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THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD SUBGROUP REPAIRS AND ALTERATIONS

MINUTES

Meeting of July 17th, 2018
Columbus, OH

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The National Board of Boiler & Pressure Vessel Inspectors
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1. **Call to Order**
   The meeting was called to order at 8:00 a.m. on July 17, 2018 by Chairman, Mr. Brian Boseo.

2. **Introduction of Members and Visitors**
   The attendees are identified on the attendance sign in sheet (**Attachment Pages 1-2**). With the attached attendance listing, a quorum was established.

3. **Announcements**
   Announcements were made to the subgroup by Mr. Terrence Hellman.
   - Items not approved at Main Committee this week will not make the 2019 Edition of the NBIC.

   .
   - The National Board will be hosting a reception for all committee members and visitors on Wednesday evening at 5:30pm at the pavilion.
   - Breakfast will be provided on Thursday morning to NBIC Committee members and visitors.
   - Lunch will be provided on Tuesday, Wednesday, and Thursday to NBIC Committee members and visitors

   After the announcements, Mr. Hellman handed out 5 Year Service Award pins to the following:
   - Mr. Brian Boseo
   - Mr. Frank Johnson
   - Mr. Wayne Jones
   - Mr. Ray Miletti
   - Mr. Walter Sperko
   - Mr. Rick Valdez

4. **Adoption of the Agenda**
   A motion was made to adopt the agenda as presented. The motion was unanimously approved.

5. **Approval of the Minutes of January 9th, 2018 Meeting**

   The minutes from the January 2018 Repairs and Alterations SG meeting were unanimously approved.

6. **Review of Rosters (Attachment Page 3)**

   a. **Membership Nominations**

   - Michael Quisenberry – (Interest Category: National Board Certificate Holder)
   - John Siefert – (Interest Cagegory – General Interest)

     The nominees addressed the Subgroup as to why they would like to become a member of the SG and how their experience and knowledge would benefit the group. The SG discussed the nominees and a motion was made to approve the nominees as members of the Repairs and Alteration SG. The motion was unanimously approved.

b. Membership Reappointments

- Mr. Carter, Mr. Edwards, Mr. Galanes, Mr. Miletti, Mr. Pillow, Mr. Sekely, and Mr. Walker all have memberships to the Repair and Alteration SG expiring on 8/30/2018. The members reaffirmed their commitment to participate in the SG. A motion was made to reappoint all members and was unanimously approved.

- Randy Cauthon submitted an email dated 7/10/2018 surrendering his seat on the Subgroup.

7. Interpretations

Item Number: 18-30	**NBIC Location: Part 3**	**Attachment Page 4**

General Description: Interchange of Convection Sections from one OSTG to another OSTG

Subgroup: Repairs and Alterations
Task Group: Jamie Walker – PM

July 2018 Meeting Action: Mr. Jamie Walker proposed responding to the inquirer with the interpretations 07-06, 01-28, and 95-15 to answer their question. The SG discussed the need to address these issues within the NBIC, and a new action Item 18-65 was assigned. A motion was made to have the NBIC Secretary respond with the referenced interpretations and close this Item. The motion was unanimously approved.

Item Number: 18-31	**NBIC Location: Part 3, 2.5.2 a)**	**Attachment Pages 5-6**

General Description: Post-weld heat treatment of a full penetration groove pipe nozzle neck repair

Subgroup: Repairs and Alterations
Task Group: Nathan Carter

July 2018 Meeting Action: The SG discussed if PWHT is not required, but is optionally performed on a vessel, do repairs require PWHT or Alternative Welding Methods. Editorial change to the Proposed Subgroup's Question to specify Section I Power Boilers in lieu of pressure vessels due to the lack of PWHT information on the MDR for ASME Section I was made. The proposed response was that the repair can be made without PWHT or using Alternative Welding Methods as long as the WPS is qualified without PWHT, Note: For Pressure Vessels, See Interpretation 95-14. A motion was made to accept the proposed response. The motion was approved with 2 disapprovals votes and 1 abstention.

