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THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE SUBGROUP REPAIRS & ALTERATIONS

AGENDA

Meeting of July 12, 2022
Indianapolis, IN

The National Board of Boiler & Pressure Vessel Inspectors 1055 Crupper Avenue
Columbus, Ohio 43229-1183
Phone: (614)888-8320
FAX: (614)847-1828

1. **Call to Order**
   The Chair will call the meeting to order at 8:00am Eastern Time. For those attending in person, the meeting will be taking place in the Alexander Ballroom on the second floor of the hotel.

2. **Roll call of Members and Introduction of Visitors**

3. **Check for a Quorum**

4. **Awards/Special Recognition**

5. **Announcements**
   - The National Board will be hosting a reception on Wednesday evening from 6:30pm to 8:30pm in City Way Gallery.

   - The National Board will be hosting breakfast and lunch on Thursday. Breakfast will be served from 7:00am to 8:00am, and lunch will be served from 11:30am to 12:30pm. Both meals will be served at the hotel in Market Table.

   - This meeting is the last at which items can be approved for inclusion in the 2023 NBIC edition.

6. **Adoption of the Agenda**

7. **Approval of the Minutes of the January 18, 2022 Meeting**
   The minutes from the January 2022 meeting can be found on the Committee Information page under the Inspection Code tab on the National Board's website.

8. **Review of Rosters**
   a. **Membership Nominations**

   b. **Membership Reappointments**
      i. The following Subgroup R&A memberships are set to expire prior to the January 2023 NBIC meetings: Mr. Tim McBee and Mr. Bob Underwood.

   c. **Officer Nominations**

   d. **Resignations**

9. Action Items

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

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

Subgroup: NR TG

Task Group: R. Spuhl (PM)

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

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

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

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

Subgroup: NR TG

Task Group: T. Roberts (PM),

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

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

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

General Description: Revisions to Part 3, Supplement 6

Subgroup: Repairs and Alterations

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

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

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

Item Number: A20-83	NBIC Location: Part 3, 1.5.1 s) &	Attachment Page 1

General Description: Revision to Part 3, 3.2.2 e)

Subgroup: Repairs and Alterations

Task Group: B. Boseo (PM)

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

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

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

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

Subgroup: NR TG

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

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

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

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

General Description: Concessions with pressure testing associated with replacement parts

Subgroup: Repairs and Alterations

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

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

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

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

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

Subgroup: Repairs and Alterations

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

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

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

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

General Description: Revise definition of "Field"

Subgroup: Repairs and Alterations

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

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

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

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

General Description: Parts used in NR Activities

Subgroup: NR TG

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

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

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

Item Number: A21-43	NBIC Location: Part 3, Glossary	No Attachment

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

Subgroup: Repairs and Alterations

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

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

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

Item Number: A21-44	NBIC Location: Part 3, Glossary	No Attachment

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

Subgroup: Repairs and Alterations

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

Explanation of Need: Defining de-rating within Part 3

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

Item Number: A21-45	NBIC Location: Part 3, Supplements	Attachment Page 2

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

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

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

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

Update: This item is currently being balloted to Main Committee.

Item Number: A21-53	NBIC Location: Part 3, S8.5 a)	Attachment Page 4

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

Subgroup: Repairs and Alterations

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

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

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

Update: SG R&A approved the proposal with 1 disapproval and 2 abstentions. The SG Inspection ballot did not pass, receiving 4 approval votes, 6 disapproval votes, and 2 abstentions.

Item Number: A21-67	NBIC Location: Part 3, 3.4.9	Attachment Page 6

General Description: Add welding requirements to plugging firetubes

Subgroup: Repairs and Alterations

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

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

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

Item Number: A21-70	NBIC Location: Part 3, Table 2.3	Attachment Page 8

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

Subgroup: Repairs and Alterations

Task Group: J. Sekely (PM)

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

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

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

Item Number: A21-80	NBIC Location: Part 3, 3.3.3(h)(2)	Attachment Page 9

General Description: Mechanical Replacement of Shell or Head

Subgroup: Repairs and Alterations

Task Group: R. Underwood (PM)

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

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

Update: During the January 2022 Main Committee meeting, the Committee asked SG and SC R&A to further review this item.

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

General Description: Examples of Repairs

Subgroup: Repairs and Alterations

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

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

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

New Items:

Item Number: A22-02	**NBIC Location: Part 3, 3.3.2 e) 1)**	**No Attachment**

General Description: Part 4 Item A21-83 may impact part 3, 3.3.2 e) 1)

Subgroup: Repairs and Alterations

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

Explanation of Need: Part 4 Item A21-83 was reviewed as it may impact part 3, 3.3.2 e) 1) examples of Routine Repairs. An Item for Part 3 will be opened to address "valve" repairs as they relate to SRVs.

July 2022 Meeting Action:

Item Number: A22-04	**NBIC Location: Part 3, 3.3.3 s)**	**Attachment Page 10**

General Description: Clarification on Part 3, 3.3.3 s)

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: The paragraph was written for pressure-retaining parts not just vessels as stated later in the first sentence.

