Date Distributed:

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD SUBCOMMITTEE REPAIRS AND ALTERATIONS

AGENDA

Meeting of July 15th, 2020
Louisville, KY

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**

   8:00 AM

2. **Introduction of Members and Visitors**

3. **Check for a Quorum**

4. **Awards/Special Recognition**

5. **Announcements**

   The National Board will be hosting a reception for all committee members and visitors on Wednesday evening at 5:30pm at the SKY Grand Terrace on the 16th floor of The Brown Hotel.

6. **Adoption of the Agenda**

7. **Approval of the Minutes of the January 15th, 2020 Meeting**

   The minutes are available for review on the National Board website, www.nationalboard.org.

8. **Review of Rosters (Attachment Page 1)**
   a. **Membership Nominations**
      i. Mr. Trevor Seime (Jurisdictional Authorities), Mr. Scott Chestnut (Users), and Mr. Paul Davis (Manufacturers) have expressed interest in becoming members of Subgroup R&A.
      ii. Mr. Brian Boseo has recently changed employers, which has led to his interest category changing from National Board Certificate Holder to General Interest. According to NBIC procedures, this counts as a resignation from the subcommittee. He would like to reapply for membership to the subcommittee.

   b. **Membership Reappointments**
      i. The following Subgroup R&A memberships are set to expire prior to the January 2021 NBIC meeting: Mr. Brian Boseo, Mr. Ben Schaefer, and Mr. Rob Troutt.
      ii. The following Subcommittee R&A memberships are set to expire prior to the January 2021 NBIC meeting: Mr. Rick Sturm.
      iii. The following Graphite Task Group memberships are set to expire prior to the January 2021 NBIC meeting: Mr. Monte Bost.
      iv. The following Locomotive Boilers Task Group memberships are set to expire prior to the January 2021 NBIC meeting: Mr. Charlie Cross, Mr. Mark Jordan, Mr. George Scerbo, and Mr. Paul Welch.
      v. The following Historical Boilers Task Group memberships are set to expire prior to the January 2021 NBIC meeting: Mr. Jon Wolf.

   c. **Officer Nominations**
      i. Mr. Brian Boseo and Mr. Ben Schaefer are up for reappointment as Chair and Vice Chair of Subgroup R&A.

9. Interpretations

Item Number: 19-26	NBIC Location: Part 3, 3.3.2	Attachment Page 2

General Description: Clarification on welding repairs on appendages

Subgroup: Repairs and Alterations
Task Group: P. Shanks – PM

Explanation of Need: The original submitter of this item will sometimes need to perform a welding repair on an appendage (not on the tank itself) in order for the complete process of refurbishment to be done for their customers' expectations. There appears to be no direct reference to these types of minor welding repairs for the refurbishment process in the NBIC code.

January 2020 Meeting Action: Mr. P. Shanks presented, and his proposal was approved by the subcommittee. The Main Committee provided several suggested changes that Mr. Shanks agreed to address for the July 2020 meeting.

Item Number: 20-3	NBIC Location: Part 3, 3.3.4.8	Attachment Page 4

General Description: Inspector involvement in Fitness-for-Service Assessments

Subgroup: Repairs and Alterations
Task Group: J. Siefert (PM)

Explanation of Need:
The below questions are intended to gain clarity as to first which Inspector (i.e. "IS" Commissioned or "R" Endorsement) signs the FFSA Form NB-403 when an "R" Certificate Holder is involved with a repair in that region as well as determine what level of review of the Fitness-for-Service the Inspector is expected to complete. If it is an Inspector holding a "R" Endorsement with an AI Commission (not tested on NBIC Part 2), shouldn't the relevant pages in NBIC Part 2 concerning Fitness for Service be included in their tested body of knowledge, so they are aware of the detailed rules?

The Body-Of-Knowledge for National Board Inspectors holding either an "IS" Commission or "R" Endorsement does not reference ASME FFS-1/API 579 Fitness-For-Service Standard or have any expectation that the Inspector be capable of determining if the correct Fitness for Service methodology was used or that the assumptions taken by the Engineer in the analysis were the most appropriate or accurate. Clarification is also requested due to the Form NB-403 signature block stating "Verified by" for the Inspector without any other disclaimers as typically found on other Forms signed by Inspectors such as ASME MDRs and NBIC Form R-1/R-2.

January 2020 Meeting Action: Mr. Carter presented the proposal. Mr. Galanes proposed creating a new action item to address FFS assessments in Part 3 as a way to handle this. This was a Progress Report.

New Interpretation Requests:

Item Number: 20-11	NBIC Location: Part 3, 3.3.3	Attachment Page 6

General Description: Scope of Repairs

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need:
NBIC Part 3 lists several examples of repair but nowhere limits the scope or amount of these examples that can be utilized when performing repairs. This creates some uncertainty when performing some types of repairs, such as replacing the tubesheets of a fixed tubesheet type heat exchanger as listed in 3.3.3 e). According to ASME BPV Code Section VIII Division 1 Part UHX, Section 13, the length of the tubes is a design parameter and therefore replacing the tubesheet in accordance with its original design might require the replacement of the tubes as well to maintain the original design length.

Item Number: 20-14	NBIC Location: Part 3, 3.3.3 & 5.12.4.1	Attachment Page 7

General Description: Mechanical Repair with no welding

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need:
ASME Section VIII, Division 3 Code stamped "Parts" are being replaced with new ASME Code stamped "Parts" without any documentation. The original ASME Data Report listed the original "Part" serial number and will no longer be accurate if the original "Part" is replaced.

Item Number: 20-17	NBIC Location: Part 3, 3.3.3	Attachment Page 9

General Description: Weld build of wasted areas with different material

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need:
It is common practice to weld build the wasted area of a component with original material and then to overlap with a corrosion resistant material to prevent future wasting of the component. It would be more efficient to simply restore the wasted area with the corrosion resistant material, provided that it meets or exceeds the strength requirements of the original material.

Item Number: 20-21	NBIC Location: Part 3, 4.4.1 e)	Attachment Page 10

General Description: Combination of NDE methods

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need:
Clarification on the intent of 4.4.1 e) 1-5 when using VT and another NDE method but on separate welds.

Item Number: 20-23	NBIC Location: Part 3, 3.4.5.1 b)	Attachment Page 11

General Description: Alteration of ASME Section VIII Div.2 vessels

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need:
Many Div.2 vessels which are in need of repair are of sufficient age whereby all of the original paperwork was paper work. Even with the best efforts such documents can become damaged or lost by the flooding event associated with the gulf coast hurricane events and or the types of refinery fires that are all too common. In a good deal of cases these vessels simply need a new B-16.5 weld neck flange or a gasket surface weld metal build up in order to allow continued leak free surface but due to some documents being unavailable the owner is left to choose between making no repair or making a repair which is not compatible with the NBIC.

Item Number: 20-24	NBIC Location: Part 3, 3.3.5.1 a) & 3.4.5.1 a)	Attachment Page 12

General Description: Certification of repair or alteration plans

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need:
3.4.5.1 b) allows for the UDS to be revised if a proposed alteration plan is not compatible with the original. this revised UDS must be certified by an engineer as must the Alteration plan, there currently does not appear to be a separation of the two certifying activity's which is not in the spirit of Div.2 requiring different engineers for the UDS and MDR.

Item Number: 20-29	NBIC Location: Part 3, 3.4.4	Attachment Page 13

General Description: PV Cycles of operations change as an alteration

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need:
Isostatic Presses in particular (but found in other pressure vessels also) are restricted by the data report to a finite number of cycles. Operators of these vessels routinely use curves to modify what is considered a cycle and extend the life of the vessel. These vessels represent a substantial risk of failure and this practice is very difficult for the inservice inspector to successfully track and audit to ensure the integrity of these vessels are maintained as this is a grey area in the current code as written.

10. Action Items

Item Number: NB15-1405	NBIC Location: Part 3, 1.2	Attachment Page 15

General Description: Impact testing of P-11B Material

Subgroup: Repairs and Alterations

Task Group: N. Carter (PM), P. Davis, G. Galanes, P. Shanks

January 2020 Meeting Action: Mr. N. Carter presented his proposal is intended to go to Review and Comment Letter Ballot to SG R&A. This was a Progress Report.

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

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

Subgroup: Graphite
Task Group: Greg Becherer (PM)

January 2020 Meeting Action: No members of the Graphite Task Group were present to discuss the item.

Item Number: NB16-1403	NBIC Location: Part 3, S4	Attachment Page 17

General Description: Add information on repair of high pressure vessels.

Subgroup: FRP

Task Group: N. Newhouse (PM)

January 2020 Meeting Action: No members of the FRP Task Group were present to present the item. This was a Progress Report.

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

Item Number: 17-134	NBIC Location: Part 3, Section 5	No Attachment

General Description: Proposed Revision for registration of Form R-1 with the National Board containing ASME pressure part data reports attached.

Subgroup: Repairs and Alterations
Task Group: P. Shanks (PM), Rob Troutt, Joel Amato, Kathy Moore, Paul Edwards

January 2020 Meeting Action: Mr. P. Shanks presented a Progress Report.

Item Number: 17-167	NBIC Location: Part 3, S3.2 d)	No Attachment

General Description: Clarify repair inspection requirements for machined only graphite parts.

Subgroup: Graphite
Task Group: Aaron Viet (PM)

January 2020 Meeting Action: No members of the Graphite Task Group were present to present the item.

Item Number: 18-66	NBIC Location: Part 3, Section 5	Attachment Page 20

General Description: Move Report Forms to a new Supplement.

Subgroup: SG Repairs and Alterations

Task Group: Marty Toth – PM, Ben Schaefer

January 2020 Meeting Action: Mr. B. Schaefer presented the changes to move Report Forms and instruction to new Supplement. A motion to move the 5 pages of revisions to a concurrent Letter Ballot for SG R&A and SC R&A with a Letter Ballot to Main Committee if approved via SC R&A Letter Ballot was made, seconded, and unanimously approved.

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

Item Number: 18-94	NBIC Location: Part 3, S3.2 f), h); S3.4 a), b), c) etc.	No Attachment

General Description: G-mark Requirements for Various Repairs/Alteration to Graphite

Subgroup: Graphite

Task Group: C. Cary (PM)

January 2020 Meeting Action: No members of the Graphite Task Group were present to present the item.

Item Number: 18-100	NBIC Location: Part 3, 3.3.2	Attachment Page 91

General Description: Revision adding heat exchanger tubes with an outside diameter of ¾" or smaller to NBIC Part 3.3.2 Routine Repairs

Subgroup: Repairs and Alterations

Task Group: M. Toth – PM, B. Schaefer, N. Carter

January 2020 Meeting Action: Mr. B. Schaefer presented a Progress Report, as this has been reassigned to new Task Group members, (previously Mr. Martinez was PM).

Item Number: 19-16	NBIC Location: Part 3, 3.3.2 e)	Attachment Page 95

General Description: Reword to provide clarity; contradictory requirement Part 3; 3.2.2 e)

Subgroup: Repairs and Alterations

Task Group: None assigned

Explanation of Need: This wording of this clause is causing confusion. The original submitter has had multiple instances where owners have requested to purchase welded replacement parts directly and read this clause with the belief that they can purchase a replacement part for in some cases a welded pressure part for an ASME Section I boiler and safe money by having the fabricator not Hydro test as per Section I even when it was not impractical to have the testing performed.

January 2020 Meeting Action: Mr. P. Edwards presented that Item 19-59 may satisfy the inquirer. Item 19-59 was taken out of order and unanimously approved. A motion to respond to the inquirer of Item 19-16 (Eben Creaser) to see if the revision proposal under Item 19-59 satisfies his request for a Code Revision was made, seconded and unanimously approved.

Update: A letter was sent to Mr. Creaser to see if item 19-59 satisfied his request. No response has been received so far.

Item Number: 19-60	NBIC Location: Part 3, 1.5.1	No Attachment

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

Subgroup: Repairs and Alterations

Task Group: Ray Miletti (PM), Paul Davis, K. Moore, B. Boseo, M. Toth, P. Shanks, M. Quisenberry, R. Sturm

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

January 2020 Meeting Action: Mr. Boseo commented that Items 19-47 and 19-48 were both closed and the scope for this item expanded to address all elements in 1.5.1. The attached proposal addresses only calibration. New Item 19-82 (Safety Verbiage addition) to be included in this Item's scope. This was a Progress Report.

Item Number: 19-61	NBIC Location: Part 3, 3.3.4	No Attachment

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

Subgroup: Repairs and Alterations

Task Group: None assigned.

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

January 2020 Meeting Action: Mr. P. Shanks presented a Progress Report.

Item Number: 19-68	NBIC Location: Part 3, 1.6	No Attachment

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

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: Review of 1.6 for possible requirement for ANI's and ANII's to hold the (R) Endorsement for "NR" activities.

January 2020 Meeting Action: Mr. P. Edwards presented a Progress Report.

Item Number: 19-73	NBIC Location: Part 3, S3	No Attachment

General Description: Requirements for who can make hole plugging repairs on graphite blocks

Subgroup: Graphite

Task Group: C. Cary (PM), A. Viet, A. Stupica

Explanation of Need: Performing hole plugging repairs in graphite blocks is a common repair for graphite pressure vessels, but the NBIC currently has no formal requirements for this type of repair.

January 2020 Meeting Action: No members of the Graphite Task Group were present to present the item.

Item Number: 19-74	NBIC Location: Part 3, S3.3	No Attachment

General Description: Routine repair requirements for partial nozzle replacement

Subgroup: Graphite

Task Group: A. Stupica (PM), M. Bost

Explanation of Need: Currently only nozzle replacement is addressed as a routine repair. The group is planning on defining the types of partial nozzle replacements and repairs that could be defined as routine.

January 2020 Meeting Action: No members of the Graphite Task Group were present to present the item.

Item Number: 19-79	NBIC Location: Part 3, S3.5.4 h)	No Attachment

General Description: Re-word Part 3, S3.5.4 h) to clarify cementing procedure for plugs

Subgroup: Graphite

Task Group: A. Stupica (PM)

Explanation of Need: Existing language includes unnecessary steps and is clunky to read. Text will be reworded to clarify the full procedure.

January 2020 Meeting Action: No members of the Graphite Task Group were present to present the item.

Item Number: 19-82	NBIC Location: Part 3, 1.5.1 j)	Attachment Page 96

General Description: Review verbiage in Part 3, 5.12.5.1 8) and 5.12.5.1.11)

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: Safety is not addressed in Part 3. This verbiage could be added to the 1.5.1 j) Method of Performing Work paragraph so Certificate Holders can address the safety concerns specific to their scope of activities.

January 2020 Meeting Action: Mr. M. Quisenberry was recently selected as the PM and presented this as a Progress Report. The intent is to add this to the scope of current Action Item 19-60 and close this Item with no action at the next meeting.

New Items:

Item Number: 20-6	NBIC Location: Part 3, Table 2.3	Attachment Page 97

General Description: Table 2.3 SWPS - Previous Versions accepted

Subgroup: Repairs and Alterations

Task Group: J. Sekely (PM)

Explanation of Need: The use of previous versions of the Designated SWPS is permitted. Previous versions include those reaffirmed, revised, or amended SWPSs regardless of publication date. The AWS reaffirms, amends or revises SWPSs in accordance with ANSI procedures. This Code addition will simplify the maintenance of Table 2.3.

Update: This item is currently being balloted to SC R&A for approval, and to Main Committee for Review and Comment.

Item Number: 20-7	NBIC Location: Part 3, 3.3.2 a)	Attachment Page 104

General Description: Routine repairs of Div.2 & or Div.3 vessels

Subgroup: Repairs and Alterations

Task Group: N. Carter (PM)

Explanation of Need: An interpretation is scheduled to be issued under item number 19-26 asserting that Routine repairs are not to be used on Div.2 or Div.3 vessels. rather than require review of an interpretation which may expire in two years the body of the code should make it clear that Routine repairs are not compatible with div.2 or div.3 vessels.

Item Number: 20-8	NBIC Location: Part 3, 8.1 b)	No Attachment

General Description: Interpretation revision process

Subgroup: Repairs and Alterations

Task Group: K. Moore (PM)

Explanation of Need: Adding language to specify that interpretations of previous NBIC editions are applicable to the most current edition, as long as code requirements have not changed.

Item Number: 20-9	NBIC Location: Part 3, 9.1	Attachment Page 105

General Description: Define "Verify" in the NBIC Glossary

Subgroup: Repairs and Alterations

Task Group: N. Carter (PM)

Explanation of Need: Defining "Verify" in the NBIC Part 1, 2, 3, and 4 to align with the definition in NB-263, RCI-1, Rules for Commissioned Inspectors.

Item Number: 20-10	NBIC Location: Part 3, New Supplement	No Attachment

General Description: Develop a new Supplement to address rules and roles for FFS

Subgroup: Repairs and Alterations

Task Group: J. Siefert (PM)

Explanation of Need: Currently, the NBIC 3.3.4.8 provides for fitness for service for defects left in a pressure retaining item. It is proposed to develop a new Supplement to provide guidance in how to conduct FFS and roles and responsibilities unique to Part 3 concerning defects.

The current FFS form resides in Part 2 and can deal with in-service condition assessment and is loosely tied to defects in Part 3.

Item Number: 20-15	NBIC Location: Part 3, 3.3.2 & 5.7.2	Attachment Page 106

General Description: Stamping requirements for routine repairs

Subgroup: Repairs and Alterations

Task Group: R. Troutt (PM), K. Moore

Explanation of Need: This would offer traceability to the R-Stamp holder responsible for the work.

