task group updated to remove B. Wielgoszinski and add: M. Wadkinson, L. Dutra, J. Ferreira, M. Schaser, D. Kinney

SG R&A July 2024 Meeting Action: M. Toth proposed to **Close w/No Action**. The motion was UA.

July 2024 Meeting Action: M. Toth proposed to **Close w/No Action**. The motion was UA.

Item Number: A21-45 **NBIC Location: Part 3, Supplements** **No Attachment**

General Description: Engineered Repairs and Alterations Supplement

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), B. Boseo, B. Ray, D. Marek, R. Underwood, J. Siefert, P. Becker

Explanation of Need: In an effort to simplify the main body of NBIC Part 3, we are proposing a new Supplement called Engineered Repairs and Alterations which will import some existing, more complex activities from the main body and then eventually add new repair and alteration activities that are not currently addressed in the Part 3.

Jan. 2024 SC R&A Meeting Action: R. Underwood presented a PR; this proposal will be revised and sent to LB to SC R&A soon.

SG R&A July 2024 Meeting Action: R. Underwood presented a **PR**; this proposal is ready for SC.

July 2024 Meeting Action: M. Schaser presented a **PR and is on hold until the new engineered repairs scope is approved by BOT.**

Item Number: A21-53 **NBIC Location: Part 3, S8.5 a)** **No Attachment**

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

Subgroup: Repairs and Alterations

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

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

SG R&A July 2024 Meeting Action: P. Gilston presented a **PR**

July 2024 Meeting Action: P. Gilston presented a **PR**

Item Number: A22-18 **NBIC Location: Part 3, Glossary** **No Attachment**

General Description: Definition of blowdown and blowoff

Subgroup: Repairs and Alterations

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

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

Jan. 2024 SG and SC R&A Meeting Action: K. Moore presented a PR.

SG R&A July 2024 Meeting Action: K. Moore presented a PR.

July 2024 Meeting Action: K. Moore presented a PR.

Item Number: A23-09	NBIC Location: Part 3, New Supplement	No Attachment

General Description: Scope and Rules for use of Additive Manufacturing Pressure Parts

Subgroup: Repairs and Alterations

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

Explanation of Need: Developing rules for the use of additive manufacturing pressure parts in alterations.

January 2024 Meeting Action: G. Galaenes presented a PR, as this will go to SG R&A as a Rvw and Comment LB.

SG R&A July 2024 Meeting Action: Galanes presented revisions to the proposal based on the Rvw & Comment LB, this will go to **SG R&A for LB Vote**

July 2024 Meeting Action: Galanes presented a **PR**, as this will go to **SG R&A for LB Vote**

Item Number: A23-13	NBIC Location: Part 3, 3.3.3 s)	No Attachment

General Description: Consistent addressing of the term for weld metal

Subgroup: Repairs and Alterations

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

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

Jan. 2024 SC R&A Meeting Action: P. Gilston presented. The proposal was UA by SC R&A, and will need to be LB to Parts 1, 2 and 4.

SG R&A July 2024 Meeting Action: P. Gilston presented a **PR**, as this was currently open to SC LB to Parts 1, 2, and 4 until 07/17/24.

July 2024 Meeting Action: P. Gilston presented a **PR**, as it has passed all SC LB to Parts 1, 2, and 4 and will be presented to MC tomorrow.

Item Number: A23-21 **NBIC Location: Part 3, 3.3.4.9** **Attachment 23**

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

Subgroup: Repairs and Alterations

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

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

Jan. 2024 SG and SC R&A Meeting Action: E. Cutlip presented a PR

SG R&A July 2024 Meeting Action: P. Gilston presented a proposal for a vote. The item **passed with 4 negatives and 3 abstentions**. (Neg. votes = M. Quisenberry, T. McBee, L. Dutra, C. Hopkins; Abstentions = B. Schaefer, J. Ferreira, T. Seime)

July 2024 Meeting Action: P. Gilston presented a proposal for a vote. The item failed (Negative Votes: M. Carlson, T. McBee, B. Boseo, P. Davis, P. Becker, S. Marks for P. Shanks, J. Siefert, C. Hopkins, M. Quisenberry, R. Miletti, T. Seime), (Abstentions: B. Schaefer) and only 2 approvals (K. Moore and P. Gilston). **This was a PR.** J. Ferriera added to the TG.

Item Number: A23-24 **NBIC Location: Part 3** **Attachment 24**

General Description: Repairs to quick actuating closures

Subgroup: Repairs and Alterations

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

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

Jan. 2024 SG and SC R&A Meeting Action: T. McBee presented a PR.

SG R&A July 2024 Meeting Action: T. McBee presented a proposal which was **UA**.

July 2024 Meeting Action: T. McBee presented a proposal which was **UA**.

Item Number: A23-35 **NBIC Location: All Parts, 9.1** **No Attachment**

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

Subgroup: Repairs and Alterations

Task Group: T. White (PM), A. Khssassi, J. Walker, P. Lentzer

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

Jan 2024 SC R&A Meeting Action: T. White presented. Based on conversation, this term may be defined in other codes already, and may need to be revised. This was a PR. Added J. Walker and P. Lentzer to task group.

SG R&A July 2024 Meeting Action: T. White presented a **PR**.

July 2024 Meeting Action: T. White presented a **PR**.

Item Number: A23-36 **NBIC Location: Part 3, 4.2 a) and 4.4 b)** **No Attachment**

General Description: Clarifying Rules for Using Alternative NDE Methods

Subgroup: Repairs and Alterations

Task Group: Tom White (PM), P. Miller, P. Lentzer

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

Jan 2024 SC R&A Meeting Action: Based on A23-04 (A. Triplett – PM) changing this paragraph, Mr. White submitted this as a PR and may combine this item with 23-77 (also dealing with paragraph 4.2). Added J. Walker and P. Lentzer to task group.

Update: A23-36 and A23-59 have been rolled into A23-77and will be Closed w/No Action

SG R&A July 2024 Meeting Action: A motion to **Close w/No Action was** UA**.**

July 2024 Meeting Action: A motion to **Close w/No Action was** UA**.**

Item Number: A23-39 **NBIC Location: Part 3, 3.3.1** **Attachment 25**

General Description: Strengthening Prevention of Defect Recurrence

Subgroup: Repairs and Alterations

Task Group: J. Ferreira (PM), J. Walker, F. Johnson, P. Gilston, A. Henson, G. Galanes, B. Hrubala

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

Jan. SC R&A Meeting Action: J. Ferreira presented. After much conversation, Mr. Ferreira submitted a PR and will revise and submit a LB soon. The following people were added to the task group: P. Gilston, A. Hanson, G. Galanes, B. Hrubula.

SG R&A July 2024 Meeting Action: J. Ferreira presented a proposal which was **UA.**

July 2024 Meeting Action: J. Ferreira presented a proposal which was **UA.**

Item Number: A23-40 **NBIC Location: Part 3, 3.3.4.1** **No Attachment**

General Description: Strengthening Requirements to Ensure Defect Removal

Subgroup: Repairs and Alterations

Task Group: L. Dutra (PM), E. Cutlip, A. Renaldo, R. Valdez, T. McBee, A. Henson

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

SG R&A July 2024 Meeting Action: L. Dutra presented a PR.

July 2024 Meeting Action: L. Dutra presented a **PR**.

Item Number: A23-41 **NBIC Location: Part 3, 3.3.4.6 a) 2)** **Attachment 26**

General Description: Strengthening Requirements for Defect Removal When Patching (tied to I24-51)

Subgroup: Repairs and Alterations

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

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

Jan. 2024 SG and SC R&A Meeting Action: A. Khssassi presented a PR

SG R&A July 2024 Meeting Action: A. Khssassi presented a proposal which was **UA**. The Intent Interp (I24-51) was also discussed and was approved by the SG to be discussed tomorrow at SC.

July 2024 Meeting Action: A. Khssassi presented a proposal which was revised and **UA**.

Item Number: A23-59 **NBIC Location: Part 3, 4.2 a) and b)** **No Attachment**

General Description: NDE Personnel Certifications for Repairs and Alterations

Subgroup: Repairs and Alterations

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

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

January 2024 Meeting Action: K. Moore presented a PR.

Update: A23-36 and A23-59 have been rolled into A23-77and will be Closed w/No Action

SG R&A July 2024 Meeting Action: A proposal to **Close w/No Action was UA.**

July 2024 Meeting Action: A proposal to **Close w/No Action was UA.**

Item Number: A23-61 **NBIC Location: Part 3, S9.3** **No Attachment**

General Description: Revise NBIC R-2 Report and guide

Subgroup: Repairs and Alterations

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

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

January 2024 Meeting Action: B. Schaefer presented a PR. This is related to A22-19.

SG R&A July 2024 Meeting Action: B. Schaefer presented a **PR**

July 2024 Meeting Action: B. Schaefer presented a **PR**

Item Number: A23-68 **NBIC Location: Part 3, 3.4.4 c) and d)** **No Attachment**

General Description: Changes to Examples of Alterations

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), T. McBee P. Becker, L. Baker

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

January 2024 Meeting Action: K. Moore presented this is still at SG and is a PR.

SG R&A July 2024 Meeting Action: M. Schaser presented a **PR**

July 2024 Meeting Action: M. Schaser presented a **PR**

Item Number: A23-69 **NBIC Location: Part 3, 9.1** **No Attachment**

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

Subgroup: Repairs and Alterations

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

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

Update - Failed SG LB (12-3-9) in Dec. 2023

January 2024 Meeting Action: R. Miletti presented a proposal and was UA by the SC R&A. This will need to go to LB to Parts 1, 2, and 4.

Update – Passed all 4 Subcommittees 7/12/24 and is ready for MC

July 2024 Meeting Action: R. Miletti presented a **PR,** as this is ready for MC.

Item Number: A23-77 **NBIC Location: Part 3, 4.2 a)** **No Attachment**

General Description: Performance of Original NDE During Repairs and Alterations

Subgroup: Repairs and Alterations

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

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

January 2024 Meeting Action: January 2024 Meeting Action: K. Moore presented this as a PR.

Update: A23-36 and A23-59 have been rolled into A23-77and will be Closed w/No Action

SG R&A July 2024 Meeting Action: A. Triplett presented a **Rvw & Comment LB to SG R&A**

July 2024 Meeting Action: A. Triplett presented a **PR**, as this will go to a **Rvw & Comment LB to SG R&A**

Item Number: A23-78 **NBIC Location: Part 3, S8** **Attachment 27**

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

Subgroup: Repairs and Alterations

Task Group: P. Becker (PM)

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

January 2024 Meeting Action: January 2024 Meeting Action: P. Becker presented a PR.

SG R&A July 2024 Meeting Action: P. Becker presented a proposal which was **UA.**

July 2024 Meeting Action: P. Becker presented a proposal which was **UA.**

Item Number: A23-83 **NBIC Location: Part 3, New Engineered repairs and Alteration Supplement** **Attachment 28**

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

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), R. Underwood

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

January 2024 Meeting Action: R. Underwood presented a PR, as this item will go to SC R&A as a LB once some of the alternative welding methods have been moved back into the main part of the NBIC Part 3.

SG R&A July 2024 Meeting Action: M. Schaser presented a proposal that was **UA.**

July 2024 Meeting Action: M. Schaser presented a proposal that was **UA.**

Item Number: A23-86 **NBIC Location: Part 3, S6.5 & S6.6** **Attachment 29**

General Description: Revision to Part 3 DOT Supplement re-write

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

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

January 2024 Meeting Action: January 2024 Meeting Action: R. Underwood presented a PR as this item will be go to SG R&A LB when ready.

SG R&A July 2024 Meeting Action: R. Underwood presented this has passed SG LB and is ready for SC.

July 2024 Meeting Action: R. Underwood presented a proposal that was **UA**.

New Action Items:

Item Number: A24-01 **NBIC Location: Part 3, 3.3.3 j)** **Attachment 30**

General Description: Change to Examples of Repairs

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), R. Collins, C. Hopkins, K. Derrick, S. Lombardo

Explanation of Need: Revision to 3.3.3(j) is needed to establish a code-based nozzle-to-nozzle spacing requirement to cover nozzle installation for both ASME VIII-1 and ASME VIII-2 design requirements.

January 2024 Meeting Action: M. Schaser presented and motioned for a vote. The vote failed the SG and the following people were added to the taskgroup: R. Collins, C. Hopkins, K. Derrick, S. Lombardo.

SG R&A July 2024 Meeting Action: M. Schaser presented a proposal that was UA.

July 2024 Meeting Action: M. Schaser presented a proposal that was **UA**

Item Number: A24-12 **NBIC Location: Part 3, S7.5** **Attachment 31**

General Description: Reference to change of service for LPG vessels incorrectly uses "altered"

Subgroup: Repairs and Alterations

Task Group: M. Vogt (PM), S. Frazier, B. Hrubala

Explanation of Need: Conversion of service for LPG tanks (typically from above ground to underground service) typically involves changes to the vessel covered under Part 3, Paragraph 3.3.3 and, as such, are considered repairs. As such, the language referring to these conversions that uses the word "altered" may be confusing to an inspector or other user of NBIC. I suggest changing the word "altered" to "changed".

This action item was previously submitted requesting changes to both Part 2 and Part 3 under Item 23-30. The changes to Part 2 were reviewed and approved by SG Inspection, SC Inspection, and Main Committee in July 2023. However, a separate action item to address the changed needed in Part 3 was never opened. Therefore, I'm submitting this now as a new action item for Part 3. A similar language change has already been approved for Part 2. This change request is to synchronize the language in both parts.

SG R&A July 2024 Meeting Action: M. Vogt presented a proposal which was **UA**.

July 2024 Meeting Action: M. Vogt presented a proposal which was **UA**.

Item Number: A24-13 **NBIC Location: Part 3, 1.5.1** **No Attachment**

General Description: Correction of wording errors in NBIC Part 3, 1.5.1

Subgroup: Repairs and Alterations

Task Group: T. Seime (PM), M. Vogt, J. Siefert

Explanation of Need: To provide clear guidance to Certificate Holders and Review Team Leaders of requirements to be included in the Quality System.

Update: SG & SC Approved via LB.

July 2024 Meeting Action: T. Seime presented a **PR,** as this is ready for MC

Item Number: A24-15 **NBIC Location: Part 3, 4.2** **Attachment 32**

General Description: NDE requirements

Subgroup: Repairs and Alterations

Task Group: M. Quisenberry (PM), M. Wadkinson, S. Frazier, R. Spuhl

Explanation of Need: B31.1 has introduced very stringent requirements on the R-Certificate holders that will create an unnecessary burden on them.

SG R&A July 2024 Meeting Action: M. Quisenberry presented a proposal that was **UA**.

July 2024 Meeting Action: M. Quisenberry presented a proposal that was **UA**.

Item Number: A24-17 **NBIC Location: Part 3, 5.7.5 b)** **No Attachment**

General Description: Specific Requirements For Stamping And Nameplates

Subgroup: Repairs and Alterations

Task Group: E. Cutlip (PM), B. Schaefer, A. Khssassi

Explanation of Need: 2023 ASME Section VIII-Div 1 UG-119(c)(5) has been revised to allow for the use of mechanical etching or laser annealing on nameplates.

SG R&A July 2024 Meeting Action: B. Schaefer presented a **PR**.

July 2024 Meeting Action: B. Schaefer presented a **PR**.

Item Number: A24-18 **NBIC Location: Part 3, 9.1** **Attachment 33**

General Description: Definition of Controlled Fill

Subgroup: Repairs and Alterations

Task Group: P. Gilston (PM), A. Triplett, R. Collins, F. Johnson

Explanation of Need: Interpretation item I 23-79 addresses the use of the term 'controlled fill' in relation to welding method 6. The term is used in 2.5.3 d in relation to welding method 6 and more specifically in Supplement 8. Supplement 8 gives a lot of detail in schematics about a controlled fill in terms of weld bead placement, its use in controlling heat input etc., but in Welding Method 6 the term is not specifically used, but direction for welding is given, typically preheats are specified, electrode size for SMAW, and the use of stringer beads only.

SG R&A July 2024 Meeting Action: P. Gilston presented a proposal which was UA by SG. This will need to be **LB to Part 1, 2, and 4 SG.**

July 2024 Meeting Action: P. Gilston presented a proposal which was **UA by Part 3 SC**. This will still need to be **LB to Part 1, 2, and 4 SG.**

Item Number: A24-20 **NBIC Location: Part 3, 9.1** **No Attachment**

General Description: Define "Engineered Repairs" and "Engineered Alterations"

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), B. Ray, R. Underwood, B. Boseo, D. Marek, J. Siefert, P. Becker

Explanation of Need: The new supplement dealing with "Engineered Repairs and Alterations" (A21-45) will impact Part 3 Section 1, the NB-415, QRRs, the application process for Certificate Holders, and other documents to be determined. Defining "Engineered Repairs" and "Engineered Alterations" clarify the intent for these new scopes.

SG R&A July 2024 Meeting Action: M. Schaser presented a **PR.**

July 2024 Meeting Action: M. Schaser presented a **PR.**

Item Number: A24-21 **NBIC Location: Part 3, 9.1** **No Attachment**

General Description: Engineered Repairs and Alterations - Section 1 Scope and Manual reqs

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), B. Ray, R. Underwood, B. Boseo, D. Marek, J. Siefert, P. Becker

Explanation of Need: The scope of "Engineered Repairs and Alterations" (A21-45)needs to be clarified in 1.4.1 d) and reflected in the scope statement requirements for manuals in 1.5.1 a).

SG R&A July 2024 Meeting Action: M. Schaser presented a **PR.**

July 2024 Meeting Action: M. Schaser presented a **PR.**

Item Number: A24-22 **NBIC Location: Part 3, 2.5.3** **Attachment 34**

General Description: Alternative Welding Methods without PWHT- Competent Technical Advice

Subgroup: Repairs and Alterations

Task Group: E. Cutlip (PM), J. Ferreira

Explanation of Need: The first sentence of 2.5.3 (b) requires the competent technical advice to be obtained for the use of every alternative welding method which can be impractical. In most cases, the R certificate firm that is making the determination to use alternative welding method. Most R-certificate holders do not retain a record of the component technical advice they may get.

Competent technical advice is used in paragraph 3.2.1 and 3.3.4.3 (d)(1) and the wording states competent technical advice should be obtained. But in 2.5.3 (b) states competent technical advice shall be obtained.

SG R&A July 2024 Meeting Action: J. Ferreira presented a proposal which was **UA**.

July 2024 Meeting Action: J. Ferreira presented a proposal which was **UA**.

Item Number: A24-28 **NBIC Location: Part 2, S9.9 b) 4)** **No Attachment**

General Description: Applying PWHT to previously "as welded" item

Subgroup: Inspection
Task Group: J. Swezy (PM), G. Galanes
Submitted by: J. Swezy

Explanation of Need: The NBIC clearly lists the application of PWHT to a PRI that was not previously PWHT by the original Manufacturer as an example of an alteration. I agree with that statement and believe it is appropriate to consider this to be an alteration. I do not under why the NBIC considers this as an acceptable alteration but does not provide its users with any guidance as to how they should address its implementation. It seems very clear to me that applying PWHT to such welds is rarely detrimental when properly applied and should not reduce their strength or toughness. If anything it should prove helpful rather than harmful under properly considered application. Good engineering practice mandates that a carbon steel vessel undergoing a change to wet H2S service should receive PWHT to provide an improved resistance to hydrogen cracking corrosion. Failing to do so would be irresponsible. The NBIC rules for a change of service even mention this as a factor to consider in Part 2, Table S-9.4.

SG R&A July 2024 Meeting Action: J. Swezy selected as PM. This was a **PR.**

July 2024 Meeting Action: G. Galens volunteered to be a member of the taskgroup**.** This was a **PR.**
MAY BE A PART 2/3 TG Item

Item Number: A24-43 **NBIC Location: Part 3, 1.3.2** **Attachment 35**

General Description: Certification of Reports of Repair without stamping - Action Item with I24-39

Subgroup: Repairs and Alterations

Task Group: M. Vogt (PM), R. Spuhl

Explanation of Need: Given INTERP 21-16 requirements, clarity is needed for R/NR work where the lack of stamping due to a practical matter, not necessarily a jurisdictional reason, may preclude certifying a Report of Repair. This Action Item is tied to Intent Interpretation I24-39.

SG R&A July 2024 Meeting Action: R. Spuhl presented a proposal that was **UA**.

July 2024 Meeting Action: R. Spuhl presented a proposal that was **UA**.

Item Number: A24-60 **NBIC Location: Part 3, 3.3.5.2 a) and 3.4.5.1** **No Attachment**

General Description: Revise the repair and alteration Sect VIII Div 2 and 3 paragraphs

Subgroup: Repairs and Alterations

Task Group: R. Collins (PM)

Explanation of Need: A revision of Part 3, 3.3.5.2 a) and 3.4.5.1 a), b), and c) are needed to reconcile the NBIC to Divisions 2 and 3 of ASME Section VIII. The attached proposal includes the complete revision draft.

SG R&A July 2024 Meeting Action: R. Collins presented a **PR**.

July 2024 Meeting Action: R. Collins presented a **PR**.

Item Number: A24-61 **NBIC Location: Part 3, 2.5.3 e) and 4.2** **No Attachment**

General Description: Relocate Volumetric NDE requirement for Weld Repair Greater than 3/8-inch

Subgroup: Repairs and Alterations

Task Group: M. Schaser (PM), M. Quisenberry, K. Derrik, B. Schaefer

Explanation of Need: Relocate the volumetric NDE requirement for weld repairs of 3/8-inch depth or greater from paragraph 2.5.3.e to paragraph 4.2.

July 2024 Meeting Action: M. Schaser presented a **PR**. M. Quisenberry, K. Derrik, and B. Schaefer were added to the TG

Item Number: A24-65 **NBIC Location: Part 3, Table 1.5.1 d)** **Attachment 36**

General Description: Applicability of Table 1.5.1 d)

Subgroup: Repairs and Alterations

Task Group: T. White (PM)

Explanation of Need: The term "administrative" appears 16 times in Part 3 but nowhere does the NBIC require or describe an administrative review of the "R" Certificate Holder's administrative processes. In addition, under the "Instructions" column, Supplement 6 should be Section 6 to include all the supplements if item d) is to be kept.

SG R&A July 2024 Meeting Action: T. White presented a proposal that was **UA**.

July 2024 Meeting Action: T. White presented a proposal that was **UA**.

12. Future Meetings

- January 13-16, 2025 – Charleston, SC
- July 2025 – TBD

13. The meeting was Adjourned @ 4:00 PM by Chair Moore.

Respectfully submitted,

Terrence Hellman

Terrence Hellman

SC R&A Secretary

SC R&A

Registrant Details

Member	Full Name	Email Address	Company Name	Title	Registration Type	Present	Column1
M	Becker, Pat	pbecker3135@gmail.com	EPRI	Technical Leader Materials Codes and Standards	In-person	x	
M	Boseo, Brian	bmboseo@burnsmcd.com	Burns & McDonnel	Department Manager	In-person	x	
M	Carlson, Mike	camx235@lni.wa.gov	State of Washington	Chief Boiler/Pressure Vessel Inspector	In-person	x	
M	Davis, Paul	paul.davis22@woodplc.com	Wood Group	Consultant QA/QC	In-person	x	
M	Gilston, Philip	philip_gilston@hsb.com	HSB	Principal Engineer - Codes & Standards	In-person	x	
M	McBee, Tim	Timothy.McBee@tuvsud.com	ARISE	Manager of Codes and Standards	In-person	x	
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M	Schaefer, Ben	bschaefer@aep.com	AEP	Quality Control Manager	In-person	x	
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M	Shanks, Paul	paul.shanks@onecis.com	BVI&I	Executive Director Verbal Communications	In-person		Stacy Marks - Substitute
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M	Hopkins, Craig	chopkins@seattleboiler.com				x	
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M	Morelock, Brian	Poppymorelock@gmail.com					
M	Valdez, Rick	rvaldez@prim.com					
M - Chair	Moore, Kathy	kathymoore@joemoorecompany.com	Joe Moore & Company, Inc.	QCM	In-person	x	
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	Edward, Speck-Kern	EDWARD.SPECK-KERN@fpl.com			In-person	X	
	Will Stevens				In-person	X	
	Jeff Churchhill				In-person	X	
	Devon Numey				In-person	x	

Update on Alternative Weld Repairs Performed to Welding Method 6 (WM6), Welding Method 7 (WM7) or Supplement 8 (S8)

NBIC Part 3, SC-Repairs and Alterations

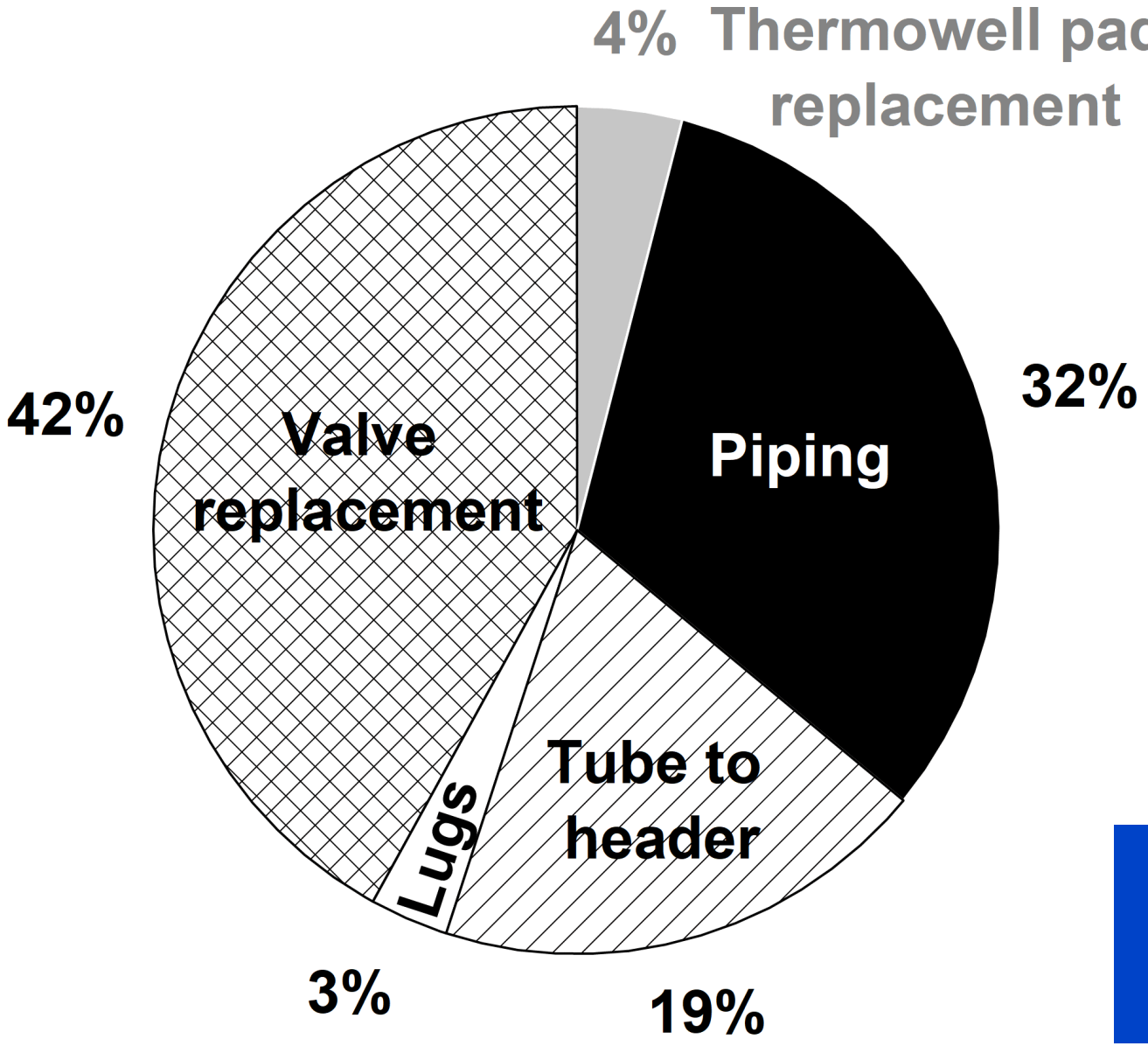
John A. Siefert, Ph.D.
Area Manager, Materials, EPRI

Hamit Afiyet
Supervising Engineer, Generation Engineering, LGE-KU

Current alternative weld repair activities

- Grade 22 (e.g., Welding Method 4)
  - Controlled experiments with standard or low carbon consumables, with and without PWHT
- T23 to T91 (common heat recovery steam generator configuration)
- Grade 92 (widespread use internationally; OEMs pushing its use)
- **Sharing service experience**
  - August 2023 small workshop hosted by EPRI
  - Today with SC-R&A
  - Other ideas welcome (Chiefs, NBIC Bulletin, etc.)