Item Number: 18-32	**NBIC Location: Part 3**	**Attachment Page 7**

General Description: Interchange of convective box (economizers) in Once Through Steam Generators (OSTG)

Subgroup: Repairs and Alterations
Task Group: Ben Schaefer

July 2018 Meeting Action: Mr. Benjamin Schaefer proposed responding in line with Item 18-30 with a response to the inquirer with the interpretations 07-06, 01-28, and 95-15 to answer their question. The SG discussed the need to address these issues within the NBIC, and this subject will be included within the newly opened Item 18-65 (see Item 18-30). A motion was made to have the NBIC Secretary respond with the referenced interpretations and close this Item. The motion was unanimously approved.

Item Number: 18-33	NBIC Location: Part 3, 3.4.4 c)	Attachment Page 8

General Description: Providing an additional stiffener ring to compensate for corrosion levels being above allowance

Subgroup: Repairs and Alterations
Task Group: None Assigned.

July 2018 Meeting Action: Progress Report: The SG has reviewed the inquiry, and the group decided to create a task group. The task group will come up with a proposal for the January 2019 meeting.

Task Group assigned: Kathy Moore – PM, Paul Shanks, David Martinez

Item Number: 18-34	NBIC Location: Part 3, 8.4	Attachment Page 9

General Description: Does an R certificate holder assume responsibility for safety/integrity of a vessel outside the scope of repair?

Subgroup: Repairs and Alterations
Task Group: Nathan Carter, Mike Quisenberry

July 2018 Meeting Action: The proposed response of "no" along with Interpretations 95-41 and 95-17 as reference was discussed. A motion was made to have the NBIC Secretary respond with the proposed reply and close this item. The motion was unanimously approved.

Item Number: 18-35	NBIC Location: Part 3	Attachment Pages 10-11

General Description: Can a vessel built to an ASME Section VIII Division 2 construction code, prior to 2017, that required a PE for design, be altered to the 2017 ASME Section VIII Division 2 Code for Class 1 vessels?

Subgroup: Repairs and Alterations
Task Group: Brian Moorelock

July 2018 Meeting Action: The group discussed the interpretation and revised the wording of the Subgroup's proposed question from, "Can a vessel built…" to "May a vessel built…". A motion was made to approve the revised proposal as the response from the NBIC Secretary, and close. The motion was approved with 1 abstention.

Item Number: 18-37	NBIC Location: Part 3, 2.5.3.6 e)	Attachment Page 12

General Description: Changing the consumables in subsection e in Part 3, 2.5.3.6

Subgroup: Repairs and Alterations
Task Group: Ray Miletti – PM , George Galanes

July 2018 Meeting Action: Mr. Galanes presented the proposal. The Subgroup reviewed the proposed reply of "No" and a motion was made to have the NBIC Secretary issue the response and close. The motion was unanimously approved.

Item Number: 18-39	NBIC Location: Part 3, 2.5.3.6	Attachment Page 13

General Description: If the original welding procedures used for construction of the vessel are not available, is it acceptable to PWHT the original welds if the R-certificate holder or client can demonstrate with sufficient PQRs that the entire range of reasonably plausible essential variables are supported in the PWHT'd condition?

Subgroup: Repairs and Alterations
Task Group: Tom White – PM, George Galanes

July 2018 Meeting Action: This inquiry was discussed and determined to be "Consulting". A motion was made to have the NBIC Secretary respond that this was considered "Consulting" and close this Item. The motion was unanimously approved.

Item Number: 18-42	NBIC Location: Part 3	Attachment Page 14

General Description: Would reducing a pressure vessel shell overall length be considered an Alteration?

Subgroup: Repairs and Alterations
Task Group: Rick Valdez – PM

July 2018 Meeting Action: This inquiry was discussed and it was determined that a change to a vessel's overall length would be considered an alteration per the definition of "alteration" in the 2017 NBIC, Part 3 and examples of alterations per paragraph 3.4.4. A motion to have the NBIC Secretary respond and close the item was made. The motion was unanimously approved.

Item Number: 18-53	NBIC Location: Part 3	Attachment Page 15

General Description: Is changing the corrosion allowance noted on the original Manufacturer's Data Report considered an alteration per NBIC, when this task is performed solely for the purpose of establishing minimum required thicknesses on an internal Owner / User mechanical integrity database?

Subgroup: Repairs and Alterations
Task Group: Brian Boseo

July 2018 Meeting Action: Progress Report: The Subgroup reviewed this inquiry and felt there was more information needed in order to draft a response. A motion was made to have the NBIC Secretary request more information from the inquirer. The motion was unanimously approved.