Item Number: 20-16	NBIC Location: Part 3, 3.4.4	Attachment Page 107

General Description: Rules to address re-cold stretching of vessels built to Appendix 44 rules

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: ASME Section VIII Div.1 Mandatory Appendix 44 paragraph 44-6.2(g) clearly sets out that a vessel built to those rules needs to be re-stretch having had repair welding. it is not clear if ASME are referring to in process (at the original manufactures location) repairs or post construction repairs. However as the NBIC is currently silent this potential issue should be addressed.

Item Number: 20-20	NBIC Location: Part 3, 3.2.2 e)	Attachment Page 109

General Description: Revision to Part 3, 3.2.2 e)

Subgroup: Repairs and Alterations

Task Group: None assigned.

Explanation of Need: The certificate holder should not have to explain or justify why a part was not pressure tested in the manufacturing stage. PG-106.8 of Section I allows the part to be fabricated and shipped as such therefore no explanation should be required.

Item Number: 20-25	NBIC Location: Part 3, S2.13	No Attachment

General Description: Repair Procedure for Fire Boxes

Subgroup: SG Historical

Task Group: M. Wahl (PM), Robin Forbes, T. Dillon, & 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 2020 Meeting Action:
Progress Report: Robert Bryce presented this item to the group. He explained the need for new wording to address repair procedures for fire boxes. L. Moedinger noted that this has been addressed in TG Locomotive (Part 3, S1.2.11.5 & Figure S1.2.11.5-c1). After discussion, the group decided to create a task group to create a proposal for the July 2020 meeting.

Item Number: 20-28	NBIC Location: Part 3, 2.2.1	Attachment Page 110

General Description: Qualification of welding procedures by multiple organizations.

Subgroup: Repairs and Alterations
Task Group: None assigned.

Explanation of Need: The attached Section IX proposal has been approved for publication by the ASME board. While Section IX provides basis for these tests, it also requires that the ruling Code of Construction expressly permits this activity.

11. Future Meetings

January 11th – 14th, 2021 – New Orleans, LA

July 12th – 15th, 2021 – Cincinnati, OH

12. Adjournment

Respectfully submitted,

Jonathan Ellis

Jonathan Ellis
NBIC Secretary

Contents

Subcommittee Repairs/Alterations

Last Name	First Name	Interest Category	Role	Exp. Date	More
Troutt	Robby	Jurisdictional Authorities	Chair	08/30/2021	Details
Moore	Kathy	National Board Certificate Holders	Vice Chair	01/30/2022	Details
Hellman	Terrence		Secretary	12/30/2099	Details
Becker	Patricia	National Board Certificate Holders	Member	10/30/2022	Details
Boseo	Brian	National Board Certificate Holders	Member	08/30/2021	Details
Edwards	Paul	National Board Certificate Holders	Member	08/30/2021	Details
Hopkins	Craig	National Board Certificate Holders	Member	01/30/2022	Details
McBee	Timothy	Authorized Inspection Agencies	Member	10/30/2022	Details
Miletti	Ray	Manufacturers	Member	07/30/2022	Details
Moedinger	Linn	Users	Member	01/30/2022	Details
Morelock	Brian	Users	Member	01/30/2023	Details
Quisenberry	Michael	National Board Certificate Holders	Member	10/30/2022	Details
Schaefer	Benjamin	National Board Certificate Holders	Member	01/30/2022	Details
Sekely	James	General Interest	Member	08/30/2021	Details
Shanks	Paul	Authorized Inspection Agencies	Member	10/30/2022	Details
Siefert	John	General Interest	Member	10/30/2022	Details
Sturm	Rick	Jurisdictional Authorities	Member	07/30/2020	Details
Toth	Marty	General Interest	Member	01/30/2022	Details

Interpretation IN19-26

Proposed Interpretation

Inquiry:	IN19-26
Source:	Doug Biggar
Subject:	NBIC Part 3 Section Part 3, 3.3.2
Edition:	[Current/all]
General Description:	Repair of none pressure boundary parts
Question 1:	If a welding repair is done to an appendage of a horizontal ASME LPG pressure vessel such as a faulty leg or the raised data plate holder, is this considered routine and are we exempt to have an inspector present to witness it and/or fill out a specialized form?
Reply 1:	No inspector needs to be present as the welding is not performed on any part of the pressure vessel directly related to its performance under pressure.
Question 2:	What is the minimum length of an appendage we can weld onto without being an ASME/NBIC certified welder (only a standard welding ticket)?
Reply 2:	1/4”
Committee’s Question 1:	Are refurbishment activities such as shot blasting, thread cleaning and painting considered within the scope of the NBIC?
Committee’s Reply 1:	No
Rationale 1:	These activities should not affect the pressure retaining integrity of the item, per the introduction to the NBIC that (maintenance) is the function of the NBIC. Reasonably these activities fall outside the scope of the NBIC
Committee’s Question 2:	Do welding activities on items which have neither a pressure retaining or load bearing function fall within the scope of the NBIC
Committee’s Reply 2:	No.
Rationale:2	These welds are such that typical ASME BPV construction codes would not dictate the qualification of the welders or welding operators.
NBIC Vote	

Include in response letter: NA

Rationale:

Having emailed the enquirer to determine the scope of their typical operations it was clear that there was a general misunderstanding about the purpose of the NBIC, the proposed questions are overly specific and as sure fail to grasp the crux of the issue hence the question re-write. Q3 was added to ensure that no misunderstand occurs. With the exception of a very hardline reading on Section 3.3.2 a) the NBIC addresses in the main body and the introduction the pressure retaining capability of the item and not work conducted elsewhere.

Sections 3.3.2 e), 3.3.3 & 3.4.4 address working (welding / replacing) on components which have a pressure retaining function. Pipes, tubes, heads, shell, and tube sheet are mentioned, integral parts without pressure retaining function such as legs and davit arms are not addressed.

Section 3.3.3 a) can be read as "Weld repairs ~~or replacement of pressure parts or~~ of (sic) attachments that have failed in a weld or in the base material;"

PROPOSED INTERPRETATION

Inquiry No.	**20-3**
Source	Nathan Carter, HSB nathan_carter@hsb.org
Subject	Inspector involvement in Fitness-for-Service Assessments **Background:** The below questions are intended to gain clarity as to first which Inspector (i.e. "IS" Commissioned or "R" Endorsement) signs the FFSA Form NB-403 when an "R" Certificate Holder is involved with a repair in that region as well as determine what level of review of the Fitness-for-Service the Inspector is expected to complete. If it is an Inspector holding a "R" Endorsement with an AI Commission (not tested on NBIC Part 2), shouldn't the relevant pages in NBIC Part 2 concerning Fitness for Service be included in their tested body of knowledge, so they are aware of the detailed rules? The Body-Of-Knowledge for National Board Inspectors holding either an "IS" Commission or "R" Endorsement does not reference ASME FFS-1/API 579 Fitness-For-Service Standard or have any expectation that the Inspector be capable of determining if the correct Fitness for Service methodology was used or that the assumptions taken by the Engineer in the analysis were the most appropriate or accurate. Clarification is also requested due to the Form NB-403 signature block stating "Verified by" for the Inspector without any other disclaimers as typically found on other Forms signed by Inspectors such as ASME MDRs and NBIC Form R-1/R-2. An example is a R-Certificate holder was hired to repair a weld seam. It was discovered during a repair that multiple base metal laminations existed adjacent to the repair location. A Fitness for Services Evaluation was subsequently performed. The first question is whether or not it is the responsibility of the Repair Inspector to sign the FFSA form once everything has been properly vetted, since the defect being left in place is not necessarily within the scope of the initial repair being performed by the "R" Certificate Holder, or should this be signed off by a Commissioned Inservice Inspector, since they are examined on the rules of NBIC Part 2? Also, Form NB-403 is vague in the signature block region for the scope of what the Inspector is signed for. It could be alluded that without a statement, such as those found on the R-1 and R-2 forms, the Inspector is signing off on the appropriateness and adequacy of the Fitness-For-Service methodology performed by the Engineer.
Edition	2019; Part: Repairs and Alterations; Section: 3; Paragraph: 3.3.4.8 2019; Part: Inspection; Section: 4; Paragraph: 4.4
Question	Question 1: In accordance with NBIC Part 3, 3.3.4.8, a fitness-for-service condition assessment as described in NBIC Part 2, 4.4 shall be completed and adequately documented on the FFSA Form NB-403. Once Form NB-403 is completed, is it required that the Inspector signing this Form hold a National Board "R" Endorsement as described in RCI-1/NB-263? Question 2: NBIC Part 2 4.4.1 d) states that the Inspector shall indicate acceptance of the Report of FFSA by signing. Paragraph 4.4.3 b) states that the Inspector shall review the condition assessment methodology and ensure that the inspection data and documentation are in accordance with Part 2. Is the Inspector's signature on Form NB-403 an indication that the condition assessment and recommendations completed by the Engineer have been fully reviewed for appropriateness and accuracy by the Inspector?

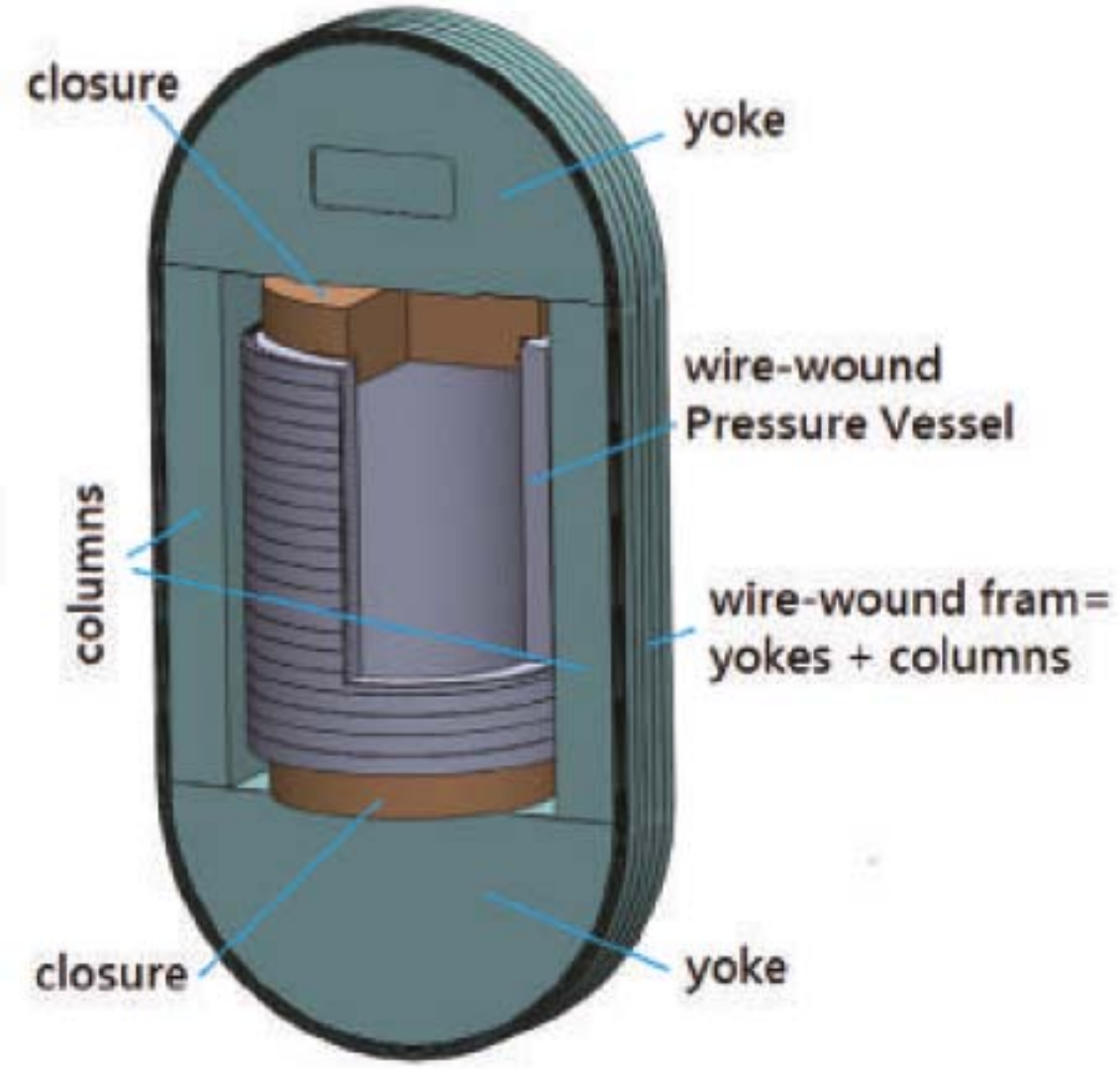
	Question 3: If the answer to Question 2 is No, is the Inspector's signature on Form NB-403 an indication of acceptance solely on the basis of review of the Form for completeness and verification that the requirements outlined in 4.4 were addressed?
Reply	Proposed Reply 1: Yes Proposed Reply 2: No Proposed Reply 3: Yes
Committee's Question	
Committee's Reply	
Rationale	

PROPOSED INTERPRETATION

Inquiry No.	**20-11**
Source	Hugh-Jean Nel, Sasol Hugh-Jean.Nel@sasol.com
Subject	Scope of Repairs **Background:** Historically NBIC has not defined limitations on the scope of repair provided the entire item is being rebuilt, see Question & Reply 2 & 3 in Interpretation 98-28. NBIC Part 3 lists several examples of repair but nowhere limits the scope or amount of these examples that can be utilized when performing repairs. This creates some uncertainty when performing some types of repairs, such as replacing the tubesheets of a fixed tubesheet type heat exchanger as listed in 3.3.3 e). According to ASME BPV Code Section VIII Division 1 Part UHX, Section 13, the length of the tubes is a design parameter and therefore replacing the tubesheet in accordance with its original design might require the replacement of the tubes as well to maintain the original design length.
Edition	2019; Part: Repairs and Alterations; Section: 3; Paragraph: 3.3.3 Examples of Repairs
Question	Question: Is it permissible for repair activities performed on pressure retaining equipment to have more than one activity listed in 3.3.3 with the scope of repair?
Reply	Proposed Reply: Yes, provided that the scope of repairs has been approved by the Inspector, and when required, by the Jurisdiction.
Committee's Question	
Committee's Reply	
Rationale	

Proposed inquiry to NBIC from Monte Bost (monte_bost@hsb.com)

Background: A Section VIII, Division 3 pressure vessel is made from machined forgings with no welding. The pressure retaining items are a cylinder, end closures and a frame that holds the end closures in place. A sketch is provided.



Inquiry

Subject: National Board Inspection Code 2019 Edition, Part 3, 3.3.3 and 5.12.4.1

Question 1: A Section VIII, Division 3 pressure vessel is made without welding from machined forgings. The pressure retaining components consist of a cylinder, end closures and a frame that holds the end closures in place. If one of the pressure retaining components is replaced with a new ASME-stamped "Part", is this activity considered a repair?

Proposed Reply (1): Yes.

Question 2: For the repair described in Question (1) above, how shall Line 7, "REPAIR TYPE" be indicated on the Form R-1, *Report of Repair*?

Proposed Reply (2): Indicate "Type of Repair: Mechanical" in Line 10 "Remarks".

PROPOSED INTERPRETATION

Inquiry No.	**20-17**
Source	Roy Darby, Chevron Products Company roy.darby@chevron.com
Subject	Weld build of wasted areas with different material **Background:** It is common practice to weld build the wasted area of a component with original material and then to overlap with a corrosion resistant material to prevent future wasting of the component. It would be more efficient to simply restore the wasted area with the corrosion resistant material, provided that it meets or exceeds the strength requirements of the original material. This represents cost savings for industry with no expected downside.
Edition	2019; Part: Repairs and Alterations; Section: 3; Paragraph: 3.3.3 Examples of Repairs
Question	Question: Would it be acceptable as a repair to weld build wasted areas with a material of different nominal composition and, equal to or greater in ultimate stress from that used in the original design, provided the replacement material satisfies the material and design requirements of the original code of construction under which the vessel was built? The minimum required thickness would be at least equal to the thickness stated on the original Manufacturer's Data Report. This would be an amalgamation of 3.3.3 (c),(d), and (r) into a single activity.
Reply	Proposed Reply: Yes.
Committee's Question	
Committee's Reply	
Rationale	

PROPOSED INTERPRETATION

Inquiry No.	**20-21**
Source	Eric Feeney, TEI Construction Services efeeney@teiservices.com
Subject	Nondestructive Examination **Background:** When a boiler outage is being performed, there may be 50-10,000+ welds made. We are accustomed to performing 100% volumetric examination when a hydrostatic test is not being performed. Some of our inspectors suggest that we can perform a portion of the NDE as volumetric and the remainder as VT. When I read 4.4.1 e) it seems to have validity, but I generally have understood paragraph e) to have been referring to each individual weld and not the repair as a whole. This is what I would like clarification on.
Edition	2019; Part: Repairs and Alterations; Section: 4; Paragraph: 4.4.1 e)
Question	Question: May a portion of a repair be subject to NDE other than visual, and the remainder of the repair be subject to exclusive use of VT in accordance with Part 3, 4.4.1 e)?
Reply	Proposed Reply: Yes.
Committee's Question	
Committee's Reply	
Rationale	