July 2022 Meeting Action:

Item Number: A22-05	**NBIC Location: Part 3, 3.3.3 s)**	**Attachment Page 11**

General Description: Clarification on Part 3, 3.3.3 s)

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: The paragraph was written for pressure-retaining parts not just vessels as stated later in the first sentence.

July 2022 Meeting Action:

Item Number: A22-11 **NBIC Location: Part 3, S5** **Attachment Page 14**

General Description: Changes to Yankee Dryer P3_S5

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: Various updates including to recognize steel in addition to cast iron, and to promote consistency of Supplements of each Part.

July 2022 Meeting Action:

Item Number: A22-12 **NBIC Location: Part 3, 3.3.5.2 & 3.4.5.1** **Attachment Page 19**

General Description: Lost or Destroyed UDS

Subgroup: Repairs and Alterations

Task Group: T. Seime (PM)

Explanation of Need: To provide the ability to repair/alter these vessels with a reconstructed UDS.

July 2022 Meeting Action:

Item Number: A22-17 **NBIC Location: Part 3, 4.4.2 & S5.7.2** **Attachment Page 21**

General Description: NBIC Part 3, S5.7.2, a), 1) and the examination methods of Part 3, 4.4.2, c

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: An additional examination option is needed for alterations performed to NBIC S5.7.2 a) 1).

July 2022 Meeting Action:

Item Number: A22-18	NBIC Location: Part 3, 9.1 (and all other Parts)	Attachment Page 22

General Description: Definition of blowdown and blowoff

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM)

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

July 2022 Meeting Action:

Item Number: A22-19	NBIC Location: Part 3, 5.5.2	Attachment Page 23

General Description: R Certificate Holders with Design Only Scope

Subgroup: Repairs and Alterations

Task Group: None assigned.

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

July 2022 Meeting Action:

10. Future Meetings

- January 2023 – Charleston, SC
- July 2023 – TBD

11. Adjournment:

Respectfully submitted,

Terrence Hellman

Terrence Hellman

SG R&A Secretary

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

20-83

Subject/Title

Definition of Nonconformance

NBIC Location

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

Project Manager and Task Group

Source (Name/Email)

Terrence Hellman / thellman@nationalboard.org

Statement of Need

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

Background Information

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

Existing Text

Proposed Text

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

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

SUPPLEMENT XX - REPAIR METHODS OF PRESSURE VESSELS AND PIPING EXCLUSIVE TO OIL, GAS, AND CHEMICAL INDUSTRIES

SXX.1 SCOPE

This supplement provides methods for repair of pressure retaining items, outside the boiler setting through the administrative boundary of ASME Section I and IV, exclusive to oil, gas, and chemical manufacturing.

SXX.2 CONSTRUCTION STANDARDS

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

SXX.3 LIMITATIONS

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

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

b) Impact testing was not required.

c) Not used in lethal service.

d) No environmental or service-related cracking conditions exist, except as provided by NBIC Part 3, 3.3.4.8.

SXX.4 JURISDICTIONAL REQUIREMENTS

Repairs will require notification to the Jurisdiction and where required, Jurisdictional approval prior to performing work.

SXX.5 REPAIR METHODS

a) WELDED LAP PATCH

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

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

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

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

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

   a. Lap patch material should be the same (e.g., composition, physical and mechanical properties) to that of the pressure retaining items' original construction. Lap patch material of a different nominal composition and, equal to or greater in allowable stress from that used in the original design, may be

used provided the material satisfies the requirements of the original code of construction under which the vessel was built.

3) The "R" Certificate Holder responsible for the design of the welded lap patch shall ensure a Fitness for Service Assessment (FFSA) has been performed on the area of the item being patched in accordance with NBIC, Part 2, 4.4.1, supporting the continued service of the item. The welded lap patch repair method shall not remain in place beyond the calculated remaining life of the covered portion of the pressure retaining item.
   a) The remaining life of the pressure retaining item shall be documented on the Form NB-403 in the Remarks section. The Form NB-403 shall be affixed to the Form R-1 and identified in the Remarks section. A National Board Commissioned Inspector holding an "R" endorsement as described in NB-263, RCI-1 shall sign both the Form R-1 and the attached NB-403.
   b) The thinned or leaking area shall be fully covered, as specified in the FFSA, to the distance where the minimum required metal thickness is verified. Wall thickness shall be verified in the area to be welded.
   c) A welded lap patch method shall not be used where cracks are present unless the cracks have been removed and repaired in accordance with NBIC Part 3, 3.3.4.2 a) and the condition that led to the crack formation and propagation has been eliminated.
4) Hazards associated with welding on degraded components should be addressed with the owner or user by the use of engineering controls, administrative controls and personal protective equipment.
   a) When the pressure retaining item will remain in service while implementing a welded lap patch, the requirements and limitations described within ASME PCC-2, Part-1 shall be used in conjunction with ASME PCC-2, Part-2.
   b) API RP-2201, "Safe Hot Tapping Practices in the Petroleum and Petrochemical Industries" may be used as a guideline for identifying hazards associated with welding to a component that is under pressure, including service restrictions.
5) Test or examination methods shall be in accordance with NBIC, Part 3, 4.4.1.