8. Action Items

Item Number: NB16-0303	NBIC Location: Part 3	Attachment Page 16

General Description: Fillet welded patches

Subgroup: SG Repairs and Alterations
Task Group: B. Boseo – PM, B. Morelock, R Underwood, J. Walker

July 2018 Meeting Action: Mr. Riley Collins with Eastman Chemical Company gave a PowerPoint presentation on the validity of fillet weld patches as a repair method using FEA. After much discussion, a motion was made to call for a vote. This Item failed with 9 Approvals, 11 Disapprovals, and 1 Abstention. A second motion was made to present this item to the Repair and Alteration SC although it did not pass SG and close with no action. The motion was unanimously approved.

Item Number: NB16-0608	NBIC Location: Part 3, 1.6.2	Attachment Pages 17-19

General Description: Address Nuclear QA program requirements for owner and certificate holder

Subgroup: Repairs and Alterations
Task Group: NR Task Group

July 2018 Meeting Action: Paul Edwards presented the item referencing the edition and addenda of NQA-1 that can be utilized within Table 1.6.2 and Table 1.6.2.1. A motion was made to accept and approve the revision. The motion was unanimously approved.

Item Number: NB16-1502	NBIC Location: Part 3	No Attachment

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

Subgroup: SG Repairs and Alterations
Task Group: International Repair Supplement Task Group, Chuck Withers – PM

July 2018 Meeting Action: Progress Report: Mr. Withers was not present and could not present the item.

Item Number: NB16-2602	NBIC Location: Part 3, Section 9	No Attachment

General Description: Add definitions for practicable and impracticable to glossary

Subgroup: Repairs and Alterations
Task Group: R. Underwood (PM), R. Milletti, J. Sekely

July 2018 Meeting Action: Mr. Robert Underwood stated that this definition was unnecessary and made a motion to close this Item with no action. The motion was unanimously approved.

Item Number: NB17-0701	NBIC Location: Part 3	Attachment Pages 20-21

General Description: Add references to Commercial Grade Dedication (CGD) to 1.6.7.1 and 1.6.8.1

Subgroup: Repairs and Alterations
Task Group: NR Task Group

July 2018 Meeting Action: Mr. Paul Edwards presented the Item and discussed that the NR TG recommended not referencing CGD in 1.6.7.1 or in 1.6.8.1, effectively closing this Item with no action. A motion to close with no action was made. The motion was unanimously approved.

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

July 2018 Meeting Action: Progress Report: P. Shanks gave a progress report.

Item Number: 17-139	NBIC Location: Part 3, 2.2.3	No Attachment

General Description: Performance qualification by independent qualifier

Subgroup: Repairs and Alterations
Task Group: Jim Pillow

July 2018 Meeting Action: Jim Pillow reported ASME Section IX is not going to act on a similar item and recommended closing this Item with no action. A motion to close with no action was made. The motion was unanimously approved.

Item Number: 17-179	NBIC Location: Part 3, Section 5	Attachment Pages 22-38

General Description: R Form Guides

Subgroup: SG Repairs and Alterations
Task Group: Tom White PM , Bill Vallance

July 2018 Meeting Action: Tom White presented the Item to revise the Report of Repair instructions and form field numbering. An editorial change was made to reference the NB form numbers in lieu of page numbers where the forms can be found. Discussion by the SG resulted in a new Action Item being created to move all Report Forms and their instructions to a supplement within Part 3 for the 2021 Edition of the NBIC (Item 18-66). A motion was made to accept the revision as edited. The motion was unanimously approved.

Item Number: 18-12	NBIC Location: Part 3	Attachment Pages 39-41

General Description: Adding Weld Buildup to WM #6

Subgroup: SG Repairs and Alterations
Task Group: John Siefert PM, George Galanes

July 2018 Meeting Action: Progress Report: Mr. George Galanes presented that this Item was opened at the January 2018 meeting and the proposed revision to Welding Method 6 to limit weld build up to 100 square inches on only Grade 91 tubes is still being worked on.

Item Number: 18-13	NBIC Location: Part 3	Attachment Pages 42-45

General Description: Weld Methods 7 addition for dissimilar weld metal-Gr. 91.

Subgroup: SG Repairs and Alterations
Task Group: John Siefert PM, George Galanes

July 2018 Meeting Action: Progress Report: Mr. George Galanes presented that this Item was opened at the January 2018 meeting and the proposed revision to add a Welding Method 7 to allow for dissimilar metal welding on Grade 91 to austenitic steels and low allow steels limited to butt welds in accordance with Welding Method 6 is still being worked on.