PROPOSED INTERPRETATION

Inquiry No.	**20-23**
Source	Paul Shanks, OneCIS Paul.shanks@onecis.com
Subject	Alteration of ASME Section VIII Div.2 vessels **Background:** Many Div.2 vessels which are in need of repair are of sufficient age whereby all of the original paperwork was paper work. Even with the best efforts such documents can become damaged or lost by the flooding event associated with the gulf coast hurricane events and or the types of refinery fires that are all too common. In a good deal of cases these vessels simply need a new B-16.5 weld neck flange or a gasket surface weld metal build up in order to allow continued leak free surface but due to some documents being unavailable the owner is left to choose between making no repair or making a repair which is not compatible with the NBIC. **Explanation of Need:** 3.3.5.2 & 3.4.5.1 both require that a repair or alteration for div.2 vessels are checked for compatibility with the original UDS which is clearly best practice for these higher stressed vessels, however a great deal of work needed on these vessels no doubt due to the higher level of engineering examination during initial fabrication is limited to fixing the problems that come form leaking gaskets i.e. corrosion on gasket faces which may require weld metal build up less than 20"2 or replacement of an ASME standard flange like for like. The professional engineer whom must review and sign for repair plans is qualified to review the service history and/or whatever original documentation is available and determine if a simple flange replacement or weld metal build up is acceptable or not.
Edition	2019 NBIC, Part 3, 3.4.5.1 b)
Question	Question: Given that Paragraph 3.4.5.1 b) allows for the User Design Specification (UDS) to be revised in the case where a proposed alteration is not compatible with the existing UDS is it unacceptable in cases where the original UDS is not available to generate a new UDS which is compatible with the design load case included with the original Manufactures Design Report?
Reply	Proposed Reply: No.
Committee's Question	
Committee's Reply	
Rationale	

PROPOSED INTERPRETATION

Inquiry No.	**20-24**
Source	Paul Shanks, OneCIS Paul.shanks@onecis.com
Subject	Certification of repair or alteration plans **Background:** 3.4.5.1 b) allows for the UDS to be revised if a proposed alteration plan is not compatible with the original. this revised UDS must be certified by an engineer as must the Alteration plan, there currently does not appear to be a separation of the two certifying activity's which is not in the spirit of Div.2 requiring different engineers for the UDS and MDR.
Edition	2019 NBIC, Part 3, 3.4.5.1 b)
Question	Question: Is it acceptable for the Repair/alteration plan to be certified by one of the same engineers that certified the UDS, Revised UDS or MDR?
Reply	Proposed Reply: No.
Committee's Question	
Committee's Reply	
Rationale	

PROPOSED INTERPRETATION

Inquiry No.	**20-29**
Source	Craig Bierl, Chubb Limited craig.bierl@chubb.com
Subject	PV Cycles of operations change as an alteration **Background:** Isostatic Presses in particular (but found in other pressure vessels also) are restricted by the data report to a finite number of cycles. Operators of these vessels routinely use curves to modify what is considered a cycle and extend the life of the vessel. These vessels represent a substantial risk of failure and this practice is very difficult for the inservice inspector to successfully track and audit to ensure the integrity of these vessels are maintained as this is a grey area in the current code as written. This is the real life scenario that has appeared on 7 of these vessels in the last 6 months (that is every one that I have been involved in evaluating for insurance coverage). 1. ASME data report says X cycles. Normally around 15-25,000. 2. Vessel is 20+ years old 3. You ask about operation and the vessel operates 330 days per year and has 5 operating cycles per day (some are 2 some are more, just throwing a number up to illustrate). So, simple math says 330x5=1650 cycles per year 25,000/1650=15.15 years of life 4. You ask for records of the operation a. You are presented with a degraded cycle curve b. "we don't operate at maximum temp (and/or) pressure" so we aren't taking a full cycle c. So now the same vessel shows that it only has 650 cycles on it or 1200 (instead of 30,000) 5. Their argument is that they are below the "design cycles", well there is no rational that the inspector can adequately track the design cycles to a degree of comfort. a. I attached one of the better design cycle tracking mechanism's I have seen, however it is still lacking Bottom line, the "operational cycle" is easily trackable. The use of curves to increase the operational cycle count beyond the ASME data report cycle maximum appears to be in conflict and lacks standardization, which makes it difficult to audit and ensure uniform measures are being taken. The cycle count appears on the data report as a criteria, if that criteria is intended to limit the operational cycle, than the use of a curve to extend that cycle should be considered an alteration and rerating of the vessel. If the cycle count on the data report is not intended to be limited by the operating cycle, then some form of standard should be created for the different types of variances that are used to extend this cycle count (by temperature, pressure, etc).
Edition	2019 NBIC, Part 3, 3.4.4 2019 NBIC, Part 2, 2.3.6.8 & 2.3.6.10
Question	Question: Should the use of a curve to extend the number of operating cycles beyond the number of cycles indicated on the ASME data report be considered an alteration/re rating of a pressure vessel (ASME Section 8 Part 3)?

Reply	Proposed Reply: Yes. The use of a curve to extend the number of operating cycles is a change in the material data on the ASME data report and is therefore an alteration of the vessel and should be considered as such through a formal re-rating process.
Committee's Question	
Committee's Reply	
Rationale	

Item #: NB15-1405
Revision: 1
Date: January 14, 2020
Subject: Clarification of Impact Testing Rules for Repairs

Justification:
This revision was generated to address an interpretation asking whether production impact test plates were required for repair of vessels made from P-No 11B materials, when no extra material from one of the heats exist. Where extra material does not exist from one of the heats, the original code of construction would require existing material from the vessel to be used. This would require the vessel to be further damaged with material being cut out to serve as a test plate.

Initially this interpretation was meant to address only P-No 11B material; however, this same problem exists for all vessel materials. As a result, the following proposal was generated.

INSERT NEW PARAGRAPHS:

3.3.6 Pressure Vessel Impact Testing

3.3.6.1 Welding procedures used for repairs shall be qualified with impact testing when required by the original code of construction. The requirements for impact testing shall be in accordance with the rules of the original code of construction.

3.3.6.2 When the original code of construction requires the welding and testing of production impact test plates, the welding of production impact test plates shall be in accordance with the rules of the original code of construction. ~~The production impact test plates shall be from the material in the vessel. When this is not practicable, the material may be from the same P-No and Group Number as the material being repaired.~~

3.3.6.3 The test material for the welding procedure qualification and for the production impact test plate shall be of the same material specification (including specification type, grade, class, and condition of heat treatment) as the material being repaired. In the event that the notch toughness of the material to be repaired is unknown, evidence from tests of that material or from another acceptable source (see NBIC Part 3, 2.5.3) may be

used for the base metal notch toughness when qualifying the WPS as required in NBIC Part 3, 2.5.3.2 h).
In the event that the original material specification is obsolete, the test material used should conform as closely as possible to the original material used for construction based on nominal composition and carbon equivalent (IIW Formula CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; elements are expressed in Weight Percent Amounts), but in no case shall the material be lower in strength.

PART 3
SUPPLEMENT 4
REPAIR AND ALTERATION OF FIBER-REINFORCED THERMOSETTING PLASTIC PRESSURE EQUIPMENT

S4.1 SCOPE
…
S4.2 INSPECTOR QUALIFICATIONS
…

S4.3 TOOLS
The following tools may be required by the Inspector:
a) adequate lighting including overall lighting and a portable lamp for close inspections;
b) handheld magnifying glass;
c) Barcol hardness tester;
d) small pick or pen knife;
e) small quantity of acetone and cotton swabs;
f) camera with flash capability; ~~and~~
g) liquid penetrant testing kit;
h) depth and length gages; and
i) metallic tap tester (e.g. quarter dollar).

S4.4 LIMITATIONS
…

S4.5 REPAIR LIMITATIONS FOR FILAMENT WOUND VESSELS
When the MAWP is greater than 200 psig (1.38 MPa), and less than 1500 psi (10.34 MPa) field repair of filament wound ASME Code Section X, Class I vessels shall be limited to corrosion barrier or liner repairs only, provided there is access to the vessel interior. ~~No s~~Structural repairs~~, re-rating, or alterations~~ are allowed for filament wound ASME Code Section X, Class 1 vessels that have an MAWP equal to or greater than ~~200 psig (1.38 MPa)~~ 1500 psi (10.34 MPa) and Class III vessels in accordance with the requirements of S4.19.

S4.6 VESSELS FABRICATED USING ELEVATED TEMPERATURE CURED RESIN SYSTEMS

…
…
…

S4.18 REPAIR AND ALTERATION METHODS
…

S4.19 REPAIR OF HIGH PRESSURE FILAMENT WOUND VESSELS

S4.19.1 Scope

Types of damage that are addressed in this section include abrasion, cuts and scratches, impact, chemical, fire and heat, and weathering.

S4.19.2 Level of damage

- Level 1 damage, up to 0.010 inch, is repairable any time
- Level 2 damage, defined by the manufacturer (or up to 0.050 if not defined), is repairable with the manufacturer's concurrence

- Level 3 damage, defined by the manufacturer (or 0.050 or greater if not defined), is not repairable

Softening of the resin due to chemical attack, or charring due to exposure to fire, ~~are considered to be~~shall be defined as Level 3 damage.

The manufacturer's guidance for assessing damage depth and levels shall be followed if it conflicts with general guidelines in this document.

Table S4.19.2-1 Damage Levels and Assessment

Type of damage	**Definition**				**Comment**
		Level 1 — accept	**Level 2**	**Level 3 — reject**	
Cuts/scratches	A sharp impression where material has been removed or redistributed	When depth is less than 0.010 in	Depth from 0.010 in to the limit defined by the manufacturer, or 0.050 if not defined.	Greater than the limit defined by the manufacturer, or greater than 0.050 if not defined	
Abrasion	An area that is scuffed or worn thinner by rubbing or scraping	When depth is less than 0.010 in	Depth from 0.010 in to the limit defined by the manufacturer, or 0.050 if not defined.	Greater than the limit defined by the manufacturer, or greater than 0.050 if not defined	
Charring/soot	Blackening or browning of an area, burning of an area	Soot only, which washes off	Minor discolouration; manufacturer's recommendation	Charring	
Chemical attack, including stress corrosion cracking	Vessel is subjected to a chemical that softens or dissolves the composite	Residue may be cleaned off, no evidence of softening or dissolving.	Permanent discoloration.	Softening or dissolving of the material, cracking of the composite due to stress and chemical exposure	
Impact	Composite material was struck or hit; the resin has a frosted or smashed appearance	Damaged area is less than 0.20 in^2 and no other damage is apparent	Damage is uncertain, requiring the manufacturer's advice	Permanent deformation of cylinder or liner, evidence of underlying delamination	
Weathering	Composite affected by UV exposure and general weather	Minor gloss loss or chalking, only non-structural materials affected.	Structural laminate affected to a level less than defined by the manufacturer, or 0.050 inch.	Structural laminate affected to a level greater than defined by the manufacturer, or 0.050 inch	

S4.19.3 Thickness considerations

Damage to a depth greater than 5% of the structural laminate thickness is not repairable, and the vessel shall be removed from service. Depth of damage does not include paint thickness, or material designated by the manufacturer as protective (non-structural) rather than structural.

S4.19.4 Impact damage considerations

Impact damage may result in rejection, without possibility of repair, regardless of the measurable depth due to risk of internal fracture or delamination. Impact damage may be characterized by noting permanent deformation, softness or deflection of the surface, or localized surface crazing.

S4.19.5 Assessment of damage depth

All loose fibers and affected resin ~~are to~~shall be removed. This includes material that is softened by actions of chemicals or heat. Confirmation that the material remaining is sound shall be determined by a tap test, Barcol hardness measurement, and/or visual inspection.

S4.19.6 Repair procedure

a) Non-structural material, including paint, shall be removed from any area involved in the repair.
b) Resin used in structural repairs shall be compatible with the resin used to fabricate the vessel.
c) Cloth patches made of glass or carbon fiber may be used in the repair and to cover the repaired area.
    1) Cloth patches shall extend at least 0.5 inches beyond the edge of the repair area, and subsequent layers ~~must~~shall extend at least 0.25 inch beyond the edge of the previous patch.
    2) Total patch thickness shall not be more than 5% of the structural thickness of the original laminate.
d) A layer of fiber wound continuously in the hoop direction may be applied over the repair.
e) Non-structural material may be applied to the repaired area for protection if originally used in the vessel design.
f) The repaired area may be covered with epoxy, polyurethane, or other compatible paint.
g) The repaired area shall be cured at a temperature that will not degrade the resin in the vessel. It may be cured prior to applying any non-structural material or paint.
h) The repair shall be confirmed by either:
    1) A tap test or Barcol hardness measurement conducted on the structural material after cure and prior to applying any non-structural material or paint, or
    2) A Modal Acoustic Emission test, in accordance with Part 2 S10.10, conducted after cure of the structural material
i) A hydrostatic proof test shall be conducted following confirmation of the repair.

S4.19.7 Acceptance of the vessel for return to service

The repair shall meet the repair confirmation requirement (i.e. confirmation of soundness using the tap test or Barcol hardness measurement, or confirmation using MAE). There shall be no delamination of the repaired area resulting from ~~the~~a hydrostatic proof test in accordance with the Design Specification. A vessel that does not meet the requirements of the repair confirmation or hydrostatic proof test shall not be returned to service.

(19) **TABLE 1.5.1**

Form "R" Reports, Records, or Documents	Instructions	Minimum Retention Period
a) Form "R" Reports and supporting records and documentation	The organization performing repairs and alterations shall retain a copy of the completed "R" Form report on file, and all records substantiating the summary of work described in NBIC Part 3, ~~5.12.4.1~~ Tables S9.2 and S9.3 of Supplement 9, Item ~~12~~19, for a minimum of 5 years. When the method of repair described in NBIC Part 3, 3.3.4.8 is used, the record retention period shall be described in b).	5 years
b) Form "R" Report with REPORT OF FITNESS FOR SERVICE ASSESSMENT FORM (NB-403) attached.	When the method of repair described in NBIC Part 3,3.3.4.8 is used, the record retention period shall be for the duration described on the FITNESS FOR SERVICE ASSESSMENT (FFSA) Form required by the repair method and as described in NBIC Part 2, 4.4. Notes: 1. The "R" Certificate Holder should be aware that when used, some of the referenced codes and standards identified in NBIC Part 2,, 1.3 describe requirements for permanent record retention throughout the service life of each equipment item. 2. When the "R" Certificate Holder is not the owner or user of the equipment, the record retention period is limited to the FFSA-results described on line 8 of the Report of Fitness for Service Assessment Form (NB-403).	5 years or as described on line 8 as reported on Form NB-403; whichever period is longer.
c) Continuity records for a welder, welding operator, bonder, or cementing technician.	Minimally, continuity records for a welder, bonder, or cementing technician within the Certificate Holder's quality system shall be described and established at the time of the applicant's initial certificate review and demonstrated at each triennial review required thereafter.	As applicable to the scope of work identified on the *Certificate of Authorization*, the continuity records are subject to review during each National Board triennial certificate review. Continuity records shall be maintained for a minimum of 5 years.

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

5.1 SCOPE

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

(19) 5.2 DOCUMENTATION

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

b) Alterations performed in accordance with the NBIC shall be documented on a Form R-2, *Report of Alteration*, as shown in Supplement S9.3~~this section~~. A Form R-4, *Report Supplement Sheet*, as shown in Supplement S9.5, shall be used as needed to record additional data when the space provided on Form R-2 is not sufficient.

c) The organization performing repairs and alterations shall retain a copy of the completed Form "R" Report on file and all records and documentation substantiating the summary of work as described throughout Section 5, and as identified in the "R" Certificate Holder's Quality System Manual. (19)

5.2.1 PREPARATION OF FORM R-1 REPORT OF REPAIR

a) Using the instructions found ~~at NBIC Part 3, 5.12.4.1~~ in Table S9.2 of Supplement 9, preparation of Form R-1 shall be the responsibility of the "R" Certificate Holder performing the repair.

b) Information describing the scope of work used to repair a pressure-retaining item (PRI) shall be documented on a Form R-1 and extended to a Form R-4 as needed to fully describe the repair activities completed per the instructions ~~at NBIC Part 3, 5.12.4.1~~ in Table S9.2 of Supplement 9.

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

d) The Form R-3, *Report of Parts Fabricated by Welding,* Manufacturer's Data Reports, and Certificates of Compliance described in this section shall be a part of the completed Form R-1 and shall be attached thereto. (19)

5.2.2 PREPARATION OF FORM R-2 REPORT OF ALTERATION

a) Using the instructions found ~~at NBIC Part 3, 5.12.4.2, Initial~~ in Table S9.3 of Supplement 9, initial preparation of Form R-2 shall be the responsibility of the "R" Certificate Holder responsible for the design portion of the alteration. The design organization shall complete and sign the "Design Certification" section of the Form R-2. An Inspector shall indicate acceptance of the design by signing the "Certificate of Design Change Review" section of the Form R-2.

b) The information describing an alteration to a pressure-retaining item shall be identified on Form R-2 with a complete description of the scope of work for physical or non-physical changes. When the scope of work represents a change that will increase the Minimum Required Relieving Capacity (MRRC) of a pressure-retaining item, such as a change in heating surface, Maximum Designed Steaming Capacity (MDSC), or BTU/hr (W) heating capacity, the new MRRC shall be documented on Form R-2 and indicated on the appropriate nameplate of NBIC Part 3, Figure 5.7.5-b or NBIC Part 3, Figure 5.7.5-c.

c) Final preparation of Form R-2, including gathering and attaching supporting reports, shall be the responsibility of the “R” Certificate Holder that performed the construction portion of the alteration. The construction organization shall complete the Form R-2 provided by the design organization, including the “Construction Certification” section of the form. 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. 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.

d) The following shall be attached to and become a part of completed Form R-2:

1) For ASME boilers and pressure vessels, a copy of the original Manufacturer’s Data Report, when available;

2) Form R-3, Report of Parts Fabricated by Welding, Manufacturer’s Partial Data Reports, or Certificates of Compliance, if applicable; and

3) For other than ASME, the manufacturer’s reports (i.e., reports required by the original code of construction, etc.), when available.

5.2.3 PREPARATION OF FORM R-3 REPORT OF PARTS FABRICATED BY WELDING (19)

Using the instructions found ~~at NBIC Part 3, 5.12.4.3~~ in Table S9.4 of Supplement 9, preparation of Form R-3 shall be the responsibility of the “R” Certificate Holder responsible for performing the work.