End-user 1 alternative weld repair database



- >1,100 repairs since 2015
- 90% using AWS type –B8
- Longest in-service repairs now >50,000 hours
- Case-by-case basis, approval governed by central engineering staff

One of the largest databases using WM6 and S8 in a variety of end-use applications

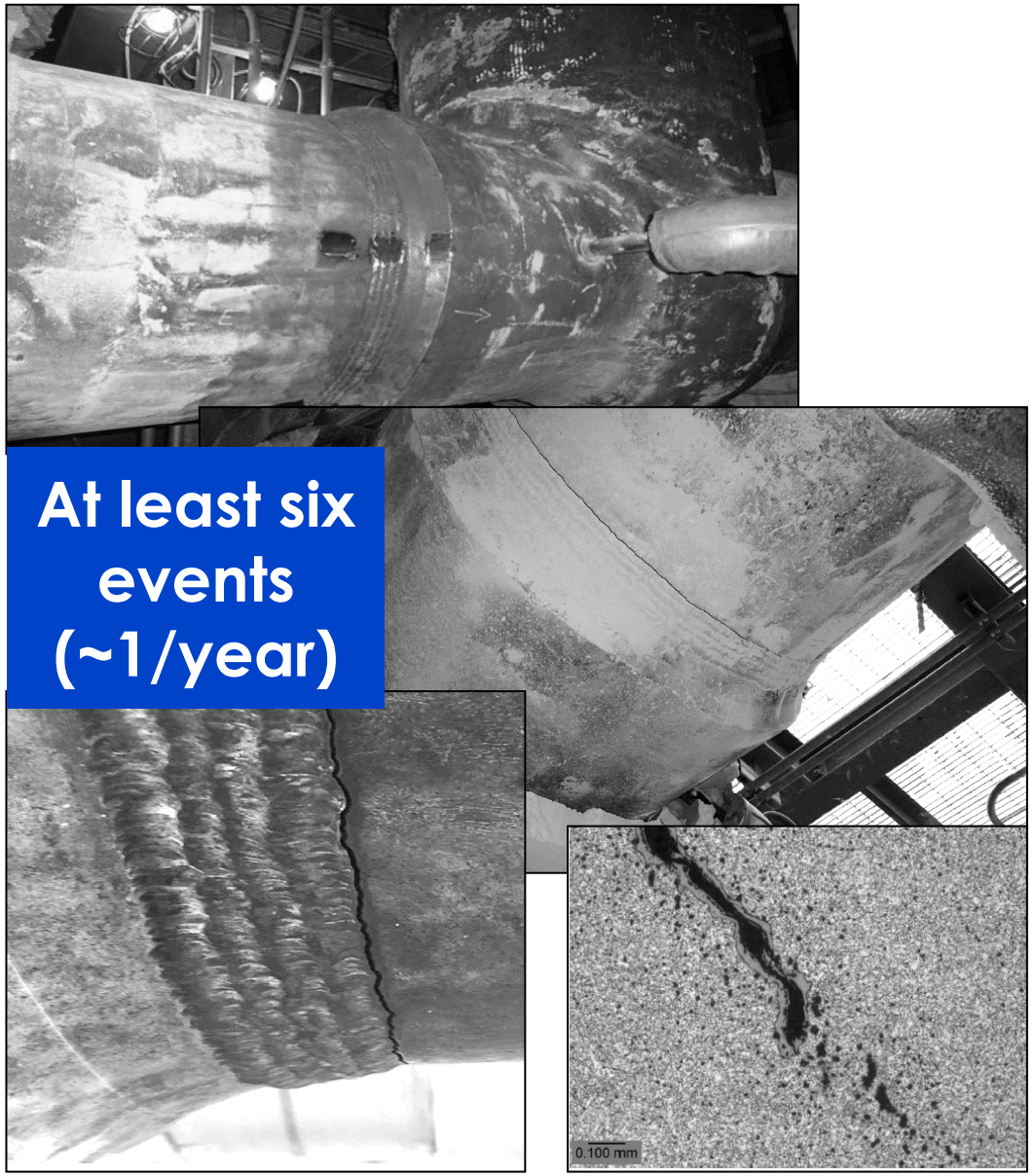
Inappropriate material installation and alternative repair

Characteristic	Description or value
Plant type	CCGT
World location	Florida, USA
Operational	
System/location	HP SH outlet header
Product form(s) Dimensions	Tube: 2-in. OD X 0.220-in. MW Header: 8.625-in. OD X 1.172-in. WT
Design	1,020°F and 2,710 psig
Operating time	~87,000 hours of operation
Explanation of damage	Carbon steel stub failed in a grade 91 steel system in September 2015
Repair	❖ New T91 replacement tube section ❖ GTAW, ERNiCr-3 + no PWHT ❖ 300°F preheat + 400°F interpass ❖ NDE = PMI, WFMT, hardness
Repair service	>47,500 hours and >1,400 starts

Failure during high demand period required repair over a weekend and saved at least 24-hours on the repair cycle

Creep cracking in hot reheat large bore girth welds

Characteristic	Description or value
Plant type	3 X 3:1 combined cycle, 1,250MW
World location	USA
Operational	November 2009
System/location	Pipe to valve body in hot reheat system
Product form(s) Dimensions	SA-335 P91, 24 X 1.1 inch (610 X 27 mm)
Operating conditions	1,103°F (595°C) and 749 psig (52 barg)
Operating time to incident	58,000 to 80,000 hours and 510 to 1,250 cycles
Explanation of damage	~35 to 50% of pipe circumference had OD-connected cracking in the HAZ of the pipe-side of the valve-to-pipe girth weld (~5 to 10% of crack was through-thickness to ID)



Midspan failure and alternative repair

Characteristic	Description or value
Plant type	CCGT
World location	Florida, USA
Operational	June 2002
System	HP SH1
Product form(s) Dimensions	SA-213 T91, 2-in. (50.8 mm) OD X 0.265-in. (6.7 mm) MW
Explanation of damage	Failure of a T91 finned tube section midspan in April 2023 (local overheat)
Repair	❖ ER80S-B2 root + ERNiCr-3 fill ❖ No back-purge ❖ No preheat, 250°F (120°C) max interpass
Repair service	>8,400 hours and >75 starts

Back purge impossible, safety concerns associated with preheat and PWHT equipment/operations on scaffolding to reach the failure

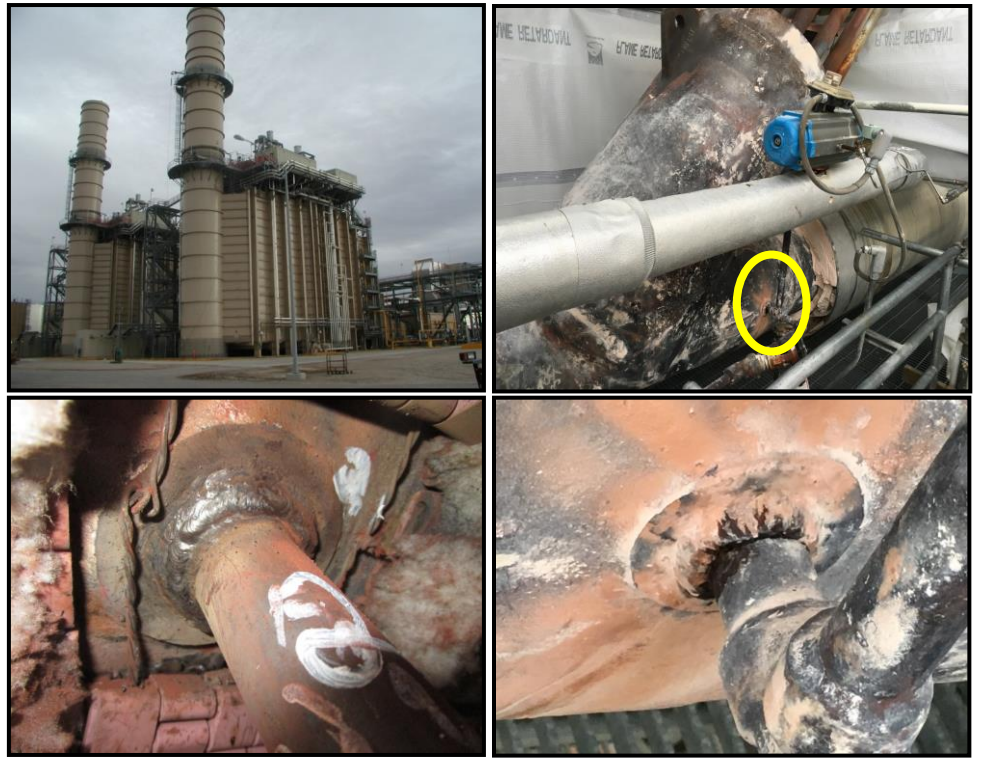
End-user 2 alternative weld repair database

Repair details						Operation	
Plant	System(s)	Component(s)	Type	No. of repairs	1st repair	Hours	Starts
A	HRH/MS/SH1	Valve balance/ warming lines, drain line, tube-to-header	WS8 (-B8)	13	Mar. 2016	<55,000	<360
B	MS	Vent valve	WS8 (-B8)	4	Jan. 2018	<37,000	<55
B	MS	Drain valve	WS8 (-B8)	2	Mar. 2019	<30,000	<45
B	Platen SH	T92 to SS310H tube ties	WM7 (FM82)	180	Spring 2024	<2,000	---
C	Radiant SH	Tube weld build-up	WS8 (-B8)	8	Apr. 2018	<46,000	<45
C	Radiant FSH	Tube butt welds	WM6 (-B8)	10	Apr. 2018	<46,000	<45
D	SH	Tube butt welds	WM6 (FM82)	3	Oct. 2020	<27,000	<120
E	MS	Fillet gamma plug welds	WS8 (-B8)	4	Apr. 2021	<16,000	<300

~225 alternative weld repairs performed since March 2016 with no failures. In selected case studies, repairs are outperforming original welds and/or prior repairs with PWHT.

Details for first weld repair

Characteristic	Description or value
Plant type	2:1 CCGT, 640 MW
World location	Colorado, USA
Operational	2004
Component	Hot reheat system, stop check valve
Product form(s) Dimensions	Valve: A-217 C12A, 24 X 0.687-in. (610 X 17.45 mm) Drain/warming line: A-335 P91, 1 X 0.179-in. (25.4 X 4.5 mm)
Operating conditions	1,035°F (557°C) and 525 psig (36.2 barg) ~72,000 hours and 1,100 starts to 1st alternative weld repair request
Operating time to incident	Warming lines repaired at least 2X using PWHT. Cracking re-occurred within ~3 years in each case. Valve body degraded to ~190 HBW.
Explanation of damage	OD-initiated thermal fatigue cracking confirmed by laboratory failure analysis



First example in fleet remains in service >55,000 hours

End-user databases

End-user	No. of repairs	Type
1	>1,100	WM6, S8
2	~225	WM6, WM7, S8
3	>100	WM6, S8
4	3,444	WM6
5	~300	WM6, S8
6	~15	WM6
7	~10	WM6
8	~1,000	WM6
9	640	WM6
10	~10	WM6
11	~10	WM6
12	2	S8
13	1	S8

- Largest number of repairs in a single outage ~1,000
- Largest single end-user application ~4,000 repairs across 2 units since 2015 to mitigate soot blower erosion damage
- Examples of WM6, WM7 and S8
- ~6 known repair failures
- Longest in service repairs >50kh
- Majority of repairs operating in high temperature and cyclic service

>10,000 estimated alternative repairs in operation

End-user perspective – LGE-KU

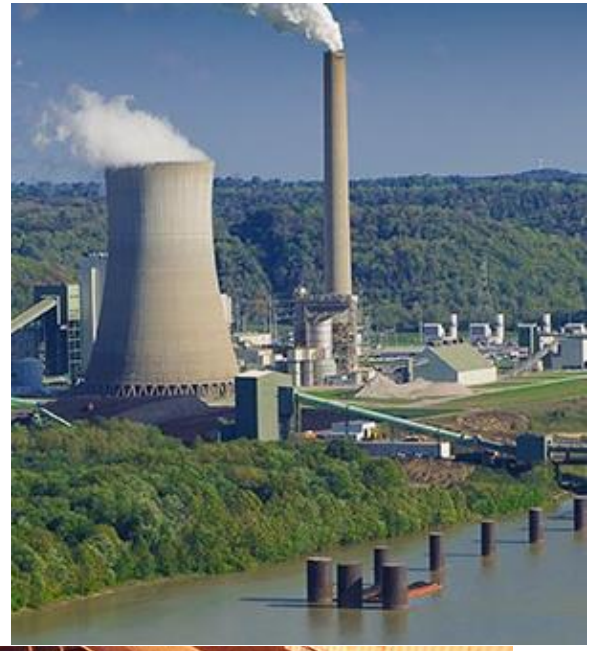
Alternative Weld Repairs in Grade 91

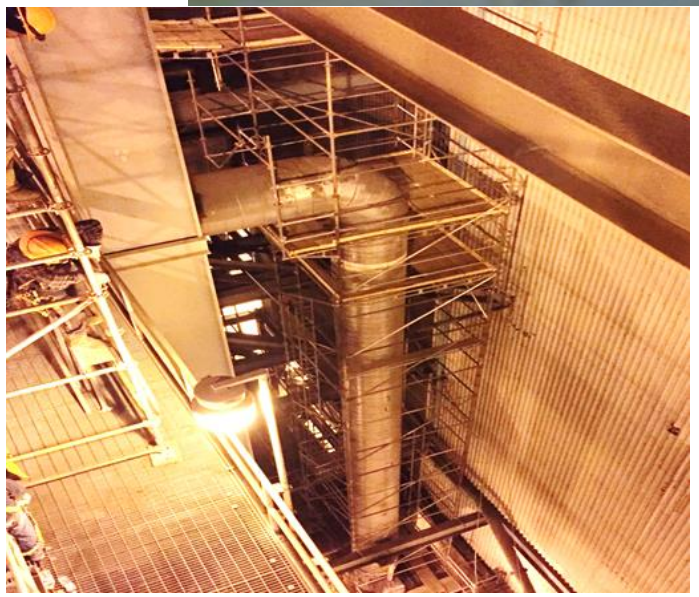
Hamit Afiyet
Mechanical Engineer
07/15/2024

LG&E KU
PPL companies

TC2 – HEPI Summary

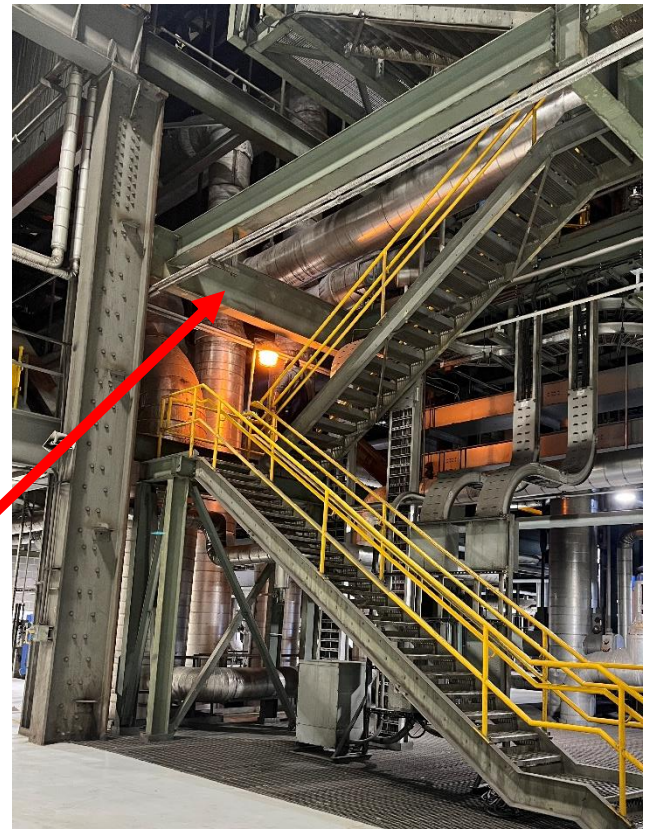
- TC2 was commissioned in 2011
  - ~89,728 hours of operation, 181 Cold Starts
- 760 MW, single reheat, eastern bituminous and PRB blend
  - Main steam design: 1091°F (588°C) and 4,133 psig (285 barg)
  - Hot reheat design: 1083°F (584°C) and 754 psig (52 barg)
- Over 455 girth welds
- 2016-2020
  - EPRI Research: MTR review, FEA modeling to better risk rank Gr. 91
  - Remaining life fraction calculations
  - Additional material samples taken during 2020 planned HEPI

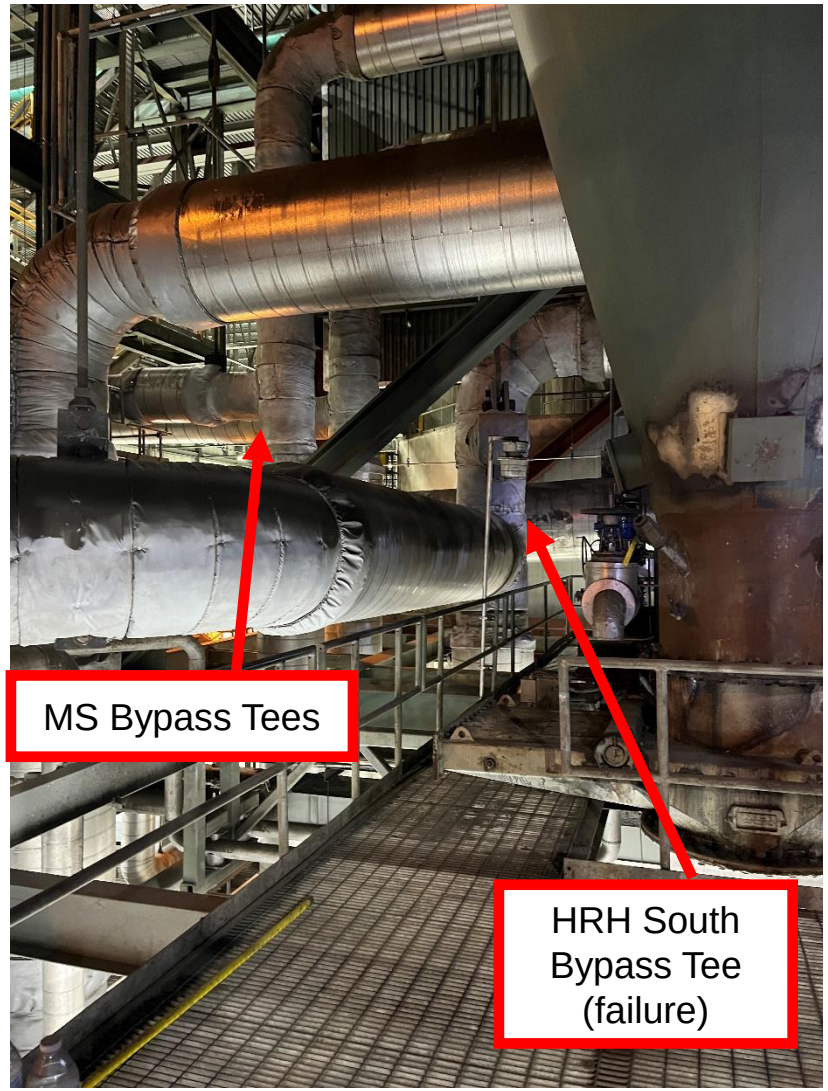




Failure – January 25th, 2021

- Hot reheat steam – South Bypass Tee
- 1,083 degF / 745 psi
- Premature failure after only ~65,000 hrs
- No injuries





Supplement 8 Weld Repair

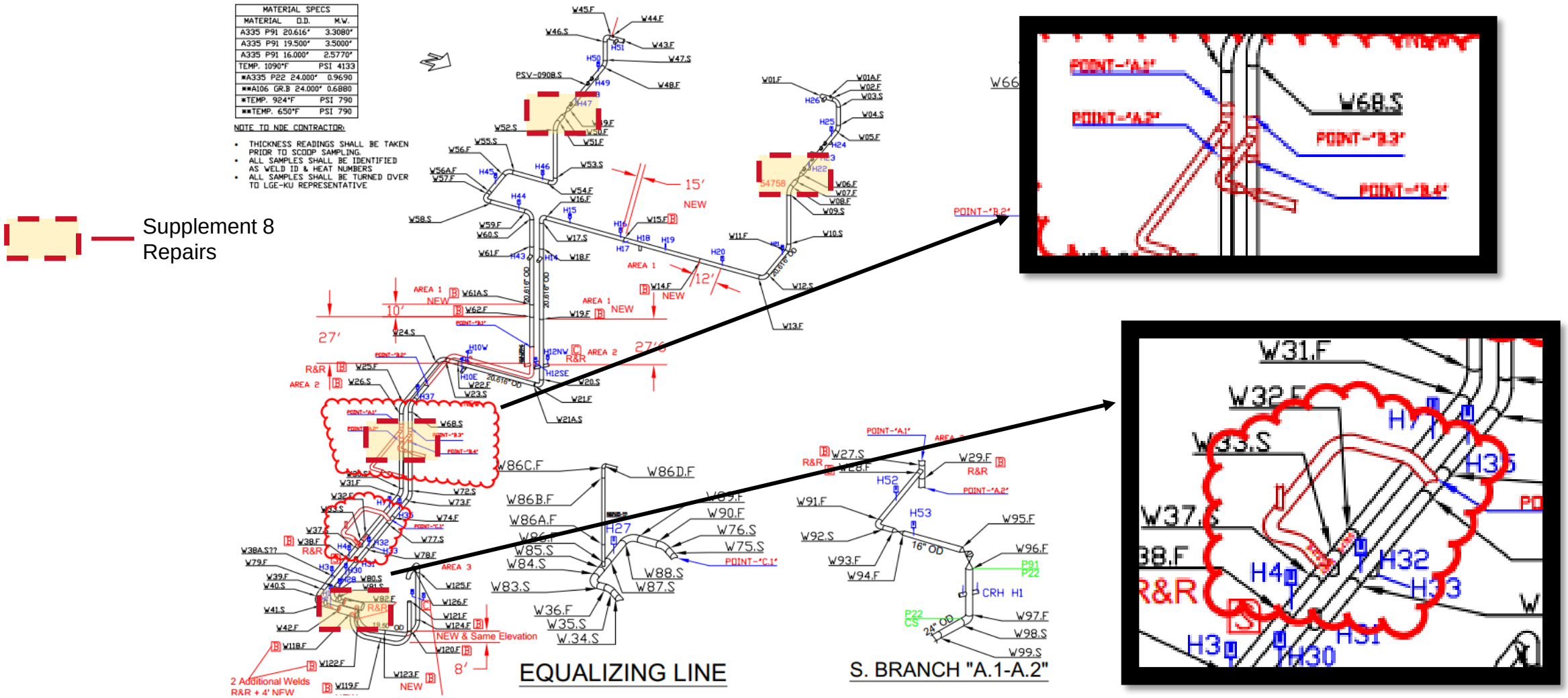
NBIC Part 3, 2021

Page 217

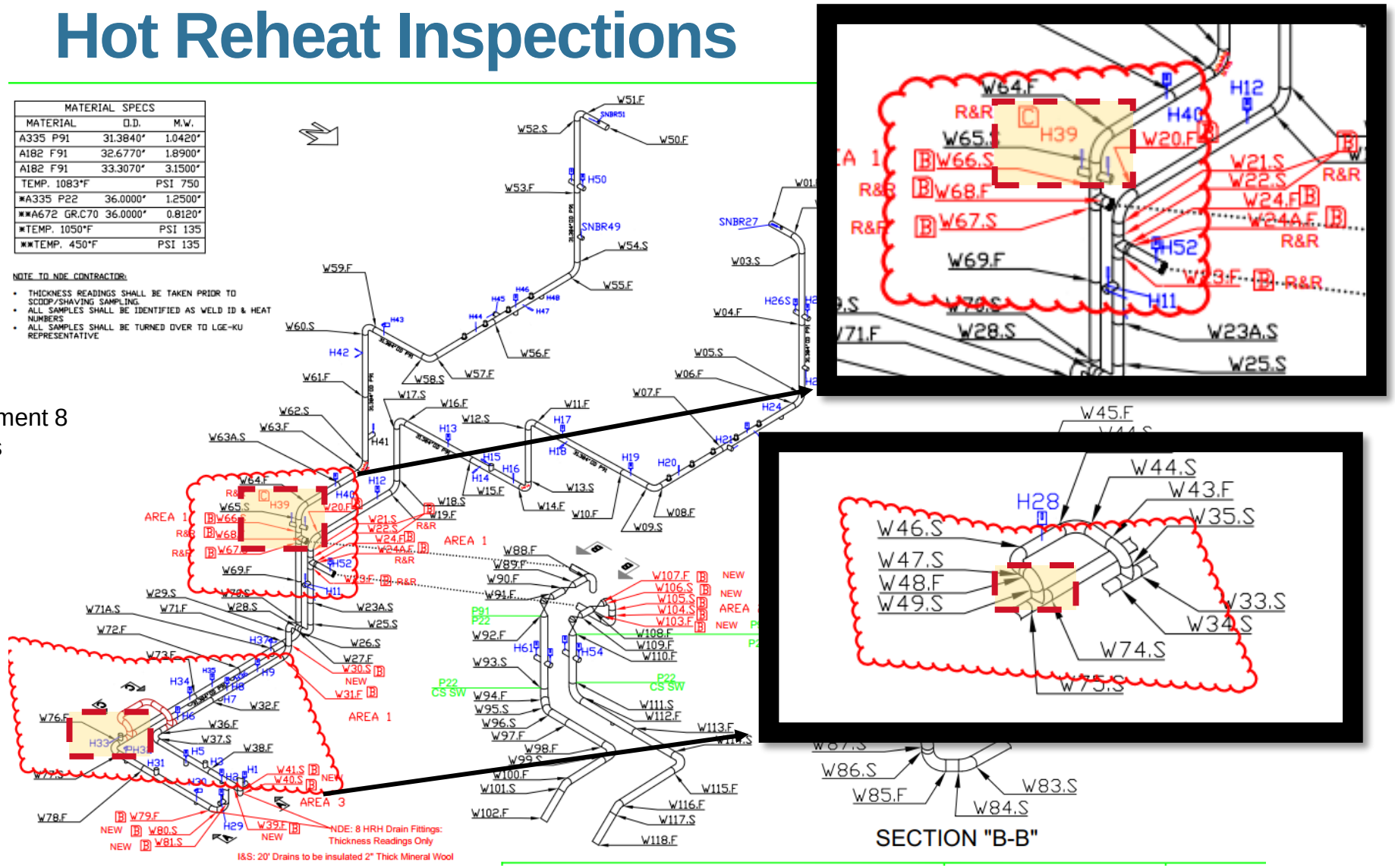
Component ID:	Repair Year	Accumulated Hours @Repair	Re-Inspection Year	Supplement 8
HRH-Gamma Plugs 2 Locations	2020 Fall	~62k	2022 (74k) Spring	GTAW ER80S-B8 B8-No PWHT
MS Thermowells 2 Locations	2020 Fall	~62k	2022 (74k) Spring	GTAW ER80S-B8 B8- No PWHT
HRH- H39	2021 Spring	~65k	2023 (83k) Spring	GTAW ER80S-B8 B8- No PWHT
MS CV Weld Repair	2022 Spring	~74k	2023 (83k) Spring	GTAW ER80S-B8 B8- No PWHT
MS CS Attachment	2023 Spring	~83k	2026	GTAW ER80S-B8 B8- No PWHT
MS Tees (6 Total Repair Locations)	2023 Spring	~83k	2024 Fall	Gr. 91 Filler – Low PWHT
HRH Tees (5 Total Repair Locations)	2023 Spring	~83k	2024 Fall	Gr. 91 Filler – Low PWHT
*HRH RH Attemperator (2 Total)	2023 Spring	~83k	TBD	GTAW ER80S-B8