SXX.6 Post Repair Inspection

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

SXX.7 Documentation

a) Documentation and distribution requirements for repair methods identified in this supplement are identified in NBIC Part 3, Section 5.

SXX.8 Registration

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A21-53

Subject/Title

Supplement 8 Weld and Post Repair Inspection of Creep Strength Enhanced Ferritic Steel Pressure Equipment

NBIC Location

NBIC Part 3 Repairs and Alterations Supplement 8 S8.5 a)

Project Manager and Task Group

Philip Gilston

Source (Name/email)

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

Statement of Need

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

Background Information

The post-repair inspection requirements specified in S8.5 are unique. There is no other mention of such inspections elsewhere in NBIC–Part 3. Presumably, Welding Method 6 repairs don't require post-repair inspection due to the perceived low-level of associated risk (inside the boiler setting).

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

	VOTE						
Committee	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

21-67

Subject/Title

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

NBIC Location

Part 3 Repairs and Alterations, Section 3, Paragraph 3.3.4.9

Project Manager and Task Group

PM – Philip Gilston

TG – Kathy Moore & Trevor Seime

Source (Name/email)

Kathy Moore / kathymoore@joemoorecompany.com

Statement of Need

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

Background Information

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

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

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

Existing Text	**Proposed Text**
3.3.4.9 **TUBE PLUGGING IN FIRETUBE BOILERS** When the replacement of a tube in a firetube boiler is not practicable at the time the defective tube is detected, with the concurrence of the owner, Inspector, and when required, the Jurisdiction, the tube may be plugged using the following course of repair: a) The scope of work, type of plug and method of retention; whether welded or mechanical interface, shall be evaluated by the “R” Certificate Holder performing the repair and reviewed with the Inspector, and when required, the Jurisdiction. b) When the method of plugging is by welding, strength calculations for the size of the weld shall be in accordance with the original code of construction. The“R” Certificate Holder performing this repair shall weld the plug to the tube, or to the tube sheet, or a	3.3.4.9 **TUBE PLUGGING IN FIRETUBE BOILERS** When the replacement of a tube in a firetube boiler is not practicable at the time the defective tube is detected, with the concurrence of the owner, Inspector, and when required, the Jurisdiction, the tube may be plugged ~~using the following course of repair:~~. a) The scope of work, type of plug and method of retention~~; whether welded or mechanical interface,~~ shall be evaluated by the Owner, the Inspector, and when required, the Jurisdiction. If the method of retention is to by welding, then the “R” Certificate Holder performing the repair ~~and reviewed with~~shall also perform a review. ~~the Inspector, and when required, the Jurisdiction.~~ b) Plugging a tube in a firetube boiler is recognized as temporary alternative to the replacement of a

combination of both. c) Plugging a tube in a firetube boiler is recognized as an alternative to the replacement of a firetube and may be further limited as a method of repair by the number of tubes plugged and their location; scattered or clustered. The operational effects on the waterside pressure boundary or membrane and the effects on the combustion process throughout the boiler should be considered prior to plugging. d) The boiler may be returned to service for a period of time agreed upon by the owner, the Inspector, and when required, the Jurisdiction. b) The Form R 1 shall be completed for the plugging of firetubes, identifying the means of plug retention; mechanical or by welding.	firetube and may be further limited as a method of repair by the number of tubes plugged and their location; scattered or clustered. The operational effects on the waterside pressure boundary or membrane and the effects on the combustion process throughout the boiler should be considered prior to plugging. c) When the method of plugging is by welding: 1. 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. 2. 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 may consider actions including but not limited to the following: i) For P-No. 1 materials, preheating to 200°F (95°C) minimum ii) Limiting the maximum weld size to 3/8" (9 mm) iii) Limiting electrode size to 1/8" (3.2 mm) maximum diameter iv) Using a stringer bead technique. v) Using a minimum of two passes 3. NDE in lieu of pressure testing is not permitted. 4. After welding is completed, consideration should be given to re-rolling adjoining tubes. 5. The Form R-1 shall be completed for the plugging of firetubes by the use of welding. d) The boiler may be returned to service for a period of time agreed upon by the owner, the Inspector, and when required, the Jurisdiction. ~~e) The Form R 1 shall be completed for the plugging of firetubes, identifying the means of plug retention; mechanical or by welding.~~