5.2.4 PREPARATION OF FORM R-4 REPORT SUPPLEMENT SHEET (19)

Using the instructions found ~~at NBIC Part 3, 5.12.4.4~~ in Table S9.5 of Supplement 9, preparation of Form R-4 shall be the responsibility of the “R” Certificate Holder responsible for performing the work.

5.3 DISTRIBUTION OF FORM R-1

a) Legible copies of completed Form R-1, together with attachments, shall be distributed to the owner or user and Jurisdiction, if required, and shall be provided to the Inspector and the inservice Authorized Inspection Agency of the pressure retaining item upon request.

b) Distribution of Form R-1 and attachments shall be the responsibility of the organization performing the repair.

5.4 DISTRIBUTION OF FORM R-2

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

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

5.5 REGISTRATION OF FORMS — GENERAL

a) When registration of the forms are required, the Certificate Holder performing a repair or alteration shall submit the completed form, meeting the requirements of the NBIC, to the National Board.

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

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

5.5.1 REGISTRATION FOR REPAIRS

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

5.5.2 REGISTRATION FOR ALTERATIONS

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

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

5.5.3 REGISTRATION FOR FIBER-REINFORCED VESSELS

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

5.5.4 REGISTRATION FOR NUCLEAR REPAIR/REPLACEMENT ACTIVITIES

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

5.5.5 REGISTRATION FOR GRAPHITE VESSELS

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

(19) 5.6 FORM REGISTRATION LOG

“R” or “NR” Certificate Holders shall maintain a log or multiple logs documenting unique and sequentially numbered Form “R” Reports that are registered with the National Board. The logs shall include, as a minimum, each form’s unique registration number, type (R-1, R-2, NR-1, etc.), description of work performed, date of acceptance by the Authorized Inspection Agency, and date the report was submitted to the National Board.

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.

5.7.2 STAMPING REQUIREMENTS FOR REPAIRS

a) Pressure-retaining items repaired in accordance with the NBIC shall be stamped as required by this section.

b) Subject to the acceptance of the Jurisdiction and the concurrence of the Inspector, nameplates and stamping may not be required for routine repairs (see NBIC Part 3, 3.3.2). In all cases, the type and extent of repairs necessary shall be considered prior to waiving the requirement.

c) Stamping or nameplate shall be applied adjacent to the original manufacturer's stamping or nameplate. A single repair nameplate or stamping may be used for more than one repair to a pressure-retaining item, provided each is carried out by the same certificate holder. The date of each repair, corresponding with the date on associated Form R-1, shall be stamped on the nameplate.

5.7.3 STAMPING REQUIREMENTS FOR ALTERATIONS

Pressure-retaining items altered in accordance with this code shall have a nameplate or stamping applied adjacent to the original manufacturer's stamping or nameplate in accordance with this section. For an alteration where physical changes are made to the pressure-retaining item, the "R" Certificate Holder responsible for the construction portion of the alteration shall apply the stamping or nameplate. For an alteration where no physical changes are made to the pressure-retaining item (e.g., a re-rating) the "R" Certificate Holder, assuming responsibility for the design, shall apply the stamping or nameplate.

5.7.4 STAMPING REQUIREMENTS FOR PARTS

Stamping or nameplate shall be applied in a conspicuous location on the part.

5.7.5 SPECIFIC REQUIREMENTS FOR STAMPING AND NAMEPLATES

a) Required data shall be in characters of at least 5/32 in. (4 mm) high, except that characters for pressure relief valve repair nameplates may be smaller. Markings may be produced by casting, etching, embossing, debossing, stamping, or engraving. The selected method shall not result in any harmful contamination, or sharp discontinuities to, the pressure-retaining item. See NBIC Part 3, Figures 5.7.5–a through 5.7.5-e.

b) The National Board Code Symbols ("R","VR", and "NR") are to be stamped; do not emboss.

c) Stamping directly on items, when used, shall be done with blunt-nose continuous or blunt-nose interrupted dot die stamps. If direct stamping would be detrimental to the item, required markings may appear on a nameplate affixed to the item.

d) The certificate holder shall use its full name as shown on the *Certificate of Authorization* or an abbreviation acceptable to the National Board.

e) The letters "RP" shall be stamped below the "R" Symbol Stamp to indicate organizations accredited for performing repairs or alterations to fiber-reinforced plastic items.

f) The letter "G" shall be stamped below the "R" Symbol Stamp to indicate organizations accredited for performing repairs or alterations to graphite pressure equipment.

g) The subject nameplate shall be securely attached using a method compatible with the structure or stand-off bracket supporting the nameplate, in a manner that will impede easy removal. The method of attaching this nameplate, as permitted by the original code of construction, may include, but is not limited to:

    1) Welding

2) Adhesive, bonding or cementing

3) Tamper-resistant mechanical fasteners of suitable metal construction

FIGURE 5.7.5-a

REQUIRED MARKINGS FOR REPAIRS, WITH USE OF NATIONAL BOARD FORM R-1

REPAIRED BY

CERTIFICATE HOLDER

NATIONAL BOARD "R" CERTIFICATE NUMBER

DATE REPAIRED

FIGURE 5.7.5-b

REQUIRED MARKINGS FOR ALTERATIONS, WITH USE OF NATIONAL BOARD FORM R-2

ALTERED BY

CERTIFICATE HOLDER

M.A.W.P. P.S.I.

AT °F

NATIONAL BOARD "R" CERTIFICATE NUMBER

DATE ALTERED

FIGURE 5.7.5-c

REQUIRED MARKINGS FOR RE-RATINGS, WITH USE OF NATIONAL BOARD FORM R-2

RE-RATED BY

CERTIFICATE HOLDER

M.A.W.P. P.S.I.

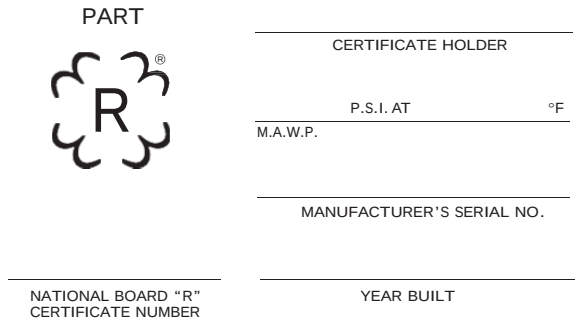
AT °F

NATIONAL BOARD "R" CERTIFICATE NUMBER

DATE ALTERED

FIGURE 5.7.5-d

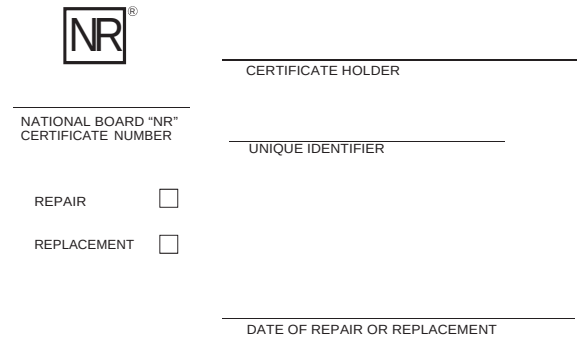
REQUIRED MARKINGS FOR PARTS FABRICATED BY WELDING, WITH USE OF NATIONAL BOARD FORM R-3



Note 1: To be indicated only when changed.

FIGURE 5.7.5-e

REQUIRED MARKINGS FOR NUCLEAR REPAIRS OR REPLACEMENTS



5.8 STAMPING FOR FIBER-REINFORCED VESSELS

The attachment of a nameplate to a repaired or altered vessel or tank shall indicate that work was performed in accordance with requirements of this code. The attachment of a nameplate shall be done only with knowledge and authorization of the Inspector. The certificate holder responsible for repair or alteration shall apply the stamping nameplate. Required stamping and nameplate information are shown in NBIC Part 3, 5.7.

5.8.1 STAMPING FOR REPAIRS

Pressure-retaining items repaired in accordance with the NBIC shall have a nameplate as required by NBIC Part 3, 5.7. Subject to the acceptance of the Jurisdiction and the concurrence of the Inspector, nameplates may not be required for routine repairs (See NBIC Part 3, 5.7.2 b). In all cases, the type and extent of repairs necessary shall be considered prior to waiving the requirement.

5.8.2 STAMPING FOR ALTERATIONS

The nameplate shall be applied in accordance with NBIC Part 3, 5.7. Location of nameplate shall be documented under "Remarks" on NBIC Form R-2 line 9.

5.9 STAMPING REQUIREMENTS FOR YANKEE DRYERS

a) Stamping is not required for repairs that do not affect pressure-retaining capability of the Yankee shell, as indicated on the De-rate Curve, or other pressure-retaining parts, as indicated on the original Manufacturer's Data Report.

b) Stamping is required for repairs that affect pressure-retaining capability of the Yankee Dryer shell, as indicated on the De-rate Curve, or other pressure-retaining parts as indicated on the original Manufacturer's Data Report.

c) Stamping is required for alterations as listed in NBIC Part 3, S5.7.2.

d) Stamping, when required, shall meet the requirements for stamping in NBIC Part 3, 5.7.2. The location of stamping shall be described in the "Remarks" section of Form R-2.

5.10 ALTERNATIVE MARKING AND STAMPING FOR GRAPHITE PRESSURE EQUIPMENT

a) General Requirements

1) This procedure may be used in lieu of the stamping and nameplate requirements defined in this section.

2) The required data as defined in this section shall be 5/32 in. (4 mm) high, minimum.

3) The National Board Code Symbol "R" shall be used to make the impression in the cement.

b) Application of the "R" Code Symbol

1) The graphite surface shall be clean and smooth.

2) Apply a thin coating of cement onto the code part. The cement should have the consistency of toothpaste.

3) Apply sufficient heat to the cement so that it begins to form a skin.

4) Apply a coating of a thinned release agent, such as "anti-seize," to the tip of the "R" stamp with a brush.

5) Press the coated stamp all the way to the bottom of the cement and remove by pulling straight out before the cement hardens.

6) Cure or heat the impression as required.

7) When cured, the part may be washed to remove any excess release agent.

c) Application of characters directly to graphite

1) Use a very thin template of a flexible material (stainless steel; flexible and easily cleaned).

2) Place the template over a clean smooth surface.

3) Hold the template securely and trowel over with approved cement to fill all of the template area.

4) Carefully lift the template from the graphite part and examine the detail of the characters.

5) If acceptable, cure the cement.

6) If the characters are incorrect or damaged, wipe off the cement with a compatible solvent and reapply.

Note: The preceding methods can be applied jointly to identify the graphite part and to transfer the "R" stamp.

5.11 REMOVAL OF ORIGINAL STAMPING OR NAMEPLATE

If it becomes necessary to remove original stamping, the Inspector shall, subject to the approval of the Jurisdiction, witness making of a facsimile of stamping, the obliteration of old stamping, and transfer of stamping to the new item. When stamping is on a nameplate, the Inspector shall witness transfer of nameplate to the new location. Any relocation shall be described on the applicable NBIC "R" Form. The re-stamping or replacement of a code symbol stamp shall be performed only as permitted by the governing code of construction.

~~5.12 REPAIR AND ALTERATION FORMS AND INSTRUCTIONS FOR COMPLETING FORMS~~

~~The following forms may be used for documenting specific requirements as indicated on the top of each form.~~

~~5.12.1 FORM R-1, *REPORT OF REPAIR*, NB-66~~

~~5.12.2 FORM R-2, REPORT OF ALTERATION, NB-229~~

~~5.12.3 FORM R-3, *REPORT OF PARTS FABRICATED BY WELDING*, NB-230~~

~~5.12.4 FORM R-4, *REPORT SUPPLEMENT SHEET*, NB-231~~

~~5.12.4.1 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM R-1 REPORT~~ ~~(19)~~

~~These instructions are to be used when completing the National Board Form R-1, Report of Repairs. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form R-1 shown in NBIC Part 3, 5.12.1. The numbers below correspond to the "circled" numbers shown on the Form R-1. Note that a fillable version of the Form R-1 (NB-66,) is available on the National Board website, www.nationalboard.org.~~

~~1) Initials of the authorized representative of the "R" Certificate Holder.~~

~~2) Initials of the Inspector reviewing the "R" Certificate Holders work.~~

~~3) When registering a Form R-1 Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicate so by "N/A". As described in NBIC Part 3, 5.6, a log shall be maintained identifying sequentially, any Form "R" registered with the National Board.~~

~~4) If applicable, document the unique purchase order, job, or tracking number assigned by the organization performing the work.~~

~~5) The name and address of the National Board "R" Certificate Holder performing the work as it appears on the "*Certificate of Authorization*".~~

~~6) Name and address of the owner of the pressure-retaining item.~~

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

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

9) Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, “unknown.”

10) Document the serial number of the pressure-retaining item if assigned by the original manufacturer. If there is no serial number assigned or is unknown, indicate “unknown.”

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

12) Indicate the jurisdiction number assigned to the pressure retaining item, if available.

13) Indicate any other unique identifying nomenclature assigned to the pressure retaining item by the owner or user.

14) Identify the year in which fabrication/construction of the pressure retaining item was completed.

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

16) Indicate the name, section, division, edition, and addenda (if applicable) of the original code of construction for the pressure-retaining item.

17) Indicate the name, section, division, edition, and addenda (if applicable) of the construction code used for the work being performed. If code cases are used, they shall be identified in the “Remarks” section.

18) Check the repair type performed on the pressure retaining item.

19) Provide a detailed summary describing the scope of work that was completed to a pressure retaining item (PRI). The information to be considered when describing the scope of work should include such items as, the nature of the repair (i.e. welding, bonding, cementing), the specific location of the work performed to the PRI, the steps taken to remove a defect or as allowed by 3.3.4.8 to remain in place, the method of repair described as listed in the examples of Part 3, Section 3 or supplemental section if applicable, and the acceptance testing and or examination method used in accordance with the NBIC. When additional space is required to describe the scope of work, a Form R-4 shall be used and attached (check box). If a FITNESS FOR SERVICE Form (NB-403) is part of the Form R-1 repair package, check box and attach the form. Information determined to be of a proprietary nature need not be included, but shall be stated on the form.

20) Indicate type of pressure test applied (Liquid, Pneumatic, Vacuum, Leak). If no pressure test applied, indicate “none.”

21) Indicate test pressure applied.

22) Indicate maximum allowable working pressure (MAWP) for the pressure retaining item, if known.

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

24) Indicate any additional information pertaining to the work involved (e.g., routine repairs, code cases).

25) When registering a Form R-1 Report with the National Board, this line is solely designated for a unique sequential number assigned by the “R” Certificate Holder. When the “R” Form is not to be registered,

indicate so by “N/A”. As described in NBIC Part 3, 5.6, a log shall be maintained identifying sequentially, any Form “R” registered with the National Board.

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

27) Type or print name of authorized representative of the “R” Certificate Holder attesting to accuracy of the work described.

28) Indicate National Board “R” *Certificate of Authorization* number.

29) Indicate month, day, and year that the “R” *Certificate of Authorization* expires.

30) Record name of “R” Certificate Holder who performed the described work, using full name as shown on the *Certificate of Authorization* or an abbreviation acceptable to the National Board.

31) Signature of “R” Certificate Holder authorized representative.

32) Enter month, day, and year repair certified.

33) Type or print name of Inspector.

34) Indicate Inspector’s Jurisdiction.

35) Indicate Inspector’s employer.

36) Indicate address of Inspector’s employer (city and state or province).

37) Indicate month, day, and year of final inspection by Inspector. For routine repairs this shall be the month, day, and year the Inspector reviews the completed routine repair package.

38) Inspector’s National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.

39) Signature of Inspector.

40) Indicate month, day, and year of Inspector signature

5.12.4.2 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM R-2 REPORT

These instructions are to be used when completing the National Board Form R-2, Report of Alteration. The numbers below correspond to the “circled” numbers depicted on Form R-2 in NBIC Part 3, 5.12.2. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form R-2 Report of Alteration. Note that a fillable version of the Form R-2 (NB-229) is available on the National Board website.

1) Initials of the National Board “R” Certificate of Authorization authorized representative who registers the Form R-2.

2) Initials of the Inspector who certified the completed Form R-2 for registration.

3) When registering a Form R-2 with the National Board, this line is solely designated for a unique sequential number assigned by the “R” Certificate Holder. As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form “R” reports that are registered with the National Board. For rerating only, the Design Organization registers the Form R-2.

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

5) The name and address of the National Board "R" *Certificate of Authorization* holder performing the design as it appears on the "Certificate of Authorization".

6) The name and address of the National Board "R" *Certificate of Authorization* holder performing the construction activity as it appears on the "Certificate of Authorization."

7) Name and address of the owner of the pressure retaining item.

8) Name and address of the plant or facility where the pressure retaining item is installed.

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

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

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

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

13) Indicate the jurisdiction number assigned to the pressure retaining item, if available.

14) Indicate any other unique identifying nomenclature assigned to the pressure retaining item by the owner or user.

15) Identify the year in which fabrication/construction of the pressure retaining item was completed.

16) Indicate edition and addenda of the NBIC under which this work is being performed, as applicable.

17) Indicate the name, section, division, edition, and addenda (if applicable) of the original code of construction for the pressure retaining item.

18) Indicate the name, section, division, edition, and addenda (if applicable) of the construction code used for the work being performed. If code cases are used, they shall be identified in the "Remarks" section.

19) Provide a detailed summary of the scope of design that was performed. When additional space is required to describe the design scope, a Form R-4 shall be used and attached (check box if needed).

20) The information to be considered when describing the construction scope of work should include such items as, the nature of the alteration (i.e. welding, bonding, cementing), the specific location of the work performed to the pressure retaining item, the steps taken to remove a defect or as allowed by NBIC Part 3, Paragraph 3.3.4.8 to remain in place, and the method of alteration described as listed in the examples of NBIC Part 3, Paragraph 3.4.4 or applicable supplement. When additional space is required to describe the construction scope, a Form R-4 shall be used and attached (check box if needed).