*** 2 36” OD Full Pen. Welds & Current Hours: 89,728**

Main Steam Inspections

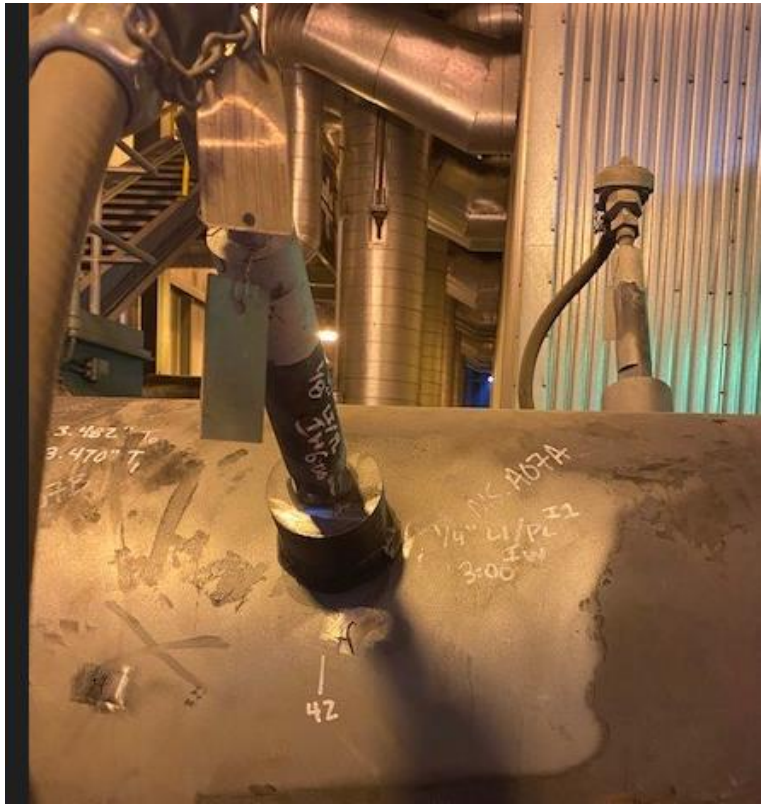


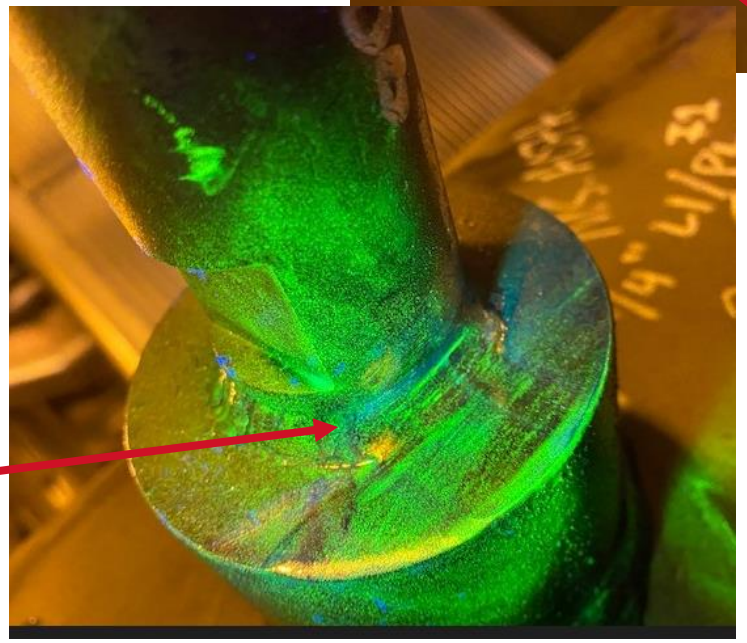
Hot Reheat Inspections



Supplement 8
Repairs

2020 HEPI Supplement 8 Repairs

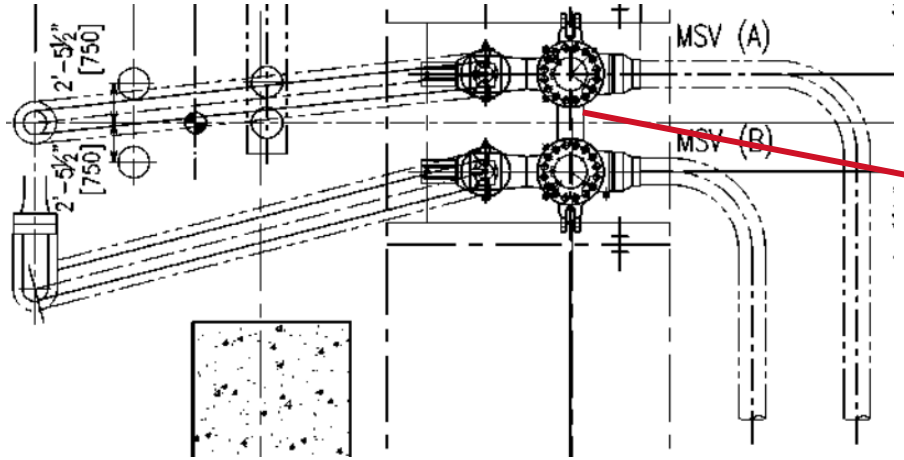


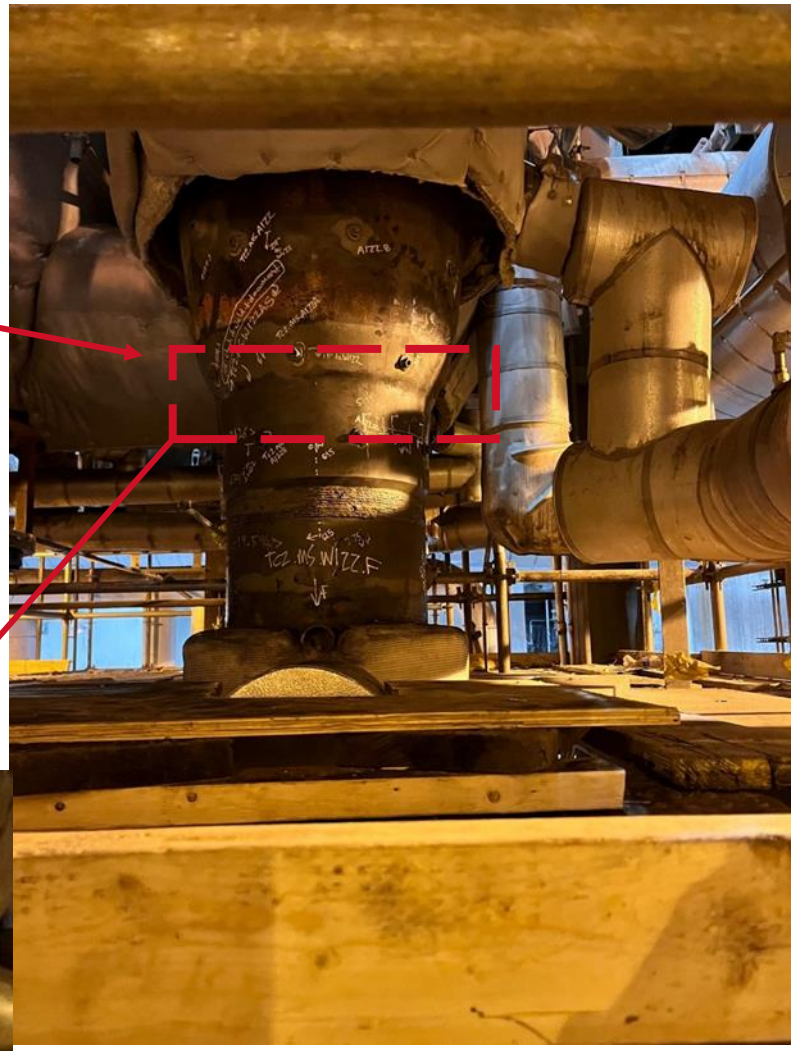


Gamma Plug with Non-conformance weld metal

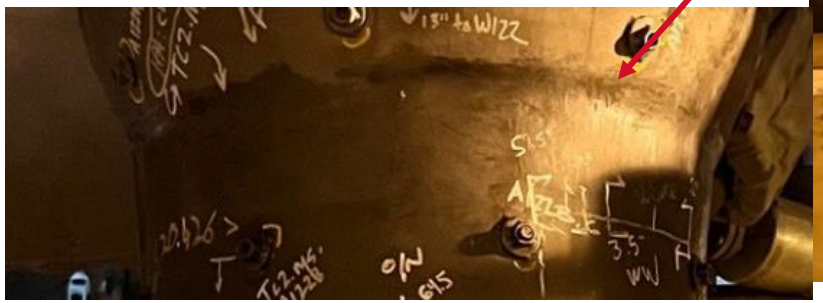
Underfilled Thermowell with Indications

2022 HEPI Main Steam: W122A.S

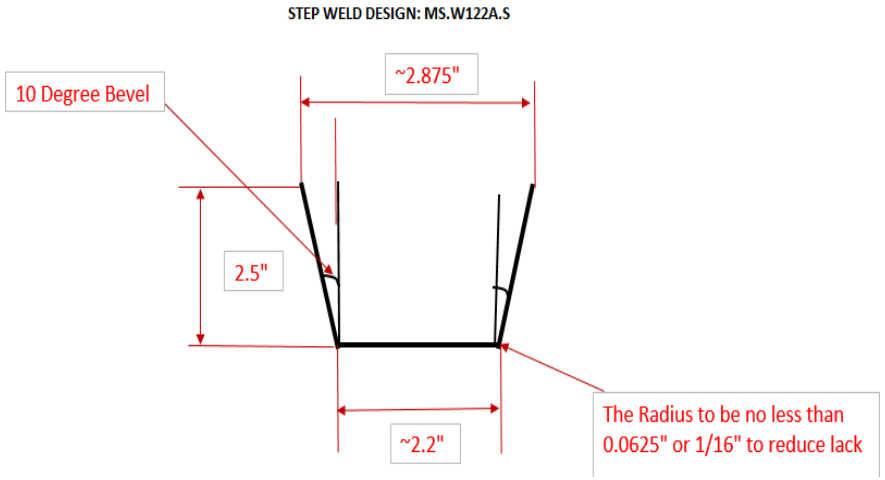




- High Traffic area



Excavation Plan & Step Weld Geometry



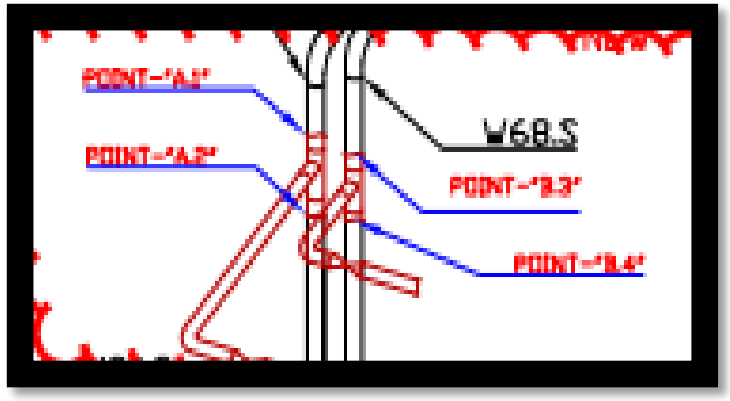
Welding

2023 HEPI Main Steam North Bypass Tee W28.S AKA ROMEO

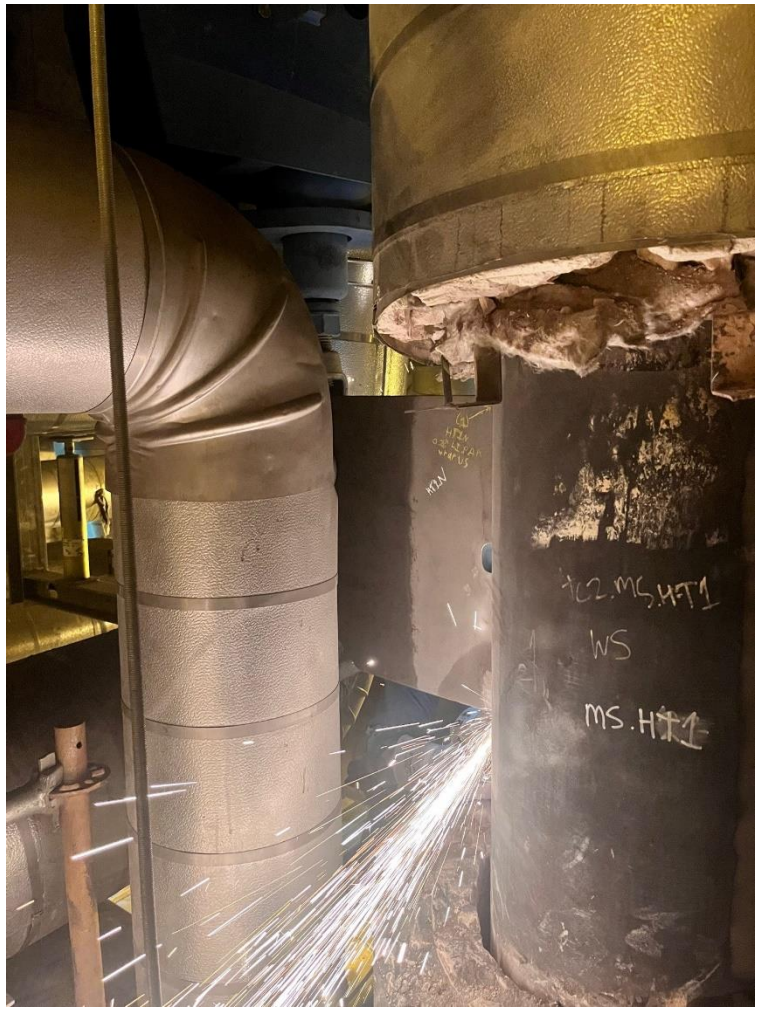
*6 o’clock location

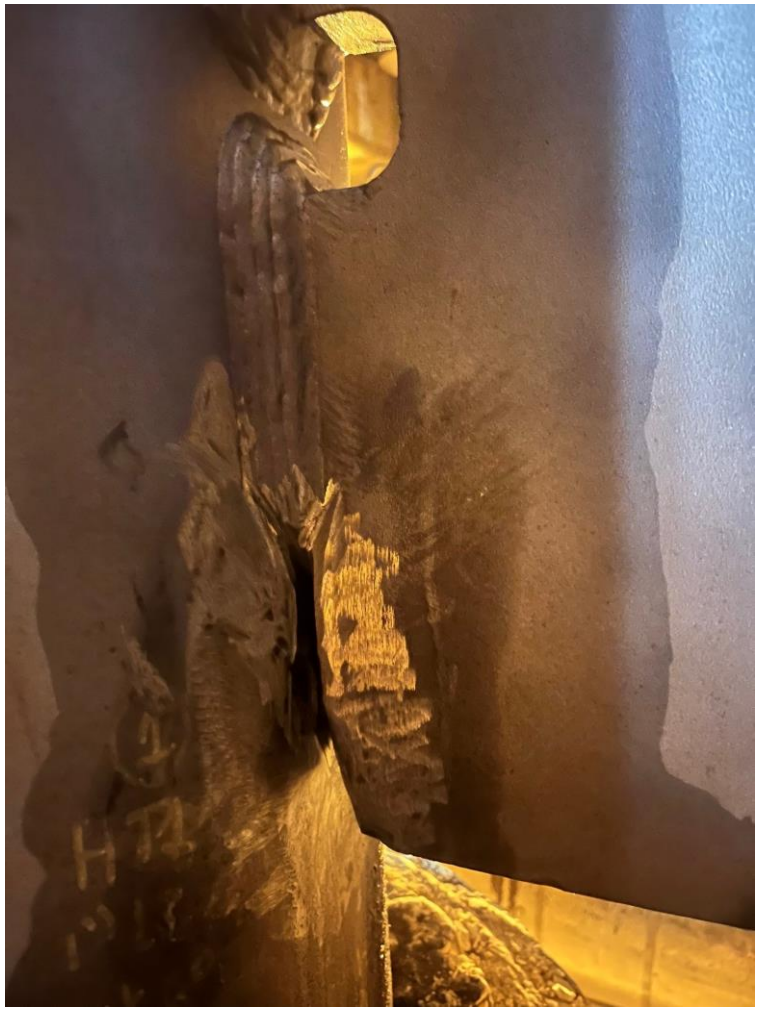
Romeo Tee

Main Steam South Tee (AKA JULIET)

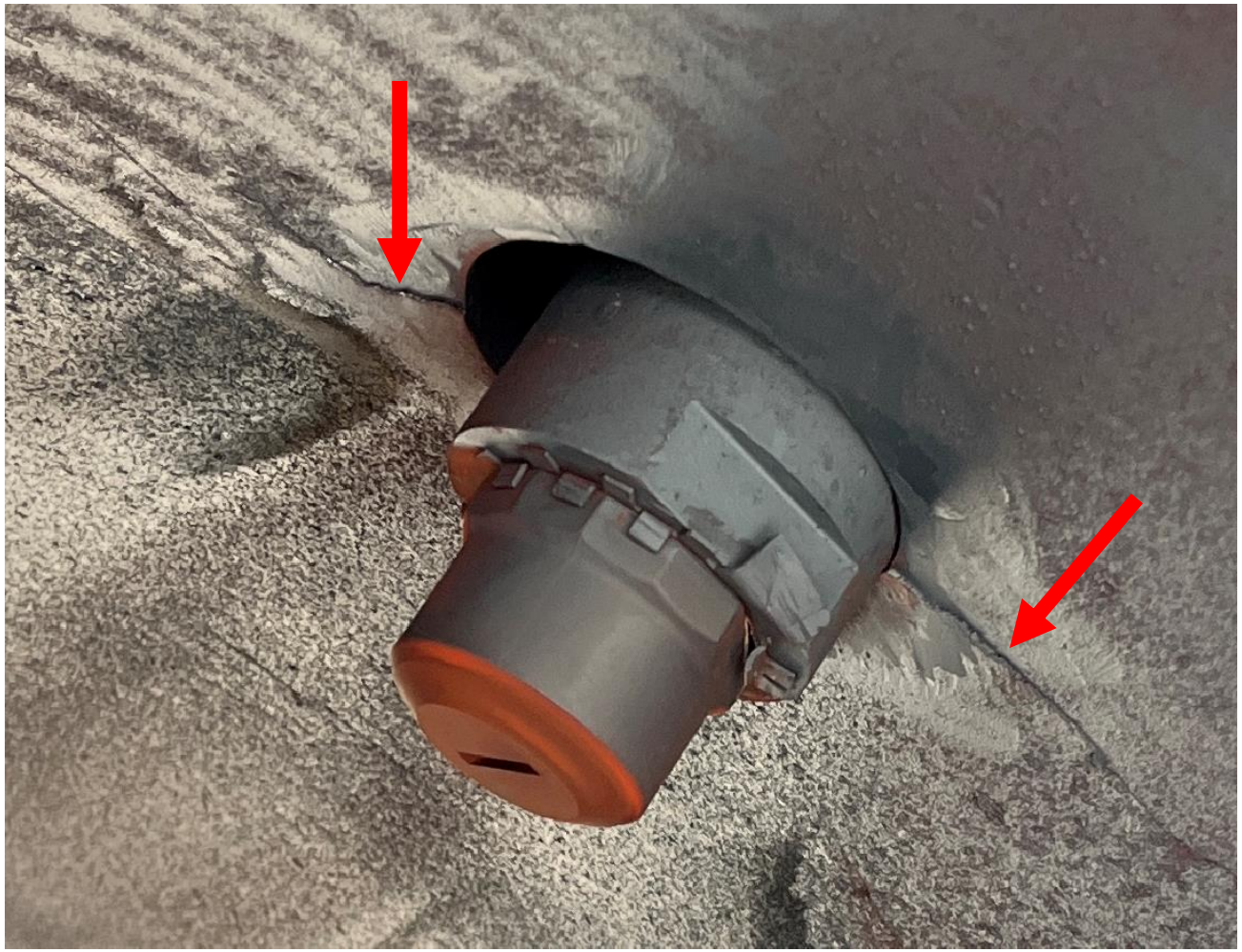


MS West Lead Constant Support HP Turbine Piping





RH Attemperator Replacement - 36” OD & 1.15” Wall



Control Fill with GTAW ER80S-B8

Reference

- NBIC 2021 part 3
- ASME B31.1 2020
- EPRI
  - Report **3002012182**: Responses, Comments, Concern
  - Report **1026584**
  - Report **3002003833**

Thank You For Your Time

Questions & Comments?

PPL companies

TOGETHER…SHAPING THE FUTURE OF ENERGY®

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

23-82

Subject/Title

Replacement of non-pressure retaining parts in Electrolyzer PEM Stack

Project Manager and Task Group

Source (Name/Email)

Kevin Choi / kevin.choi@accelerazero.com

Statement of Need

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

Background Information

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

Proposed Question

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

Proposed Reply

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

Committee's Question 1

Is the replacement of mechanically installed non-pressure parts not listed on the MDR within a mechanically assembled ASME Section VIII pressure-retaining item that does not affect the pressure parts considered a repair or routine repair by the NBIC?

Committee's Reply 1

No, the NBIC does not address the requirements for mechanical repairs to these types of components.

Rationale

Since the non-pressure parts are not attached to the PRI by welding, are not listed on the MDR, and do not affect the pressure parts of the PRI, it is not considered a repair or routine repair.

Committee's Question 2

Is the mechanical assembly of an ASME Section VIII pressure-retaining item after only mechanically installed non-pressure parts have been replaced required to be documented on Form R-1, Report of Repair.

Committee's Reply 2

No, this is beyond the scope of NBIC, Part 3.

Rationale

See rationale from Question 1.

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

24-10

Subject/Title

Qualification requirements for AIA Audit

Project Manager and Task Group

Source (Name/Email)

Raymond Spuhl / raymond_spuhl@hsb.com

Statement of Need

The 2023 Edition of the NBIC added the requirement for the ANI performing NR activities to have the N, R, and I endorsements. This raises the question as to the intent of the NBIC as to what endorsements are required for the Supervisor that oversees the ANI's work and performs the audit of the NR CH.

Background Information

RCI-1 contains specific requirements for the ANI and ANIS. Neither of which require the R or I endorsements. Since these endorsements have been added to the NR Quality Program requirements in the NBIC, the industry needs clarification on the Supervisor qualifications. A change to the NBIC to address the endorsements required for the Supervisor is being worked on under Record 23-58 and 23-60.

Proposed Question

Is the annual audit by the AIA of the NR CH required to be performed by the ANIS? If so, is the ANIS required to be qualified as an ANIS and ANII per RCI-1? Is the ANIS required to be qualified as an ANIIS per RCI-1?

Proposed Reply

Yes Yes No

Committee's Question 1
Does NBIC Part 3, 1.6.4 d) require the annual audit to be performed by the Authorized Nuclear Inspector Supervisor?

Committee's Reply 1

No.

Rationale

NBIC Part 3, 1.6.4 d)

Committee's Question 2

Committee's Reply 2

Committee's Question 3

PROPOSED INTERPRETATION

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

Item No.

24-29

Subject/Title

Volumetric NDE requirements for welded repairs to pressure vessels

Project Manager and Task Group

Marty Toth (PM), Mike Quisenberry, Robert Derby

Source (Name/Email)

Michael Schultz / michael.w.schultz@exxonmobil.com

Statement of Need

Urgent - scheduled maintenance event upcoming

Background Information

Specific vessel currently in question is a refinery Coke Drum (1.5" plate thickness with 0.100" corrosion resistant clad. Vessel has highly localized corrosion due to cladding damage. Once excavated for repair the corroded locations will exceed the 4.2a size restrictions. Original welds were RT inspected. Weld repairs will be completed via temperbead procedure with elevated preheat.

Proposed Question

Part 3 Section 4 (4.2a) was amended in the 2023 edition including more restrictive NDE requirements than previous editions for vessels constructed with volumetric NDE. Please confirm the intent of this update. It is currently being interpreted to require volumetric NDE on all welds to a pressure vessel (original weld seam OR plate material away from weld seam) that do not meet the depth (<1\8") and length (<6") restrictions. Is this interpretation correct?

Proposed Reply

Inspector discretion is allowed when volumetric testing is not possible/practicable

Committee's Question 1

Are repairs and alterations to base metal and corrosion-resistant cladding of pressure-retaining items originally examined utilizing volumetric NDE subject to the conditional requirements outlined in 4.2 for nondestructive examinations?

Committee's Reply 1

Yes

Rationale

If the original code of construction calls for the volumetric NDE before or following corrosion-resistant cladding, then the repair and/or alteration must adhere to the requirement outlined in 4.2 – Nondestructive Examination.

Committee's Question 2

Committee's Reply 2

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Rationale

4.2. – Nondestructive Examination specifically states this allowance.

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

24-33

Subject/Title

Proof Testing by a non-manufacturing R Certificate Holder

Project Manager and Task Group

Source (Name/Email)

Greg Francisco / greg.francisco@wrightspec.com

Statement of Need

My company, Wrightspec LLC, is planning to apply for a 'R' Certificate in order to support field & shop Repairs & Alterations (Rerating) of cast iron paper machine dryers. We hold an AIA service agreement with Arise Boiler Inspection & Insurance Company and are hopeful to have an R-stamp by end of summer 2024.

Background Information

Wrightspec LLC currently performs examination and installation activities of paper machine dryers and partial heads/shells, as hired mechanical contractors with extensive NDE expertise. Many of these vessels were made decades ago and in most cases the OEM is either no longer in existence, or the OEM has let their ASME 'U' & NBIC 'R' authorizations expire for North America in favor of overseas manufacturing. Thus, these OEM's can no longer perform Repair or Alteration activities on existing drying cylinders. Many paper mill clients already hire Wrightspec to examine existing dryers and/or install new heads. We would like to offer Repair and Alteration services to better support our clients' in-service equipment needs, due to the decline of authorized OEM's to perform these types of activites.

Proposed Question

In the case of non-welded cast iron pressure vessel heads originally constructed and designed by proof testing per the rules of ASME Section VIII Division 1, can a 'R' Certificate holder perform a burst test per UCI-101 / UCD-101 in lieu of calculations to support the Rerate of an existing pressure vessel, when the 'R' Holder does not hold an ASME 'U' authorization?

Proposed Reply

Yes, a 'R' Holder can perform proof testing in lieu of calculation in cases where the design is not able to be validated by calculation.

Committee's Question 1

When re-rating a pressure vessel as an alteration whose MAWP was determined via proof test in accordance with ~~its~~ the original code of construction, may proof testing be performed for re-rating in lieu of design calculations?

Committee's Reply 1

Yes, provided all other requirements of NBIC Part 3, 3.4.1 are met.

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

24-34

Subject/Title

Rerating using OEM's design data to waive proof testing

Project Manager and Task Group

Source (Name/Email)

Greg Francisco / greg.francisco@wrightspec.com

Statement of Need

My company, Wrightspec LLC, is planning to apply for a 'R' Certificate in order to support field & shop Repairs & Alterations (Rerating) of cast iron paper machine dryers. We hold an AIA service agreement with Arise Boiler Inspection & Insurance Company and are hopeful to have an R-stamp by end of summer 2024.

Background Information

A PV built in 1990 contains heads made of Class 40 cast iron. The heads were proof tested by the OEM and determined to be suitable for 160 psi MAWP. However, the OEM certified the vessel for only 125 psi due to customer requirements. Fast forward to present day, and the vessel owner now wants to Rerate the vessel to a higher pressure. The OEM is no longer in business, but the 'R' Holder is able to obtain a copy of the original proof test report by the OEM. Can it be acceptable for the 'R' Holder to Rerate the head above 125 psi, based on OEM records stating the design is good for higher pressure, without the 'R' Holder having to perform their own separate proof test? The 'R' Holder would not be using the OEM proof test record for any new manufacturing, only for the purposes of altering an existing vessel or part within the confines of the original design.

Proposed Question

Can a 'R' Certificate Holder use an OEM's original design documents (drawings, calculations, U-1A form, proof test records) to support a Rerate of a pressure vessel in cases where the OEM is either no longer in business, but the 'R' Holder is able to obtain copies of the original design documents which support that Rerating is possible?

Proposed Reply

Yes, a non-manufacturing 'R' Holder may utilize an OEM's design and test records for rerating existing in-service PV's so long as the physical condition of the vessel is suitable for increased MAWP, there are no physical changes to geometry, and the new/higher MAWP does not exceed that which is recorded on the OEM proof test report.

Committee's Question 1

Can a 'R' Certificate Holder use an OEM's original calculations when rerating a pressure vessel?

Committee's Reply 1

No

Rationale

3.4.1 a)

Committee's Question 2

Can a 'R' Certificate Holder use an OEM's original proof test records when rerating a pressure vessel?

Committee's Reply 2

No

Rationale

3.4.1 d)

I 24-34

I am retracting my negative and am voting abstaining. Reason is I think the use of previous cases should be allowed and Para 341 a) needs to be revised.

Jose

335 West Broadway • Louisville, Kentucky 40202 • (502) 583-1234 • www.brownhotel.com

I24-34

Gilston Philip - Hartford-HSB <Philip_Gilston@hsb.com>

Wed 7/17/2024 10:11 AM

To:Terrence Hellman <THellman@nationalboard.org>

Abstention, I would like more time to look at the background and reread the Code wording.

Philip Gilston CEng, MSc, IWE, MWeldI
Principal Engineer, Codes and Standards

The Hartford Steam Boiler
Inspection and Insurance Company
One State Street
P.O. Box 5024
Hartford, CT 06102-5024
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I24-34 - Abstention

Benjamin Schaefer <bschaefer@aep.com>

Wed 7/17/2024 11:55 AM

To:Terrence Hellman <THellman@nationalboard.org>
Cc:Benjamin Schaefer <bschaefer@aep.com>

Terry,

As justification for my Abstention vote for the item mentioned in the Subject. I believe there is a previous interpretation that needs to be considered in this item 93-5 (shown below) in reference to the second question. This is in reference to the original background referenced in the interpretation request.

Item Number: I24-34 **NBIC Location: Part 3, 3.4.1** **Attachment**

General Description: Rerating using OEM's design data to waive proof testing

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM), B. Hrubala

Explanation of Need: A PV built in 1990 contains heads made of Class 40 cast iron. The heads were proof tested by the OEM and determined to be suitable for 160 psi MAWP. However, the OEM certified the vessel for only 125 psi due to customer requirements. Fast forward to present day, and the vessel owner now wants to Rerate the vessel to a higher pressure. The OEM is no longer in business, but the 'R' Holder is able to obtain a copy of the original proof test report by the OEM. Can it be acceptable for the 'R' Holder to Rerate the head above 125 psi, based on OEM records stating the design is good for higher pressure, without the 'R' Holder having to perform their own separate proof test?

The 'R' Holder would not be using the OEM proof test record for any new manufacturing, only for the purposes of altering an existing vessel or part within the confines of the original design.

INTERP TG July 2024 Meeting Action: Proposal was **passed with 1 abstention (J. Ferreira)**

July 2024 Meeting Action:

+93-5 1992, Chapter III, R-503(d) Requirement for Pressure Test when Re-rating a Vessel

INTERPRETATION 93-5

Subject: Requirement for Pressure Test when Re-rating a Vessel

Edition: 1992

Question: If a pressure test required for a re-rated vessel is less than or equal to the hydrostatic test performed during construction, is a new pressure test required after the re-rating is completed?

Reply: No, provided no physical work is performed.

Re: I24-34

Terrence Hellman <THellman@nationalboard.org>

Wed 7/17/2024 11:37 AM

To:Paul SHANKS <Paul.Shanks@bureauveritas.com>;Stacey MARKS <stacey.marks@bureauveritas.com>

1 attachments (40 KB)

Item I24-34 KM 070924 (3) (1).docx;

Terrence Hellman

Senior Staff Engineer **Email: thellman@nbbi.org**
Phone: 614-431-3234
Fax: 614-847-1828

****

From: Stacey MARKS <stacey.marks@bureauveritas.com>
Sent: Wednesday, July 17, 2024 10:13 AM
To: terrence.helman@nbic.org
Cc: Paul SHANKS <Paul.Shanks@bureauveritas.com>
Subject: I24-34

I am voting no on this interp because I believe the code words do not support this answer. The code words say calcs are to be per the QCS with no limitations given. In addition, often the certificate holder is the OEM and they should be able to continue to use their own calcs/proof tests.

Best Regards,

Stacey Marks, P.E., C.W.I.
Director of Training & Development
Bureau Veritas Inspection and Insurance Company
Phone: 804.536.4150
stacey.marks@bureauveritas.com

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

24-39

Subject/Title

Certification of NR-1 without stamping

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

Given I21-16 requirements, clarity is needed for NR work where the lack of NR stamping due to a practical matter, not necessarily a jurisdictional reason, may preclude certifying an NR-1.

Background Information

I21-16 states that an Inspector shall not certify the R-1 if the Jurisdictional requirements do not meet the NBIC requirements. Would the lack of NR stamping due to a practical matter, not necessarily a jurisdictional reason, also preclude certifying an NR-1?

Proposed Question

Would repair or replacement work done remotely in a hot space that is too hot to allow the stamping of the NR mark on the item also preclude certifying the NR-1?

Proposed Reply

No, provided the NR-1 indicated the stamping was not possible, but all other parts of the NBIC were adhered to.

Committee's Question 1

Is it the intent of the NBIC to allow certification of the NR-1 or NVR-1 form without application of the NR stamp or nameplate when repair or replacement work is in a space that is dangerous due to radioactivity?

Committee's Reply 1

Yes, provided the Owner is also the “NR” Certificate Holder and application of the National Board Code Symbol is not possible because of personnel safety or potential contamination, and all other requirements of the NBIC have been met, stamping of or attachment of a nameplate may be waived with the acceptance of the Jurisdiction provided it is addressed in the NR Certificate Holder’s QA program. Justification shall be noted in the “Remarks” section of the Form NR-1 or Form NVR-1.

Rationale

Rationale

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

24-41

Subject/Title

4.4.2 (a) Pressure testing Connection Welds

Project Manager and Task Group

Source (Name/Email)

Steven Hoffmann / steven_hoffmann@hsb.com

Statement of Need

There seem to be some different opinions among inspectors and R certificate holders when 4.4.2 (a)(1&) refers to replacement parts. Some inspectors and R certificate holders have the opinion that those replacement parts referenced in 4.4.2 (a) are only welded replacement parts, while others have the opinion that the replacement parts are not limited to just welded parts, but apply to all replacement parts.