New Items:

Item Number: 18-14	**NBIC Location: Part 3**	**Attachment Pages 46-51**

General Description: SWPS Revisions

Subgroup: SG Repairs and Alterations
Task Group: Jim Sekely (PM).

July 2018 Meeting Action: Mr. Jim Sekely presented that this item passed both SG and SC R&A letter ballots on June 30th, and the comments have been addressed. A motion was made to reaffirm this Item as revised for presentation at the Main Committee. The motion was unanimously approved.

Item Number: 18-38	**NBIC Location: Part 3, 1.1 b) and c)**	**Attachment Page 52**

General Description: Add parts to Part 3, 1.1 b) and c) address "T/O" stamp

Subgroup: SG Repairs and Alterations
Task Group: Tom White – PM, Frank Hampton, Nathan Carter

July 2018 Meeting Action: Mr. Tom White presented, and editorial changes to the Item to clarify the number of accreditation programs in 1.1 b), and the capitalization of the program titles in 1.1 c) were made. A motion was made to approve the Item as edited. The motion was unanimously approved.

Item Number: 18-40	**NBIC Location: Part 3, Section 3**	**Attachment Pages 53-58**

General Description: Define that brazing should be done in accordance with ASME Section 9 in Part 3 Section 3 of NBIC

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

July 2018 Meeting Action: Mr. Jim Pillow presented that this Item was issued as a Review and Comment Ballot and all comments from the ballot had been addressed in the latest revision of the Item. A discussion by the SG yielded the creation of a new Action Item (Item 18-67) to align the definitions of brazing between ASME Section IX and NBIC. A motion was made to accept the Item as revised. The motion was unanimously approved.

Item Number: 18-47	**NBIC Location: Part 3, Section 5**	**Attachment Pages 59-88**

General Description: Remove the general instruction paragraph 5.12.4.1 in Part 3, for all Repair Reports, and the specific requirements in paragraphs 5.12.5.1 for "NR" forms and 5.12.6.1 for "NVR" form

Subgroup: SG Repairs and Alterations
Task Group: Rick Valdez – PM, Marty Toth

July 2018 Meeting Action: Mr. Rick Valdez presented that this Item was intended to move all references to the Reports of Repair and their instructions to the National Board website. Per a discussion by the SG, and the approval of previous Action Item 17-179 to revise all Reports of Repair and their respective instructions within the NBIC, a motion to close this Item with no action was made. The motion was unanimously approved.

Item Number: 18-48	NBIC Location: Part 3, 2.5.3 e)	Attachment Pages 89-91

General Description: Revise Part 3, 2.5.3 e) to exempt MT/PT of flush patches/window welds and to change reference to radiographic testing to volumetric testing

Subgroup: SG Repairs and Alterations
Task Group: R. Underwood (PM)

July 2018 Meeting Action: Mr. Underwood presented the Item. After discussions regarding concerns over requiring volumetric examinations (shear-wave UT) where jurisdictional authority may have allowed alternative methods, Mr. Underwood revised the proposed text of the Item. A motion was made to approve the item as revised. The motion was unanimously approved.

Item Number: 18-51	NBIC Location: Part 3, Section 3	Attachment Pages 92-93

General Description: Adding controls in accordance with NBIC Part 3, 2.5.2 and 4.4.1e) to Part 3, Supp 6 when alternatives to PWHT and NDE are used

Subgroup: SG Repairs and Alterations
Task Group: Paul Galanes – PM, Walter Sperko

July 2018 Meeting Action: Mr. George Galanes presented the Item to require alternative welding methods referenced in Supplement 6 be done in accordance with 2.5.3. A motion was made to approve the item. The motion was approved with 1 abstention.

Item Number: 18-52	NBIC Location: Part 3, Section 9	Attachment Page 94

General Description: Revise the definition of "Jurisdiction" in the NBIC glossary

Subgroup: SG Repairs and Alterations
Task Group: Rick Valdez – PM, Paul Shanks

July 2018 Meeting Action: Mr. Rick Valdez presented the revised definition of “Jurisdiction” A motion was made to approve the Item. The motion was unanimously approved.