21) Indicate type of pressure test applied (liquid, pneumatic, vacuum, leak). If no pressure test applied, indicate "none."

22) Indicate test pressure applied.

23) Indicate maximum allowable working pressure (MAWP) for the pressure retaining item. (As altered)

24) When registering a Form R-2 with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. As described in NBIC Part 3, Paragraph 5.6,

a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board. For rerating only, the Design Organization registers the Form R-2.

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

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

27) Indicate any additional information pertaining to the work involved (e.g. code cases, interpretations used).

28) Type or print name of the National Board "R" *Certificate of Authorization* authorized representative responsible for design certification.

29) Indicate National Board "R" *Certificate of Authorization* number.

30) Indicate month, day, and year that the "R" *Certificate of Authorization* expires.

31) Indicate month, day, and year the alteration was certified.

32) Record the name of National Board "R" *Certificate of Authorization* holder who performed the design portion of the work, using full name as shown on the "*Certificate of Authorization*" or an abbreviation acceptable to the National Board.

33) Signature of National Board "R" *Certificate of Authorization* authorized representative for the design change.

34) Type or print the name of Inspector certifying the design review.

35) Indicate Inspector's Jurisdiction.

36) Indicate Inspector's employer.

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

38) Indicate the month, day and year of the design certification by the Inspector.

39) Signature of the Inspector certifying the design review.

40) Inspectors National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.

41) Type or print name of the National Board "R" *Certificate of Authorization* authorized representative responsible for any construction.

42) Indicate the National Board "R" *Certificate or Authorization* number.

43) Indicate month, day, and year the National Board "R" *Certificate of Authorization* expires.

44) Indicate the date the alteration was certified.

45) Record the name of National Board "R" *Certificate of Authorization* holder who performed the construction portion of the described work, using full name as shown on the *Certificate of Authorization* or an abbreviation acceptable to the National Board.

46) Signature of National Board "R" *Certificate of Authorization* authorized representative.

47) Type or print the name of Inspector certifying the construction inspection.

48) Indicate the Inspector's Jurisdiction.

49) Indicate Inspector's employer.

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

51) Indicate the month, day and year of the final inspection by the Inspector.

52) Indicate the month, day and year the completed Form R-2 was signed by the Inspector.

53) Signature of the Inspector certifying the construction inspection.

54) Inspector's National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.

(19) 5.12.4.3 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM R-3 REPORT

This guide is to be used when completing the National Board Form R-3, Report of Parts Fabricated by Welding. The numbers below correspond to the "circled" numbers shown on the Form R-3 in NBIC Part 3, 5.12.3. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form R-3 Report of Parts Fabricated by Welding. Note that a fillable version of the Form R-3 (NB-230) is available on the National Board website.

1) Initials of the National Board "R" *Certificate of Authorization* authorized representative who registers the Form R-3.

2) Initials of the Inspector who certified the completed Form R-3 for registration.

3) When registering a Form R-3 Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicated so by "N/A". As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board.

4) The name and address of the National Board "R" Certificate Holder who manufactured the welded parts as it appears on the "*Certificate of Authorization.*"

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

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

7) Document name of organization responsible for specifying the code design conditions, if known. If origin of design conditions are not known, state "unknown."

8) Document name of organization responsible for performing the code design, if known. If code design organization is not known, state "unknown."

9) Name, section, and division of the design code, if known. If the design is not known, state "unknown."

10) Indicate code edition year used for fabrication.

11) Indicate code addenda date used for fabrication, if applicable.

12) Indicate the code paragraph reference for formula used to establish the MAWP, if known. If the code reference of the formula is not known, state "unknown."

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

14) Indicate quantity of named parts.

15) Match line number of part references for Identification of Parts in item 5 and the Description of Parts in item 6.

16) Indicate manufacturer's serial number or identification number for the named part.

17) Indicate drawing number for the named part.

18) Indicate maximum allowable working pressure (MAWP) for the part, if known.

19) Indicate test pressure, if applied.

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

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

22) Indicate the complete material specification number and grade.

23) Indicate nominal thickness of plate and minimum thickness after forming.

24) Indicate shape as flat, dished, ellipsoidal, or hemispherical.

25) Indicate minimum thickness after forming.

26) Indicate the complete material specification number and grade for the head or end.

27) Indicate outside diameter.

28) Indicate minimum thickness of tubes.

29) Indicate the complete material specification number and grade for tubes.

30) Indicate any additional information pertaining to the work involved (e.g. code cases). The part manufacturer is to indicate the extent he has performed any or all of the design function. If only a portion of the design, state which portion.

31) When registering a Form R-3 Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicated so by "N/A". As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board.

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

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

34) Indicate National Board "R" *Certificate of Authorization* number.

35) Indicate month, day, and year that the "R" *Certificate of Authorization* expires.

36) Indicate the date the repair was certified.

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

38) Signature of National Board "R" *Certificate of Authorization* authorized representative.

39) Type or print name of Inspector.

40) Indicate Inspector's Jurisdiction.

41) Indicate Inspector's employer.

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

43) Indicate month, day, and year of final inspection by Inspector.

44) Indicate the month, day and year the completed Form "R" was signed by the Inspector.

45) Signature of Inspector.

46) Inspector's National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.

(19) **5.12.4.4 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM R-4 REPORT**

This guide is to be used when completing the National Board Form R-4, Report Supplement Sheet. The numbers below correspond to the "circled" numbers shown on the Form R-4 in NBIC Part 3, 5.12.4. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form R-4, Report Supplement Sheet. Note that a fillable version of the Form R-4 (NB-231) is available on the National Board website.

1) When registering a Form "R" Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicate so by "N/A". As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board. Complete information identical to that shown on the Form "R" to which this sheet is a supplement.

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

3) The name and address of the Certificate Holder performing the work as it appears on the "*Certificate of Authorization.*"

4) Name and address of the owner of the pressure-retaining item.

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

6) Indicate the Form "R" type to which this report is supplementary. Example: Form R-1, Form R-2, Form R-3.

7) Indicate the reference line number from the Form "R" to which this report is supplementary.

8) Complete information for which there was insufficient space on the reference Form "R".

9) Indicate the date certified.

10) Signature of the repair organizations authorized representative.

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

12) Indicate the date the form was completed by the Inspector.

13) Signature of the Inspector.

14) Inspector's National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.

5.12.5 FORM NR-1, *NUCLEAR COMPONENTS AND SYSTEMS IN NUCLEAR POWER PLANTS*, SEE PG. 96

5.12.5.1 GUIDE FOR COMPLETING NATIONAL BOARD FORM NR-1 REPORT OF REPAIR/ REPLACEMENT ACTIVITIES FOR NUCLEAR FACILITIES

This guide is to be used when completing the National Board Form NR-1, Report of Repair/Replacement Activities for Nuclear Facilities. When computer generated, the form shall replicate the content and format of the information depicted on the Form NR-1, Report of Repair/Replacement Activities for Nuclear Facilities.

Title Block: Check type of activity, repair/replacement and/or rerating, as applicable.

Check category of activity, 1, 2, or 3, as described in Part 3, Paragraph 1.6.2.

1) Name and address of the organization, as shown on the National Board "NR" *Certificate of Authorization*, which performed the activity.

2) Indicate NR Form Registration Number.

3) Indicate the repair/replacement plan, job number, etc., as applicable, assigned by the organization that performed the work for traceability to documentation.

4) Name and address of the owner of the nuclear facility.

5) Name and address of the nuclear power plant and, if applicable, identification of the unit.

6) Identify the system or component (e.g., residual heat removal, reactor coolant) with which the repair/ replacement and/or re-rating activity is associated.

7) Identify the original design specification number and revision for the system or component listed in line 4.

8) Identify the original construction code, edition/addenda used for the system or component identified in line 4.

9) NBIC Edition used for performing activities specified on this form.

10) Organization having responsibility for design when there is a change from the original design specification.

11) Identify code edition/addenda used for design, when applicable.

12) Check the type of test conducted (e.g., hydrostatic, pneumatic, system leakage, exempt, or other) and indicate the pressure applied when applicable.

13) Indicate the number of components where work was performed. Each component shall be indicated on page 2 of the form NR-1.

14) Provide a detailed summary describing the scope of work completed. Information to be considered should include type of work (welding, brazing, fusing), location, steps taken for removal or acceptance of defects, examinations, testing, heat treat, and other special processes or methods utilized. If Necessary, attach additional data, sketch, drawing, Form R-4, etc. In the remarks section state if additional data is attached.

15) Indicate any additional information pertaining to the work, including manufacturer's data reports.

16) Number in sequence beginning with No. 1 to identify each component work was performed. This number may be used to correspond with the detailed description of work performed.

17) Identify the type of item. i.e. piping, pump, valve, etc.

18) Identify the manufacturer's name of component.

19) Identify the manufacturer's serial no. or other assigned number for traceability.

20) Identify the National Board registration number, if previously assigned.

21) Identify the code class criteria, as assigned for each component.

22) Identify the code section used to perform work.

23) Identify Code section year and/or addenda used to perform work.

24) Identify any code cases used for work performed.

25) Identify any revisions to be made to the design specifications or if any design reconciliations were performed.

26) Type or print name of authorized representative from the certificate holder.

27) Name of the organization that performed the identified work, using the full name as shown on the *Certificate of Authorization*, or an abbreviation acceptable to the National Board.

28) Indicate code section as applicable to the repair/replacement activity and/or re-rating activity performed.

29) Indicate National Board *Certificate of Authorization* number.

30) Indicate month, day, and year the certificate expires.

31) Signature of authorized representative from the NR certificate holder.

32) Indicate month, day and year of signature by the Authorized Representative.

33) Title of authorized representative as defined in the Quality Program.

34) Type or print name of Authorized Nuclear Inspector.

35) Indicate the Jurisdiction where the activity is performed, when required.

36) Indicate Authorized Nuclear Inspector's employer.

37) Indicate month, day, and year of inspection by the Authorized Nuclear Inspector.

38) Signature of Authorized Nuclear Inspector.

39) Indicate month, day, and year of signature by the Authorized Nuclear Inspector.

40) National Board Commission number and required endorsements.

5.12.6 FORM NVR-1, *NUCLEAR PRESSURE RELIEF DEVICES*, SEE PG. 99

5.12.6.1 GUIDE FOR COMPLETING NATIONAL BOARD FORM NVR-1 REPORT OF REPAIR/REPLACEMENT ACTIVITIES FOR NUCLEAR PRESSURE RELIEF DEVICES

This guide is to be used when completing the National Board Form NVR-1, Report of Repair/Replacement Activities for Nuclear Pressure Relief Devices. When computer generated, the format of the form shall

replicate the type and relative location of the information depicted on the Form NVR-1, Report of Repair/ Replacement Activities for Nuclear Pressure Relief Devices.

Title Block: Check type of activity, repair/replacement, as applicable.

Check category of activity, 1, 2, or 3, as described in Part 3, Paragraph 1.6.2.

1) Name and address of the organization, as shown on the National Board "VR" and "NR" *Certificates of Authorization*, which performed the activity.

2) Indicate NVR Form Registration Number.

3) Indicate the repair/replacement plan number, job number, etc., as applicable for traceability, assigned by the organization that performed the work.

4) Name and address of the organization for which the work was performed.

5) Name and address of the owner nuclear facility.

6) Name and address of the nuclear facility and, if applicable, identification of the unit.

7) Identify the edition, addenda, and as applicable, code cases of the code used for the inservice inspection activity.

8) Identify the edition, addenda, and as applicable, code cases of the code used for the repair/replacement activity.

9) Identify the NBIC edition used for the repair/replacement activity.

10) Identify the organization responsible for design or design reconciliation, if applicable.

11) Indicate the set pressure of the valve.

12) Indicate the blowdown, if applicable, as a percentage of set pressure.

13) Indicate the location of testing.

14) Indicate medium (steam, air, etc.) used for the adjustment of the set pressure and, if applicable, blowdown.

15) Provide a detailed summary describing the scope of work completed. Information to be considered should include type of work (welding, brazing, fusing), location, steps taken for removal or acceptance of defects, examinations, testing, heat treat, and other special processes or methods utilized. If Necessary, attach additional data, sketch, drawing, Form R-4, etc. If additional data is attached, so state in the remarks section.

16) Indicate any additional information pertaining to the work, such as, additional documentation that is attached to this form to further support item 15.

17) Manufacturer's name of the affected item.

18) Describe the type of pressure relief device (e.g., safety valve, safety relief valve, pressure relief valve).

19) Manufacturer's serial number of the affected item.

20) National Board number, if applicable, of the affected item.

21) Indicate the service as steam, liquid, air/gas, etc.

22) Indicate the pressure relief device by inlet size, in inches.

23) Indicate the year the affected item was manufactured.

24) Indicate the name, section and division of the original construction code for the affected item.

25) Indicate the code class for the affected item as applicable, i.e. Class 1, 2 or 3.

26) Indicate the construction code edition for the affected item.

27) Indicate the construction code addenda, as applicable, for the affected item.

28) Indicate any applicable code cases used for manufacturing of the affected item.

29) Name of the replacement part.

30) Identifying number of the replacement part.

31) Number/quantity of each replacement part used.

32) Indicate the Serial number or other traceability used by the manufacturer of the replacement part.

33) Type or print name of authorized representative from the certificate holder.

34) Indicate code as applicable to the repair/replacement activity performed.

35) Indicate National Board *Certificate of Authorization* number, if applicable for the "VR" Stamp.

36) Indicate month, day, and year the certificate expires, if applicable for the "VR" Stamp.

37) Indicate National Board *Certificate of Authorization* number, if applicable for the "NR" Stamp.

38) Indicate month, day, and year the certificate expires, if applicable for the "NR" Stamp.

39) Signature of authorized representative from the certificate holder defined in item 27 above.

40) Indicate month, day, and year of signature by the authorized representative.

41) Title of authorized representative as defined in the Quality Program.

42) Type or print name of Authorized Nuclear Inspector.

43) Indicate the Jurisdiction where the activity is performed, when required.

44) Indicate Authorized Nuclear Inspector's employer.

45) Indicate address of Authorized Nuclear Inspector's employer (city and state or province).

46) Indicate month, day, and year of inspection by the Authorized Nuclear Inspector.

47) Signature of Authorized Nuclear Inspector defined in item 42 above.

48) Indicate month, day, and year of signature by the Authorized Nuclear Inspector.

49) National Board Commission number and required endorsements.

SUPPLEMENT 9
REPAIR AND ALTERATION FORMS AND INSTRUCTIONS FOR COMPLETING FORMS

S9.1 SCOPE

a) This supplement provides requirements and guidelines for completing the following National Board Forms

1) R-1 (Report of Repair, form NB-66)

2) R-2 (Report of Alteration, form NB-229)

3) R-3 (Report of Parts Fabricated by Welding, form NB-230)

4) R-4 (Report Supplement Sheet, form NB-231)

5) NR-1 (Report of Repair/Replacement Activities for Nuclear Facilities, form NB-81)

6) NVR-1 (Report of Repair/Replacement Activities for Nuclear Pressure Relief Devices, form NB-160).

b) Immediately following each of the forms within this supplement is a guide for completing that form. The forms may be used for documenting specific requirements as indicated on the top of each form. The explanations included in the guides are keyed to the forms in the following manner:

1) Circled numbers on each of the forms refer to the items listed on the applicable guide. The parenthesized numbers in the guides correspond to circled numbers on the forms.

2) Numbers without circles appearing in the guides identify specific line or item numbers of the forms.

c) When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the applicable form for the specific requirements as indicated on the top of each form. Note that a fillable version of all forms is available on the National Board website.

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

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 16, (01/28/19)

FORM R-1 REPORT OF REPAIR

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

(1) (Authorized Rep. initials)

(2) (Inspectors initials)

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

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

1. WORK PERFORMED BY: (5) (name of repair organization)

(address)

2. OWNER: (6) (name)

(address)

3. LOCATION OF INSTALLATION: (7) (name)

(address)

4. ITEM IDENTIFICATION: (8) (boiler, pressure vessel, or piping) NAME OF ORIGINAL MANUFACTURER: (9)

5. IDENTIFYING NOS: (10) (mfg. serial no.) (11) (National Board no.) (12) (jurisdiction no.) (13) (other) (14) (year built)

6. NBIC EDITION/ADDENDA: (15) (edition) (addenda)

Original Code of Construction for Item: (16) (name / section / division) (edition / addenda)

Construction Code Used for Repair Performed: (17) (name / section / division) (edition / addenda)

7. REPAIR TYPE: (18) ☐ welded ☐ graphite pressure equipment ☐ FRP pressure equipment ☐ DOT

8. DESCRIPTION OF WORK: (use Form R-4, if necessary) ☐ Form R-4, Report Supplementary Sheet is attached ☐ FFSA Form (NB-403) is attached

(19)

(20) (Liquid, Pneumatic, Vacuum, Leak) Pressure Test, if applied (21) psi MAWP (22) psi

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

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

(23)

10. REMARKS: (24)

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors • 1055 Crupper Avenue, Columbus, Ohio 43229-1183 Page 1 of 2

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 16, (01/28/19)

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

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

CERTIFICATE OF COMPLIANCE

I, (27) , certify that to the best of my knowledge and belief the statements made in this report are correct and that all material, construction, and workmanship on this Repair conforms to the *National Board Inspection Code*. National Board "R" *Certificate of Authorization* No. (28) Expiration date: (29)

Repair Organization: (30)

Signed: (31) (authorized representative)

Date: (32)

CERTIFICATE OF INSPECTION

I, (33) , holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the Jurisdiction of (34) and employed by (35) of (36) , have inspected the work described in this report on (37) , and state that to the best of my knowledge and belief, this work complies with the applicable requirements of the *National Board Inspection Code*. By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage, or loss of any kind arising from or connected with this inspection.