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

2.3 STANDARD WELDING PROCEDURE SPECIFICATIONS (SWPSs)

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

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

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

TABLE 2.3

SWPS DESIGNATION: YEAR

B2.1-1-001: 2020	B2.1-1-201: 2019	B2.1-8-215: 2012	B2.1-1/8-229: 2013
B2.1-1-002: 2020	B2.1-1-202: 2019	B2.1-8-216: 2012	B2.1-1/8-230: 2013
B2.1-1-016: 2018	B2.1-1-203: 2019	**B2.1-4-217: 2021**	B2.1-1/8-231: 2015
B2.1-1-017: 2018	B2.1-1-204: 2019	**B2.1-4-218: 2021**	B2.1-1-232: 2020
B2.1-1-018: 2021	B2.1-1-205: 2019	**B2.1-4-219: 2021**	B2.1-1-233: 2020
B2.1-1-019: 2018	B2.1-1-206: 2019	**B2.1-4-220: 2021**	**B2.1-1-234: 2020**
B2.1-1-020: 2018	B2.1-1-207: 2019	**B2.1-4-221: 2021**	**B2.1-1-235: 2020**
B2.1-1-021: 2018	B2.1-1-208: 2019	**B2.1-5A-222: 2022**	
B2.1-1-022: 2018	B2.1-1-209: 2019	**B2.1-5A-223: 2022**	
B2.1-8-023: 2018	B2.1-1-210: 2012	**B2.1-5A-224: 2022**	
B2.1-8-024: 2012	B2.1-1-211: 2012	**B2.1-5A-225: 2022**	
B2.1-8-025: 2012	B2.1-8-212: 2012	**B2.1-5A-226: 2022**	
B2.1-1-026: 2018	B2.1-8-213: 2012	B2.1-1/8-227: 2013	
B2.1-1-027: 2018	B2.1-8-214: 2012	B2.1-1/8-228: 2013	

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

3.3.3 Examples of Repairs

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

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

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

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

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

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

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

PROPOSED REVISION OR ADDITION

Item No.

A 22-04

Subject/Title

Clarification on Part 3, 3.3.3 s)

NBIC Location

Part: Repairs and Alterations; Section: 3.3.3; Paragraph: s)

Project Manager and Task Group

Source (Name/Email)

Tom White / Thomas.white@nrg.com

Statement of Need

The paragraph was written for pressure-retaining parts not just vessels as stated later in the first sentence.

Background Information

Researching alteration examples 3.4.4 (g) which states: except as permitted in NBIC Part 3, 3.3.3 s);

Existing Text

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

Proposed Text

Change "vessel" at end of first sentence to "pressure-retaining part" as indicated at start of paragraph.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.	A22-05
Subject/Title	NDE requirements for specific Original Code of Construction edition.
NBIC Location	Part 3, 1.2 & 4.2
Project Manager and TaskGroup	Don Kinney (PM), Bob Derby
Source (Name/Email)	Don Kinney/ don.kinney@labor.nc.gov
Statement of Need	There is confusion on what NDE method to use, specifically volumetric (UT vs. RT) when UT was not considered in the Original Code of Construction (OCC). This is chiefly due to the statement in 4.2 "Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds.". This revision is needed to clarify that the use of other NDE methods are permissible in accordance with the OCC edition being used for the scope of work.
Background Information	A weld joint repair is being made. The original weld required RT by the OCC (UT was not addressed in the original edition), however the current Code edition allows for UT of the same joint. The current Code edition is being used for the repair. The AIA's position is that RT is still required per Part 3, 4.2, and the Certificate Holder disagrees.
Existing Text	1.2 CONSTRUCTION STANDARDS FOR PRESSURE-RETAINING ITEMS a) When the standard governing the original construction is the ASME Code or ASME RTP-1, repairs and alterations to pressure-retaining items shall conform, insofar as possible, to the section and edition of the ASME Code most applicable to the work planned. b) If the pressure-retaining item was not constructed to a construction code or standard, or when the standard governing the original construction is not the ASME Code or ASME RTP-1, repairs or alterations 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 or ASME RTP-1, provided the "R" or "NR" Certificate Holder has the concurrence of the Inspector and the Jurisdiction where the pressure-retaining item is installed. 4.2 NONDESTRUCTIVE EXAMINATION a) The nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction for the pressure-retaining item. Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used, provided that all other requirements of this section are met.
Proposed Text	1.2 CONSTRUCTION STANDARDS FOR PRESSURE-RETAINING ITEMS a) When the standard governing the original construction is the ASME Code or ASME RTP-1, repairs and alterations to pressure-retaining items shall conform, insofar as possible, to the section and edition of the ASME Code most applicable to the work planned. The edition selected shall be the governing original code of construction for the scope of work. b) If the pressure-retaining item was not constructed to a construction code or standard, or when the standard governing the original construction is not the ASME Code or ASME RTP-1, repairs or alterations shall conform, insofar as possible, to the edition of the construction standard or specification most applicable to the work. The edition selected shall be the governing original code of construction for the scope of work. Where this is not possible or practicable, it is permissible to use other codes, standards, or specifications, including the ASME Code or ASME RTP-1, provided the "R" or "NR" Certificate Holder has the concurrence of the Inspector and the Jurisdiction where the pressure-retaining item is installed. 4.2 NONDESTRUCTIVE EXAMINATION a) The nondestructive examination (NDE) requirements, including inspection, examination and tests, joint efficiency consideration, method, technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction or the standard selected for the repair or alteration of for the pressure-retaining item (see NBIC Part 3, 1.2). Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used, provided that all other requirements of this section are met.