Background Information

Company A is performing an alteration where the only welding involved is attaching the new material directly to the pressure retaining item, there are no Code stamped parts. Company A is proposing to test the weld using a pressure test or NDE in accordance with paragraph 4.4.1 by referencing paragraph 4.4.2(a)(2).

Proposed Question

Do replacement parts as referenced in 4.4.2(a)(1 & 2) include those parts as defined in 3.2.2(a) and 3.2.2(b)?

Proposed Reply

Yes

Committee's Question 1

Do replacement parts as referenced in 4.4.2(a)(1 & 2) include those parts as defined in 3.2.2(a) and 3.2.2(b)?

Committee's Reply 1

Yes.

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED INTERPRETATION

Item No.

24-45

Subject/Title

Correct method for reporting Date Repaired on R form

Project Manager and Task Group

Source (Name/Email)

Alexander Garbolevsky / alex_garbolevsky@hsb.com

Statement of Need

Repair stampings are often encountered in the field with "Date Repaired" indicated by "month and year" as well as with "month, day and year." Repair Organizations and Inspectors occasionally disagree as to whether "month and year" is sufficient.

Background Information

NBIC Part 3 [2023], 5.7.2(c) states: The date of each repair, corresponding with the date on associated Form R-1, shall be stamped on the nameplate. Since the subject of that subparagraph deals with multiple repairs, this is especially important. What if a firm does a repair on April 1, stamps the nameplate as "4/2024", and needs to come back for another repair on April 15? Although there are repair stampings encountered in the field that only indicate month / year, in my opinion, the instructions for the Form R-1 in Supplement 9, Table S9.2 suggest "date" means a specific "month, day, and year". See Circled Number (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." also Circled Number (40): Indicate month, day, and year of Inspector signature.

Proposed Question

When "Date Repaired" is required on a Repair nameplate or stamping, must it include month, day and year?

Proposed Reply

Yes

Committee's Question 1

When "Date Repaired" is required on a Repair nameplate or stamping, must it include month, day and year?

Committee's Reply 1

Yes

Rationale

NBIC Part 3, 5.7.2 states “The date of each repair, corresponding with the date on associated Form R-1, shall be stamped on the nameplate” and the supplement states the date includes Day, Month, and Year.

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED INTERPRETATION

Item No.

24-51

Subject/Title

NBIC Part 3, 3.3.4.6 Flush Patches that Intersect Existing Welds

Project Manager and Task Group

Source (Name/Email)

Zach Bachstein / zbachstein@cimarron.com

Statement of Need

NBIC Part 3 paragraph 3.3.4.6 details controls for flush patches but does not appear to address controls for flush patches that intersect a new or existing weld.

Background Information

A flush patch repair is planned to replace the bottom portion of a pressure vessel. The corners of the flush patch shall be rounded to meet the requirements of NBIC Part 3, 3.3.4.6(a)(2), but we feel the rounded tie-in to the girth seams creates a greater stress riser than if the corners were squared. ASME PCC-2 paragraph 201-3 provides rules for this situation, but since the corners contradict the requirements of NBIC Part 3, and NBIC Part 3, 3.2.6 says the NBIC rule take precedence, it cannot be considered a NBIC repair.

Proposed Question

Question 1: Does NBIC Part 3, 3.3.4.6 address flush patches that intersect existing welds. Question 2: May a “doghouse patch” described in ASME PCC-2 (2022) paragraph 201-4.4.1 and shown in Figure 201-3.8-2 be used in flush patch repairs that intersect new and existing welds provided it is acceptable to the Inspector and Jurisdiction, when required

Proposed Reply

Question 1: No Question 2: Yes

Committee's Question 1

Is it the intent of NBIC Part 3, 3.3.4.6 that square corners in flush patches that intersect existing weld seams are prohibited?

Committee's Reply 1

No

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

The National Board of Boiler and Pressure Vessel Inspectors

PROPOSED INTERPRETATION

Item No.

24-52

Subject/Title

Clarification of Routine Repair classification of welded in diaphragms.

Project Manager and Task Group

Source (Name/Email)

Certificate Administrator / victor.kidwell@lge-ku.com

Statement of Need

Clarification of Routine Repair classification of welded in diaphragms. Because of the confusion regarding this repair vs routine repair classification we have faced multiple delays at different power plants over the past three years.

Background Information

LGE KU (R9646) has installed many welded in diaphragms on feedwater heaters and classified each as routine repairs under the guidance of the Kentucky Jurisdiction. During our renewal review in October 2020 the Team Leader wrote a Deficiency - "Many of the repairs were characterized as Routine Repairs, but were not. These repairs consisted of welding in replacement diaphragms located under the bolted manway. The team leader closed this with a corrective action stating these types of repairs would not be treated as routine.

Proposed Question

Does paragraph 3.3.2 e) 5 "Seal welding of a mechanical connection for leak tightness where by- design, the pressure retaining capability is not dependent on the weld for strength and requires no postweld heat treatment" apply to welded in diaphragms installed in feedwater heaters where the diaphragm is not the pressure retaining item? (A head is bolted on to the flange outside the seal welded diaphragm.)

Proposed Reply

Interpretation confirming an email response to this question on 4/4/2024 from Gary L. Scribner, Assistant Executive Director, Technical - as follows - It is my opinion that this is a routine repair in accordance with the NBIC Part 3, 3.3.2, e), 5, Seal welding of a mechanical connection for leak tightness where by- design, the pressure retaining capability is not dependent on the weld for strength and requires no postweld heat treatment.

Committee's Question 1
Does paragraph 3.3.2 e) 5 "Seal welding of a mechanical connection for leak tightness where by- design, the pressure retaining capability is not dependent on the weld for strength and requires no postweld heat treatment" apply to welded in diaphragms installed in feedwater heaters where the diaphragm is not the pressure retaining item? (A head is bolted on to the flange outside the seal welded diaphragm.)

Committee's Reply 1

Yes

Rationale

Committee's Question 2

Committee's Reply 2

Rationale

PROPOSED INTERPRETATION

Item No.

24-53

Subject/Title

NBIC Part 3, 3.3.4 in relation to ASME PCC-2 Article 212

Project Manager and Task Group

Source (Name/Email)

Roy Darby / roy.darby@chevron.com

Statement of Need

As this sort of configuration is compliant with the original Code Of Construction and guidance is supplied by an industry-recognized document on repair of pressure equipment, it isn't clear why it would be prohibited. When properly engineered and correctly installed, this sort of alteration could extend the life of damaged vessels.

Background Information

Legacy NBIC interpretations 93-02 and 95-06 suggest that installation of patches using fillet welds would not be permitted. These interpretations pre-date the publication of ASME PCC-2, Article 212 though. Also, lap joints with only fillet welds are permitted by ASME Section VIII Division 1 for all categories of joints. As this sort of configuration is compliant with the original Code Of Construction and guidance is supplied by an industry-recognized document on repair of pressure equipment, it isn't clear why it would be prohibited.

Proposed Question

May a wasted area on a vessel have a lap patch installed as an alteration provided that all rules and requirements of ASME PCC-2, Article 212 are met as well as rules and requirements of the original Code Of Construction are met including for the installation of lap joints and fillet welds (such as UW-36 of ASME Section VIII Division 1)?

Proposed Reply

Yes.

Committee's Question 1

May a fillet welded lap patch be installed on a pressure retaining item?

Committee's Reply 1

No.

Rationale

The weld must be a full penetration weld per 3.3.4.6 a) 1).

Committee's Question 2

Committee's Reply 2

Rationale

The National Board of Boiler and Pressure Vessel Inspectors

PROPOSED

Item No.

I 24-70

Subject/Title

2.5.3.2(f) Waiving of hardness testingand carbon equivalency requirements

NBIC Location

Part: Repairs and Alterations; Section: 2; Paragraph: 2.5.3.2(f)

Project Manager and Task Group

Source (Name/Email)

Baher Elsheikh / elsheikhb@agri.sabic.com

Statement of Need

I have superheater coils in boilers designed to temperature of 480 C and requires repair.

Background Information

I am working for fertilizer plant and have multiple boilers where frequent repairs needed in the superheater coils and manifolds.

Existing Text	Proposed Text

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

NBIC Item I24-70

Dear Mr. Baher Elsheikh
Lead Engineer at Static Equipment Engineering

The Task Group (TG) on Interpretations has reviewed your inquiry. Your inquiry submittal has not been prepared using the format for submittal of an Interpretation in accordance with the guidelines set forth in the Introduction of the 2023 Edition of the NBIC.

Based on initial review, the TG considers your questions as providing consulting advice rather than an interpretation of existing words.

Best Regards,

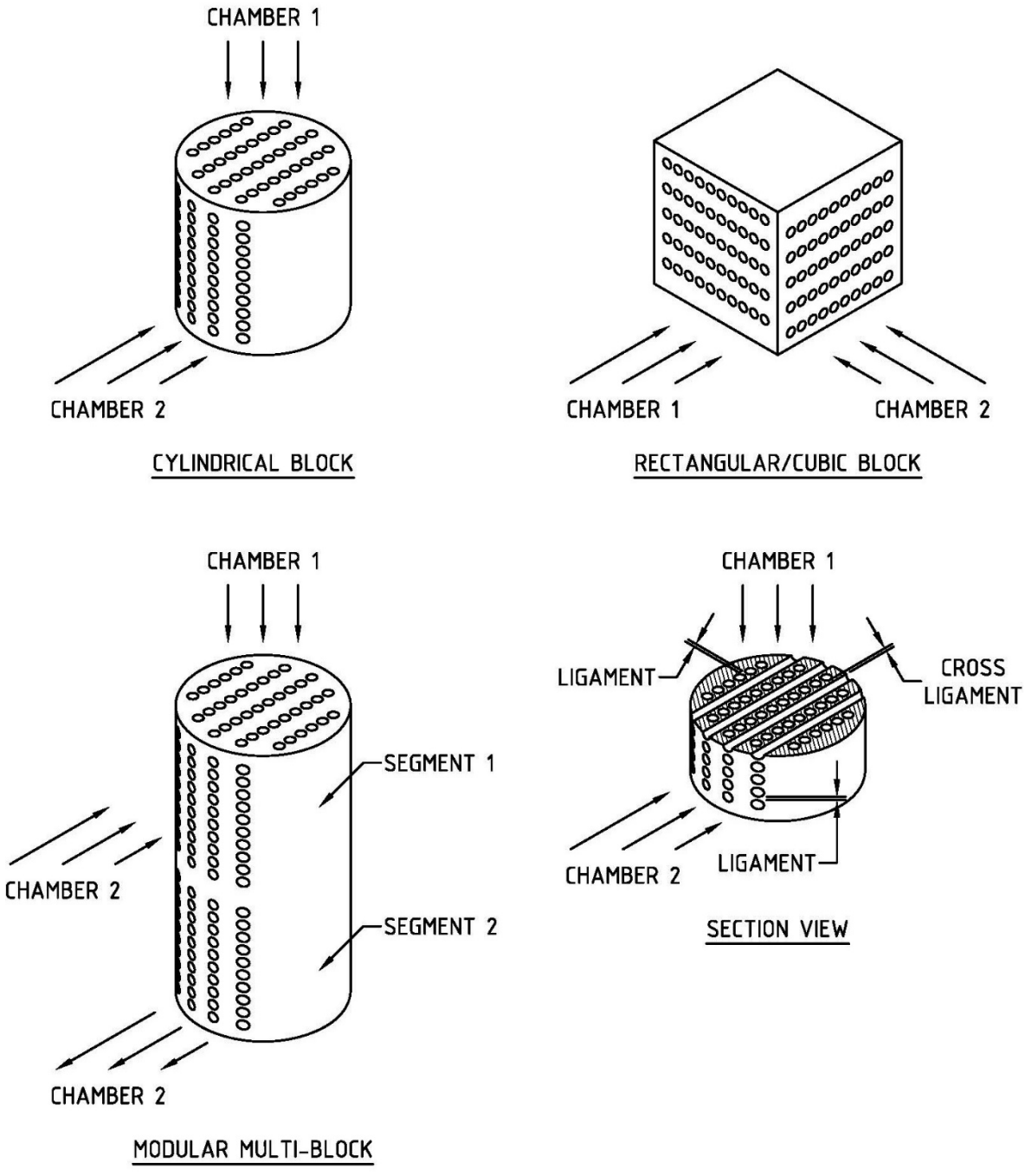
TG Interpretations

Close the item with the above letter.

S3.5.6 REPAIR OF CROSS-DRILLED ~~EXCHANGE~~ BLOCKS

Cross-drilled ~~exchange~~ blocks are solid impervious graphite forms~~,~~ drilled through in perpendicular patterns to isolate two different operating fluids~~/gases~~.

FIGURE S3.5.6



a) Cross-drilled blocks ~~may~~ can experience failure in a cross ligament~~,~~ due to ~~a~~ cracks or erosion~~,~~ that leads to fluid transfer between the opposing chambers. The general steps used to repair a cross-drilled block that is transferring fluid follow below.
   1) Isolate one chamber sufficiently to perform a pressure test.
   2) Test the isolated chamber.
   3) Check the opposing chamber for affected holes.
   4) Identify and mark any leaking holes.
   5) Plug all leaking holes per S3.5.4.

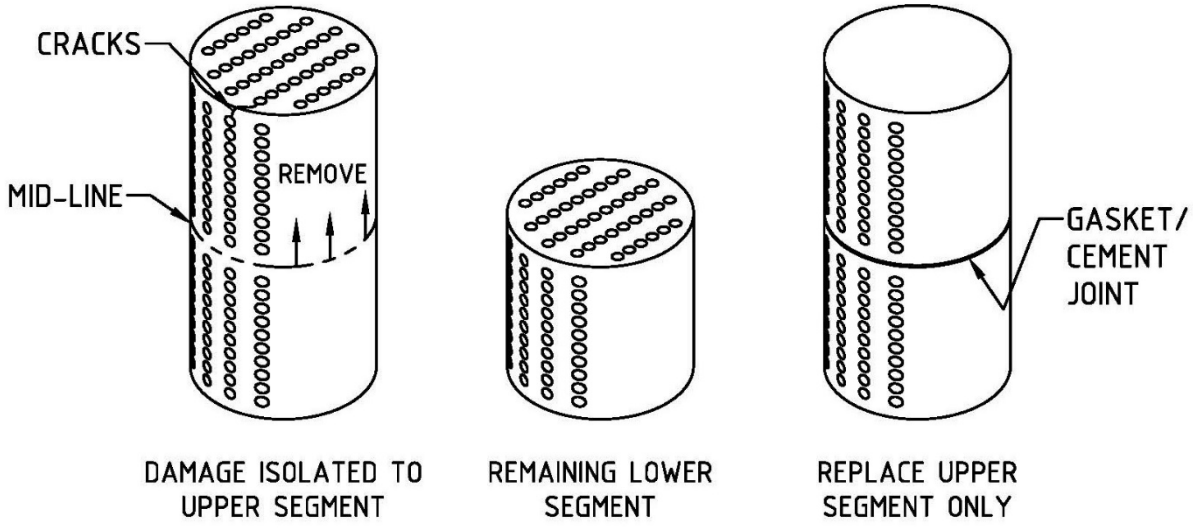
b) During visual inspection of a cross-drilled block, same chamber ligament cracking can~~may~~ be identified. To prevent crack propagation, the affected area can be repaired by material inlaying, or the affected holes can be plugged per S3.5.4

c) ~~Cross-drilled blocks may experience failure due to surface erosion.~~ Surface erosion may be repaired by material inlaying.

~~c)~~d) Damage to gasket surfaces may be repaired per S3.3 a) 2) or by material inlaying.

~~d)~~e) When a modular multi-block type of cross-drilled block is confirmed to be transferring fluid, is showing visible ligament cracking, or has visible surface erosion damage, it shall be tested as required~~according~~ ~~into~~ S3.5.6-a. ~~Once the location of all the damage is identified, if a single S~~segment~~s is~~ determined to be free of damage~~, that segment~~ may be re-used after cutting away the damaged~~affected~~ segment(s). The portion of the block that was removed shall be replaced.

FIGURE S3.5.6-d



Editors note: re-number Reimpregnation section to S3.5.7 and carry through.

Item 23-45

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

S3.2 Repairs

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

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

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

S3.3 Routine Repairs

a)

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

S2.4.1 Limitations

a) Work performed on historical boilers which were not constructed to a recognized code of construction shall be considered an alteration and shall conform to a code of construction acceptable to the jurisdiction, where applicable.

b) Any pressure retaining part or attachment of a historical boiler constructed to a recognized code of construction can be replaced as a repair or alteration, acceptable to the jurisdiction, where applicable.

c) Work is to be performed using replacement material that:
   1. is acceptable per NBIC Part 3, S2.7.1;
   2. has a nominal composition that is equivalent to the original material;
   3. has strength equivalent to or greater than the original material; and
   4. is suitable for the intended service.

d) If the work being perform modifies the historical boiler from its original design or code of construction, the work shall be done as an alteration unless specified otherwise within Part 3 Supplement 2. Below is a list of some examples that are considered alterations.

   1. Construction of seams is modified from original design (e .g. changing from riveted to welded).
   2. Flanged corners are removed (e.g. changing firebox from flanged door sheet and rear tube sheet to a flat sheet).
   3. Replacement material thickness is less than the original material thickness.
   4. Riveted seam dimensions are changed from original construction (e.g. rivet spacing changed or rivet size changed).
   5. Braces are changed from original construction (e.g. changing from rivet braces to welded braces).
   6. The addition of new threaded connections, handholes, or openings.

1.6.6 o) Quality Assurance Records
The provisions identified in ASME NQA-1, Part 1, Requirement 17, shall apply, except Paragraphs 400, 500, and 600 are not applicable. The following requirements shall be followed:

1) Records shall be identifiable and retrievable;

2) Records shall be retained consistent with the owners requirements for duration, location and assigned responsibility;

3) Forms NR-1 and NVR-1 as applicable shall be completed by the "NR" Certificate Holder upon completion of all repair/replacement activities. Completion of forms, registrations and stamping of the "NR" symbol stamp shall meet the requirements of NBIC Part 3, Section 5. A log shall be maintained in accordance with NBIC Part 3, 5.6; When permitted by the Jurisdiction, the owner may use alternative forms containing all the information within the Form NR-1 and NVR-1.

4) Lifetime and non-permanent records shall be as specified in ASME Section III, NCA-4134, Tables NCA-4134.17-1, and 4134.17-2;

1.6.6
q) Inspection or Test Status (not to include operating status)
The provisions identified in ASME NQA-1, Part 1, Requirement 14 shall apply. Measures shall be established to indicate inspection and test status of parts, items, or components during the repair/ replacement activity. The system used shall provide positive identification of the part, item, or component by means of stamps, labels, routing cards, or other acceptable methods. The system shall include any procedures or instructions necessary to achieve compliance. Procedures shall be provided for the identification of acceptable and unacceptable items and for the control of status indicators. The authority for application and removal of status indicators shall also be specified. The Quality Assurance Program shall provide adequate control of the "NR" Symbol Stamp. In addition, the Quality Assurance Program shall make provisions for the Inspector acceptance prior to the application of the "NR" Symbol Stamp to the item or attachment of the stamped nameplate.

24-07 – Category 2

1.6.7 o) Quality Assurance Records
5) The original of the completed Form NR-1 or Form NVR-1, as applicable, shall be registered with the National Board and, if required, a copy forwarded to the Jurisdiction where the nuclear power plant is located. A log shall be maintained in accordance with NBIC Part 3, 5.6. When permitted by the Jurisdiction, the owner may use alternative forms containing all the information within the Form NR-1 and NVR-1.

q) Inspection or Test Status (not to include operating status)
Measures shall be established to indicate examination and test status of parts, items, or components during the repair/replacement activity. The system used shall provide positive identification of the part, item, or component by means of stamps, labels, routing cards, or other acceptable methods. The system shall include any procedures or instructions necessary to achieve compliance. Also, measures shall be provided for the identification of acceptable and unacceptable items. They shall also include procedures for control of status indicators, including the authority for application and removal of status indicators. The Quality Assurance Program shall provide adequate control of the “NR” Symbol Stamp. In addition, the Quality Assurance Program shall make provisions for the Inspector acceptance prior to the application of the “NR” Symbol Stamp to the item or attachment of the stamped nameplate.

24-08 -Category 3

1.6.8 o) Records

1) All quality related records shall be classified, identified, verified, maintained, distributed retrievable, and accessible. When the “NR” Certificate Holder is the owner, designated records and reports received by the owner, shall be filed and maintained in a manner to allow access by the Authorized Nuclear Inservice Inspector (ANII). Suitable protection from deterioration and damage shall be provided by the owner. These records and reports shall be retained as specified in the owner’s QAP for the lifetime of the component or system. Records to support evidence of activities affecting quality shall include as applicable:

a. Inspections and acceptance criteria/results;
b. Tests performed and supporting reports;
c. Procedures/instructions;
d. Qualification of personnel, procedures, and equipment;
e. Types of observations and results;
f. Audits;
g. Nonconformances; and
h. Corrective actions.

2) The original of the completed Form NR-1 or Form NVR-1, as applicable, shall be registered with the National Board and, if required, a copy forwarded to the Jurisdiction where the nuclear power plant is located. A log shall be maintained in accordance with NBIC Part 3, 5.6. When permitted by the Jurisdiction, the owner may use alternative forms containing all the information within the Form NR-1 and NVR-1.

q) Inspection or Test Status

Measures shall be established to indicate inspection and test status of parts, items or components during repair/replacement activity. Measures shall include identification, procedures, control indicators (acceptable, unacceptable) and responsibility of personnel. The Quality Assurance Program shall provide adequate control of the “NR” Symbol Stamp. In addition, the Quality Assurance Program shall make provisions for the Inspector acceptance prior to the application of the “NR” Symbol Stamp to the item or attachment of the stamped nameplate.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 21-12

Subject/Title

Revision to add an introductory paragraph to Part 3, Section 3 and to add guidance on classifying a repair vs alteration

NBIC Location

Part: Repairs and Alterations; Section: Section 3

Project Manager and Task Group

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

Source (Name/Email)

Pat Becker, pbecker@epri.com

Statement of Need

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

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

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

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

Background Information

Update of Part 3, Section 3 to improve the user experience and to add a decision tree logic diagram to aid in use of the list of examples of alterations in 3.4.4.

Existing Text

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

3.1 SCOPE

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

3.2 GENERAL REQUIREMENTS FOR REPAIRS AND ALTERATIONS

3.2.1 MATERIAL REQUIREMENTS FOR REPAIRS AND ALTERATIONS

Proposed Text

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

(NEW)
3.0 INTRODUCTION

This Section provides information on the requirements for repairs and alterations to pressure retaining items. Information on how to classify, perform, and document acceptable repair and alteration activities may be found throughout the Sections of Part 3 and in Supplement X, Figure SX.1. It is the intent that Section 3 be used in cooperation with local jurisdictional authorities and with an understanding of the applicable pressure vessel code regulations relevant to the scope of repair or alteration activity. Note that the guidance herein and the examples given in 3.3.3 *(Examples of Repairs)* and 3.4.4 *(Examples of Alterations)* are not all inclusive and are intended to be representative of cases and activities commonly considered either a repair or alteration.

3.1 SCOPE

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

	Section 6. **3.2 GENERAL REQUIREMENTS FOR REPAIRS AND ALTERATIONS**
	(NEW) SUPPLEMENT X CLASSIFYING REPAIRS AND ALTERATIONS SX.1 SCOPE FIGURE SX.1 DECISION TREE (LOGIC DIAGRAM) FOR DETERMINING REPAIR OR ALTERATION ACTIVITY CLASSIFICATION **(See Below , next page, for diagram)**

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

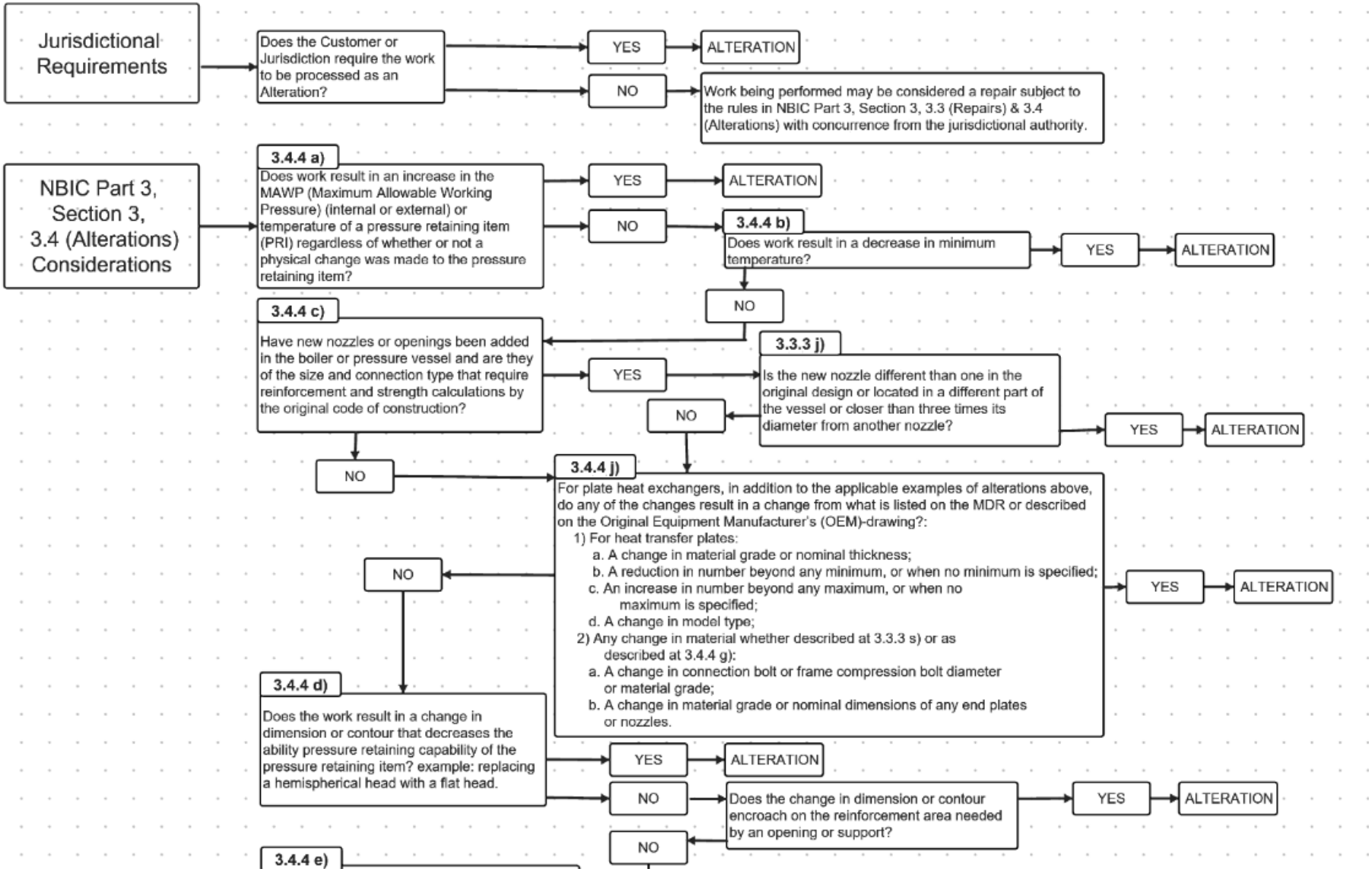
(NEW)

SUPPLEMENT X
CLASSIFYING REPAIRS AND ALTERATIONS

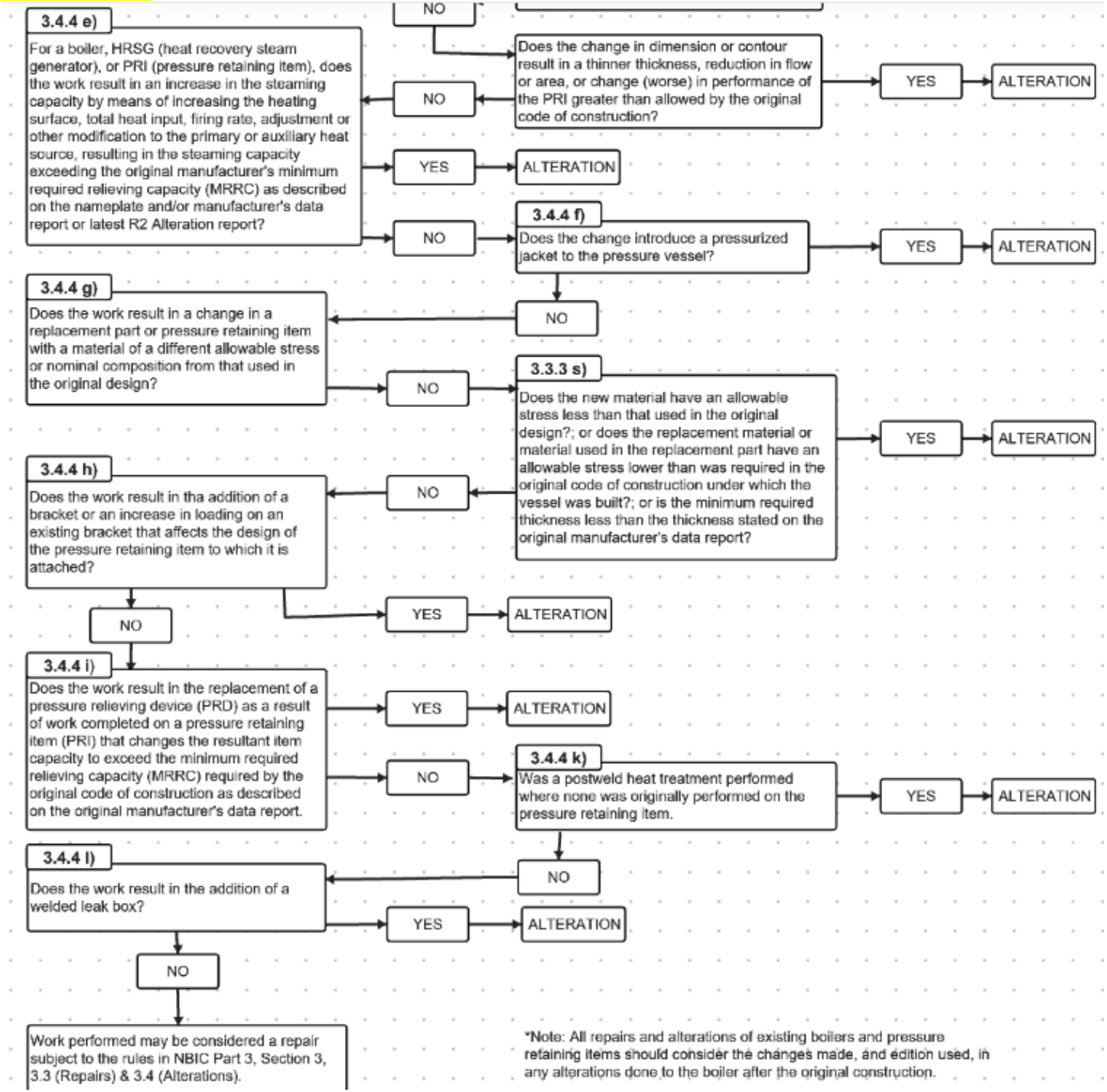
SX.1 SCOPE

FIGURE SX.1
DECISION TREE (LOGIC DIAGRAM) FOR DETERMINING REPAIR OR ALTERATION ACTIVITY CLASSIFICATION BASED ON PART 3, SECTION 3, 3.4.4, ALTERATION EXAMPLES