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

Signed: (39) (Inspector)

Date: (40)

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

TABLE S9.2

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

Reference to Circled Numbers in the Form	Description
(1)	Initials of the authorized representative of the "R" Certificate Holder.
(2)	Initials of the Inspector reviewing the "R" Certificate Holders work.
(3)	When registering a Form R-1 Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicate so by "N/A". As described in NBIC Part 3, 5.6, a log shall be maintained identifying sequentially, any Form "R" registered with the National Board.
(4)	If applicable, document the unique purchase order, job, or tracking number assigned by the organization performing the work.
(5)	The name and address of the National Board "R" Certificate Holder performing the work as it appears on the "*Certificate of Authorization*".
(6)	Name and address of the owner of the pressure-retaining item.
(7)	Name and address of plant or facility where the pressure-retaining item is installed.
(8)	Description of the pressure-retaining item, such as boiler or pressure vessel, or piping. Include the applicable unit identification.
(9)	Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, "unknown."
(10)	Document the serial number of the pressure-retaining item if assigned by the original manufacturer. If there is no serial number assigned or is unknown, indicate "unknown."
(11)	When the pressure-retaining item is registered with the National Board, document the applicable registration number. If the pressure-retaining item is installed in Canada, indicate the Canadian design registration number (CRN), and list the drawing number under "other." If the item is not registered, indicate, "none."
(12)	Indicate the jurisdiction number assigned to the pressure retaining item, if available.
(13)	Indicate any other unique identifying nomenclature assigned to the pressure retaining item by the owner or user.
(14)	Identify the year in which fabrication/construction of the pressure retaining item was completed.
(15)	Indicate edition and addenda of the NBIC under which this work is being performed.
(16)	Indicate the name, section, division, edition, and addenda (if applicable) of the original code of construction for the pressure-retaining item.
(17)	Indicate the name, section, division, edition, and addenda (if applicable) of the construction code used for the work being performed. If code cases are used, they shall be identified in the "Remarks" section.

(18) Check the repair type performed on the pressure retaining item.

TABLE S9.2 Cont'd

Reference to Circled Numbers in the Form	Description
(19)	Provide a detailed summary describing the scope of work that was completed to a pressure retaining item (PRI). The information to be considered when describing the scope of work should include such items as, the nature of the repair (i.e. welding, bonding, cementing), the specific location of the work performed to the PRI, the steps taken to remove a defect or as allowed by 3.3.4.8 to remain in place, the method of repair described as listed in the examples of Part 3, Section 3 or supplemental section if applicable, and the acceptance testing and or examination method used in accordance with the NBIC. When additional space is required to describe the scope of work, a Form R-4 shall be used and attached (check box). If a FITNESS FOR SERVICE Form (NB-403) is part of the Form R-1 repair package, check box and attach the form. Information determined to be of a proprietary nature need not be included, but shall be stated on the form.
(20)	Indicate type of pressure test applied (Liquid, Pneumatic, Vacuum, Leak). If no pressure test applied, indicate "none."
(21)	Indicate test pressure applied.
(22)	Indicate maximum allowable working pressure (MAWP) for the pressure retaining item, if known.
(23)	As applicable, identify what Replacement Parts manufactured by welding or bonding were introduced as needed to complete the scope of work. Indicate part, item number, manufacturer's name, stamped identification, and data report type or Certificate of Compliance.
(24)	Indicate any additional information pertaining to the work involved (e.g., routine repairs, code cases).
(25)	When registering a Form R-1 Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicate so by "N/A". As described in NBIC Part 3, 5.6, a log shall be maintained identifying sequentially, any Form "R" registered with the National Board.
(26)	If applicable, document the unique purchase order, job, or tracking number assigned by organization performing work.
(27)	Type or print name of authorized representative of the "R" Certificate Holder attesting to accuracy of the work described.
(28)	Indicate National Board "R" *Certificate of Authorization* number.
(29)	Indicate month, day, and year that the "R" *Certificate of Authorization* expires.
(30)	Record name of "R" Certificate Holder who performed the described work, using full name as shown on the *Certificate of Authorization* or an abbreviation acceptable to the National Board.
(31)	Signature of "R" Certificate Holder authorized representative.
(32)	Enter month, day, and year repair certified.
(33)	Type or print name of Inspector.

(34) Indicate Inspector's Jurisdiction.

(35) Indicate Inspector's employer.

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

TABLE S9.2 Cont'd

Reference to Circled Numbers in the Form	Description
(37)	Indicate month, day, and year of final inspection by Inspector. For routine repairs this shall be the month, day, and year the Inspector reviews the completed routine repair package.
(38)	Inspector's National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.
(39)	Signature of Inspector.
(40)	Indicate month, day, and year of Inspector signature

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

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-229, Rev. 8, (12/07/16)

FORM R-2 REPORT OF ALTERATION

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

(1) (Authorized Rep. initials)

(2) (Inspectors initials)

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

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

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

(address)

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

(address)

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

(address)

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

(address)

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

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

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

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

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

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

(19)

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

(20)

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

This form may be obtained from The National Board of Boiler and Pressure Vessel Inspectors • 1055 Crupper Avenue, Columbus, Ohio 43229-1183 Page 1 of 2

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-229, Rev. 8, (12/07/16)

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

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

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

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

(26)

9. REMARKS: (27)

DESIGN CERTIFICATION

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

Date (31), (32) Signed (33)

(name of design organization) (authorized representative)

CERTIFICATE OF DESIGN CHANGE REVIEW

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

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

Date (38) Signed (39) Commissions (40)

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

CONSTRUCTION CERTIFICATION

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

Date (44), (45) Signed (46)

(name of alteration organization) (authorized representative)

CERTIFICATE OF INSPECTION

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

Date (52) Signed (53) (54)

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

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

TABLE S9.3

GUIDE FOR COMPLETING FORM R-2, REPORT OF ALTERATION, NB-226

Reference to Circled Numbers in the Form	Description
(1)	Initials of the National Board "R" Certificate of Authorization authorized representative who registers the Form R-2.
(2)	Initials of the Inspector who certified the completed Form R-2 for registration.
(3)	When registering a Form R-2 with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board. For rerating only, the Design Organization registers the Form R-2.
(4)	If applicable, document the unique purchase order, job, or tracking number assigned by the organization performing the work.
(5)	The name and address of the National Board "R" Certificate of Authorization holder performing the design as it appears on the "Certificate of Authorization".
(6)	The name and address of the National Board "R" Certificate of Authorization holder performing the construction activity as it appears on the "Certificate of Authorization."
(7)	Name and address of the owner of the pressure-retaining item.
(8)	Name and address of the plant or facility where the pressure-retaining item is installed.
(9)	Description of the pressure-retaining item, such as boiler or pressure vessel, or piping. Include the applicable unit identification.
(10)	Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, "unknown."
(11)	Document the serial number of the pressure-retaining item if assigned by the original manufacturer. If there is no serial number assigned or it is unknown, indicate "unknown."
(12)	When the pressure-retaining item is registered with the National Board, document the applicable registration number. If the pressure-retaining item is installed in Canada, indicate the Canadian design, registration number (CRN), and list the drawing number under "other." If the item is not registered, indicate, "none."
(13)	Indicate the jurisdiction number assigned to the pressure retaining item, if available.
(14)	Indicate any other unique identifying nomenclature assigned to the pressure retaining item by the owner or user.
(15)	Identify the year in which fabrication/construction of the pressure retaining item was completed.
(16)	Indicate edition and addenda of the NBIC under which this work is being performed, as applicable.
(17)	Indicate the name, section, division, edition, and addenda (if applicable) of the

	original code of construction for the pressure-retaining item.
(18)	Indicate the name, section, division, edition, and addenda (if applicable) of the construction code used for the work being performed. If code cases are used, they shall be identified in the “Remarks” section.

TABLE S9.3 Cont'd

Reference to Circled Numbers in the Form	Description
(19)	Provide a detailed summary of the scope of design that was performed. When additional space is required to describe the design scope, a Form R-4 shall be used and attached (check box if needed).
(20)	Indicate type of pressure test applied (liquid, pneumatic, vacuum, leak). If no pressure test applied, indicate "none."
(21)	Indicate test pressure applied.
(22)	Indicate maximum allowable working pressure (MAWP) for the pressure retaining item. (As altered)
(23)	When registering a Form R-2 with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board. For rerating only, the Design Organization registers the Form R-2.
(24)	If applicable, document the unique purchase order, job, or tracking number assigned by organization performing work.
(25)	As applicable, identify what parts manufactured by welding or bonding were introduced as needed to complete the scope of work. Indicate part, item number, manufacturer's name, stamped identification, and data report type or Certificate of Compliance.
(26)	Indicate any additional information pertaining to the work involved (e.g. code cases, interpretations used).
(27)	Type or print name of the National Board "R" *Certificate of Authorization* authorized representative responsible for design certification.
(28)	Indicate National Board "R" *Certificate of Authorization* number.
(29)	Indicate month, day, and year that the "R" *Certificate of Authorization* expires.
(30)	Indicate month, day, and year the alteration was certified.
(31)	Record the name of National Board "R" *Certificate of Authorization* holder who performed the design portion of the work, using full name as shown on the "*Certificate of Authorization*" or an abbreviation acceptable to the National Board.
(32)	Signature of National Board "R" *Certificate of Authorization* authorized representative for the design change.
(33)	Type or print the name of Inspector certifying the design review.
(34)	Indicate Inspector's Jurisdiction.
(35)	Indicate Inspector's employer.
(36)	Indicate type of pressure test applied (liquid, pneumatic, vacuum, leak). If no pressure test applied, indicate "none."
(37)	Indicate address of Inspector's employer (city and state or province).

(38) Indicate the month, day and year of the design certification by the Inspector.

(39) Signature of the Inspector certifying the design review.

TABLE S9.3 Cont'd

Reference to Circled Numbers in the Form	Description
(40)	Inspectors National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.
(41)	Type or print name of the National Board "R" *Certificate of Authorization* authorized representative responsible for any construction.
(42)	Indicate the National Board "R" *Certificate or Authorization* number.
(43)	Indicate month, day, and year the National Board "R" *Certificate of Authorization* expires.
(44)	Indicate the date the alteration was certified.
(45)	Record the name of National Board "R" *Certificate of Authorization* holder who performed the construction portion of the described work, using full name as shown on the *Certificate of Authorization* or an abbreviation acceptable to the National Board.
(46)	Signature of National Board "R" *Certificate of Authorization* authorized representative.
(47)	Type or print the name of Inspector certifying the construction inspection.
(48)	Indicate the Inspector's Jurisdiction.
(49)	Indicate Inspector's employer.
(50)	Indicate address of Inspector's employer (city and state or province).
(51)	Indicate the month, day and year of the final inspection by the Inspector.
(52)	Indicate the month, day and year the completed Form R-2 was signed by the Inspector.
(53)	Signature of the Inspector certifying the construction inspection.
(54)	Inspector's National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.

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

FIGURE S9.4.1
FORM R-3, PAGE 1 OF 2

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

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

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

1. MANUFACTURED BY: (4) (name of "**R**" certificate holder)
(address)
2. MANUFACTURED FOR: (6) (name)
(address)
3. DESIGN CONDITION SPECIFIED BY: (7) CODE DESIGN BY: (8)
4. DESIGN CODE: (9) (10) (11) (12)
5. REPAIR/ALTERATION/MODIFICATION ACTIVITIES

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

6. DESCRIPTION OF PARTS

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

7. REMARKS: (30)

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

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

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

CERTIFICATE OF COMPLIANCE

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

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

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

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

CERTIFICATE OF INSPECTION

I, (39) _____, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the Jurisdiction of (40) _____ and employed by (41) _____ of (42) _____ have inspected the part described in this report on (43) _____, _____ and state that to the best of my knowledge and belief the parts comply with the applicable requirements of the *National Board Inspection Code*.

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

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

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

TABLE S9.4

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

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

(20)	Identify the year in which fabrication/construction of the item was completed.
(21)	Use inside diameter for size: indicate shape as square, round, etc.
(22)	Indicate the complete material specification number and grade.

TABLE S9.4 Cont'd

Reference to Circled Numbers in the Form	Description
(23)	Indicate nominal thickness of plate and minimum thickness after forming.
(24)	Indicate shape as flat, dished, ellipsoidal, or hemispherical.
(25)	Indicate minimum thickness after forming.
(26)	Indicate the complete material specification number and grade for the head or end.
(27)	Indicate outside diameter.
(28)	Indicate minimum thickness of tubes.
(29)	Indicate the complete material specification number and grade for tubes.
(30)	Indicate any additional information pertaining to the work involved (e.g. code cases). The part manufacturer is to indicate the extent he has performed any or all of the design function. If only a portion of the design, state which portion.
(31)	When registering a Form R-3 Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R" Form is not to be registered, indicated so by "N/A". As described in NBIC Part 3, Paragraph 5.6, a log shall be maintained identifying unique and sequentially numbered Form "R" reports that are registered with the National Board.
(32)	If applicable, document the unique purchase order, job, or tracking number assigned by organization performing work.
(33)	Type or print name of authorized representative of the "R" Certificate Holder attesting to accuracy of the work described.
(34)	Indicate National Board "R" Certificate of Authorization number.
(35)	Indicate month, day, and year that the "R" Certificate of Authorization expires.
(36)	Indicate the date the repair was certified.
(37)	Record name of "R" Certificate Holder who performed the described work, using full name as shown on the Certificate of Authorization or an abbreviation acceptable to the National Board.
(38)	Signature of National Board "R" Certificate of Authorization authorized representative.
(39)	Type or print name of Inspector.
(40)	Indicate Inspector's Jurisdiction.
(41)	Indicate Inspector's employer.
(42)	Indicate address of Inspector's employer (city and state or province).
(43)	Indicate month, day, and year of final inspection by Inspector.
(44)	Indicate the month, day and year the completed Form "R" was signed by the Inspector.

(45)	Signature of Inspector.
(46)	Inspector's National Board commission number and endorsement that qualifies the Inspector to sign this report, and when required by the Jurisdiction, the applicable State or Provincial numbers.

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

FIGURE S9.5.1
FORM R-4, PAGE 1 OF 1

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

FORM R-4 REPORT SUPPLEMENT SHEET

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

(1) ______ (form "**R**" referenced)

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

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

______ (address)

2. OWNER: (4) ______ (name)

______ (address)

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

______ (address)

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

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

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

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TABLE S9.5

GUIDE FOR COMPLETING FORM R-4, REPORT SUPPLEMENT SHEET, NB-231

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

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

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

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

CATEGORY OF ACTIVITY: 1 ☐ 2 ☐ 3 ☐

☐ REPAIR/REPLACEMENT ☐ RE-RATING

(2) (NR Form Registration No.)

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

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

(address)

2. OWNER: (4)
(name)

(address)

3. NAME, ADDRESS, AND IDENTIFICATION OF NUCLEAR FACILITY:
(5)
(name)

(address)

(unit identification)

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

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

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

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

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

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

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

11. REMARKS: (15)

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-81, Rev. 8, (03/30/17)

(2) (NR Form Registration No.)

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

WORK PERFORMED BY: (1)

(Name of "NR" certificate holder)

(Address of "NR" certificate holder)

COMPONENT IDENTIFICATION

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

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-81, Rev. 8, (03/30/17)

(**NR** Form Registration No.)

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

CERTIFICATE OF COMPLIANCE

I, (26) _____, employed by (27) _____
certify that to the best of my knowledge and belief the statements made in this report are correct and the repair/replacement activities or re-rating described above conform to (28) _____ and the *National Board Inspection Code* "**NR**" rules.

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

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

Title: (33) _____
(authorized representative)

CERTIFICATE OF INSPECTION

I, (34) _____, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the Jurisdiction of (35) _____ and employed by (36) _____ have inspected the repair/replacement and/or re-rating activities described in this report on (37) _____ and state that to the best of my knowledge and belief, these activities have been completed in accordance with the Code specified and the *National Board Inspection Code* "**NR**" rules.

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

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

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TABLE S9.6

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

Reference to Circled Numbers in the Form	Description
	Title Block: Check type of activity, repair/replacement and/or rerating, as applicable.
	Check category of activity, 1, 2, or 3, as described in Part 3, Paragraph 1.6.2.
(1)	Name and address of the organization, as shown on the National Board "NR" Certificate of Authorization, which performed the activity.
(2)	Indicate NR Form Registration Number.
(3)	Indicate the repair/replacement plan, job number, etc., as applicable, assigned by the organization that performed the work for traceability to documentation.
(4)	Name and address of the owner of the nuclear facility.
(5)	Name and address of the nuclear power plant and, if applicable, identification of the unit.
(6)	Identify the system or component (e.g., residual heat removal, reactor coolant) with which the repair/replacement and/or re-rating activity is associated.
(7)	Identify the original design specification number and revision for the system or component listed in line 4.
(8)	Identify the original construction code, edition/addenda used for the system or component identified in line 4.
(9)	NBIC Edition used for performing activities specified on this form.
(10)	Organization having responsibility for design when there is a change from the original design specification.
(11)	Identify code edition/addenda used for design, when applicable.
(12)	Check the type of test conducted (e.g., hydrostatic, pneumatic, system leakage, exempt, or other) and indicate the pressure applied when applicable.
(13)	Indicate the number of components where work was performed. Each component shall be indicated on page 2 of the form NR-1.
(14)	Provide a detailed summary describing the scope of work completed. Information to be considered should include type of work (welding, brazing, fusing), location, steps taken for removal or acceptance of defects, examinations, testing, heat treat, and other special processes or methods utilized. If Necessary, attach additional data, sketch, drawing, Form R-4, etc. In the remarks section state if additional data is attached.
(15)	Indicate any additional information pertaining to the work, including manufacturer's data reports.
(16)	Number in sequence beginning with No. 1 to identify each component work was performed. This number may be used to correspond with the detailed description of work performed.
(17)	Identify the type of item. i.e. piping, pump, valve, etc.