	VOTE:						
COMMITTEE	**Approved**	**Disapproved**	**Abstained**	**Not Voting**	**Passed**	**Failed**	**Date**
SG R&A							
SC R&A							

PART 3, SECTION 1
REPAIRS AND ALTERATIONS — GENERAL AND ADMINISTRATIVE REQUIREMENTS

1.1 SCOPE

a) This part provides requirements and guidelines that apply when performing repairs and alterations to pressure-retaining items.

b) The National Board administers four specific accreditation programs:

1) "R" — Repairs and Alterations to Pressure-Retaining Items

2) "NR" — Repair and Replacement Activities for Nuclear Items

3) "VR" — Repairs to Pressure Relief Valves

4) "T/O" — Test Only of Pressure Relief Valves

c) This part describes some of the administrative requirements for the accreditation of repair organizations. Additional administrative requirements can be found in:

1) NB-415, *Accreditation of* "R" *Repair Organizations*

2) NB-417, *Accreditation of "NR" Repair Organizations*

3) NB-514, *Accreditation of "VR" Repair Organizations*

4) NB-528, *Accreditation of "T/O" Test Only Organizations*

d) Requirements for repairs to pressure relief valves can be found in NBIC Part 4.

1.2 CONSTRUCTION STANDARDS FOR PRESSURE-RETAINING ITEMS

a) When the standard governing the original construction is the ASME Code or ASME RTP-1, repairs and alterations to pressure-retaining items shall conform, insofar as possible, to the section and edition of the ASME Code most applicable to the work planned. The edition selected shall be the governing original code of construction for the scope of work.

b) If the pressure-retaining item was not constructed to a construction code or standard, or when the standard governing the original construction is not the ASME Code or ASME RTP-1, repairs or alterations shall conform, insofar as possible, to the edition of the construction standard or specification most applicable to the work. The edition selected shall be the governing original code of construction for the scope of work. Where this is not possible or practicable, it is permissible to use other codes, standards, or specifications, including the ASME Code or ASME RTP-1, provided the "R" or "NR" Certificate Holder has the concurrence of the Inspector and the Jurisdiction where the pressure-retaining itemis installed.

c) For historical boilers, ASME, Section I provides rules for design and features of construction.

d) Piping systems are designed for a variety of service conditions such as steam, water, oil, gas, or air. Design requirements for repairs and alterations are to meet the original code of construction or the code most appropriate for the repair or alteration. These systems shall be designed for the most severe conditions of pressure, temperature, loadings, and expected transients considered for normal operation. Allpipe materials, fittings, and valves shall be rated for the maximum service conditions for normal operation. Design corrosion of piping systems should also be considered when determining types of materialsand thicknesses.

PART 3, SECTION 4
REPAIRS AND ALTERATIONS — EXAMINATION AND TESTING

4.1 SCOPE

This section provides requirements and guidelines for performing examinations and tests for repairs and alterations to pressure-retaining items.

(21) **4.2 NONDESTRUCTIVE EXAMINATION**

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

b) NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice Non-destructive 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.

4.3 PRESSURE GAGES, 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.

4.4 EXAMINATION AND TEST FOR REPAIRS AND ALTERATIONS

The following requirements shall apply to all repairs and alterations to pressure-retaining items:

a) The integrity of repairs, alterations, and replacement parts used in repairs and alterations shall be verified by examination or test;

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

c) The "R" Certificate Holder is responsible for all activities relating to examination and test of repairs and alterations;

d) Examinations and tests to be used shall be subject to acceptance of the Inspector and, where required, acceptance of the Jurisdiction.

4.4.1 TEST OR EXAMINATION METHODS APPLICABLE TO REPAIRS

Based on the nature and scope of the repair activity, one or a combination of the following examination and test methods shall be applied to repairs and replacement parts used in repairs.

SUPPLEMENT 5
GENERAL REQUIREMENTS FOR REPAIRS AND ALTERATIONS TO YANKEE DRYERS
S5.1 SCOPE

This supplement provides requirements and guidelines for repairs and alterations to Yankee dryer pressure retaining components and shall be used in conjunction with inspection requirements identified in NBIC Part 2, *Inspection* Supplement 5.

S5.2 EXAMINATIONS AND TEST METHODS

~~In addition to the requirements of NBIC Part 3, 4.4.1 and 4.4.2, the following are recommended:~~The following supplemental examination methods may be used in addition to the requirements of NBIC Part 3, 4.4.1.and 4.4.2:

a) Acoustic emission testing; and

b) Metallographic examination when thermal damage is suspected due to operational or repair activities.

S5.3 YANKEE DRYER REPAIR METHODS

This supplement provides additional requirements for repair methods to Yankee Dryer pressure-retaining components and shall be used in conjunction with NBIC Part 3, Section 2 through 5 of this part, as appropriate.