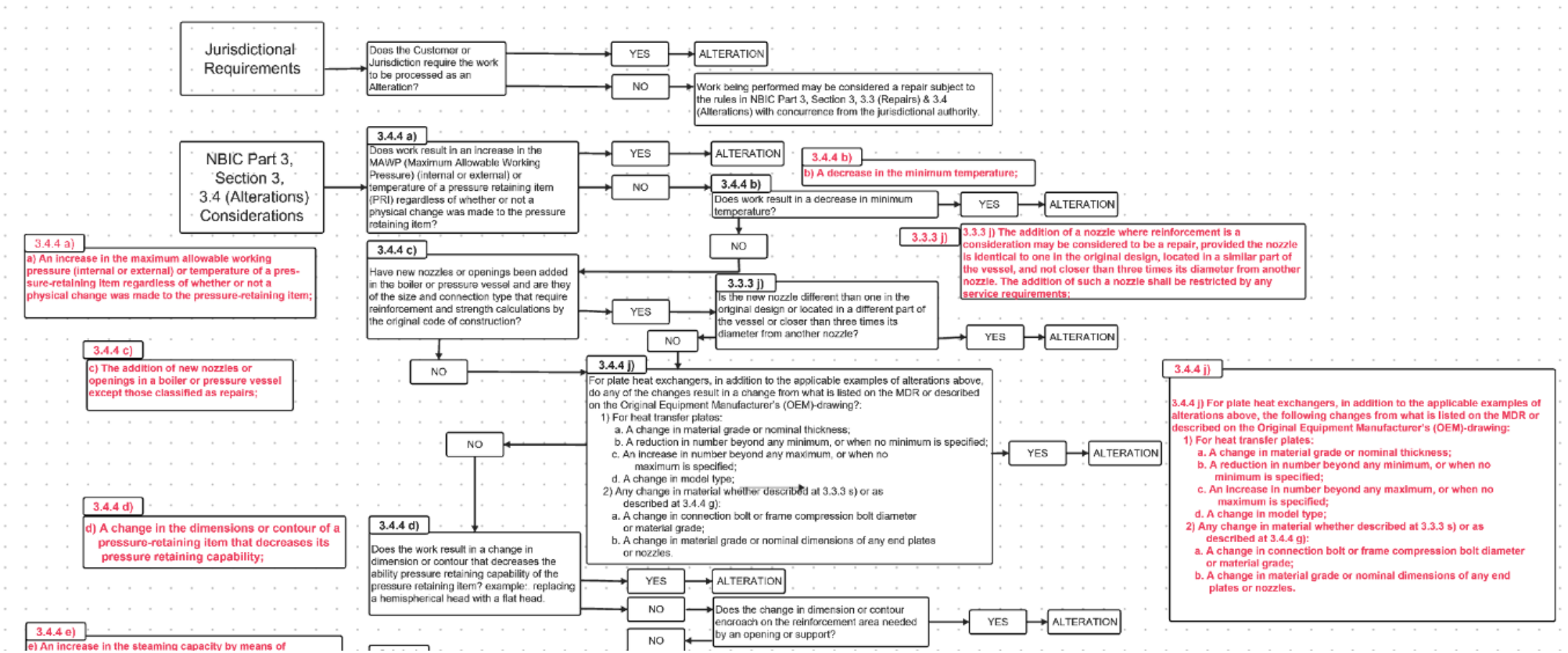
'Clean' copy without references



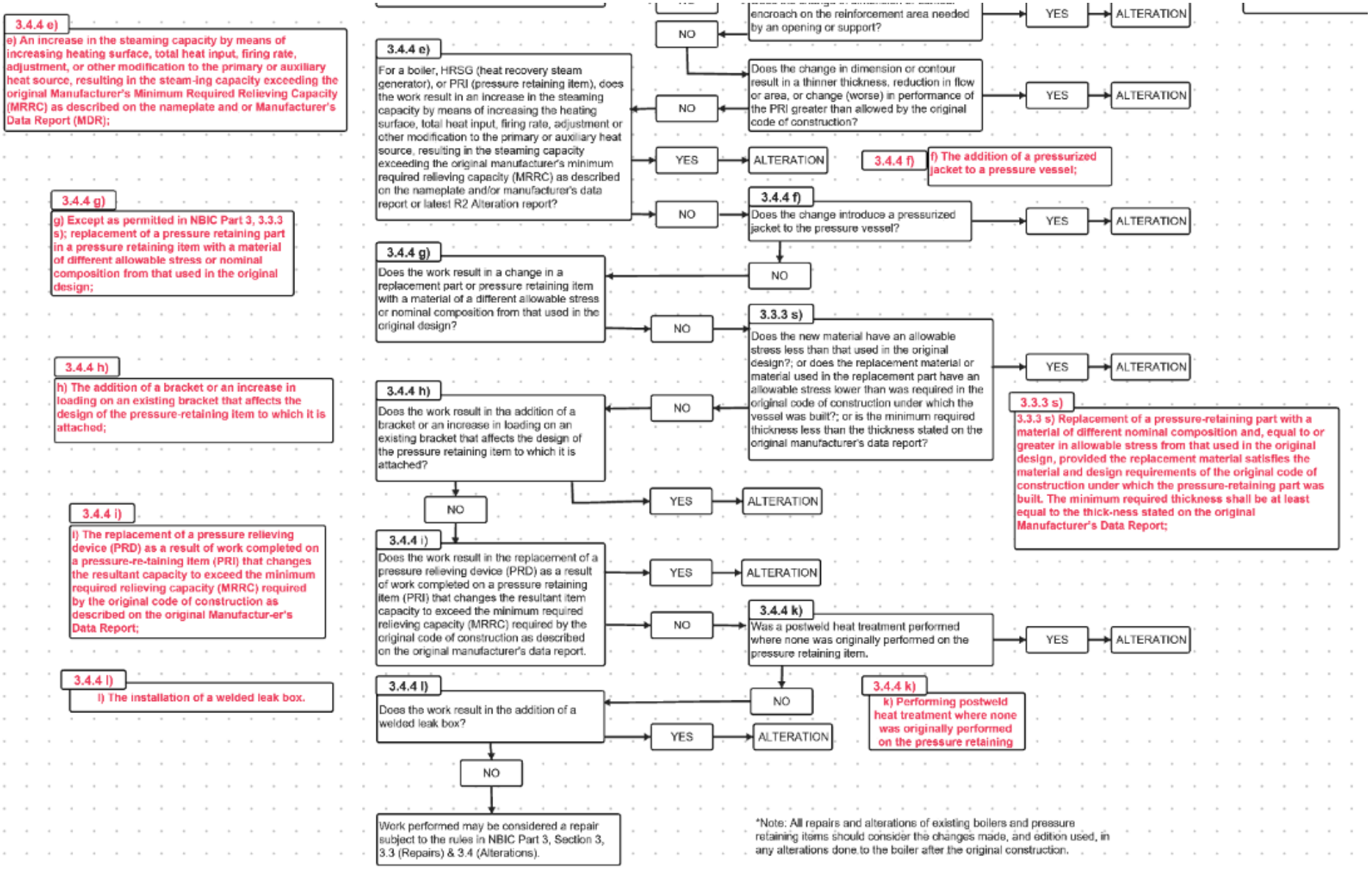
Clean copy without references contd.



(Showing diagram with 'Example' references from 3.3.3 and 3.4.4)



(Showing diagram with 'Example' references from 3.3.3 and 3.4.4 Contd.)



PROPOSED REVISION OR ADDITION

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

Item No.

A 21-43

Subject/Title

Defining and revising "Practicable" and "Practical" within the NBIC

NBIC Location

Part: Repairs and Alterations; Section: 9; Paragraph: Glossary - All Parts

Project Manager and Task Group

Marty Toth (PM), Robert Underwood, Melissa Wadkinson, Louis Dutra, Jonathan Ferreira, Matt Schaser, Donald Kinney,

Source (Name/Email)

Marty Toth / mtoth@boiscotraininggroup.com

Statement of Need

Defining and revising Practicable and Practical within the NBIC and revising where applicable

Background Information

Defining and revising Practicable and Practical within the NBIC and revising where applicable

Existing Text	Proposed Text
	Practicable: An NBIC activity such as, but not limited to, a process, action, test, or examination that can be performed and/or accomplished. **Practical**: An NBIC activity such as, but not limited to, a process, action, test, or examination that is able to provide useful, functional, or suitable results.

21-43

Walter Sperko <wsperko@bellsouth.net>

Tue 7/16/2024 11:35 AM

To:Terrence Hellman <THellman@nationalboard.org>
Cc:Toth Marty <mtoth@boiscotraininggroup.com>;Davis Paul <paul.davis22@woodplc.com>;Underwood Robert - Hartford-Remote-HSB <robert_underwood@hsb.com>

Hi, Terry,

The definitions are synonymous.

Practicable: An NBIC activity such as, but not limited to, a process, action, test, or examination that is able to be done or performed.

Practical: An NBIC activity such as, but not limited to, a process, action, test, or examination that is able to provide useful and suitable results.

What is needed is a definition that distinguishes practicable from practical so that practicable can be used to allow judgment to be used when safety or the information extracted from an action is not worth the hassle or cost of performing that activity. I suggest the following:

Practicable: An NBIC activity such as, but not limited to, a process, action, test, or examination that is able to be done or performed safely and when the activity produces an outcome that verifies compliance that cannot be verified by other considerations.

While this is not a dictionary definition, it is something that we can use when some judgement is appropriate. Since we are making up the rules, we get to make up our own definitions to suit our pur

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Pronouns: His Excellency

21-43, practical, practicable

Gilston Philip - Hartford-HSB <Philip_Gilston@hsb.com>

Wed 7/17/2024 12:33 PM

To:Terrence Hellman <THellman@nationalboard.org>

I have spent time researching this and I am unable to determine a clear understanding of the two words and their differentiation. Given how much time we as a committee discuss this and still cannot come to a consensus, then how is a general user to interpret the word.

As I noted yesterday, I would rather see an action to eliminate the use for the word practicable from the book.

Philip Gilston CEng, MSc, IWE, MWeldI
Principal Engineer, Codes and Standards

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A21-43

Davis, Paul (US) <paul.davis22@woodplc.com>

Wed 7/17/2024 1:32 PM

To:Terrence Hellman <THellman@nationalboard.org>

I voted negative based on the following rationale:

1. NBIC already has a viable definition for “practicable”. Another definition does nothing to further clarified.
2. Recommend that the definition for “practical” be added as written.
3. Once we have both definitions, continue action to make sure that the existing text is using the words correctly per the accepted definitions or if the terms need to be deleted as they add no additional value or clarification.

RE: Disapproval vote - Subcommittee Item A21-43

Benjamin Schaefer <bschaefer@aep.com>

Wed 7/17/2024 1:31 PM

To:Terrence Hellman <THellman@nationalboard.org>
Cc:Benjamin Schaefer <bschaefer@aep.com>

Terry,
Below, I have inserted my disapproval response for the Subgroup voting for this same item, there was some additional information that came out in Subcommittee that I have added.

Terry,
I voted against this item in Subgroup R&A July 2024 meeting. The definition of the "Practical" is acceptable, my objection has to do with the definition of "Practicable" which is too rigidly defined. The specific text "process, action, test, or examination that is able to be done or performed." does not leave any exception for safety of personnel or the equipment and does not allow the inspector to include those factors in the decision. Secondly, we have many uses of this term and all three parts of the NBIC and if the definition is added, all existing uses must conform to this definition, whether or not we want that much rigidity in the words of the paragraphs in which this term applies. Additionally, there is currently a definition in the Glossary for "Practicable" which was added in 2023 and, in my opinion, is better than the definition proposed.

Ben Schaefer

Item A21-43 - rationale for negative - Siefert, SC-R&A

Siefert, John <jsiefert@epri.com>

Wed 7/17/2024 1:42 PM

To:Terrence Hellman <THellman@nationalboard.org>

Terry, assuming we need to define practical and practicable (arguments given today were not convincing in this regard), I believe the present definition in the NBIC Glossary is preferable for practicable. Others who commented today offered a reasoned argument for this. Again, and as emphasized in my prior negative at the SG-R&A level, I believe future efforts need to firstly consider where these words are used, establish the context for their use, and ultimately remove these wherever possible. If these words must remain in the NBIC then we would move to define them.

Best regards,

John Siefert, Ph.D.
Area Lead – Materials

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THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 23-21 Rev 00

Subject/Title

TUBE PLUGGING IN BOILERS BY WELDING

NBIC Location

3.3.4.9

Project Manager and Task Group

Eric Cutlip (PM), Kathy Moore, Tom White, Andrew Triplett, Philip Gilston

Source (Name/email)

Statement of Need

While rules are included in NBIC Part 3 for plugging of tube in firetube boilers, no corresponding rules exist for plugging of tubes in watertube boilers.

Background Information

Existing Text	**Proposed Text**
3.3.4.9 **TUBE PLUGGING BY WELDING IN FIRETUBE BOILERS** When the replacement of a tube in a firetube boiler is not practicable at the time the defective tube is detected, with the concurrence of the owner, Inspector, and when required, the Jurisdiction, the tube may be plugged. a) When installing a welded firetube plug, the repair may be limited by the number of tubes plugged and their location. The operational effects on the waterside pressure boundary and reduced heat transfer (e.g. potential for overheating of remaining tubes)should be considered prior to plugging. Competent technical advice should be obtained from the manufacturer of the pressure-retaining item or from another qualified source. b) Strength calculations for the size of the weld shall be in accordance with the original code of construction. The “R” Certificate Holder performing this repair shall weld the plug to the tube, or to the tube sheet, or a combination of both.	3.3.4.9 **TUBE PLUGGING BY WELDING IN ~~FIRETUBE~~ BOILERS** When the replacement of a tube in a ~~firetube~~ boiler is not practicable at the time the defective tube is detected, with the concurrence of the owner, Inspector, and when required, the Jurisdiction, the tube or bore hole may be plugged. a) When installing a welded ~~firetube~~ plug, the repair may be limited by the number of tubes plugged and their location. The operational effects on the waterside pressure boundary and reduced heat transfer (e.g. potential for overheating of remaining tubes) should be considered prior to plugging. Competent technical advice should be obtained from the manufacturer of the pressure-retaining item or from another qualified source. b) Strength calculations for the size of the weld shall be in accordance with the original code of construction. The “R” Certificate Holder performing this repair shall weld the plug to the tube, ~~or to the~~ tube sheet, drum, header, or a combination ~~of both~~ thereof.

c) Cracking of ligaments due to the use of welded plugs is a common issue. To mitigate this possible occurrence the “R” Certificate Holder performing the repair shall consider actions including but not limited to the following: 1) For P-No. 1 and 3 materials, preheating to 200°F (95°C) minimum. 2) Limiting the maximum weld size to 3/8” (10 mm). 3) Limiting electrode size to 1/8” (3 mm) maximum diameter. 4) Using a stringer bead technique. 5) Using a minimum of two passes. d) NDE in lieu of pressure testing is not permitted.	c) Cracking of ligaments due to the use of welded plugs is a common issue. To mitigate this possible occurrence the “R” Certificate Holder performing the repair shall consider actions including but not limited to the following: 1) For P-No. 1 and 3 materials, preheating to 200°F (95°C) minimum. Higher P-No. materials may have additional preheat, PWHT, and welding parameter requirements. 2) Limiting the maximum weld size to 3/8” (10 mm). 3) Limiting electrode size to 1/8” (3 mm) maximum diameter. 4) Using a stringer bead technique. 5) Using a minimum of two passes. d) NDE in lieu of pressure testing is not permitted for Firetube Boiler applications.

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

A23-21

Boseo, Brian M <bmboseo@burnsmcd.com>

Wed 7/17/2024 2:20 PM

To:Terrence Hellman <THellman@nationalboard.org>

Terry,

My reason for voting negative is I do not believe this item provides a clear path between welded repairs to a watertube boiler tube plugs where weld strength calculations are now required vs. when a mechanical plug with seal weld is used. I think firetube requirements need to be separate.

Brian

Brian Boseo \ Burns & McDonnell
Quality Assurance Department Manager \ Construction
O (816) 601-0209 \ **M** (708) 941-3016
bmboseo@burnsmcd.com \ burnsmcd.com
9400 Ward Parkway, Kansas City, MO 64114

RE: Item 23-21 NO Vote

Louis Dutra <ldutra@baycityboiler.com>
Wed 7/17/2024 12:19 PM
To:Terrence Hellman <THellman@nationalboard.org>

Terry,
The reason for the no is there is not enough definition of the boiler types I.E ,package firetube boilers are different then some other firetube boilers that have steam drums. Per code 3.3.1 we need to determine why the tube failed weather it is oxygen corrosion, scale or electrolysis and plugging a fire tube boiler or water tube boiler you are not following this process to investigate the cause. I feel watertube and fire tubes boilers need to fall under different rules based on design.
Thank you!

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A23-21

Carlson, Michael (LNI) <CAMX235@LNI.WA.GOV>

Wed 7/17/2024 2:19 PM

To:Terrence Hellman <THellman@nationalboard.org>

Terry,

I'm am opposed to item A23-21 and vote no. Tube plugging of firetube boilers and non-firetube boilers should have separate paragraphs.

Respectfully submitted,

Mike Carlson

Chief Boiler/Pressure Vessel Inspector
Washington State Dept. of Labor & Industries
Field Services and Public Safety-Boiler Section
360-902-5270
E-mail camx235@lni.wa.gov
Website- https://Lni.wa.gov/boilers

Washington State Department of
Labor & Industries

A23-21

Stacey MARKS <stacey.marks@bureauveritas.com>

Wed 7/17/2024 2:15 PM

To:Terrence Hellman <THellman@nationalboard.org>;Paul SHANKS <Paul.Shanks@bureauveritas.com>

I am voting no on this item as I support the view of others that it would be more appropriate to have stand alone paragraphs for firetube and watertube. The equipment itself has separate rules in Section I which supports the view of Mr. Trout (and others) that these are 2 different animals.

Best Regards,

Stacey Marks, P.E., C.W.I.
Director of Training & Development
Bureau Veritas Inspection and Insurance Company
Phone: 804.536.4150
stacey.marks@bureauveritas.com

Item A23-21 - rationale for negative - Siefert, SG-R&A

Siefert, John <jsiefert@epri.com>

Wed 7/17/2024 2:11 PM

To:Terrence Hellman <THellman@nationalboard.org>

Terry, I do not believe this proposed verbiage is clear as to what is being advocated. There was discussion back and forth on this point and I believe a set of illustrations showing the most common types of welded plugs would be very helpful for this item to eliminate the ambiguity.

John Siefert, Ph.D.
Area Lead – Materials

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FW: A23-21 Negative

Davis, Paul (US) <paul.davis22@woodplc.com>
Wed 7/17/2024 2:15 PM
To:Terrence Hellman <THellman@nationalboard.org>

My concern is the same as originally submitted from SG. Now it is a negative.

From: Davis, Paul (US)
Sent: Tuesday, July 16, 2024 11:18 AM
To: Terrence Hellman <thellman@nationalboard.org>
Subject: A23-21 Abstention

My reason for abstaining is that I do not believe this item provides a clear distinction between welded repairs to boiler tube plugs where weld strength calculations are required vs. when a mechanical plug with seal weld is used. I think this item needs to be clarified.

Paul Davis

A23-21 No Vote

Frazier, Steve <Steve.Frazier@seattle.gov>

Wed 7/17/2024 2:10 PM

To:Terrence Hellman <THellman@nationalboard.org>

Hi Terry,
My no vote on A23-21 is based on my opinion that plugging of water tubes should be separate from plugging of fire tubes.
Respectfully,

Steve Frazier (he/him/his)
Chief Boiler Inspector
Seattle Department of Construction and Inspections
206-684-8459 I steve.frazier@seattle.gov

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SDCI offers most services online through our Virtual Applicant Services Center. For customers who need language assistance or technical assistance accessing the Virtual ASC, we have an SDCI information desk on the 4th floor of the Seattle Municipal Tower. We offer limited access to our offices for scheduled public meetings.

A23-21

McBee, Timothy <Timothy.McBee@tuvsud.com>

Wed 7/17/2024 2:08 PM

To:Terrence Hellman <THellman@nationalboard.org>

Terry,

I disapprove as seal welding of driven plugs is still not clearly defined and strength welding could be misunderstood.

Respectfully,

Tim McBee
Manager of Codes and Standards
Phone: 217-412-9300
Email address: Timothy.McBee@tuvsud.com

Business address
ARISE Boiler Inspection and Insurance Company RRG
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https://www.linkedin.com/company/arise-boiler-inspection-&-insurance-company/

Disapproval of A23-21

Seime, Trevor S. <tsseime@nd.gov>

Wed 7/17/2024 2:12 PM

To:Terrence Hellman <THellman@nationalboard.org>

My disapproval is based on the fact that I still believe there should be distinctions made between the 2 types of boilers and possibly 2 separate paragraphs is what is needed to accomplish this.

R/

Trevor Seime

Office of the Director • Boiler Inspection Program • Chief Boiler Inspector

701-220-4723 • 701-328-5200 (fax) • tsseime@nd.gov • https://deq.nd.gov/

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PROPOSED REVISION OR ADDITION

Item No.

A23-24

Subject/Title

GENERAL REQUIREMENTS FOR REPAIRS TO QUICK-ACTUATING/QUICK-OPENING CLOSURES

NBIC Location

New SUPPLEMENT XX

Project Manager and Task Group

Tim McBee (PM), Chuck Becker, Matt Schaser, Robert Smith, Aziz Khssassi

Source (Name/Email)

Kathy Moore (kathymoore@joemoorecompany.com)

Statement of Need

There are many small stamp holders (which I am one of them) that do not understand the "uniqueness" of these repairs. I would like to see some engineering controls as part of this "section".

Background Information

The NBIC currently has no specific safe guidelines for Quick-Actuating/Quick-Opening repairs.

Existing Text	**Proposed**
None	**See attached**

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

A23-24
SUPPLEMENT XX
GENERAL REQUIREMENTS FOR REPAIRS TO QUICK-ACTUATING/QUICK-OPENING CLOSURES

SXX.1 SCOPE

This supplement provides additional requirements and guidelines above and beyond those cited in the main body of the NBIC code for repairs to quick-actuating/quick-opening closure pressure-retaining components referred throughout this supplement as “Quick Closures”. Special consideration shall be given to meet the requirements set forth in NBIC Part 3, Section 2 through 5 as appropriate and inspection requirements identified in paragraph 2.3.6.5 in NBIC Part 2.

The components of quick closures include but are not limited to the following:
a) Cover (Head, Flat Plate, etc.)
b) Support Elements (Davit Hinge, Post Davit, Vertical/Slide Sides, etc.)
c) Locking Elements (Wedges, Latch, etc.)
d) Locking Mechanism (Rotating Locking Ring, Seal Flanges, Lugs etc.)
e) Holding Elements (Pins)
f) Interlock Device (Pressure Indicating Device)
g) Seal design

SXX.2 REPLACEMENT PARTS FOR QUICK CLOSURES

a) No components furnished or specified by the Manufacturer of the quick closure shall be removed unless Manufacturer’s concurrence is received. In the event the original Manufacturer is no longer available, components shall not be removed.
b) Replacement pressure retaining parts shall be identical to the original equipment furnished. Substitutions may be allowed if they are approved by the Manufacturer.
c) Quick closure replacement pressure-retaining parts shall be fabricated in accordance with the Manufacturer’s design and the original code of construction.
d) Replacement of the nonpressure-retaining load bearing parts, when different from the Manufacturer’s design, shall be evaluated for any possible effect on the pressure-retaining parts.
e) Replacement materials, including welding materials, shall be consistent with the original materials of construction, including heat treatment.

SXX.3 REPAIR GUIDE FOR QUICK CLOSURES

a) The Manufacturer’s Data Report or Manufacturer’s drawings when available, shall be carefully reviewed to determine the material of construction of each quick closure. If material data is not available, positive material identification (PMI) to identify the material’s chemistry and hardness testing shall be performed.

b) Weld repairs performed in accordance with NBIC Part 3 are permitted on quick closure pressure-retaining components that are manufactured from steel. Hinge pins or bolts shall not be welded. Special attention shall be paid to any requirements for the finished weld profile and PWHT.

c) Structural deterioration or damage caused by corrosion, thinning, or cracking shall not be repaired until its extent has been determined by suitable nondestructive examination.

d) The Certificate Holder shall have a plan covering the scope of the repair. The plan shall ensure that the work involved is compatible with the original design specification and good engineering practices.

e) Removing the quick closure mechanism components from one vessel for the installation on another vessel is STRICTLY PROHIBITED.

(f) When quick closures are repaired, the locking mechanism or locking device shall be operational per the quick closure Manufacturer's specifications.

SXX.4 ROUTINE REPAIRS

The following examples of repairs do not require stamping or nameplate attachment provided the repair procedure has been accepted by the Repair Inspector and the R-Certificate Holder has verified there will be no effect on the pressure-retaining capability of the quick closure.

a) Replacement of consumable parts, for example wedges.

b) Alignment adjustments

SXX.5 REPAIR OF DAMAGE

SXX.5.1 REPAIR OF QUICK CLOSURE WELDS

All welds associated with the quick closure pressure-retaining components should be repaired in accordance with the original manufacturer's design specifications. Special attention shall be paid to any requirements for the finished weld profile and PWHT.

SXX.5.2 REPAIR OF QUICK CLOSURE SURFACES

The repair of quick closure surfaces shall be limited to the restoration of wasted areas through weld build-up. The final surface shall be flush with nominal surface. Seating surfaces shall be machined back to original design specifications. External weld build-up is prohibited on closure components. Alternatively, Fitness-for Service (FFS) may be used to qualify local thin areas.

SXX.5.3 REPAIR OF QUICK CLOSURE MECHANISM

a) The designs of quick closure locking mechanisms are typically proprietary; therefore, all repairs shall be performed to restore the closure to the original design specifications. If design specifications, such as original quick closure configuration and nominal thicknesses are not available, then all repairs shall be performed by the original manufacturer. If this is not practicable, the Certificate Holder shall contact an organization competent in quick-actuating/quick-opening closure design and construction to approve or establish a repair plan prior to implementing any repairs.

b) Safety devices (sensors, interlocks, etc.) removed during maintenance or repair shall be reinstalled per the original manufacturer's specifications.

c) Repairs shall avoid damaging gasket materials. If damage occurs to gasket materials, the gaskets shall be replaced before returning system back into service.

SXX.6 EXAMINATIONS AND TEST METHODS

NBIC Part 3, Section 4 is applicable for all post construction activities pertaining to examination and testing.

SXX.7 CERTIFICATION/DOCUMENTATION AND STAMPING

NBIC Part 3, Section 5 is applicable for all post construction activities pertaining to certification/documentation and stamping.

Stamping may also be waived per SXX.4 of this Supplement.

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Item No.

A 23-39

Subject/Title

Strengthening Prevention of Defect Recurrence

NBIC Location

Part: Repairs and Alterations; Section: 3; Paragraph: Paragraph 1 (3.3.1)

Project Manager and Task Group

Jon Ferreira (PM), Tom White, Jamie Walker and Adam Henson

Source (Name/Email)

Adam Henson / adam.henson@csb.gov

Statement of Need

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

Background Information

On April 3, 2017, an explosion occurred at the Loy-Lange Box Company in St. Louis, Missouri. The incident occurred when the bottom head of a pressure vessel called a semi-closed receiver (SCR), which was used in the company's steam generation system, catastrophically failed. The SCR was launched in the air as the result of the explosion and landed on a neighboring business. One employee of the Loy Lange Box Company and three members of the public were fatally injured. The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated this incident and learned during the investigation that the SCR was repaired by an R stamp organization in 2012 five years prior to the incident. During the repair, a wasted area of the bottom head of the SCR was flush patched. The cause of the defect was determined to be oxygen pitting corrosion. Evidence gathered during the investigation suggests that the defects in the head were not fully removed during the repair activity. The R stamp organization stated during the investigation that Loy-Lange requested an "emergency repair" following the discovery of a leak from the SCR. The R stamp organization stated further that they interpreted this to mean the repair needed to be completed immediately, presumably so production could resume as normal. This was not the first time the SCR leaked. The vessel leaked previously in April 2004, August 2012, and November 2012. In addition to causing these leaks oxygen pitting corrosion was also discovered in other parts of Loy Lange's steam system. During the investigation, the CSB noted that no effort was made to determine the extent of the oxygen pitting corrosion in the steam generation system, including the SCR, and that Loy Lange's operating practices up to the date of the incident were such that oxygen levels within the steam generation system were not effectively managed. Had the level of oxygen within the steam generation system been effectively managed following any of the leaks repaired over the years the 2017 incident would not have happened. Full details of the Loy-Lange Box Company Pressure Vessel Explosion are available at this link:
https://www.csb.gov/loy-lange-box-company-pressure-vessel-explosion-/

Existing Text

3.3.1 DEFECT REPAIRS

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

Proposed Text

3.3.1 DEFECT REPAIRS

Before a repair is made to a defect in a welded joint or base metal, the owner or user of a pressure-retaining item is responsible for determining whether a condition assessment is required to determine the cause, extent, and likelihood of defect recurrence. Depending on the complexity of the defect, competent technical advice should be obtained. NBIC Part 2, Section 4.4 may be used as a guide to aid in the condition assessment. For repairs of pressure-retaining items without complete removal of the defect, see NBIC Part 3, Section 3.3.4.8.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

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PROPOSED REVISION OR ADDITION

Item No.