(18)	Identify the manufacturer's name of component.
(19)	Identify the manufacturer's serial no. or other assigned number for traceability.
(20)	Identify the National Board registration number, if previously assigned.
(21)	Identify the code class criteria, as assigned for each component.
(22)	Identify the code section used to perform work.

TABLE S9.6 Cont'd

Reference to Circled Numbers in the Form	Description
(23)	Identify Code section year and/or addenda used to perform work.
(24)	Identify any code cases used for work performed.
(25)	Identify any revisions to be made to the design specifications or if any design reconciliations were performed.
(26)	Type or print name of authorized representative from the certificate holder.
(27)	Name of the organization that performed the identified work, using the full name as shown on the Certificate of Authorization, or an abbreviation acceptable to the National Board.
(28)	Indicate code section as applicable to the repair/replacement activity and/or re-rating activity performed.
(29)	Indicate National Board Certificate of Authorization number.
(30)	Indicate month, day, and year the certificate expires.
(31)	Signature of authorized representative from the NR certificate holder.
(32)	Indicate month, day and year of signature by the Authorized Representative.
(33)	Title of authorized representative as defined in the Quality Program.
(34)	Type or print name of Authorized Nuclear Inspector.
(35)	Indicate the Jurisdiction where the activity is performed, when required.
(36)	Indicate Authorized Nuclear Inspector's employer.
(37)	Indicate month, day, and year of inspection by the Authorized Nuclear Inspector.
(38)	Signature of Authorized Nuclear Inspector.
(39)	Indicate month, day, and year of signature by the Authorized Nuclear Inspector.
(40)	National Board Commission number and required endorsements.

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

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

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

(2) (NVR Form Registration No.)

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

CATEGORY OF ACTIVITY: 1 ☐ 2 ☐ 3 ☐

☐ REPAIR/REPLACEMENT ☐ RE-RATING

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

(address)

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

(address)

3. OWNER: (5)
(name)

(address)

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

(address)/ (unit identification)

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

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

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

8. DESIGN RESPONSIBILITY: (10)

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

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

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

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

12. REMARKS: (16)

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

(2) (NR Form Registration No.)

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

WORK PERFORMED BY: (1)

(Name of "NR" certificate holder)

(Address of "NR" certificate holder)

PRESSURE RELIEF DEVICE

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

CONSTRUCTION CODE

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

NAME AND IDENTIFYING NUMBER OF REPLACEMENT PARTS

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

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Page 2 of 3

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

_____
(form "**NVR**" registration no.)

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

CERTIFICATE OF COMPLIANCE

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

National Board *Certificate of Authorization* No. (35) _____ to use the "**VR**" stamp expires (36) _____
National Board *Certificate of Authorization* No. (37) _____ to use the "**NR**" stamp expires (38) _____
Date (39) _____ Signed (40) _____ (41) _____
(authorized representative) (title)

CERTIFICATE OF INSPECTION

I, (42) _____, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and certificate of competency, where required, issued by the Jurisdiction of (43) _____ and employed by (44) _____ of (45) _____ have inspected the repair/replacement described in this report on (46) _____ and state that to the best of my knowledge and belief, this repair/replacement has been completed in accordance with the Code specified and the *National Board Inspection Code* "**VR**" & "**NR**" rules.

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

Signed (47) _____ Date (48) _____ (49) _____
(inspector) (National Board and endorsement)

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TABLE S9.7

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

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

(20)	National Board number, if applicable, of the affected item.
(21)	Indicate the service as steam, liquid, air/gas, etc.

TABLE S9.7 Cont'd

Reference to Circled Numbers in the Form	Description
(22)	Indicate the pressure relief device by inlet size, in inches.
(23)	Indicate the year the affected item was manufactured.
(24)	Indicate the name, section and division of the original construction code for the affected item.
(25)	Indicate the code class for the affected item as applicable, i.e. Class 1, 2 or 3.
(26)	Indicate the construction code edition for the affected item.
(27)	Indicate the construction code addenda, as applicable, for the affected item.
(28)	Indicate any applicable code cases used for manufacturing of the affected item.
(29)	Name of the replacement part.
(30)	Identifying number of the replacement part.
(31)	Number/quantity of each replacement part used.
(32)	Indicate the Serial number or other traceability used by the manufacturer of the replacement part.
(33)	Type or print name of authorized representative from the certificate holder.
(34)	Indicate code as applicable to the repair/replacement activity performed.
(35)	Indicate National Board Certificate of Authorization number, if applicable for the "VR" Stamp.
(36)	Indicate month, day, and year the certificate expires, if applicable for the "VR" Stamp.
(37)	Indicate National Board Certificate of Authorization number, if applicable for the "NR" Stamp.
(38)	Indicate month, day, and year the certificate expires, if applicable for the "NR" Stamp.
(39)	Signature of authorized representative from the certificate holder defined in item 27 above.
(40)	Indicate month, day, and year of signature by the authorized representative.
(41)	Title of authorized representative as defined in the Quality Program.
(42)	Type or print name of Authorized Nuclear Inspector.
(43)	Indicate the Jurisdiction where the activity is performed, when required.
(44)	Indicate Authorized Nuclear Inspector's employer.
(45)	Indicate address of Authorized Nuclear Inspector's employer (city and state or province).
(46)	Indicate month, day, and year of inspection by the Authorized Nuclear Inspector.
(47)	Signature of Authorized Nuclear Inspector defined in item 42 above.

(48)	Indicate month, day, and year of signature by the Authorized Nuclear Inspector.
(49)	National Board Commission number and required endorsements.

PART 3, SECTION 11
REPAIRS AND ALTERATIONS — INDEX

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Background for Interpretation 18-100

Task Group PM – David Martinez;

Task Group members: Marty Russel and Nathan Carter

Item Number: 18-100 NBIC Location: Part 3, 3.3.2 Attachment Page 44

General Description: Revision adding (plugging) heat exchanger tubes with an outside diameter of ¾" or smaller to NBIC Part 3.3.2 Routine Repairs

Subgroup: Repairs and Alterations

Task Group: David Martinez (PM)

January 2019 Meeting Action: Progress Report: Mr. Martinez reported on this item and presented interpretations (98-04 and 98-29) that may satisfy the revision request, however after a presentation from TEiC regarding the use of explosive welding of tubes to be considered as a routine repair, Mr. Martinez recommend this be considered progress report to continue working to address explosive welding as a Routine Repair.

3.3.2 ROUTINE REPAIRS

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

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

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

d) Alternative welding methods without postweld heat treatment as described in NBIC Part 3, 2.5.3 shall not be used for routine repairs.

(Example of proposed additional category to examples of Routine Repairs – paragraph e)

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

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

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

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

3) Weld buildup of wasted areas in heads, shells, flanges and fittings not exceeding an area of 100 in.2 (64,520 mm2) or a thickness of 25% of nominal wall thickness or 1/2 in. (13 mm), whichever is less;

4) Corrosion resistance weld overlay not exceeding 100 in.2 (64,520 mm2); ~~and~~

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 postweld heat treatment; and

6) Plugging of heat exchanger tubes ¾ in. outside diameter and smaller when explosive plugging is used as method of plugging tubes.

Background Interpretation

INTERPRETATION 15-04

Subject: Part 3, Section 3

Edition: 2015

Question: Is explosion welding of plugs into leaking heat exchanger tubes considered a repair per the NBIC Part 3?

Reply: Yes.

Support for Consideration of the Proposed Action

ASME Section IX – 2019 (Addresses Procedure and Performance Qualification for Explosion Welding heat exchanger tubes to tubesheets, but not the plug to the tube)

QW-193 TUBE-TO-TUBESHEET TESTS
When the applicable Code Section requires the use of this paragraph for tube-to-tubesheet demonstration mockup qualification, QW-193.1 through QW-193.1.3 shall apply.

QW-193.1 Procedure Qualification Specimens. Ten mockup welds are required for qualifying each tube-to tubesheet welding procedure. The mockup assembly shall essentially duplicate the tube-to-tubesheet weld joint design to be used in production, within the limits of the essential variables of QW-288. The mockup test assembly shall be prepared with the tubesheet element having a thickness not less than the lesser of the thickness of the production tubesheet or 2 in. (50 mm). For tube-to-tubesheet welds to clad tubesheets, the cladding or overlay may be represented by a base material with a chemical composition that is essentially equivalent to the cladding composition. All welds in the mockup assembly shall be subjected to the following tests and shall meet the applicable acceptance criteria.

QW-193.1.1 Visual Examination. The accessible surfaces of the welds shall be examined visually with no magnification required. The welds shall show complete fusion, be free from visual cracks or porosity indications,
and have no evidence of burning through the tube wall.

QW-193.1.2 Liquid Penetrant. The liquid penetrant examination shall meet the requirements of Section V, Article 6. The weld surfaces shall meet the requirements of QW-195.2.

QW-193.1.3 Macro-Examination. The mockup welds shall be sectioned through the center of the tube for macro-examination. The four exposed surfaces shall be smoothed and etched with a suitable etchant (see QW-470) to give a clear definition of the weld and heat-affected zone. Using a magnification of 10X to 20X, the exposed cross sections of the weld shall confirm
(a) minimum leak path dimension required by the design
(b) no cracking
(c) complete fusion of the weld deposit into the tubesheet and tube wall face

Table QW-288.2
Essential Variables for Procedure Qualification of Tube-to-Tubesheet Welding (Explosion Welding)

Paragraph		Brief of Variables
QW-403 Base Metals	.35	ϕ Tube thickness
QW-410 Technique	.82	ϕ Pressure application
	.83	ϕ Explosive
	.84	ϕ Distance charge to tubesheet
	.85	ϕ Specified clearance

Legend:
ϕ Change

QW-410.83 A change in the type of explosive or a change in the energy content greater than ±10%.

QW-410.84 A change in the distance between the explosive charge and the tubesheet face greater than ±10%.

QW-410.85 A change in the specified clearance between the tube and the tubesheet greater than ±10%.

QW-193.2 Performance Qualification Specimens.
A minimum of five mockup tube-to-tubesheet welds are required to qualify each welder or welding operator. The same rules as those applicable for procedure qualification (QW-193.1) shall be followed, with the following additional requirements and exceptions:
(a) The essential variables in QW-387 shall apply.
(b) Essential performance qualification variables applicable for each welding process listed in QW-350 or QW-360 shall also be observed in addition to the variables of Table QW-388.
(c) Postweld heat treatment may be omitted.

Only one mockup weld is required to renew a welder's or welding operator's qualification when that qualification has expired or has been revoked per the requirements of QW-322.1.

Logic to consider motion for approval:

- Explosion welding to plug leaking tubes is supported by qualified written welding procedures and welder qualification procedures compared to other mechanical tube-plugging methods that are performed with no NBIC guidance.
- Explosion welding does not rely on fusion to join the two materials. It is a pressure weld in which the explosive force joins the two materials. Unlike fusion welding that is allowed in other examples of Routine Repairs, there is no heat affected zone, and PWHT is not needed nor required.
- The majority, if not all explosion tube plugging is performed on tubes ¾" and smaller, and typically under emergency conditions. No Inspector involvement would be required if this specific category was added to the categories of Routine Repairs
- The explosion tube-plugging method for tubes ¾" and smaller would be more cost and schedule effective and is proven to be a reliable method for plugging leaking heat exchanger tubes for owners and users.

Note: The only realistic test upon completion of explosion tube-plugging is a pressure test.

Item 19-16: NBIC Part 3, 3.2.2 e)
Submitted by: Eben Creaser eben.creaser@gnb.ca

Explanation of Need: This wording of this clause is causing confusion. I have had multiple instances where owners have requested to purchase welded replacement parts directly and read this clause with the belief that they can purchase a replacement part for in some cases a welded pressure part for an ASME Section I boiler and safe money by having the fabricator not Hydro test as per Section I even when it was not impractical to have the testing performed.

Background Information: The second sentence of 3.2.2 seems to provide optional provisions that contradict the mandatory requirement stated in the first sentence that requires 3.2.2 c) or d) parts to be pressure tested by the original code of construction. If this is the intent of the committee then the clause should be reworded to add an "or" between the sentences. The wording could also be understood to mean that all parts addressed in 3.2.2 c) or d) have to be pressure tested. But then the second sentence alludes to an optional requirement, it's just not clear.

Proposed Text:
If the intent of this clause is to provide optional pressure test requirements for parts then;

e) Replacement parts addressed by 3.2.2 c) or d) above shall receive a pressure test as required by the original code of construction prior to installation, or, when accepted by the owner, the Inspector and, where required, the Jurisdiction, parts ~~. If replacement parts have not been pressure tested as required by the original code of construction prior to installation they~~ may be installed without performing the original code of construction pressure test provided the owner, the Inspector and, when required, the Jurisdiction accept the use of one or a combination of the examination and test methods shown in Part 3, Section 4, paragraph 4.4.1 (for repairs) or 4.4.2 (for alterations). The R Certificate Holder responsible for completing the R Form shall note in the Remarks section of the R Form the examination(s) and test(s) performed, and the reason the replacement part was not tested in accordance with the original code of construction.

Item 19-82: Request for Revision to NBIC Part 3, 1.5.1 j)

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Purpose	Safety is not addressed in Part 3. This verbiage could be added to the 1.5.1 j) Method of Performing Work paragraph so Certificate Holders can address the safety concerns specific to their scope of activities.
Scope:	Part: Repairs and Alterations; Section: 1.5.1; Paragraph: 1.5.1 j)
Background:	Safety concerns from confined space issues, to flammable or volatile vessel contents should be addressed in Part 3 to ensure that welders, Inspectors, and other personnel are not put at unnecessary risk during Repair/Alteration activity.
Proposed Revision:	See below for the proposed revision

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

h) Repair and Alteration Methods

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

i) Materials

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

j) Method of Performing Work

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

k) Welding, NDE and Heat Treatment

The manual shall describe controls for welding, nondestructive examination (NDE), and heat treatment. The manual is to indicate the title of the individual(s) responsible for the welding procedure specification (WPS) and its qualification, and the qualification of welders and welding

ITEM 20-06: Update Clause 2.3 and Table 2.3

2.3 STANDARD WELDING PROCEDURE SPECIFICATIONS (SWPSs)

a) One or more SWPSs from NBIC Part 3, Table 2.3 may be used as an alternative to one or more WPS documents qualified by the organization making the repair or alteration, provided the organization accepts by certification (contained therein) full responsibility for the application of the SWPS in conformance with the Application as stated in the SWPS. When using SWPSs, all variables listed on the Standard Welding Procedure are considered essential and, therefore, the repair organization cannot deviate, modify, amend, or revise any SWPS. US Customary Units or metric units may be used for all SWPSs in NBIC Part 3, Table 2.3, but one system shall be used for application of the entire SWPS in accordance with the metric conversation table 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.

1) Reaffirmed SWPSs: When reaffirmation occurs without revision to the SWPS, the letter R is added to the SWPS designation.

2) Amended SWPSs: When an amendment occurs the suffix “AMD1” is added to the SWPS designation. Amendments are issued when essential for the prompt correction of an error that could be misleading. Amendments are incorporated into the existing text of the SWPS, which is reprinted and clearly marked as incorporating an amendment(s), and which is identified in the revised Foreword of the amended SWPS.

3) Revised SWPSs: When a revision to a published SWPS occurs, the publication date is added to the SWPS designation. The date of the superseded SWPS is also noted on the cover page. Previous versions of the superseded SWPS may be used at the option of the R Certificate holder.