S5.3.1 REPLACEMENT PARTS FOR YANKEE DRYERS

a) Yankee dryer replacement pressure-retaining parts shall be fabricated in accordance with the manufacturer's design and the original code of construction. Yankee dryer pressure-retaining parts may include:

   1) shell;

   2) heads;

   3) center shaft, stay, or trunnion;

   4) stay bars;

   5) structural bolting; and

   6) journals.

b) Replacement of non-pressure-retaining parts, when different from the manufacturer's design, shall be evaluated for any possible effect on the pressure-retaining parts.

S5.4 REPAIR GUIDE FOR YANKEE DRYERS

a) Welding or brazing shall not be used on any Yankee dryer pressure-retaining component manufactured from cast iron. The *Manufacturer's Data Report* shall be carefully reviewed to determine the material of construction of each Yankee dryer component such as shell, heads, and journals.

b) ~~a)~~ Weld repairs are permitted on yankee dryer pressure-retaining components manufactured from steel when properly evaluated and completed as described in NBIC Part 3.

b)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.

c)d) The user 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.

d)e) All repair work shall be documented.

S5.5 PROCEDURES THAT DO NOT REQUIRE STAMPING OR NAMEPLATE ATTACHMENT

All repair procedures , shall be acceptable to the Inspector, and when verified by the owner-user to not affect pressure-retaining capability of the Yankee dryer, do not require stamping or nameplate attachment. Examples of repairs that do not require stamping or nameplate attachment are:

a) Grinding and machining:

1) removal of shell overhung flange;

2)1) removing bolt-stop ring for test specimens;

3)2) head/shell joint corrosion removal;

4)3) journal grinding;

5)4) shell surface grinding (crowning);

6)5) crack removal;

7)6) head flange OD reduction during shell grinding; and

8)7) back spot facing of flange surfaces (head, shell, journal).

b) Metallizing (full face, spot, edge):

1) applying a metallized coating; and

2) grinding of a metallized coating.

c) Epoxy (sealant) repair of steam leaks at bolted joints (using fittings and pumping bolts) and epoxy filling of surface imperfection;

d) Installation of spoiler bars;

e) Maintain/repair/replace internal condensate removal system;

f) Driven plug repair when completed as described in NBIC Part 3, S5.6.3; and

g) Threaded plug repair when completed as described in NBIC Part 3, S5.6.4.

g)h) Installation of head insulation

S5.6 DAMAGE REPAIR

S5.6.1 REPAIR OF LOCAL THINNING

a) A Local Thin Area (LTA) may develop in a pressure-retaining part or may result from the original ~~casting~~ manufacturing process. Inservice thin areas may result from mechanical wear, erosion-corrosion caused by steam and condensate flow, corrosion, impact damage, or grinding for the removal of material flaws.

b) Evaluation of thinning for repair shall consider the unique design and loading characteristics of the Yankee dryer. Local thin areas are often analyzed as specific cases by the finite element method.

1) When a LTA is evaluated by finite element method, analysis should consider the location of the thin area and account for strength provided by the vessel center shaft and heads in addition to the strength provided by the shell alone. Such structural analysis should consider all relevant loads to ensure safe operation of the ~~shell according~~pressure vessel ~~to the De-rate Curve, or other pressure-retaining parts as indicated on the original *Manufacturer's Data Report*.~~

2) Following evaluation and determination of maximum allowable operating parameters, an LTA can be coated or filled to prevent further wear or deterioration. Grooves and gouges should always be lightly ground to remove sharp notches and edges. Welding or brazing repairs are NOT permitted on cast-iron pressure-retaining components.

3) Where the LTA is of sufficient size to cause a reduction in maximum allowable operating parameters ~~according to the De-rate Curve,~~ an R-2 form shall be submitted.

4) Depending upon the cause of the LTA, further monitoring may be necessary to ensure deterioration has been arrested.

5) Inspection data, including all thickness readings and corresponding locations used to determine the minimum and average thicknesses, and the accompanying stress analysis, should be included in the documentation and retained for the life of the vessel.

S5.6.2 TREATMENT OF CRACK-LIKE FLAWS

a) Crack-like flaws are planar flaws that are predominantly characterized by a length and depth with a sharp root radius. They may either be embedded or surface breaking. In some cases it may be advisable to treat volumetric flaws, such as aligned porosity, inclusions, and laps, as planar flaws, particularly when such volumetric flaws may contain microcracks at the root.