A 23-41

Subject/Title

Strengthening Requirements for Defect Removal When Patching

NBIC Location

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

Project Manager and Task Group

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

Source (Name/Email)

Adam Henson / adam.henson@csb.gov

Statement of Need

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

Background Information

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

Existing Text	New Proposed Text (09 Jan 2024)
3.3.4.6 PATCHES a) Flush Patches 1) The weld around a flush patch shall be a full penetration weld and the accessible surfaces shall be ground flush where required by the applicable original code of construction. Examples of welded flush patches are shown in NBIC Part 3, Figure 3.3.4.6-a. Nondestructive examination shall be performed in accordance with the requirements from NBIC Part 3, Section 4.2. 2) Before installing a flush patch, defective material shall be removed until sound material is reached. The patch shall be formed to the proper shape or curvature. The edges shall align without overlap. In stayed areas, the weld seams should come between staybolt rows or riveted seams. Patches shall be made from a material whose composition and thickness meet the intended service. Patches may be any shape or size. If the patch is rectangular, a minimum radius of not less than three times the material thickness shall be provided at the corners. Square corners are not permitted. The completed welds shall meet the requirements of the original code of construction. **Position – addition –**	**3.3.4.6 PATCHES** a) Flush Patches **1)** Examples of welded flush patches are shown in NBIC Part 3, Figure 3.3.4.6-a. **2)** Defects should be evaluated in accordance with 3.3.1 & 3.3.4.1. **3)** Before installing a flush patch, defective material shall be removed until sound material is reached. The area adjacent to the flush patch opening shall be measured to ensure it is at or above the required minimum thickness as per the original Code of construction. **4)** Patches shall be made from a material whose composition and thickness meet the intended service. **5)** Patches may be any shape or size. Square corners are not permitted except where the flush patch intersects with an existing weld seam ~~If the patch is rectangular.~~. A minimum radius of not less than three times the material thickness shall be provided at the corners. ~~Square corners are not permitted~~. **6)** The patch shall be formed to the proper shape or curvature. **7)** The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. **8)** The ~~edges~~ patch shall ~~align~~ be fitted and aligned without overlap. The fit-up and tack welding shall be inspected in accordance with the original code of construction. In stayed areas, the weld seams should come between staybolt rows or riveted seams. **9)** The weld around a flush patch shall be a full penetration weld and the accessible surfaces shall be ground flush where required by the applicable original code of construction. **10)** Nondestructive examination shall be performed in accordance with the requirements from NBIC Part 3, Section 4.2. **11)** The completed welds shall meet the requirements of the original code of construction.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

ASME PCC-2 articles:

Article 212 - Fillet Welded Patches

212-2 LIMITATIONS

….

(c) This repair method shall not be used where the damage mechanism, the extent of damage, or likely future damage cannot be characterized. This repair method may be used in certain cases on areas with local crack-like flaws, provided

(1) the growth has stopped, been arrested, or can be accurately predicted for all propagation modes

(2) the effect of the flaw is evaluated using detailed analyses

….

212-3 DESIGN

212-3.1 General

…

(b) In general, the patch material and welding filler metal should be the same or very similar (e.g., compositional, physical, and mechanical properties) to that of the pressure component's original construction. Repair material selection shall consider, as a minimum, characteristics such as chemistry, weldability, physical properties (such as coefficient of thermal expansion), mechanical properties (such as strength, ductility, notch toughness), and compatibility with the process medium.

(c) The thickness of the patch plate is dependent on material mechanical properties and the calculated attachment weld sizes.

(d) The size (length and width) of the patch plate is governed by the requirement that all attachment welds be located on sound base metal completely encompassing the damaged area(s) (see Figure 212-1-1). The repair plate shall also be large enough to encompass any additional area(s) anticipated to experience similar or related damage during the life of the repair. The patch plate should overlap sound base metal by at least 25 mm (1 in.).

….

212-4 FABRICATION

(a) Plate edges may be cut to shape and size by mechanical means such as machining, shearing, grinding, or by thermal means such as flame or arc cutting. If thermal means are used, a minimum of 1.5 mm (1⁄16 in.) additional material shall be removed by grinding or machining. If the repair plate is greater than 25 mm (1 in.) thick, and the fillet weld size is less than the plate thickness, the weld prep edges shall be examined by magnetic particle (MT) or liquid penetrant (PT) methods to check for laminations. Laminations shall be cause for rejection unless repaired or found acceptable by fitness-for-service analysis in accordance with API 579-1/ASME FFS-1.

(b) The patch plate may be formed to the required shape by any process that will not unduly impair the mechanical properties of the patch plate material.

Where required due to repair plate size or access/interference considerations, split sections may be used when joined by full penetration welds.

(c) Parts to be fillet welded shall be fit as tightly as practical to the surface to be welded and in no event shall be separated by more than 5 mm (3⁄16 in.). If the separation at the faying edge of the plate is 1.5 mm (1⁄16 in.) or greater, the size of the perimeter weld shall be recalculated by adding the amount of the separation to the eccentricity, e.

(d) Welding procedures, welders, and welding operators shall be qualified in accordance with the current requirements of the applicable construction code or postconstruction code. If not otherwise specified, ASME BPVC, Section IX may be used for procedure and performance qualification. Article 210 should be consulted for inservice welding issues; Article 214 should be consulted for field heat treating issues.

…

212-5 EXAMINATION

(a) Patch plate attachment welds shall be examined in accordance with the applicable construction code or postconstruction code by either the MT or PT methods if not temperature limited by the test methods. If not otherwise specified by the applicable construction code or postconstruction code, NDE shall be performed using procedures written and qualified in accordance with ASME BPVC, Section V.

….

(e) The examination acceptance criteria of the applicable construction code or post-construction code shall apply.

…

212-6 TESTING

(a) Testing shall be performed in accordance with the applicable post-construction code.

(b) The pressure component and installed patch plate(s) should be leak tested in accordance with the applicable post-construction code. Special safety precautions should be taken when pneumatic leak testing is performed.

(c) If permitted by the applicable post-construction code, nondestructive examination may be performed as an alternative to leak testing. Also, an initial service inspection may be performed of all weld joints after the pressure component has returned to normal operating pressure and temperature, if these were reduced while welding was performed.

…

Comments received in June 2024

Comments / Propositions	Contact
I appreciate your work on this item (and others) and your commitment to the NBIC. The new text in line 3 is a good addition in my opinion, I see these comments in some of the other Defect types but not in this one good catch.I don't think the new text in line 5 is necessary, requiring a minimum radius seems to eliminate the need for the new text about square corners not being permitted, I think square corners are not possible if a minimum radius is required. It seems the full penetration requirement is covered in line 9. Is it possible to massage the rest of line 7 into line 11, I realize one is for preparation and one is for the final weld but the essence of the point seems to be the same.Ben Schaefer	Benjamin Schaefer
Answer:	
Nice work on this item. If we make changes to the current wording, then I think we should try to update the method to be consistent with ASME PCC-2. Please reference the attachment for my specific comments.	Matt Schaser
Answer:	
The terminology "square corner" seems to imply a 90-degree corner. What about a triangular patch. I think the requirement that all corners are radius does address all corners.	Raymond Spuhl
Answer:	
For 9) "The weld around a flush patch shall be a full penetration weld." Consider - A full penetration weld is required to join the flush patch to existing base metal.	Tom White
Answer:	

*Comments received verbally during **January 2024** subgroup meeting from :*

- *Jonathan Ferreira*
- *George Galanes*
- *Matt Schaser*
- *Craig Hopkins*

*Comments received in **December 2023** (answers sent to all by email)*

Comments / Propositions	Contact
I like the proposal. My only comment is with #3) "and laminations and shall be verified through nondestructive examination suitable for providing meaningful results (e.g. MT or PT)." If I am looking for laminations in plate I have a ultrasonic lamination scan performed. PT/MT can only detect on the edges and that is not a certainty. I suggest removing the NDE examples and let the repair organization suggest a suitable NDE and obtain the repair inspector concurrence: 3) Before installing a flush patch, defective material shall be removed until sound material is reached. The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results (e.g. MT or PT). The remaining material shall be measured to ensure it is at or above the required minimum thickness.	Tom White Thomas.white@nrg.com +1 (281) 7824972
Answer: Agree with leaving the repair organization suggest an NDE method. **3)** Before installing a flush patch, defective material shall be removed ~~until sound material is reached.~~ The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results. The remaining material adjacent to the flush patch area shall be measured to ensure it is at or above the required minimum thickness.	
Many good comments. Here's a few more: change end of first sentence in Item 3) (e.g; MT or PT to (e.g; MT, PT, UT-T) and recorded, to ensure its acceptance for subsequent flush patch installation. Delete its second sentence entirely. 7) change beginning of first sentence from The edges to The prepped areas. Change second sentence to After VT acceptance a suitable Nondestructive Examination (MT/PT) shall be performed for acceptance of all weld preparation areas of remaining surfaces and the flush patch.	Jamie Walker jwalker@hayesmechanical.com +1 (773) 9105892
Answer: I don't feel the need to add here that NDE results must be recorded to ensure acceptance of flush patch installation. NDE must be performed according to an NDE procedure that should address records, examiners…etc. We need to keep the second sentence. The requirement of measuring the thickness of the remaining material is what triggered this request of change. **3)** Before installing a flush patch, defective material shall be removed ~~until sound material is reached.~~ The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results. The remaining material adjacent to the flush patch area shall be measured to ensure it is at or above the required minimum thickness. **Answer:** I agree that 7) needs some tweaking as suggest. My proposal would be: **7)** The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. After VT acceptance, a suitable nondestructive examination shall be performed for acceptance of all weld preparation areas before assembly and welding.	
#7) I would recommend replacing "faces" with area. 7) The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. A suitable nondestructive examination shall be used to examine the weld preparation area before assembly and welding.	Rick Valdez rvaldez@prim.com +1 (661) 3316024
Answer: I agree that 7) needs some tweaking as suggest. My proposal would be: **7)** The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. After VT acceptance, a suitable nondestructive examination shall be performed for acceptance of all weld preparation areas before assembly and welding.	
There are a lot of good comments from others that need to be addressed. We probably should have sent this to Review and Comment instead of an up/down vote.	Robert Underwood robert_underwood@hsb.com +1 (618) 593.6231
Answer: Agree. Thank you. I answered Rob.	

I agree with the comments provided by Rick and Tom, and I have the following additional comments: - In (3), we should clarify that the "nondestructive examination suitable for providing meaningful results" is surface NDE, which I believe will speak to Tom's comment. In addition, I believe additional instruction should be given in the last sentence regarding thickness measurement, specifically the quantity/representativeness of measurements and how far out they extend from the flush patch cut edge. You may also want to refer to 3.3.4.1, as revised by Action Item 23-40, which is adding language specifically about material thickness measurement after defect removal. - In (5), I believe the wording should not be restricted to just rectangular shapes or square corners; it should encompass all shapes which have edges of 90 degrees or greater. While it's not exactly likely that someone will try cutting a triangular flush patch, it is possible, and those corners should be rounded as well. - In 11), I believe this wording is quite vague and should be revised to state precisely what construction code requirements are to be met (i.e., welding procedure/performance qualification, welding documentation, etc.). For instance, the existing statement could easily be read as requiring a hydrostatic test for all flush patches, due to the construction code requiring such testing for all pressure boundary welds; I don't believe that's the intent of this statement, but it reads that way.	Andrew Triplett triplettal@ornl.gov +1 (865) 241.5969

Answer: I double checked item 23-40. The addition being discussed in 23-40 is *After the defect has been removed, the thickness of the remaining base material shall be measured to confirm thickness complies with the original Code of construction. Measurement results shall be documented.* See below new proposition. I believe that documentation of thickness measurements is a must and should be present in the NDE result that will be produced by the examiner after applying a thickness measuring technique. Item 23-41 includes in 2) a reference to 3.3.4.1 & 3.3.1 for the evaluation of defects.

2) Defects should be evaluated in accordance with 3.3.1 & 3.3.4.1.

3) Before installing a flush patch, defective material shall be removed ~~until sound material is reached~~. The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results. The remaining material adjacent to the flush patch area shall be measured to ensure it is at or above the required minimum thickness as per the original Code of construction.

Answer: We didn't work on item 5. We kept the original text as is. Agree with the suggestion and proposing to rearrange the text of 5):

5) Patches may be any shape or size. ~~If the patch is rectangular,~~. Square corners are permitted. A minimum radius of not less than three times the material thickness shall be provided at the corners.

Answer: We didn't work on item 11. We kept the original text as is. I don't agree with the comment. The various requirements to be complied with are stated in few other articles (welding documentation and qualification is addressed in section 2 of NBIC Part-3. Testing and examination is addressed in Section 4…etc.). A flush patch repair may require a hydrotest or alternative NDE. I suggest to leave 11) as is if possible.

11) The completed welds shall meet the requirements of the original code of construction.

Item 5, the term rectangular, seem very limiting. What if the patch is a triangle or a pentagon. Do the corners need to be radius? Item 7, why is an additional exam required of the weld preparation faces? The remaining material is already examined for defects in item 3.	Raymond Spuhl raymond_spuhl@hsb.com +1 (314) 223.6603

Answer: We didn't work on item 5. We kept the original text as is. Agree with the suggestion and proposing to rearrange the text of 5):

5) Patches may be any shape or size. ~~If the patch is rectangular,~~. Square corners are permitted. A minimum radius of not less than three times the material thickness shall be provided at the corners.

Answer: 7) is for weld preparation of the pressure retaining item and the patch. 3) is only for the defects removal in the area to be repaired.

3) Before installing a flush patch, defective material shall be removed ~~until sound material is reached~~. The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results. The remaining material adjacent to the flush patch area shall be measured to ensure it is at or above the required minimum thickness as per the original Code of construction.

7) The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. After VT acceptance, a suitable nondestructive examination shall be performed for acceptance of all weld preparation areas before assembly and welding.

While I approve this change, had the fabricator followed these rules, the Loy-Lang vessel still would have failed due to the incompetence of the owner.	Walter Sperko sperko@asme.org +1 (336) 674-0600

Answer: Agree. Thank you. I answered M.Sperko

Although I agree with Davis, Sperko, Walker and White; this item needs more work.	James Sekely jsekely@comcast.net +1 (412) 3895567

Answer: Agree. Thank you. I answered James.

I agree this should have went to review and comment before a vote as there are many good comments that need to be addressed	Trevor Seime tsseime@nd.gov +1 (701) 220.4723

Answer: Agree. Thank you. I answered Trevor.

In light of all the comments made as to changes needed I am abstaining	Michael Quisenberry michael@spartan-mech.com +1 (806) 316.7174

Answer: Agree. Thank you. I answered Michael.

I like this in theory, but #7 is confusing to me. What exactly are we going to be asking of the stamp holder?	Kathy Moore kathymoore@joemoorecompany.com +1 (919) 8321665

Answer: I agree that we should look at 3 & 7 one more time and see if we can simplify both. **My proposition?**

3) Before installing a flush patch, defective material shall be removed ~~until sound material is reached~~. The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results. The remaining material shall be measured to ensure it is at or above the required minimum thickness as per the original Code of construction.

7) The edges of the opening and patch shall be prepared for welding to ensure full penetration welds. After VT acceptance, a suitable nondestructive examination shall be performed for acceptance of all weld preparation areas before assembly and welding.

Abstaining due to the posted comments as I believe they should be addressed.	Donald Kinney don.kinney@labor.nc.gov +1 (919) 707.7911

Answer: Agree. Thank you. I answered Donald

Abstaining because of the comments made '	Frank Johnson fjkeck22@aol.com +1 (419) 386-8450

Answer: Agree. Thank you. I answered Frank.

While I like where we're trying to go with this change, I think the posted comments show that we need to do a lot more work on this proposal to reach consensus.	Steven Frazier steve.frazier@seattle.gov +1 (206) 684.8459

Answer: Agree. Thank you. I answered Steven.

I agree with most of this. However, I will abstain as Action Item 23-39 has a proposal to revise 3.3.1 and I think that if 23-39 passes this may affect 23-41. I plan on presenting action item 23-39 during January's meeting.	Jonathan Ferreira jonathan_ferreira@hsb.com +1 (207) 745.6889

Answer: Thank you. Below is item 23-39. I believe it does give a general requirement of making sure making sure defects are dealt with. Item 23-41 brings more clarity and specific checks to be made when considering a patch. I think we can leave 23-41 as is for now and improve it possible in the future if we realize that overlapping does exist between articles 3.3.1 & 3.3.4.6.

3.3.1 ~~Before a repair is made to a defect in a welded joint or base metal, care should be taken to investigate its cause and to determine its extent and likelihood of recurrence.~~ When determining the repair plan for repairing a defect in a welded joint or base metal, a condition assessment to determine the cause, extent, and likelihood of recurrence of the defect is required depending on the complexity of the defect. The owner or user of the pressure-retaining item is responsible for the selection and application of the condition assessment methodology that is performed. When a condition assessment is performed, it shall be documented on the applicable R-form. Organizations or qualified individuals with experience in inspection, design, construction, repairs, or failure analysis of pressure-retaining items should be consulted to assist in identifying damage mechanisms and to evaluate the condition assessment results of the pressure-retaining item. NBIC Part 2, Section 4.4 should be used as a guide to aid in this assessment.

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

I Feel this needs more work before we can vote on it.	Louis Dutra ldutra@baycityboiler.com +1 (925) 3482881

Answer: Agree. Thank you. I answered Louis.

From new item: "3) Before installing a flush patch, defective material shall be removed until sound material is reached. The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results (e.g. MT or PT). The remaining material shall be measured to ensure it is at or above the required minimum thickness". I believe you need to limit (or define extent of) the remaining material to an area around the patch. As it is written, one might assume the entire remaining pressure part has to be examined and must be free of the defects you list. Also, you may need to perform an appropriate volumetric type of examination instead of just surface / slight subsurface to find internal laminations.	Paul Davis pappy329@charter.net +1 (412) 3277420

Answer: I agree. We removed the NDE examples and left NDE to be decided by the repair organization and the repair inspector as long as meaningful results can be obtained. For thickness measurements, the repair organization and the repair inspector will normally focus on the damaged areas or the pressure retaining item area that needs to be repaired (installation of a flush patch). An inspection normally already took place and articles such as 3.3.1 & 3.3.4.1 have been complied with. I don't think we can put a limitation on what areas of the pressure retaining items need thickness measurements. I know in my jurisdiction that when a pressure retaining item needs a flush patch, than it means it's not in a great shape and our repair inspector does indeed ask for thicknesses measurements in other areas to make sure the remaining parts of the vessel ae actually ok.

3) Before installing a flush patch, defective material shall be removed ~~until sound material is reached.~~ The remaining material shall be free of corrosion and defects such as cracks and laminations and shall be verified through nondestructive examination suitable for providing meaningful results. The remaining material adjacent to the flush patch area shall be measured to ensure it is at or above the required minimum thickness as per the original Code of construction.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 23-78

Subject/Title

Edits to NBIC Part 3, Supplement 8

NBIC Location

Part: Repairs and Alterations; Section: Supplement 8

Project Manager and Task Group

P. Becker (PM), J. Siefert

Source (Name/Email)

Pat Becker, pbecker@epri.com

Statement of Need

Clarifying editorial comments and recent updates to the ASME BVPC Section IIC filler metal designations

Background Information

N/A

Existing Text

TABLE S8.2.1

ALTERNATIVE WELD REPAIR METHODS, FILLER METALS AND WELDING PROCESSES FOR GRADE 91 STEEL.

Acceptable Weld Repair Method		Welding Process and Filler Metal AWS Classification
Filler Metal	Welding Procedure	
Matching (9Cr-1Mo-VNbN)	Controlled Fill + Low PWHT	• SMAW – E9015-B9, E9016-B9, E9018-B9 or E9015-B91$_A$, E9016-B91$_A$ or E9018-B91$_A$ • FCAW – E91T1-B9 or E91T1-B91$_A$ • GTAW – ER90S-B9 or ER90S-B91$_A$
9Cr-1Mo	Controlled Fill	• SMAW – E8015-B8, E8016-B8 or E8018-B8 • FCAW – E81T1-B8 • GTAW – ER80S-B8
Ni-base	Controlled Fill	• SMAW – EPRI P87^B, ENiCrFe-2, ENiCrFe-3 • FCAW – None available • GTAW – EPRI P87^C, ERNiCr-3

[A] –B91 AWS classification is pending for the various Grade 91 filler metal product forms (currently –B9)

[B] Incorporated by ASME B&PV Code as Code Case 2734 for classification as an F No. 43 filler material

[C] Incorporated by ASME B&PV Code as Code Case 2733 for classification as an F No. 43 filler material

Proposed Text

TABLE S8.2.1

ALTERNATIVE WELD REPAIR METHODS, FILLER METALS AND WELDING PROCESSES FOR GRADE 91 STEEL.

Acceptable Weld Repair Method		Welding Process and Filler Metal AWS Classification
Filler Metal	Welding Procedure	
Matching (9Cr-1Mo-VNbN)	Controlled Fill + Low PWHT	• SMAW – ~~E9015-B9, E9016-B9, E9018-B9~~ or E9015-B91$_A$, E9016-B91$_A$ or E9018-B91$_A$ • FCAW – ~~E91T1-B9~~ or E91T1-B91$_A$ • GTAW – ~~ER90S-B9~~ or ER90S-B91$_A$
9Cr-1Mo	Controlled Fill	• SMAW – E8015-B8, E8016-B8 or E8018-B8 • FCAW – E81T1-B8 • GTAW – ER80S-B8
Ni-base	Controlled Fill	• SMAW – ~~EPRI P87^B~~, ENiCrFe-2, ENiCrFe-3 • FCAW- ~~ENiCrFe-4~~ ENiCr3Tx-y[1], ENiCrFe2Tx-y[1], or ENiCrFe3Tx-y[1] • GTAW – ~~EPRI P87^C~~, ERNiCr-3 , ~~ERNiCrFe-4~~

~~[A] –B91 AWS classification is pending for the various Grade 91 filler metal product forms (currently –B9)~~

~~[B] Incorporated by ASME B&PV Code as Code Case 2734 for classification as an F No. 43 filler material~~

~~[C] Incorporated by ASME B&PV Code as Code Case 2733 for classification as an F No. 43 filler material~~

Notes to Table S8.2.1

[A] –B91 AWS classification is pending for the various Grade 91 filler metal product forms (currently –B9)

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~~[B] Incorporated by ASME B&PV Code as Code Case 2734 for classification as an F No. 43 filler material~~

~~[C] Incorporated by ASME B&PV Code as Code Case 2733 for classification as an F No. 43 filler material~~

[1] Clarification on the 'x-y' designators may be found in ASME BPVC Section IIC, SFA-5.34/SFA-5.34M Specification for Nickel-Alloy Flux Cored and Metal Cored Welding Electrodes.

S8.2.2

a) For repairs in P-No. 15E, Group 1, Grade 91, CSEF steel joined to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction, the filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43 and limited to the following consumables: ERNiCr-3, ENiCrFe-3, ENiCrFe-2, UNS N08087. This weld repair option does not require PWHT.

S8.2.2

a) For repairs in P-No. 15E, Group 1, Grade 91, CSEF steel joined to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction, the filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43 and limited to the following consumables: ERNiCr-3, ENiCrFe-3, ENiCrFe-2, ERNiCrFe-4, ENiCrFe-4, ENiCr3Tx-y, ENiCrFe2Tx-y, or ENiCrFe3Tx-y. ~~UNS N08087~~. This weld repair option does not require PWHT.

S8.2.2 b)

2) A martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: E9015-B9, E9016-B9, E9018-B9, E9015-B91, E9016-B91, E9018-B91, E91T1-B9, E91T1-B91, ER90S-B9 or ER90S-B91. This weld repair option requires PWHT at a minimum temperature of 1250°F (675°C).

S8.2.2 b)

2) A martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: ~~E9015-B9, E9016-B9, E9018-B9,~~ E9015-B91, E9016-B91, E9018-B91, E91T1-B9, E91T1-B91, ~~ER90S-B9~~ or ER90S-B91. This weld repair option requires PWHT at a minimum temperature of 1250°F (675°C).

S8.3

c) Figures S8.3-a through S8.3-d illustrate the types of acceptable weld joint details using the controlled fill technique for full or partial penetration weld repairs.

S8.3

c) Figures S8.3-a through S8.3-d illustrate the ~~types of acceptable weld joint details~~ deposition of weld passes using the controlled fill technique for full or partial penetration weld repairs. This supplement is not restricted to the repair of girth welds.

Figure S8.3b (inset image 6 – entire figure on following page)

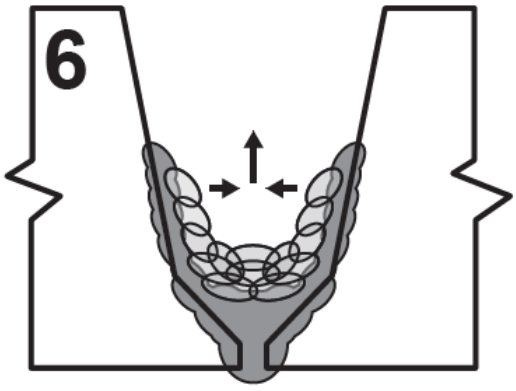


Figure S8.3b

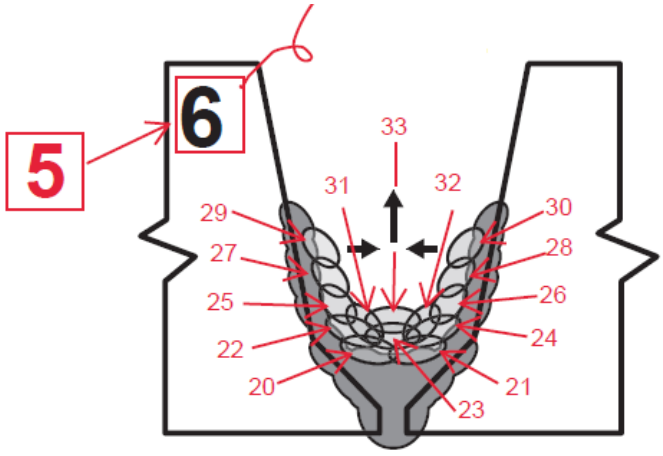
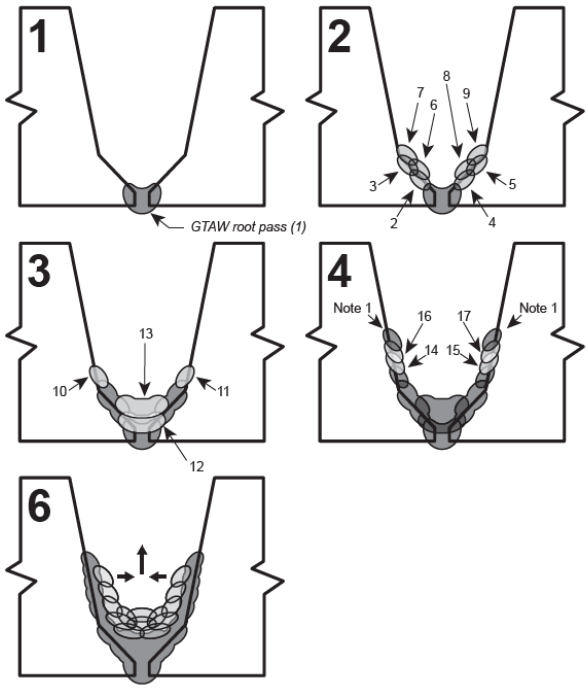


FIGURE S8.3-b.

SCHEMATIC OF THE CONTROLLED FILL WELDING PROCEDURE FOR GRADE 91 STEEL FOR A FULL PENETRATION WELD REPAIR USING A COMPOUND BEVEL.



Note 1 – Where the excavation may pose challenges with electrode access, it is recommended that the fill passes in immediate contact with the machined excavation be restricted in height as the weld repair is performed.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

Item 23-83

This item proposes to **relocate** three **existing** repair methods and two existing alteration methods to a new Engineered Repairs and Alterations Supplement which was approved by the Main Committee last August.

Note: These are existing activities in the main body of Part 3 and will not, at this time, require an "Advanced Scope/Certificate" issued by the National Board. The "Advanced Scope/Certificate" will be addressed after the 2025 Edition is published. Additionally, these paragraphs have not been modified except for needed references to other relevant parts of Part 3.

The following paragraphs have been relocated to this proposed supplement:

3.3.4.3 WASTED AREAS ~~e) External Weld Metal Buildup~~ *All text in **3.3.4.3(e)**, including **Figure 3.3.4.3-c**, will be relocated to paragraph SXX.2.1 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.*
~~**3.3.4.8 REPAIR OF PRESSURE-RETAINING ITEMS WITHOUT COMPLETE REMOVAL OF DEFECTS**~~ *All text in 3.3.4.8 will be relocated to paragraph SXX.2.2 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.*
~~**3.3.5 REPAIR OF ASME SECTION VIII< DIVISION 2 OR 3, PRESSURE VESSELS**~~ *All text in 3.3.5 will be relocated to paragraph SXX.2.3 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.*
~~**3.4.3 ENCAPSULATION**~~ *All text in 3.4.3 will be relocated to paragraph SXX.3.1 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.*
~~**3.4.5 ALTERATION OF ASME CODE SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS**~~ *All text in 3.4.5 will be relocated to paragraph SXX.3.2 of the new Engineered Repairs and Alteration Supplement as indicated on page 2 of this proposal.*

SUPPLEMENT XX – ENGINEERED REPAIRS AND ALTERATIONS

SXX.1 SCOPE

a) This supplement provides requirements and guidelines for engineered repairs and alterations to pressure retaining items. These requirements shall be used in conjunction with the applicable rules of the main Parts of the NBIC.