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

ITEM 20-06: Update Clause 2.3 and Table 2.3

TABLE 2.3

CARBON STEEL- (P1/M1 MATERIAL)

SMAW — Shielded Metal Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel, (M-1/P-1, Group 1 or 2), 3/16 in. through 3/4 in., As- Welded Condition, With Backing, Primarily Plate and Structural Applications.	B2.1-1-001: 2018
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, E7018, As-Welded or PWHT Condition, Primarily Plate and Structural Applications.	B2.1-1-016: 2018
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, E6010, As-Welded or PWHT Condition, Primarily Plate and Structural Applications.	B2.1-1-017: 2018
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, E6010 (Vertical Uphill) followed by E7018, As-Welded or PWHT Condition, Primarily Plate and Structural Applications.	B2.1-1-022: 2018
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, E6010 (Vertical Downhill) followed by E7018, As-Welded or PWHT Condition, Primarily Plate and Structural Applications.	B2.1-1-026: 2018
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3mm) through 3/4 in. (19 mm) Thick, E6010 (Vertical Uphill) followed by E7018, (Vertical Uphill) in the As-Welded Condition, Primarily Pipe Applications.	B2.1-1-201: 2019
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3 mm) through 3/4 in. (19 mm) Thick, E6010 (Vertical Downhill) followed by E7018 (Vertical Uphill), in the As-Welded Condition, Primarily Pipe Applications.	B2.1-1-202: 2019
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3 mm) through 3/4 in. (19 mm) Thick, E6010 (Vertical Uphill), In the As-Welded Condition, Primarily Pipe Applications.	B2.1-1-203: 2019
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3 mm) through 3/4 in. (19 mm)Thick, E6010 (Vertical Downhill Root with balance Vertical Uphill), in the As-Welded Condition, Primarily Pipe Applications.	B2.1-1-204: 2019
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3 mm) through 1 ½ in. (38 mm) Thick, E6010 (Vertical Uphill) followed by E7018 (Vertical Uphill), in the As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-205:2019
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3 mm) through 1-1/2 in. (38 mm) Thick, E6010 Vertical Downhill) followed by E7018 (Vertical Uphill), in the As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-206:2019
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3 mm) through 1 ½ in. (38 mm) Thick, E7018, in the As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-208: 2019

ITEM 20-06: Update Clause 2.3 and Table 2.3

GTAW — Gas Tungsten Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel, (M-1/P-1, Group 1 or 2), 3/16 in. through 7/8 in. Thick, in the As-Welded Condition, With or Without Backing, Primarily Plate and Structural Applications.	B2.1-1-002: 2006
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1, Group 1 or 2), 1/8 in. (3 mm) through 1 ⅛in. (38 mm) Thick, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Application.	B2.1-1-207: 2019
Standard Welding Procedure Specification for Gas Tungsten Arc Welding with Consumable Insert Root of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1-1/2 in. Thick, INMs-1, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-210: 2012

FCAW — Flux Core Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Self-Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, E71T-8, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-1-018: 2005
Standard Welding Procedure Specification for CO2 Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, E70T-1 and E71T-1, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-1-019: 2018
Standard Welding Procedure Specification for 75% Ar/25% CO2 Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1-1/2 in. Thick, E70T-1M and E71T-1M, As-Welded or PWHT Condition, Primarily Plate and Structural Applications.	B2.1-1-020: 2018
Standard Welding Procedure for Self-Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1 Group 1 or 2), 1/8 in. (3 mm) through 1/2 in. (13 mm) Thick, E71T-11, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-1-027: 2018
Standard Welding Procedure Specification (SWPS) for Argon Plus 25% Carbon Dioxide Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 and 2), 1/8 in. through 1 ½ in. Thick, E7XT-XM, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-234: 2006

GMAW – Gas Metal Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Argon Plus 25% Carbon Dioxide Shielded Gas Metal Arc Welding (Short Circuiting Transfer Mode) followed by Argon Plus 2% Oxygen Shielded Gas Metal Arc Welding (Spray Transfer Mode) of Carbon Steel (M-1/P-1/S-1, Groups 1 and 2), 1/8 in. through 1 ½ in. Thick, ER70S-3, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-233: 2006
Standard Welding Procedure Specification for Argon Plus 2% Oxygen Shielded Gas Metal Arc Welding (Spray Transfer Mode) of Carbon Steel (M-1/P-1/S-1, Groups 1 and 2), 1/8 in. through 1 ½ in. Thick, ER70S-3, Flat Position Only, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-235: 2006

ITEM 20-06: Update Clause 2.3 and Table 2.3

GTAW/SMAW Combination of Welding Processes	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, ER70S-2 and E7018, As-Welded or PWHT Condition, Primarily Plate and Structural Applications.	B2.1-1-021: 2018
Standard Welding Procedure Specification for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Groups 1 or 2), 1/8 in. (3 mm) through 1 ½ in. (38 mm) Thick, ER70S-2 and E7018, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-209: 2019
Standard Welding Procedure Specification for Gas Tungsten Arc Welding with Consumable Insert Root Followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. through 1 ½ in. Thick, INMs-1, ER70S-2, and E7018 As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-211: 2012

GMAW/FCAW – Combination of Welding Processes	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Argon Plus 25% Carbon Dioxide Shielded Gas Metal Arc Welding (Short Circuiting Transfer Mode) Followed by Argon Plus 25% Carbon Dioxide Shielded Flux Cored Arc Welding of Carbon Steel (m-1/P-1/S-1, Groups 1 and 2), 1/8 in. through 1 ½ in. Thick, ER70S-3 and EXT-X, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-232: 2006

Austenitic Stainless Steel — (M8/P8 Materials)

SMAW — Shielded Metal Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. through 1½ in. Thick, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-8-023: 2018
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in through 1½ in. Thick, E3XX-XX, As-Welded Condition, Primarily Pipe Application.	B2.1-8-213: 2012

GTAW — Gas Tungsten Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. through 1 ½ in. Thick, ER3XX, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-8-024: 2012
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. through 1 ½ in. thick, ER3XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-212: 2012

ITEM 20-06: Update Clause 2.3 and Table 2.3

Standard Welding Procedure Specification for Gas Tungsten Arc Welding With Consumable Insert Root of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. through 1 ½ in. Thick, IN3XX and ER3XX As-Welded Condition, Primarily Pipe Applications.	B2.1-8-215: 2012

Combination Processes GTAW/SMAW	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. through 1 ½ in. Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-8-025: 2012
Standard Welding Procedure Specification for Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. through 1 ½ in. Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-214: 2012
Standard Welding Procedure Specification for Gas Tungsten Arc Welding with Consumable Insert Root followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. through 1 ½ in. Thick, IN3XX, ER3XX, and E3XX-XX As-Welded Condition, Primarily Pipe Applications.	B2.1-8-216: 2012

Combination of Carbon Steel (M-1/P-1 Material) To Austenitic Stainless Steel (M-8/P-8 Material)

SMAW — Shielded Metal Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specifications for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. through 1 ½ in. Thick, E309 (L)-15, -16, or -17, As-Welded Condition, Primarily Pipe Applications.	B2.1-1/8-228: 2013

GTAW — Gas Tungsten Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1 ½ in. Thick, ER309(L), As-Welded Condition, Primarily Pipe Applications.	B2.1-1/8-227: 2013
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding with Consumable Insert Root of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1½ in. Thick, IN309 and ER309(L), As-Welded Condition, Primarily Pipe Applications.	B2.1-1/8-230: 2013

ITEM 20-06: Update Clause 2.3 and Table 2.3

GTAW/SMAW Combination of Welding Processes	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1,Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in through 1½ in. Thick, ER309 (L) and E309 (L)-15, -16, or -17, As-Welded Condition, Primarily Pipe Applications.	B2.1-1/8-229: 2013
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding with Consumable Insert Root followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 In. through 1½ in. Thick, IN3009, ER309, and E309-15, -16, or -17 or IN309, ER309 (L) and ER309 (L)-15, -16, or -17, As-Welded Condition, Primarily Pipe Applications.	B2.1-1/8-231: 2015

Chromium Molybdenum Steel (M4/P4 and M5A/P5A Materials)

SMAW — Shielded Metal Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specifications for Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), E8018-B2, 1/8 in. through 1 ½ in. Thick, As-Welded Condition, 1/8 in. through 1½ in. Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-4-218: 2009
Standard Welding Procedure Specifications for Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), E9018-B3, 1/8 in. through 1 ½ in. Thick, As-Welded Condition, 1/8 in. through 1½ in. Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-5A-223: 2009

GTAW — Gas Tungsten Arc Welding	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), ER80S-B2, 1/8 in. through 1 ½ in. Thick, As-Welded Condition, 1/8 in. through ¾ in. Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-4-217: 2009
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) of Chromium-Molybdenum Steel (M-4/P-4, Group 1 or 2), E8018-B2, 1/8 in. through 1 ½ in. Thick, As-Welded Condition, 1/8 in. through ¾ in. Thick, PWHT Condition, IN515 and ER80S-B2, Primarily Pipe Applications.	B2.1-4-220: 2009
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), ER90S-B3, 1/8 in. through 1½ in. Thick, As-Welded Condition, 1/8 in. through 3/4 in. (19 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-5A-222: 2009

ITEM 20-06: Update Clause 2.3 and Table 2.3

Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) of Chromium-Molybdenum Steel (M-5A/P-5A), 1/8 in. through 1-1/2 in. Thick, As-Welded Condition, 1/8 in. through 3/4 in. Thick, PWHT Condition, IN521 and ER90S-B3, Primarily Pipe Applications.	B2.1-5A-225: 2009

GTAW/SMAW Combination of Welding Processes	
TITLE	**DESIGNATION: YEAR**
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) followed by Shielded Metal Arc Welding of Chromium- Molybdenum Steel (M-4/P-4, Group 1 or 2), 1/8 in. through 1-1/2 in. Thick, As-Welded Condition, 1/8 in. through 1 ½ in. Thick, PWHT Condition, IN515, ER80S-B2, and E8018-B2, Primarily Pipe Applications.	B2.1-4-221: 2009
Standard Welding Procedure Specifications (SWPS) for Gas Tungsten Arc Welded followed by Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-4A/P-4, Group 1 or 2), 1/8 in. through 1/2 in. Thick, As-Welded Condition, 1/8 in. through 1 ½ in. Thick, PWHT Condition, ER80S-B2 and E8018-B2, Primarily Pipe Applications.	B2.1-4-219: 2009
Standard Welding Procedure Specifications for Gas Tungsten Arc Welded followed by Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), 1/8 in. through 1 ½ in. Thick, As-Welded Condition, 1/8 in. through 1 ½ in. Thick, PWHT Condition, ER90S-B3 and E9018-B3, Primarily Pipe Applications	B2.1-5A-224: 2009
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) followed by Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), 1/8 in. through 1 ½ in. Thick, As- Welded Condition, 1/8 in. through 1 ½ in. Thick, PWHT Condition, IN521, ER90S-B3, and E9018-B3, Primarily Pipe Applications.	B2.1-5A-226: 2009

Item 20-7

Routine repairs of Div.2 & or Div.3 vessels

Part 3, 3.3.2 a)

Submitted by: Paul Shanks

Explanation of Need: An interpretation is scheduled to be issued under item number 19-26 asserting that Routine repairs are not to be used on Div.2 or Div.3 vessels. Rather than require review of an interpretation which may expire in two years the body of the code should make it clear that Routine repairs are not compatible with div.2 or div.3 vessels.

Background Information: 3.3.5.2 b) makes clear that an Inspector will make the acceptance inspection and sign the R1, the provision in 3.3.2 to waive the AI involvement or routine repairs is simply not applicable.

Proposed Change:

3.3.2 ROUTINE REPAIRS

a) Routine repairs are repairs for which the requirements for in-process involvement by the Inspector and stamping by the "R" Certificate Holder may be waived as determined appropriate by the Jurisdiction and the Inspector. As such routine repairs are not acceptable for ASME Section VIII Div.2 or Div. 3 vessels. All other applicable requirements of this code shall be met. Prior to performing routine repairs, the "R" Certificate Holder should determine that routine repairs are acceptable to the Jurisdiction where the pressure-retaining item is installed;

Item 20-9

Define "Verify" in the NBIC Glossary

Part 3, 9.1

Submitted by: Terry Hellman

Explanation of Need: Defining "Verify" in the NBIC Part 1, 2, 3, and 4 to align with the definition in NB-263, RCI-1, Rules for Commissioned Inspectors.

Background Information: The need for the definition of "verify" was initiated from Interpretation Item 18-03, which addresses which Inspector (i.e. “IS” Commissioned or “R” Endorsement) signs the FFSA Form NB-403 when an “R” Certificate Holder is involved with a repair in that region as well as determine what level of review of the Fitness-for-Service the Inspector is expected to complete.

Proposed Change:

9.1 DEFINTIONS

Verify – To determine that a particular action has been performed in accordance with the requirements either by witnessing the action or reviewing records.

Item 20-15

Stamping requirements for routine repairs

Part 3, 3.3.2 & 5.7.2 b)

Submitted by: Kathy Moore

Explanation of Need: This would offer traceability to the R-Stamp holder responsible for the work.

Background Information: Requested by the Chief of Texas.

Proposed Change:

3.3.2 ROUTINE REPAIRS

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

5.7.2 STAMPING REQUIREMENTS FOR REPAIRS

a) Pressure-retaining items repaired in accordance with the NBIC shall be stamped as required by this section.

~~b) Subject to the acceptance of the Jurisdiction and the concurrence of the Inspector, nameplates and stamping may not be required for routine repairs (see NBIC Part 3, 3.3.2). In all cases, the type and extent of repairs necessary shall be considered prior to waiving the requirement.~~

~~c~~b) Stamping or nameplate shall be applied adjacent to the original manufacturer's stamping or nameplate. A single repair nameplate or stamping may be used for more than one repair to a pressure-retaining item, provided each is carried out by the same certificate holder. The date of each repair, corresponding with the date on associated Form R-1, shall be stamped on the nameplate.

Item 20-16
Part 3, 3.4.4
Submitted by: Paul Shanks

Explanation of Need: ASME Section VIII Div.1 Mandatory Appendix 44 paragraph 44-6.2(g) clearly sets out that a vessel built to those rules needs to be re-stretched, having had repair welding. It is not clear if ASME is referring to in process (at the original manufactures location) repairs or post construction repairs. However, the NBIC is currently silent on this and this potential issue should be addressed.

Background Information: ASME Section VIII Div.1 Mandatory Appendix 44 establishes rules that allow a vessel to be designed and built for use at low temperatures using allowable stresses which are higher than would normally be allowed at 'room temperature'. The condition for doing so is that said vessels are subject to a pre-stressing operation that actually stretches the base material. The use of these higher stresses is contingent on certain design and manufacturing criteria.

Proposed Change:
3.4.4 EXAMPLES OF ALTERATIONS

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

b) A decrease in the minimum temperature;

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

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

e) In a boiler, Heat Recovery Steam Generator (HRSG), or Pressure Retaining Item (PRI), an increase in the steaming capacity by means of increasing heating surface, total heat input, firing rate, adjustment, or other modification to the primary or auxiliary heat source, resulting in the steaming capacity exceeding the original Manufacturer's Minimum Required Relieving Capacity (MRRC) as described on the nameplate and or Manufacturer's Data Report (MDR);

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

g) Except as permitted in NBIC Part 3, 3.3.3 s); replacement of a pressure retaining part in a pressure retaining item with a material of different allowable stress or nominal composition from that used in the original design;

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

i) The replacement of a pressure relieving device (PRD) as a result of work completed on a pressure-retaining item (PRI) that changes the resultant capacity to exceed the minimum required relieving capacity (MRRC) required by the original code of construction as described on the original Manufacturer's Data Report;

j) For plate heat exchangers, in addition to the applicable examples of alterations above, the following changes from what is listed on the MDR or described on the Original Equipment Manufacturer's (OEM)-drawing:

1) For heat transfer plates:
   a. A change in material grade or nominal thickness;
   b. A reduction in number beyond any minimum, or when no minimum is specified;
   c. An increase in number beyond any maximum, or when no maximum is specified;
   d. A change in model type;

2) Any change in material whether described at 3.3.3 s) or as described at 3.4.4 g):
   a. A change in connection bolt or frame compression bolt diameter or material grade;

k) Performing postweld heat treatment where none was originally performed on the pressure retaining item; ~~and~~

l) The installation of a welded leak box~~.~~; and

m) Welding on a vessel marked with the cold stretching 'CS' mark without subsequent renewed cold stretching operating witness by the Inspector.

Item 20-20

Revision to Part 3, 3.2.2 e)

Part 3, 3.2.2 e)

Submitted by: Eric Feeney – efeeney@teiservices.com

Explanation of Need: The certificate holder should not have to explain or justify why a part was not pressure tested in the manufacturing stage. PG-106.8 of Section I allows the part to be fabricated and shipped as such therefore no explanation should be required.

Background Information: The certificate holder is rarely the supplier of the replacement parts. Parts are typically supplied by the owner or OEM. The current wording places the onus on the certificate holder to explain why the parts were not tested in accordance with the original code of construction. (Section I for the inquirer) The reason is most likely a cost savings to the supplier and even if it was, the certificate holder has no authority to rectify this. My company, for one, takes ownership of the parts at the time of receipt inspection at the site of installation.

Proposed Change:

3.2.2 REPLACEMENT PARTS

e) Replacement parts addressed by 3.2.2 c) or d) above shall receive a pressure test as required by the original code of construction. If replacement parts have not been pressure tested as required by the original code of construction prior to installation they may be installed without performing the original code of construction pressure test provided the owner, the Inspector and, when required, the Jurisdiction accept the use of one or a combination of the examination and test methods shown in Part 3, Section 4, paragraph 4.4.1 (for repairs) or 4.4.2 (for alterations). The R Certificate Holder responsible for completing the R Form shall note in the Remarks section of the R Form the examination(s) and test(s) performed~~, and the reason the replacement part was not tested in accordance with the original code of construction.~~.

Subject: NBIC Part 3, Qualification of Weld Procedures by Multiple Organizations

Proposal: To add words to 2.2.1 permitting simultaneous qualification of weld procedures by more than one organization.

Explanation: Cost of qualification of weld procedures can represent a considerable cost for a manufacturer for labor, materials, testing etc. Further, when new materials are being introduced to the industry, availability can be extremely limited. Section IX will introduce new rules (already board approved) under item 18-555 (provided in the background information), which provides the framework to allow multiple organizations to supervise the welding of a single test coupon. The rules only permit this when it is expressly permitted by the referencing code. This proposal intends to add words to 2.2.1 of Part 3 to allow Manufacturers to take advantage of the new rules coming to Section IX.

Such testing sessions have already taken place, organized by EPRI, for qualification of repair procedures for Welding Method 6 and Supplement 8.

Current Wording	Proposed Wording
2.2.1 PROCEDURE SPECIFICATIONS A procedure specification is a written document providing direction to the person applying the material joining process. Welding, brazing and fusing shall be performed in accordance with procedure specifications for welding (WPS), brazing (BPS), and fusing (FPS) qualified in accordance with the original code of construction or the construction standard or code selected. When this is not possible or practicable, the procedure specification may be qualified in accordance with ASME Section IX.	**2.2.1 PROCEDURE SPECIFICATIONS** A procedure specification is a written document providing direction to the person applying the material joining process. Welding, brazing and fusing shall be performed in accordance with procedure specifications for welding (WPS), brazing (BPS), and fusing (FPS) qualified in accordance with the original code of construction or the construction standard or code selected. When this is not possible or practicable, the procedure specification may be qualified in accordance with ASME Section IX. Welding procedures may be simultaneously qualified by more than one organization under the rules of ASME Section IX QG-106.4, provided that each organization accepts full responsibility for any such qualifications and complies with the other requirements of Section IX for documentation of welding records. The manufacturer's or assembler's written quality control program shall include requirements for addressing the rules of Section IX QG-106.4.