1) Knowledge of local stress level and classification, and of flaw origin, type, size, location, and angle relative to the principal stress direction is essential in making determinations regarding remediation. It is also important to know whether the crack is active. Acoustic Emissions testing can be used to determine if the crack is active. Various other methods of nondestructive examination should be employed to determine crack length and depth. Ultrasonics is the recommended sizing technique for depth and inclination of crack-like flaws. Magnetic particle, specifically the wet fluorescent technique, and liquid penetrant methods are applicable in determining the length of a surface flaw. Radiographic and metallographic methods may also be useful. ~~Metallographic analysis is crucial in differentiating between original casting flaws and cracks.~~

2) ~~Evaluation of crack-like flaws, that have been determined to be cracks is most often accomplished through removal via grinding or machining. Because cast iron is categorized as a brittle material, this is the conservative approach regarding crack-like flaws. Welding or brazing repairs are not permitted for cast-iron parts.~~Crack like flaws are most often removed via grinding or machining. Weld repairs are permitted in steel, but not in cast iron. Metal-stitching is permitted as a repair. However this method of repair requires evaluation as to whether a reduction in allowable operating conditions is required. This evaluation shall be performed by the manufacturer or by another qualified source acceptable to the Inspector.

3) Crack-like flaws that have been identified as cracks, but which developed from normal service exposure or excessive operating conditions, shall be remediated by appropriate means regardless of location.

4) Crack-like flaws that have been identified as cracks that developed through non-standard load events, such as by water hoses from operation or firefighting or mechanical damage, shall be evaluated and remediated as necessary. ~~if in the shell. Cracks in other pressure-retaining parts shall be analyzed, documented, and monitored to ensure their presence will not be, or has not been, affected by current operating conditions.~~

5) Crack-like flaws that are not identified as cracks, but which existed in the original material, i.e., material flaws, shall be analyzed, documented, and monitored to ensure their presence will not be, or have not been, affected by current operating conditions.

b) All documents pertaining to ~~the~~ crack-like flaw assessment shall be retained for the life of the vessel. Documentation should address the engineering principles employed, including stress analysis methods and flaw sizing, the source of all material data used, identification of any potential material property degradation mechanisms and the associated influence on the propagation of flaw, and the criteria applied to the assessment procedures.

S5.6.3 DRIVEN PLUG REPAIR

~~Shell~~ Cast iron shell surface imperfections ~~should~~ may be repaired with smooth, driven plugs as described in ASME Section VIII, Div. 1, UCI-78, with the following additional requirements:

a) Maximum plug length (depth) shall be limited to 20% of shell effective thickness, and plug diameter shall not exceed the plug length (depth);

b) Total surface area of plugs shall not exceed 4 sq. in. in an 8 in. diameter circle (2580 sq. mm in a 200 mm diameter circle);

c) Average number of shell plugs shall not exceed 1 plug per 1 sq. ft. (1 plug per 0.1 sq. m) of the surface;

d) The land distance between edges of plugs shall be at least equal to the diameter of the larger plug;

e) The plug material shall conform in all respects to the material specification of the base material;

f) The installed plug shall have an interference fit. The average hole diameter is determined after the plug hole is drilled or reamed. The maximum plug diameter shall not exceed 1.012 times the average hole diameter. This provides an interference fit while minimizing the residual stresses;

g) All plug repair work shall be documented in the form of a plug repair map or other suitable method of recording and retained in the dryer's permanent file.

S5.6.4 THREADED PLUG REPAIR

Casting defects, leaks and local thin areas ~~should~~ may be repaired with threaded plugs as described in ASME Section VIII, Division 1, UCI-78 with the additional requirement that a threaded plug shall not be used in an area subject to ~~dynamic~~ high frequency fatigue loading (e.g.,Yankee dryer shell) as determined by the manufacturer or another qualified source acceptable to the Inspector.

S5.7 ALTERATIONS TO YANKEE DRYERS

S5.7.1 SCOPE

This supplement provides additional requirements for alterations to Yankee dryer pressure-retaining components and shall be used in conjunction with NBIC Part 3, Sections 2 through 5, as appropriate.

S5.7.2 ALTERATION TYPES

a) Any change in the Yankee dryer (shell, heads, center shaft, journals, manway covers, fasteners), as described on the original *Manufacturer's Data Report*, which affects the pressure-retaining capability, shall be considered an alteration. Examples of alterations are:

   1) Drilling/enlarging of bolt holes ~~in castings~~ for larger diameter bolts;

   2) Replacement of structural bolts differing in size, material, or design, from those described on the *Manufacturer's Data Report*;

   3) Removal of shell overhung flange;

   4) Journal outside diameter reduction to install a sleeve ~~machining;~~

   5) Head flange outside diameter reduction;

   6) Machining of head flange or shell flange ~~surface~~ mating surfaces to remove corrosion; and

   7) Changes to ~~Operating above~~ the nameplate temperature.

b) Alteration procedures shall be written, reviewed, approved, and accepted by the Inspector prior to the start of work.

Item 22-12: Lost or Destroyed UDS (Part 3, 3.3.5.2 & 3.4.5.1)

Explanation of Need: To provide the ability to repair/alter these vessels with a reconstructed UDS.

Background Information: This addition is based on the comments received at the task group level for Interpretation 21-60.

Proposed Changes:

3.3.5.2 REPAIR PLAN

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

a) 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 Design 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 Design 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.