SXX.2 Engineered Repair Methods

SXX.2.1 EXTERNAL WELD METAL BUILDUP

a) Pressure-retaining items that have localized internal thinning due to erosion and/or corrosion and where the internal surface is not readily accessible may be weld repaired by depositing weld metal on the external surface of the item as shown in NBIC Part 3, Figure SXX.2.1-a. This method of repair is subject to approval by the Inspector and the Jurisdiction, where required.

b) All of the following conditions shall apply for this repair method to be permitted:

1) The component to be repaired shall be a ferrous material;

2) The maximum design temperature of the repaired component shall not exceed 650°F (340°C), and the minimum design temperature shall not be less than -20°F (-29°C);

3) The pressure-retaining item shall be volumetrically examined for cracks in the area to be weld repaired. If cracks are detected, this repair method shall NOT be used;

4) The WPS followed shall be qualified for weld metal buildup in accordance with ASME Section IX. The nominal chemical analysis of the deposited weld metal shall be equivalent to the base material that is to be repaired. In addition, the nominal tensile strength of the deposited weld metal shall be equal to or exceed the specified minimum tensile strength and shall be based on the requirements of the welding consumable. If butt welds in the component being overlaid required postweld heat treatment by the code of construction, the WPS followed for the weld buildup shall be qualified with PWHT;

5) The pressure-retaining item shall be taken out of service prior to performing the weld metal buildup. The owner of the pressure-retaining item shall evaluate the flammability, volatility, or potential reaction of the contents that were in the vessel to ensure safe working conditions during weld repair. When required by the results of this evaluation, the pressure-retaining item shall be drained of its contents to the extent necessary to make the repair;

6) This method may be used more than once in the same areas to repair locally thinned areas; however, the cumulative weld buildup for all repairs shall not exceed the thickness (t) of the component at any point; and

7) Repairs using this method shall not cover more than 25% of the circumference of the component.

c) External weld buildup shall be applied in accordance with the following requirements:

1) The area to be repaired shall be ultrasonically scanned for wall thickness, and the location and size of the thinned region shall be mapped;

2) The area requiring repairs and the boundaries of the weld buildup shall be marked on the external surface of the component;

3) The general design of the external weld buildup shall be in accordance with NBIC Part 3, Figure SXX.2.1-a. The finished weld buildup shall be circular, oval, or rectangular in shape;

4) The weld buildup shall extend, at full thickness, a minimum distance B in each direction beyond the boundaries of the thinned base metal area.

   a. $B = 3/4 \sqrt{(Rt_{nom})}$

   b. R = outer radius of the component, or D/2

   c. t_{nom} = nominal wall thickness of the component

   The thickness shall be sufficient to maintain the predicted life of the repair. Any corrosion allowance that is determined to be necessary shall be added to the value of B.

5) All edges of the weld buildup shall be tapered to the existing contour of the component, at a maximum angle (a) of 45°;

6) The thickness of the weld buildup shall be uniform except along tapered edges as welded surfaces are acceptable, provided they are free of coarse ridges and valleys and are suitable for any required nondestructive examinations;

7) All corners of the weld buildup shall have a minimum radius (r), not less than the overlay thickness;

8) Any corrosion allowance that is determined to be necessary shall be added to the thickness of the weld buildup;

9) The thickness (W) of the weld deposit plus the remaining wall thickness in the affected area (μ) of the component at its thinnest point shall not exceed the nominal wall thickness (t) of the component. This shall be verified by ultrasonic methods;

10) Final dimension and contour of the weld buildup may be achieved by grinding or machining. This work may be done before or after any PWHT;

11) The weld buildup shall be examined by liquid penetrant inspection or wet fluorescent magnetic particle inspection. If the buttwelds in the component being built up were required to be volumetrically examined during the original construction, the built-up area shall be similarly volumetrically examined;

12) For each repair, the maximum dimension (L, length along axis) compensated by a circular or oval weld buildup shall not exceed the lesser of 1/4 the nominal outside diameter or the component or 8 in. (200 mm). The length of a rectangular patch is not limited; and

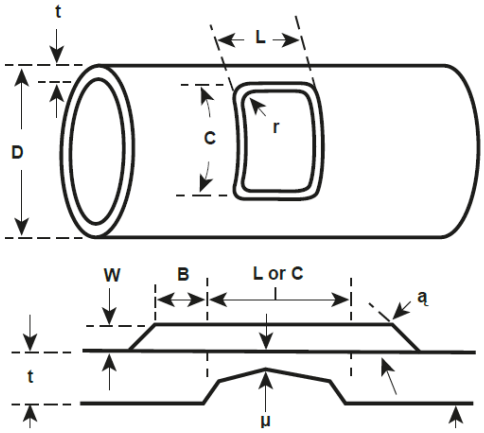
13) The distance between the weld toes of the multiple weld buildup regions on a component's outer diameter surface area shall not be less than $3/4 \sqrt{(Rt)}$.

14) Test and examination methods shall be in accordance with Part 3, Section 4.

15) Documentation and distribution requirements shall be in accordance with Part 3, Section 5.

FIGURE SXX.2.1-a

EXTERNAL OVERLAY TERMS AND DEFINITIONS



L = length of area to be repaired along the axis of the component

C = length of area to be repaired along outside circumference of the component

W = the completed thickness of the overlay

ą = the angle between the component and the overlay (maximum 45°)

B = 3/4 $(Rt)^{0.5}$ minimum

R = nominal outside radius of the component

D = the nominal outside diameter of the component

t = nominal wall thickness of the component

μ = remaining wall thickness of the component shall be 1/16 in. (1.6 mm) or greater

r = minimum radius, not less than the overlay thickness

SXX.2.2 REPAIR OF PRESSURE-RETAINING ITEMS WITHOUT THE COMPLETE REMOVAL OF DEFECTS

a) There may be cases where removal of a defect in a pressure-retaining item is not practical at the time the defect is found. In such cases, with approval of the Inspector and, when required, the Jurisdiction, an engineering evaluation shall be performed to determine the scope of the repair and impact to safety prior to returning the pressure-retaining item to service for a specified period of time. The engineering evaluation shall be performed by an organization with demonstrated competency in defect (and flaw) characterization of pressure-retaining items. The method of defect evaluation and time interval for returning the pressure-retaining item back to service shall be as agreed upon by the Inspector, and when required, the Jurisdiction. The specified period of time the defect can remain in service after weld repair shall be based on no measurable defect growth during subsequent inspections, or a period of time as specified by the Jurisdiction, if applicable. This repair method is not permitted for vessels used in lethal service, vessels designed for high-cycle operation or fatigue service, compressed air storage, and in cases where high stress concentration cannot be reduced by weld repair. This repair method is not permitted for DOT vessels.

b) One or more fitness-for-service engineering evaluation methods as described in NBIC Part 2, 4.4 shall be used to determine whether the defect may remain, either in part or in whole, in the pressure-retaining item. If it is determined that the defect can remain in the item, a risk-based inspection program shall be developed as described in NBIC Part 2, 4.5 to assure inspection of the defect and monitoring of defect growth over time. This program shall be a controlled and documented inspection program that specifies inspection intervals as agreed upon with the Inspector and, when required, the Jurisdiction, and shall be maintained until the defect can be completely removed and the item repaired.

c) The following requirements shall apply to the weld repair of pressure-retaining items without complete removal of defects:

   1) Engineering evaluation of the defect in the pressure-retaining item shall be conducted using one or more fitness-for-service condition assessment method(s) as described in NBIC Part 2, 4.4. Engineering evaluation of the condition assessment results shall be performed by an organization

that has demonstrated industry experience in evaluating pressure-retaining items, if the fitness-for-ser- vice engineering evaluation requires finite element analysis (FEA), the requirements in NBIC Part 2, 4.6 and NBIC Part 2, Supplement 11 shall be met.

2) If engineering evaluation indicates a defect can remain in the pressure-retaining item, a risk-based inspection program shall be developed and implemented based on review and acceptance by the Inspector and, when required, the Jurisdiction. The risk-based inspection program shall be in accordance with the requirements in NBIC, Part 2, 4.4.

3) The fitness-for-service condition assessment and risk-based inspection programs shall remain in effect for the pressure-retaining item until such time that the defect can be completely removed and the item repaired. The fitness-for-service condition assessment method, results of assessment, and method of weld repair, if applicable, shall be documented on a Report of Fitness for Service Assessment (FFSA) Form as described in NBIC Part 2, 4.4.1 and shall be filed with the Jurisdiction, when required.

4) When weld repairs are performed without complete removal of the defect(s), this shall be noted on the Form R-1 in the description of the work. The “R” Stamp Holder performing the weld repairs shall provide detailed information on the Form R-1, describing the method, extent, and include the specific location of the weld repair on the item.

5) The interval to re-inspect or remove the item from service or perform weld repair shall be determined based on a risk-based inspection program developed and implemented as required by NBIC Part 2, 4.5. The inspection interval shall not exceed the remaining life of the item, and shall be documented on the Form NB-403 and in the Remarks section of the Form R-1. The Form NB-403 shall be affixed to the Form R-1. A National Board Commissioned Inspector holding an “R” endorsement as described in NB-263, RCI-1 shall sign both the Form R-1 and the attached Form NB-403.

6) A copy of the completed Form R-1 with the completed Form NB-403 attached may be registered with the National Board, and when required, filed with the Jurisdiction where the item was installed.

SXX.2.3 REPAIR OF ASME SECTION VIII, DIVISION 2 OR DIVISION 3 PRESSURE VESSELS

a) Scope

The following requirements shall apply for the repair of pressure vessels constructed to the requirements of Section VIII, Division 2 or 3 of the ASME Code.

b) Repair Plan

The user shall prepare or cause to have prepared, a detailed plan covering the scope of repair.

1) Engineer Review and Certification

The repair plan shall be reviewed and certified by an engineer meeting the criteria of ASME Section VIII, Division 2 or 3, as applicable, for an engineer signing and certifying a Manufacturer’s Data Report. The review and certification shall be such as to ensure the work involved in the repair is compatible with the User’s Design Specification and the Manufacturer’s Data Report. The certifying requirement may be waived for ASME Section VIII, Division 2, Class 1 vessels that did not require the Manufacturer’s Design Report to be certified during initial construction.

Note: The engineer qualification criteria of the Jurisdiction where the pressure vessel is installed should be verified before selecting the certifying repair.

2) Authorized Inspection Agency Acceptance

Following review and certification, the repair plan shall be submitted for acceptance to the Authorized Inspection Agency/Owner-User Inspection Organization whose Inspector will make the acceptance inspection and sign the Form R-1.

SXX.3 ENGINEERED ALTERATION METHODS

SXX.3.1 ENCAPSULATION

Encapsulation is a method used to maintain the pressure retaining capability of piping and valves (with the exception of firetube boilers) by fabricating a new pressure containing boundary over the item in the form of a “welded leak box” as described by ASME PCC-2, Article 204.

a) Except as required in SXX.3.1 c) 1), ASME PCC-2 should be used as a guideline for the design of the welded leak box and fabrication shall be in accordance with the original code of construction, when practicable. Design of the encapsulation shall consider original design conditions, taking into account current service conditions and damage mechanisms. Use of this method shall be acceptable to the inspector and when required, the jurisdiction.

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

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

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

3) A welded leak box shall not be used to encapsulate a crack unless it has been removed and repaired in accordance with Part 3, Paragraph 3.3.4.2 a).

c) Hazards associated with welding on degraded components should be addressed with the Owner-User by the use of engineering controls, administrative controls, and personal protective equipment.

1) When the pressure retaining item will remain in service while implementing this method, the requirements and limitations described within ASME PCC-2, Part-1 shall be used in conjunction with the Welded Leak Box Repair article in ASME PCC-2, Part-2, Article 210.

2) API RP-2201, “Safe Hot Tapping Practices in the Petroleum and Petrochemical Industries” may be used as a guideline for identifying hazards associated with welding to a component that is under pressure, including service restrictions.

d) Visual examination shall be in accordance with the NBIC Part 3, 4.4.1 e).

e) Completion of the Form R-2 shall follow the requirements for preparation, distribution, and registration as described in Part 3, Section 5.

SXX.3.2 ALTERATION OF ASME SECTION VIII, DIVISION 2 OR 3, PRESSURE VESSELS

a) Alteration Plan

1) Engineer Review and Certification

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

b. Provided that the alteration does not introduce a condition that would require an engineer to sign the Manufacturer's Design Report for ASME Section VIII, Division 2, Class 1 vessels, the certifying requirement may be waived for vessels that did not require the Manufacturer's Design Report to be certified during initial construction.

Note: The engineer qualification criteria of the jurisdiction where the pressure vessel is installed should be verified before selecting the certifying engineer.

2) User's Design Specification

If the alteration is such that the work is not compatible with, or changes one or more requirement(s) of the original user's design specification, the user's design specification shall be revised by the user with the new parameters or changes. The revisions shall be certified by an engineer meeting the criteria of ASME Section VIII, Division 2 or 3, as applicable, for an engineer signing and certifying a Manufacturer's Design Report.

Note: The engineer qualification criteria of the Jurisdiction where the pressure vessel is installed should be verified before selecting the certifying engineer.

3) Manufacturer's Design Report

a. The "R" Certificate Holder shall prepare, or cause to have prepared a supplement to the Manufacturer's Design Report to reconcile the new parameters or changes with the User's Design Specification.

b. The supplement to the Manufacturer's Design Report shall be certified by an engineer meeting the criteria of ASME Section VIII, Division 2 or 3, as applicable, for an engineer signing and certifying a Manufacturer's Design Report.

Note: The engineer qualification criteria of the Jurisdiction where the pressure vessel is installed should be verified before selecting the certifying engineer.

4) Authorized Inspection Agency Acceptance

Following review and certification, the alteration plan shall be submitted for acceptance to the Authorized Inspection Agency/Owner-User Inspection Organization whose inspector will make the acceptance inspection and sign the Form R-2.

Background: The DOT is requesting that the below **two** changes be added to Item 20-67 which was approved by Main Committee and will be published in the 2025 Edition of the NBIC Part 3. These changes will address a proposed future revision to the DOT standard.

SUPPLEMENT 6
REPAIR, ALTERATION, AND MODIFICATION OF DOT TRANSPORT (CARGO) TANKS

S6.1 SCOPE

This supplement provides requirements and guidelines for repairs, alterations, or modifications to DOT Transport Tanks used for the transportation of dangerous goods via highway, rail, air, or water.

S6.2 DEFINITIONS

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

S6.3 CONSTRUCTION STANDARDS

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

S6.4 ACCREDITATION AND REGISTRATION

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

S6.5 AUTHORIZATION

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

S6.6 INSPECTION

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

S6.7 MODIFICATIONS

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

S6.8 DRAWINGS AND CALCULATIONS

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

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

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

S6.9 MATERIALS

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

S6.10 REPLACEMENT PARTS

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

S6.11 WELDING

a) Welding, including procedure specification qualification, performance qualification, qualification records, qualified personnel identification, continuity of qualified personnel, and process continuity records shall be in accordance with the requirements of the original code of construction used for the fabrication of the pressure retaining item and Part 3, Section 2.

b) For hydrogen control when low alloy steel filler metals are used, the filler metal classification shall include an H4 supplemental diffusible hydrogen designator (maximum 4 ml [H2]/100 g deposited metal) for each of the following welding processes:

   1) electrodes for shielded metal arc welding (SMAW) conforming to SFA-5.5;

   2) electrodes and fluxes for submerged arc welding (SAW) conforming to SFA-5.26;

   3) electrodes and rods for gas shielded metal arc welding (GMAW) conforming to SFA-5.28;

   4) electrodes for flux-cored arc welding (FCAW) conforming to SFA 5.29.

c) Practices used for controlling storage and exposure of filler metals shall be those developed by the “R” Certificate Holder or those recommended by the filler metal manufacturer.

S6.12 HEAT TREATMENT

S6.12.1 PREHEATING

Preheating may be employed during use of a process to assist in completion of the joint Preheating shall comply with the requirements in NBIC Part 3, 2.5.1.

S6.12.2 POSTWELD HEAT TREATMENT (PWHT)

Postweld heat treatment used in repairs, alterations, and modifications of DOT Transport Tanks shall comply with the requirements provided in NBIC Part 3, 2.5.2 and the Competent Authority.

S6.12.3 ALTERNATIVES TO POSTWELD HEAT TREATMENT

a) Under certain conditions, postweld heat treatment in accordance with the original code of construction may be inadvisable or impractical. In such instances, alternative methods of postweld heat treatment or special welding methods in accordance with NBIC Part 3, 2.5.3, and acceptable to the Inspector and Competent Authority may be used.

b) When the standard governing the original construction is the Code of Federal regulation for DOT/MC 331 transport tanks for propane, butane, anhydrous ammonia, and other DOT permitted commodities, and the tanks are made to the ASME Code, Section VIII, Division 1, Part UHT, repairs, alterations, or modifications shall conform insofar as possible, to the edition of the construction standard or specification most applicable to the work. Where this is not possible or practicable, it is permissible to use other codes, standards, or specifications provided the “R” Certificate Holder has the concurrence of the DOT. Shells and heads of MC 331 transport tanks were made from quenched and tempered alloy steel plate, SA517, Grade E (originally Code Case 1298) and Grade F (originally Code Case 1204) prior to 1994.

c) The 1994 ASME Code Addenda revised UHT-5(b) to permit the joining of UHT materials to UCS or UHA materials in head and shell sections. Propane, butane, and anhydrous ammonia are the most common transported commodities and the shipper is required by DOT to comply with certain composition limitations. Propane and butane transported must have sufficiently low hydrogen sulfide content so as not to exceed the limitations for Classification One of the ASTM D1838-74 copper strip test, and the anhydrous ammonia transported must be inhibited with a minimum water content of 0.2% by weight. In addition, such transport tanks made for propane, butane, and anhydrous ammonia service must be postweld heat treated, unless specifically exempted by a DOT special permit that exempts PWHT.

S6.13 REPAIRS OF DEFECTS

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

b) For MC 330 and MC 331 transport tanks, when a repair is made to defects revealed by the wet fluorescent magnetic particle examination, including those repaired by grinding, the affected area of the transport tank must again be examined by the wet fluorescent magnetic particle method after hydrostatic testing to assure that all defects have been removed.

S6.14 NONDESTRUCTIVE EXAMINATION

a) The nondestructive examination (NDE) requirements, including qualification of NDE personnel shall comply with the requirements in NBIC Part 3, 4.2 and the Competent Authority.

S6.15 MEASUREMENT, EXAMINATION, AND TEST EQUIPMENT

The calibration of pressure gages, measurement, examination, and test equipment, and documentation of calibration shall be performed, as required, by the applicable standard used for construction. This system shall be documented.

S6.16 PRESSURE TESTS FOR REPAIRS AND ALTERATIONS

The following requirements shall apply to all repairs, alterations, or modifications to DOT Transport Tank pressure-retaining items:

a) The integrity of repairs alterations, modifications, and replacement parts used in repairs, alterations, or modifications shall be verified by a pressure test;

b) Pressure testing shall be conducted in accordance with the original code of construction and the regulations of the Competent Authority.

c) The “R” Certificate Holder is responsible for all activities relating to the pressure testing of repairs, alterations, or modifications;

S6.16.1 PRESSURE TEST METHODS APPLICABLE TO REPAIRS

a) Liquid Pressure Test

Liquid pressure testing of repairs to DOT Transport Tanks shall comply with NBIC Part 3, 4.4.1(a) and the following requirements:

1) Liquid pressure tests shall be conducted in accordance with the requirements of the original code of construction and the regulations of the Competent Authority at pressures established in Table S6.16-a. When the original test pressure included consideration of corrosion allowance, the test pressure may be further adjusted based on the remaining corrosion allowance;

TABLE S6.16-a
TEST PRESSURE REQUIREMENTS FOR REPAIRS PER 49CFR180.413 and 49CFR180.407.

Transport Tank Specification	Test Pressure
MC 300, 301, 302, 303, 305, 306	The test pressure on the name plate or specification plate, 20.7 kPa (3 psig) or design pressure, whichever is greater.
MC 304, 307	The test pressure on the name plate or specification plate, 275.8 kPa (40 psig) or 1.5 times design pressure, whichever is greater.
MC 310, 311, 312	The test pressure on the name plate or specification plate, 20.7 kPa (3 psig) or 1.5 times design pressure, whichever is greater.
MC 330, 331	The test pressure on the name plate or specification plate, 1.5 times either MAWP or the re-rated pressure, whichever is applicable. DOT Transport Tanks

	constructed in accordance with Part UHT in Section VIII, Division 1 of the ASME Code shall be tested at a pressure at least twice the design pressure.
MC 338	The test pressure on the name plate or specification plate, 1.25 times either MAWP or the re-rated pressure, whichever is applicable.
DOT 406	The test pressure on the name plate or specification plate, 34.5 kPa (5 psig) or 1.5 times the MAWP, whichever is greater.
DOT 407	The test pressure on the name plate or specification plate, 275.8 kPa (40 psig) or 1.5 times the MAWP, whichever is greater.
DOT 412	The test pressure on the name plate or specification plate, 1.5 times the MAWP, whichever is greater.

b) Pneumatic Test

A pneumatic test may be conducted in accordance with the requirements of the original code of construction and the regulations of the Competent Authority at pressures established in Table 6.16-a. Concurrence of the owner shall be obtained in addition to that of the Inspector and the Competent Authority, where required. Precautionary requirements of the original code of construction and NBIC Part 2, S6.13.6.1(c) shall be followed.

S6.16.2 PRESSURE TEST METHODS APPLICABLE TO ALTERATIONS AND MODIFICATIONS

a) Liquid Pressure Test

Liquid pressure testing of alterations and modifications to DOT Transport Tanks shall comply with NBIC Part 3, 4.4.2(a) and the following requirements:

1) Liquid pressure tests shall be conducted in accordance with the requirements of the original code of construction and the regulations of the Competent Authority at pressures established in Table S6.16-b. When the original test pressure included consideration of corrosion allowance, the test pressure may be further adjusted based on the remaining corrosion allowance;

TABLE S6.16-b
TEST PRESSURE REQUIREMENTS FOR ALTERATIONS AND MODIFICATIONS PER 49CFR180.413 AND THE APPLICABLE DOT TRANSPORT TANK SPECIFICATION

Transport Tank Specification	Test Pressure
MC 300, 301, 302, 303, 305, 306	The test pressure on the name plate or specification plate, 20.7 kPa (3 psig) or design pressure, whichever is greater.
MC 304, 307	The test pressure on the name plate or specification plate, 275.8 kPa (40 psig) or 1.5 times design pressure, whichever is greater.
MC 310, 311, 312	The test pressure on the name plate or specification plate, 20.7 kPa (3 psig) or 1.5 times design pressure, whichever is greater.
MC 330, 331	The test pressure on the name plate or specification plate, 1.5 times either MAWP or the re-rated pressure, whichever is applicable. DOT Transport Tanks constructed in accordance with Part UHT in Section VIII, Division I of the ASME Code shall be tested at a pressure at least twice the design pressure.
MC 338	The test pressure on the name plate or specification plate or 1.5 times the design pressure, plus static head of lading, plus 101.3 kPa (14.7 psi) if subjected to external vacuum. DOT Transport Tanks constructed in accordance with Part

	UHT in Section VIII, Division 1 of the ASME Code shall be tested at a pressure at least twice the design pressure.
DOT 406	The test pressure on the name plate or specification plate, 34.5 kPa (5 psig) or 1.5 times the MAWP, whichever is greater.
DOT 407	The test pressure on the name plate or specification plate, 275.8 kPa (40 psig) or 1.5 times the MAWP, whichever is greater.
DOT 412	The test pressure on the name plate or specification plate, 1.5 times the MAWP, whichever is greater.

c) Pneumatic Test

A pneumatic test may be conducted in accordance with the requirements of the original code of construction and the regulations of the Competent Authority at pressures established in Table 6.16-b. Concurrence of the owner shall be obtained in addition to that of the Inspector and the Competent Authority, where required. Precautionary requirements of the original code of construction and NBIC Part 2, S6.13.6.1(c) shall be followed.

S6.17 ACCEPTANCE INSPECTION

The Inspector making the acceptance inspection shall be the same Inspector who authorized the repairs, alterations, or modifications. Where this is not possible or practicable, another Inspector may perform 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 repairs, alterations, or modifications.

S6.18 GENERAL STAMPING REQUIREMENTS

The stamping of or attaching of a nameplate to a pressure-retaining item shall indicate that the work was performed in accordance with the requirements of this code and any requirements of the Competent Authority. Such stamping or attaching of a nameplate shall be done only with the knowledge and authorization of the Inspector. The “R” Certificate Holder responsible for the repair or the construction portion of the modification/alteration shall apply the stamping. For a re-rating where no physical changes are made to the pressure-retaining item, the “R” Certificate Holder responsible for the design shall apply the stamping. Requirements for stamping and nameplate information are shown in NBIC Part 3, Section 5.

S6.18.1 SPECIFIC “R” STAMPING AND NAMEPLATE REQUIREMENTS

The holder of a “R” *Certificate of Authorization* is required to affix a stamping or nameplate on the Transport Tank that indicates, the repair, alteration, or modification has been performed in accordance with the requirements of NBIC Part 3, Supplement 6 and the additional requirements of the code of construction. All repairs, alterations, and modifications, after acceptance by the Inspector, shall have the “R” Symbol affixed to the stamping or the nameplate. The stamping or nameplate information shall satisfy the requirements of NBIC Part 3, 5.7.

S6.18.2 REMOVAL OF ORIGINAL STAMPING OR NAMEPLATE

Removal of the original stamping or nameplate shall comply with the requirements of NBIC Part 3, 5.11.

S6.18.3 REPLACEMENT OF STAMPING OR NAMEPLATE

Replacement of indistinct stamping or lost, illegible, or detached nameplates shall comply with the requirements provided in NBIC Part 2, 5.2.

S6.19 FORM “R” REPORTS

S6.19.1 DOCUMENTATION OF FORM “R” REPORTS

Repairs, alterations, or modifications that have been performed in accordance with the NBIC shall be documented on Form R-1, *Report of Repair* or Form R-2, *Report of Alteration* as shown in NBIC Part 3, Section 5. Form R-4, *Report Supplementary Sheet*, shall be used to record additional data when space is insufficient on Form R-1 or R-2.

S6.19.2 PREPARATION OF FORM “R” REPORTS

Preparation of “R” Forms shall be the responsibility of the “R” Certificate Holder performing the repairs, alterations, or modifications and shall comply with the requirements provided in NBIC Part 3, 5.2.1, 5.2.2 and 5.2.4.

S6.19.3 DISTRIBUTION OF FORM “R” REPORTS

Distribution of Form “R” Reports shall comply with the requirements provided in NBIC Part 3, 5.3 and 5.4

S6.19.4 REGISTRATION OF FORM ”R” REPORTS

a) Repair organizations performing repairs, alterations, or modifications required by this supplement shall submit the completed “R” Form, meeting the requirements of the NBIC, to the National Board.

b) The repair organization shall maintain a sequential Form Registration Log as described in Part 3, 5.6.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 24-01

Subject/Title

Change to Examples of Repairs

NBIC Location

Part: Repairs and Alterations; Section: 3; Paragraph: 3.3.3(j)

Project Manager and Task Group

Source (Name/Email)

Matt Schaser / mschaser@e2g.com

Statement of Need

Revision to 3.3.3(j) is needed to establish a code-based nozzle-to-nozzle spacing requirement to cover nozzle installation for ASME design requirements.

Background Information

A recent interpretation request (I23-64) has identified a potential nonconservative design requirement in the example of a repair, paragraph 3.3.3(j), "addition of identical nozzles". The caveat regarding nozzle spacing appears arbitrary and may be nonconservative if a new nozzle is installed close to a larger nozzle. Revision to 3.3.3(j) is needed to establish a code-based spacing requirement to cover ASME design requirements. Justification provided below.

Existing Text

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

Proposed Text

j) The addition of a nozzle (or opening) where reinforcement is ~~a consideration may be~~required is considered to be a repair, provided all the following are satisfied:

1) ~~–T~~the nozzle is identical to one in the original design (including orientation).~~,~~

2) The nozzle is ~~–~~located in a similar part of the vessel.

~~,~~3) The spacing between the nozzle and any adjacent nozzles is no ~~and not~~ closer than three times ~~its~~ the average finished opening diameter ~~from another~~of the nozzle and the adjacent nozzle, measured from the nozzles' centerlines.

4) Material within the nozzle's limits of reinforcement, measured parallel to the vessel wall, as defined in the applicable code of construction is available in its entirety for reinforcement.

5) The ~~addition of such a~~ nozzle ~~shall be~~is not restricted by any service requirements.

Current Text

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

Clean Version of Proposed Text

j) The addition of a nozzle (or opening) where reinforcement is required is considered a repair, provided all the following are satisfied:

1) The nozzle is identical to one in the original design (including orientation).
2) The nozzle is located in a similar part of the vessel.
3) The spacing between the nozzle and any adjacent nozzles is no closer than three times the average finished opening diameter of the nozzle and the adjacent nozzle, measured from the nozzles' centerlines.
4) Material within the nozzle's limits of reinforcement, measured parallel to the vessel wall, as defined in the applicable code of construction is available in its entirety for reinforcement.
5) The nozzle is not restricted by any service requirements.

Code Synopsis:

This current revision does not require calculations by the R-Certificate holder. As written, it is referenced to the centerline of two adjacent nozzles; however, it can be re-phrased to reference the ODs of two adjacent nozzles, i.e. ($d_1 + d_2$). This revision would provide a conservative spacing requirement with respect to the reinforcement requirements of Section 1, B31-1, B31-3, Section VIII-1, and Section VIII-2. Note that the reinforcement limits for Section 1, Section IV, B31-1, B31-3, and Section VIII-1 are equivalent. However, as an upper bound they may encroach the upper-bound limits of VIII-2. Therefore, VIII-2 upper-bound limits of reinforcement are used to provide a conservative recommendation on spacing, see figure below. Note, if these spacing requirements are restrictive, code calculations can be performed to identify the specific code required spacing limit which will likely provide a more acceptable limit.