If the User's Design Specification is lost or destroyed, the ASME nameplate, Section VIII, Division 2 and 3 forms shall be used to reconstruct the User's Design Specification such as Form A-1 Manufacture's Data Report, Form A-2 Manufacturer's Partial Data Report for Section VIII, Division 2 vessels or Manufacturer's Data Reports for Section VIII, Division 3. The reconstrued UDS shall meet the requirements of Section VIII, Division 2 or Division 3.

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

b) 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.

3.4.5.1 ALTERATION PLAN

a) Engineer Review and Certification

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.

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.

If the User's Design Specification is lost or destroyed, the ASME nameplate, Section VIII, Division 2 and 3 forms shall be used to reconstruct the User's Design Specification such as Form A-1 Manufacture's Data Report, Form A-2 Manufacturer's Partial Data Report for Section VIII, Division 2 vessels or Manufacturer's Data Reports for Section VIII, Division 3. The reconstrued UDS shall meet the requirements of Section VIII, Division 2 or Division 3.

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

PROPOSED REVISION OR ADDITION

Item No.

A 22-17

Subject/Title

NBIC Part 3, S5.7.2, a), 1) and the examination methods of Part 3, 4.4.2, c

NBIC Location

Part: Repairs and Alterations & Repairs and Alterations; Section: Section 4 & Supplement 5; Paragraph: 4.4.2, c) & S5.7.2 a), 1)

Project Manager and Task Group

Source (Name/Email)

Timothy McBee / Timothy.McBee@tuvsud.com

Statement of Need

An additional examination option is needed for alterations performed to NBIC S5.7.2 a) 1).

Background Information

When fasteners on dryers are no longer suitable for the intended service, an alteration may be performed by enlarging bolt holes to accept larger diameter bolts. This may be accomplished as a field alteration with the heads in place. Prior to performing the alteration, a finite element analysis (FEA) is performed to evaluate and approve stress levels and to ensure sufficient clamping to retain pressure. A thorough cleaning and visual inspection of enlarged holes and fastener seating surfaces are performed to verify no cracks or other indications. As there is only the removal of existing material by drilling and the original Code of Construction does not require NDE for the drilled holes, a visual inspection should be an acceptable examination. A liquid pressure test is generally not practicable.

Existing Text	Proposed Text
4.4.2 c) Nondestructive Examination NDE may be conducted when contamination of the pressure-retaining item by liquids is possible or when pressure testing is not practicable. Concurrence of the owner shall be obtained in addition to the Inspector, and where required, the Jurisdiction. Exclusive use of Visual Examination (VT) shall not be permitted. In all cases NDE methods or combination of methods used shall be suitable for providing meaningful results to verify the integrity of the alteration.	4.4.2 c) Nondestructive Examination NDE may be conducted when contamination of the pressure-retaining item by liquids is possible or when pressure testing is not practicable. Concurrence of the owner shall be obtained in addition to the Inspector, and where required, the Jurisdiction. Exclusive use of Visual Examination (VT) shall not be permitted except for alterations performed to S5.7 a) 1). In all cases NDE methods or combination of methods used shall be suitable for providing meaningful results to verify the integrity of the alteration.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 22-18

Subject/Title

Definition of blowdown and blowoff

NBIC Location

Part: Installation & Pressure Relief Devices; Section: Section 9 & 9; Paragraph: 1 & 1

Project Manager and Task Group

Kathy Moore, Subcommittee Repairs/Alterations

Source (Name/Email)

Kathy Moore / kathymoore@joemoorecompany.com

Statement 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.

Background Information

Gary Scribner is updating NB-27 which addresses this action and equipment. We want to have consistent terminology used for all NB documents. I will be glad to be the PM and present it to each group.

Existing Text	Proposed Text
	Blowoff - the equipment and piping used when blowing down equipment such as boiler Blowdown - The act of releasing liquid with the purpose of removing solids form equipment

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

PROPOSED REVISION OR ADDITION

Item No.

A 22-19

Subject/Title

R Certificate Holders with Design Only Scope

NBIC Location

Part: Repairs and Alterations; Section: 5; Paragraph: 5.2.2

Project Manager and Task Group

Source (Name/Email)

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Statement of Need

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

Background Information

The NBIC does not address the responsibilities of R Certificate Holders with Design Only in their Scope. NB-12 permits these repair firms to perform calculations for re-rates as well as NDE, Stamping, and pressure testing. This information should be addressed in the NBIC to provide guidance to these repair firms and Inspectors.

Existing Text

Proposed Text

d) When no construction work is performed (e.g., a re-rating with no physical changes), the “R” Certificate Holder responsible for the design shall prepare the Form R-2, including gathering and attaching of supporting documentation. An Inspector shall indicate that the work complies with the applicable requirements of this code by completing and signing the “Certificate of Inspection” section of the form. The Construction Certificate section of the form shall not be completed when no construction work has been performed. e) “R” Certificate Holders whose scope is “Design Only” can perform code calculations for re-rating and alterations as defined in this Part, but are prohibited from performing physical work to the pressure retaining item except for the “R” Stamping, NDE, and/or final pressure testing, as applicable.

	VOTE:						
COMMITTEE	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date