Figure PG-33.1
Nomenclature and Equations for Reinforced Openings

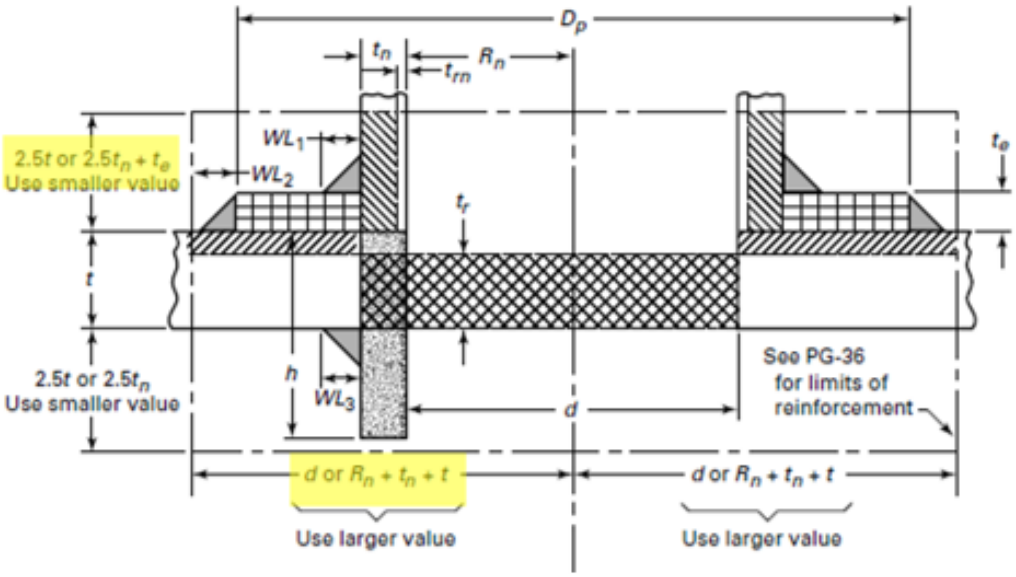


Figure UG-37.1
Nomenclature and Formulas for Reinforced Openings

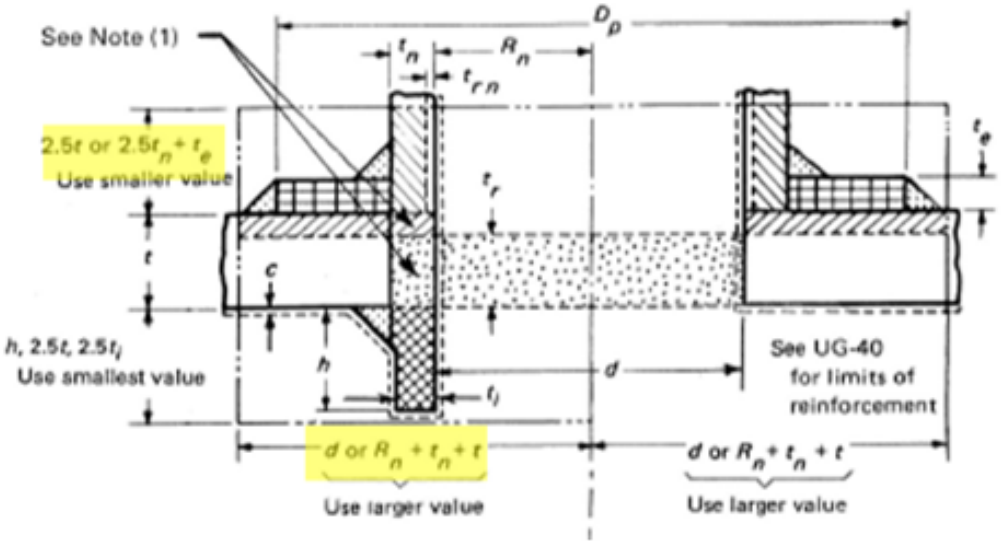


Figure 1. Section I vs. Section VIII, Division 1 limits of reinforcements

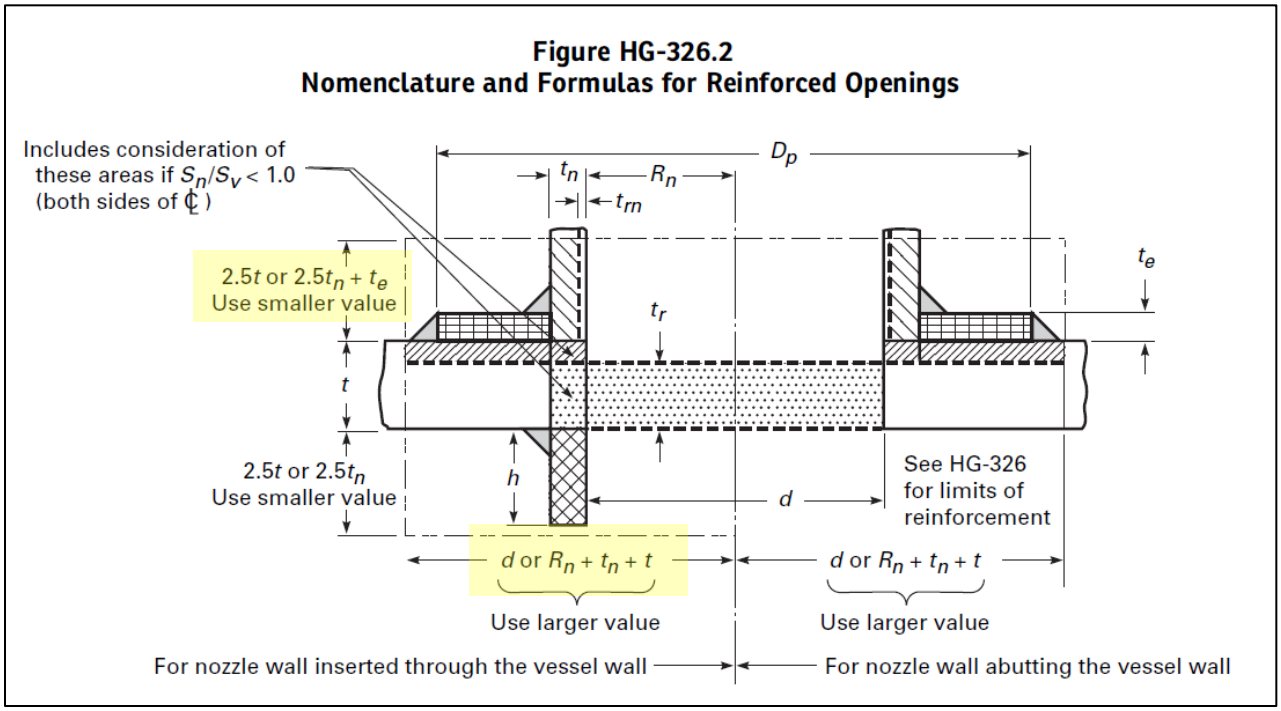


Figure 2. Section IV limits of reinforcements

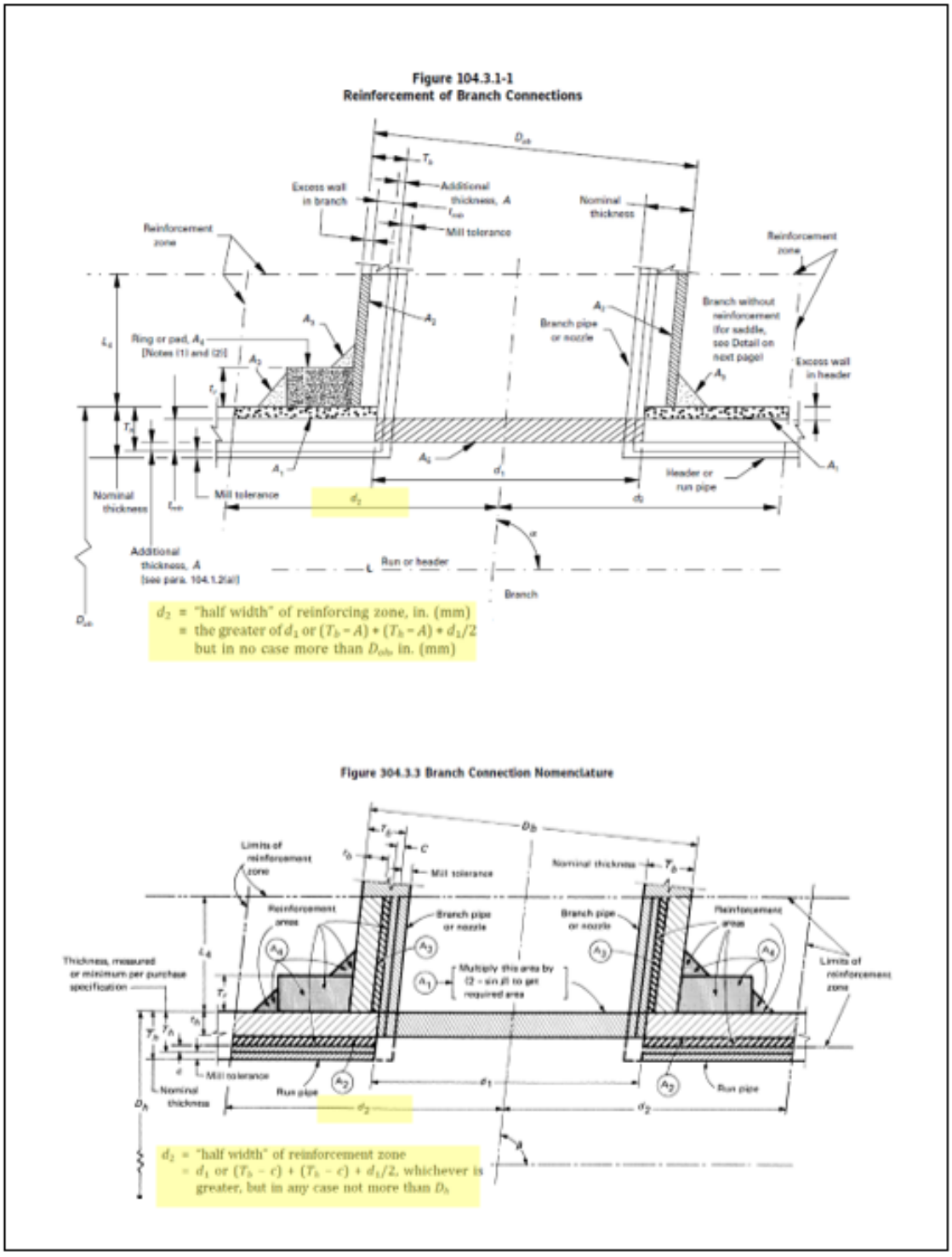
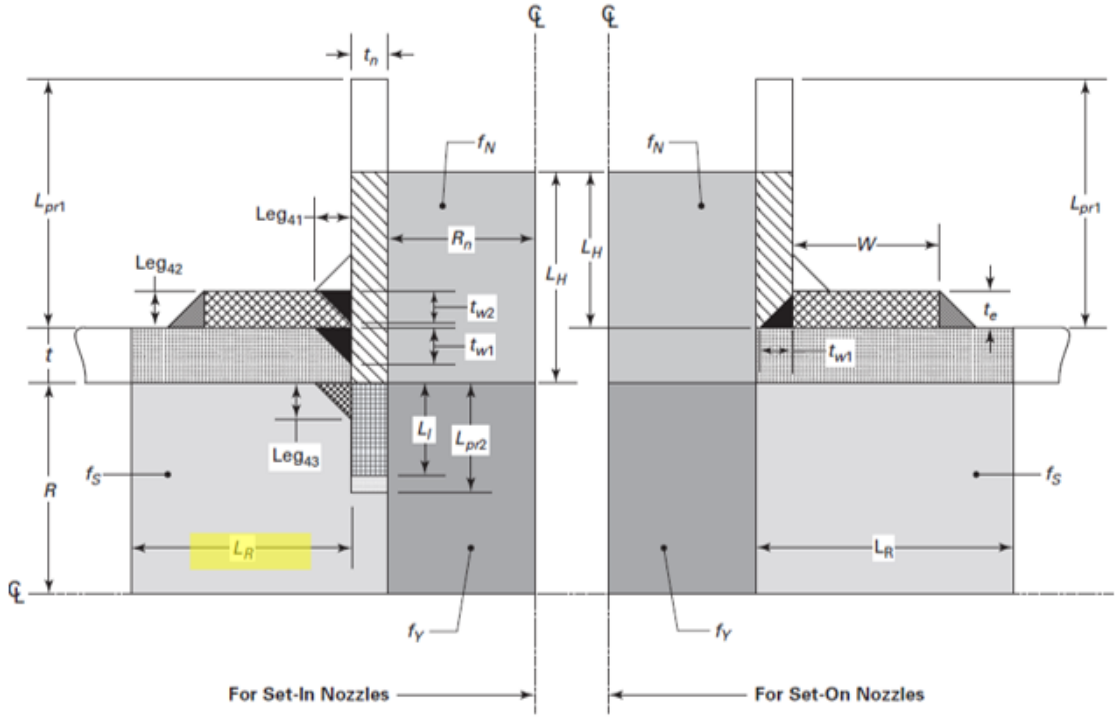


Figure 3. B31.1 vs. B31.3 limits of reinforcements

Figure 4.5.1
Nomenclature for Reinforced Openings



Step 2. Calculate the limit of reinforcement along the vessel wall.
(a) For integrally reinforced nozzles:

$$L_R = \min\left[\sqrt{R_{eff}t}, 2R_n\right] \quad \text{for set-in nozzles} \quad (4.5.4)$$

$$L_R = \min\left[\sqrt{R_{eff}t}, 2R_n\right] + t_n \quad \text{for set-on nozzles} \quad (4.5.5)$$

Figure 4. Section VIII-2 limits of reinforcements

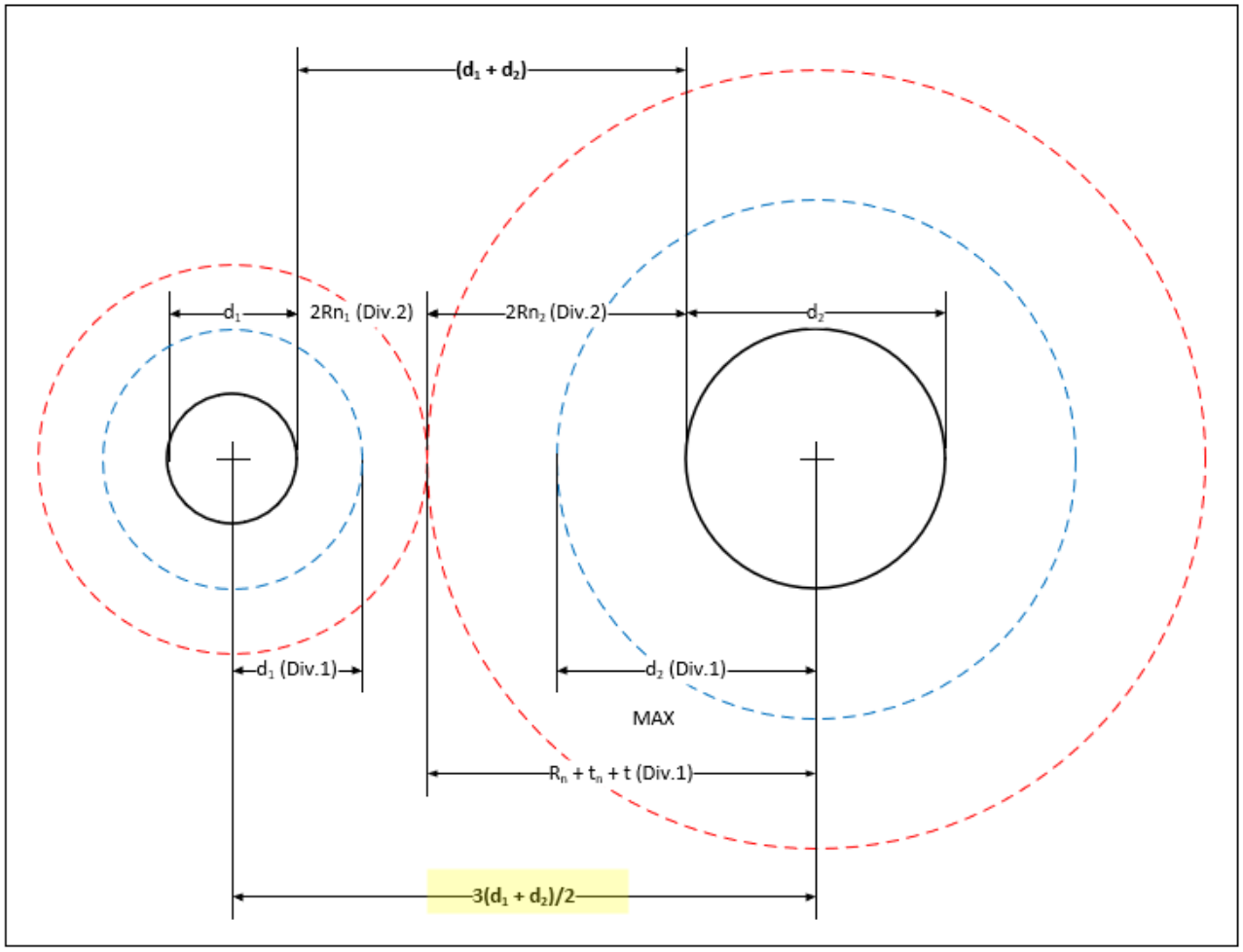


Figure 5. Section (I, IV, VIII-1, B31-1, B31-3) vs. VIII-2 limits of reinforcements

NBBI SINCE 1919 THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 24-12

Subject/Title

Reference to change of service for LPG vessels incorrectly uses "altered"

NBIC Location

Part: Repairs and Alterations; Section: Supplement 7; Paragraph: S7.5

Project Manager and Task Group

Source (Name/Email)

Thomas Vandini / tvandini@propanetank.com

Statement of Need

Conversion of service for LPG tanks (typically from above ground to underground service) typically involves changes to the vessel covered under Part 3, Paragraph 3.3.3 and, as such, are considered repairs. As such, the language referring to these conversions that uses the word "altered" may be confusing to an inspector or other user of NBIC. I suggest changing the word "altered" to "changed". This action item was previously submitted requesting changes to both Part 2 and Part 3 under Item 23-30. The changes to Part 2 were reviewed and approved by SG Inspection, SC Inspection, and Main Committee in July 2023. However, a separate action item to address the changed needed in Part 3 was never opened. Therefore, I'm submitting this now as a new action item for Part 3. A similar language change has already been approved for Part 2. This change request is to synchronize the language in both parts.

Background Information

This action item was previously submitted requesting changes to both Part 2 and Part 3 under Item 23-30. The changes to Part 2 were reviewed and approved by SG Inspection, SC Inspection, and Main Committee in July 2023. However, a separate action item to address the changed needed in Part 3 was never opened. Therefore, I'm submitting this now as a new action item for Part 3. A similar language change has already been approved for Part 2. This change request is to synchronize the language in both parts.

Existing Text	Proposed Text
ASME LPG storage vessels may be altered from above ground (AG) service to underground (UG) service subject to the conditions of NBIC Part 2, S7.10.	ASME LPG storage vessels may be ~~altered~~ changed from above ground (AG) service to underground (UG) service subject to the conditions of NBIC Part 2, S7.10.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No. A 24-15
Subject/Title NDE requirements
NBIC Location Part: Repairs and Alterations; Section: 4; Paragraph: 4.2
Project Manager and Task Group Michael Quisenberry (PM), Melissa Wadkinson, Raymond Spuhl, Steve Frazier
Source (Name/Email) Kathy Moore / kathymoore@joemoorecompany.com
Statement of Need B31.1 has introduced very stringent requirements on the R-Certificate holders that will create an unnecessary burden on them.
Background Information During the Q&A period after the presentation was given, I asked the members of B31.1 committee what was the driving force behind the change? Were there any near misses of accidents that they were aware of to drive this change. The answer was "No. They are simply trying to align B31.1 and B31.3.

4.2 NONDESTRUCTIVE EXAMINATION

a) ~~The~~ All nondestructive examination (NDE) requirements, except for NDE personnel qualification requirements, ~~including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria,~~ shall be in accordance with the Original Code of Construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2). Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, or where there is insufficient information available to determine the original NDE requirements, alternative NDE methods that provide meaningful results to verify the integrity of the repair or alteration may be used if acceptable to the Inspector and, where required, the Jurisdiction where the pressure-retaining item is installed, provided all other requirements of this section are met.

Where the welds were subject to volumetric NDE during construction, repairs may be made to the base material and weld joints without volumetric examination under the following conditions:

1) The repair depth does not exceed the lesser of 1/8 inch (3 mm) or 25% of the nominal base material thickness;

2) The aggregate repair length is no longer than 6 inches (150 mm);

3) The repair cavity and each layer of deposited weld, including the final weld surface, have been examined by MT or PT.

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

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

c) NDE personnel utilizing volumetric examination methods shall be qualified and certified in accordance with the requirements of the original code of construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2). When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice Nondestructive Testing Personnel Qualification and Certification* (2006 edition), or ANSI/ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel* (2006 edition), shall be used as a guideline for employers to establish their written practice. Provisions for training, experience, qualification, and certification of NDE personnel shall be described in the "R" Certificate Holder's written quality system.

d) NDE personnel utilizing NDE examination methods other than volumetric such as visual examination (VT), liquid penetrant (PT), or magnetic particle (MT) shall be qualified and certified in accordance with the requirements of the Original Code of Construction, standard, or specification selected for the repair or alteration of the pressure-retaining item (see NBIC Part 3, 1.2). Alternatively, NDE personnel may be qualified and certified in accordance with a written program established by the employer of the personnel being certified, which shall be based on the following minimum requirements:

1) Instruction in the fundamentals of the applicable NDE method;
2) on-the-job training to familiarize the NDE personnel with the appearance and interpretation of indications of weld defect. The length of time for such training shall be sufficient to ensure adequate assimilation of the knowledge required;
3) for VT examination methods, a visual acuity examination performed annually, with correction if necessary to enable reading of Jaeger Type No.1 Standard Chart at a distance of not less than 12 in. (300 mm);
4) for PT and MT examination methods a visual acuity examination performed annually, with correction if necessary to enable reading of Jaeger Type No. 2 Standard Chart at a distance of not less than 12 in. (300 mm), that is capable of distinguishing and differentiating contrast between colors used to determine optical capability of NDE personnel to perform the required examinations;
5) upon completion of 1) and 2) above, the NDE personnel shall be given a written examination and performance examination by the employer to determine if the NDE personnel are qualified to perform the required examinations and interpretation of results.

6) certified NDE personnel whose work has not included performance of a specific examination method for a period of 1yr or more shall be recertified by successfully completing the examination of 4) and also passing the visual examination of 3).
7) Substantial changes in procedures or equipment shall require recertification of NDE personnel.
8) All documentation concerning the training, qualification, examination, and certification of NDE personnel in this program shall be described in the “R” Certificate Holder’s written quality system.

As an alternative to 1) through 5) above, the requirements of ASME BPVC, Section V, Article 1, T-120(e) or T-120(f) may be used for the qualification of NDE personnel. Personnel qualified to AWS QC1 may be used for the visual examination of welds provided they meet the annual visual acuity examination requirement of 3) and the Jaeger J1 visual acuity requirement of ASME BPVC, Section V, Article 9.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 24-18 Rev 01

Subject/Title

Controlled Fill Definition

NBIC Location

All Parts, Section 9, Glossary of Terms

Project Manager and Task Group

Philip Gilston (PM), A. Triplett

Source (Name/email)

Philip Gilston (philip_gilston@hsb.com)

Statement of Need

There is no definition of the term 'controlled fill'.

Background Information

Interpretation item I 23-79 addresses the use of the term 'controlled fill' in NBIC Part 3, 2.5.3 d in relation to Welding Method 6 for Grade 91 material.

While the term 'controlled fill' is not specifically used in the text of Welding Method 6 (2.5.3.6), directions are given for such variables as typical preheats, electrode size for SMAW, and the use of stringer beads only. The term is used explicitly in Supplement 8 for CSEF repairs, where S8.3.b says that "To control heat input the weld repair shall be performed using a "controlled fill" technique"; details are also given on such items as preheats, electrode size, required fill pass overlap, etc., and a lot of detail is provided in schematics including specifics on weld bead placement.

Existing Text	Proposed Text	Clean Copy
None	**Changes form Rev 00 shown** **Controlled Fill** – ~~requirements specified~~control of weld technique for a ~~permitted weld~~ repair process ~~in order to manage heat input~~ to ensure satisfactory weld properties by controlling distortion, promoting tempering and minimizing the risk of cracking by addressing variables including but not limited to heat input, ~~such as~~ preheat and interpass temperature, weld consumable type and ~~diameter~~size, weld technique (string or weave~~),~~) and bead placement ~~etc~~.	**Controlled Fill** – control of weld technique for a repair process to ensure satisfactory weld properties by controlling distortion, promoting tempering and minimizing the risk of cracking by addressing variables including but not limited to heat input, preheat and interpass temperature, weld consumable type and size, weld technique (string or weave) and bead placement.

	VOTE						
Committee	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 24-22

Subject/Title

Alternative Welding Methods without PWHT- Competent Technical Advice

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: 2 & 1; Paragraph: 2.5.3 (b) & Table 1.5.1

Project Manager and Task Group

E. Cutlip (PM), J. Ferreira, G. Galanes

Source (Name/Email)

Jonathan Ferreira / jonathan_ferreira@hsb.com

Statement of Need

The first sentence of 2.5.3 (b) requires the competent technical advice to be obtained for the use of every alternative welding method which can be impractical. In most cases, the R certificate firm that is making the determination to use alternative welding method. Most R-certificate holders do not retain a record of the component technical advice they may get. Competent technical advice is used in paragraph 3.2.1 and 3.3.4.3 (d)(1) and the wording states competent technical advice should be obtained. But in 2.5.3 (b) states competent technical advice shall be obtained.

Background Information

During a joint review, the review resulted in a 30-day follow-up as the R-certificate holder did not have written objective evidence that competent technical advice was obtained to use alternative welding method 1, even though the R-certificate hold was the actual OEM of the PRI being repaired. The way the current paragraph 2.5.3 (b) is worded, a record would have to retained for such technical advice. Which I think is fine if the alternative welding methods are being used in highly stressed areas, if service conditions are conducive to stress corrosion cracking, if materials are subject to hydrogen embrittlement, or are operating at temperatures in the creep range, or if the alternative is being considered for “on-stream” repairs or “hot tapping” on piping systems. If none of those conditions are applicable, then I think it should not be mandatory to obtain technical advice nevertheless retain such information.

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

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 24-43

Subject/Title

Certification of Reports of Repair without stamping - Action Item with I24-39

NBIC Location

Part: Repairs and Alterations; Section: 1.3; Paragraph: 1.3.2

Project Manager and Task Group

Mark Vogt / mark.vogt@vistracorp.com

Source (Name/Email)

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Statement of Need

Given INTERP 21-16 requirements, clarity is needed for R/NR work where the lack of stamping due to a practical matter, not necessarily a jurisdictional reason, may preclude certifying an Report of Repair. This Action Item is tied to Intent Interp I24-39.

Background Information

I21-16 states that an Inspector shall not certify the R-1 if the Jurisdictional requirements do not meet the NBIC requirements. Would the lack of stamping the R or NR due to a safety matter, not necessarily a jurisdictional reason, also preclude certifying a Report of Repair, e.g. would repair or replacement work done in a space that is too unsafe to allow the stamping of the R or NR mark on the item, also preclude certifying the applicable Report of Repair?

Existing Text	**Proposed Text**
See next page.	See next page.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

Existing Text

NBIC Part 3, Section 5.7 Stamping Requirements for Repairs and Alterations

5.7.1 General

The stamping of or attachment of a nameplate to a pressure-retaining item shall indicate that the work was performed in accordance with the requirements of this code. Such stamping or attaching of a nameplate shall be done only with the knowledge and authorization of the Inspector. The "R" Certificate Holder responsible for repair or the construction portion of the alteration shall apply stamping. For a re-rating where no physical changes are made to the pressure-retaining item, the "R" Certificate Holder responsible for design shall apply stamping.

Proposed Text

NBIC Part 3, Section 5.7 Stamping Requirements

5.7.1 General

a) The stamping of or attachment of a nameplate to a pressure-retaining item shall indicate that the work was performed in accordance with the requirements of this code. Such stamping or attaching of a nameplate shall be done only with the knowledge and authorization of the Inspector. The "R" Certificate Holder responsible for repair or the construction portion of the alteration shall apply stamping. For a re-rating where no physical changes are made to the pressure-retaining item, the "R" Certificate Holder responsible for design shall apply stamping.

b) Where the Owner is also the "NR" Certificate Holder and application of the National Board Code Symbol is not possible because of personnel safety or potential contamination, and all other requirements of the NBIC have been met, stamping of or attachment of a nameplate may be waived with the acceptance of the Jurisdiction provided it is addressed in the NR Certificate Holder's QA program. Justification shall be noted in the "Remarks" section of the Form NR-1 or Form NVR-1.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 24-65

Subject/Title

Applicability of Table 1.5.1 d)

NBIC Location

Part: Repairs and Alterations; Section: 1; Paragraph: Table 1.5.1 d)

Project Manager and Task Group

Thomas White

Source (Name/Email)

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Statement of Need

The term "administrative" appears 16 times in Part 3 but nowhere does the NBIC require or describe an administrative review of the "R" Certificate Holder's administrative processes. In addition, under the "Instructions" column, Supplement 6 should be Section 6 to include all the supplements if item d) is to be kept. **Propose to delete item d) in Table 1.5.1 since most administrative requirements are now in NB-415 to which 1.1 references.**

Background Information

An inquiry was received by an ASME Designee (consultant) asking the meaning of item d) of Table 1.5.1. Typically, requirements are described in a paragraph and tables referenced by the paragraph highlight or expound on the paragraph requirement. Item d) seems to be on an island waiting for help.

Existing Text

Form "R" Reports, Records, or Documents	Instructions	Minimum Retention Period
d) Administrative record review of the "R" Certificate Holder's administrative processes.	Records supporting completed administrative reviews or audits of procedures or processes required by the "R" Certificate Holder's Quality System Manual, or in combination with the applicable part of the NBIC Part 3, Supplement 6 as it applies to the identified scope listed on the "R" *Certificate of Authorization*.	Subject to review during the triennial evaluation of the certificate holder's Quality System.

Proposed Text

Deleted

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date