Item Number: 18-65	NBIC Location: Part 3, Section 3	No Attachment

General Description: Draft rules for “used” material in repairs and/or alterations.

Subgroup: SG Repairs and Alterations
Task Group: Jamie Walker – PM, Marty Toth, Pat Becker, Michael Quisenberry, Issac Osborn, Paul Shanks.

July 2018 Meeting Action: As a result of Interpretation Item 18-30, the SG decided to open this new Item to draft rules for “used” material utilized in repairs and/or alterations. A Task Group was formed: Jamie Walker – PM, Marty Toth, Pat Becker, Michael Quisenberry, Issac Osborn, Paul Shanks.

Item Number: 18-66	NBIC Location: Part 3, Section 5	No Attachment

General Description: Move sample forms and the instructions/guides for completing Reports of Repair from Section 5 to a new Supplement.

Subgroup: SG Repairs and Alterations
Task Group: Marty Toth – PM, Ben Schaefer

July 2018 Meeting Action: As a result of Action Item 17-179, the SG decided to open this new Item to move the Reports of Repair and their instructions to a new Supplement. A Task Group was formed: Marty Toth – PM, Ben Schaefer

Item Number: 18-67	NBIC Location: Part 3, Section 2&9	No Attachment

General Description: Align definition of "Brazing" with ASME Section IX and address non-metallic pre-heat requirements.

Subgroup: SG Repairs and Alterations
Task Group: Jim Pillow – PM, Paul Edwards, Walter Sperko

July 2018 Meeting Action: As a result of Action Item 18-40, the SG decided to address the term "Brazing" as defined by the NBIC and non-metallic pre-heat requirements. A Task Group was formed: Jim Pillow – PM, Paul Edwards, Walter Sperko

9. Future Meetings

- January 14th-17th – San Antonio, TX
- July, 2019 – Kansas City or Minneapolis

10. Adjournment

A motion was made and unanimously approved to adjourn the meeting at 3:34 PM.

Respectfully submitted,

Terrence Hellman
SG Repairs and Alterations Secretary

SG Repairs and Alterations Attendance Sheet - 7/17/18

Name	Company	Phone Number	Email	Signature
Brian Boseo	Graycor Industrial Constructors	(630) 684-7300	brian_boseo@graycor.com	
Benjamin Schaefer	AEP	(614) 267-4072	bschaefer@aep.com	
William Vallance	National Board	(614) 888-8320	bvallance@nationalboard.org	
Joel Amato	State of Minnesota	(651) 284-5137	joel.amato@state.mn.us	
Nathan Carter	Hartford Steam Boiler	(860) 722-5750	nathan_carter@hsbct.com	
Randal Cauthon	Alstom Power	(860) 285-3481	randal.t.cauthon@power.alstom.com	
Paul Edwards	~~CBI~~ STONE+WEBSTER	~~(617) 589-5677~~ 617-483-5315	~~paul.edwards@cbi.com~~ EDWARDSPH@ASME.ORG	
George Galanes	Diamond Technical Services	(815) 634-2727	ggalanes@diamondtechnicalservices.com	
Craig Hopkins	Seattle Boiler Works	(206) 762-0737	chopkins@seattleboiler.com	
Isaac Osborn			IOsborn@SeattleBoiler.com	
Frank Johnson	PBF Energy	~~(419) 698-6614~~ 419-336-8950	frank.johnson@pbfenergy.com FJohnson22@aol.com	
Wayne Jones	Arise	(251) 895-8826	wayne.jones@ariseinc.com	
David Martinez	Factory Mutual	~~(781) 255-4784~~ 703-262-6314	david.martinez@fmglobal.com	
Ray Miletti	Babcock & Wilcox	(330) 860-2589	rlmiletti@babcock.com	
Kathy Moore	Joe Moore & Company	(919) 832-1665	kathymoore@joemoorecompany.com	
Brian Morelock	Eastman Chemical Company	(423) 229-1205	morelock@eastman.com	
James Pillow	Common Arc	(860) 688-2531	jpillow@commonarc.com	
James Sekely	Consultant	(412) 389-5567	jsekely@comcast.net	
Walter Sperko	Sperko Engineering Services	(336) 674-0600	sperko@asme.org	
Marty Toth	~~Boiler Supply Company~~ ECS Consulting	(615) 504-9064	~~mtoth@boiseo.com~~ boiscotrainingroup.com	
Rob Troutt	State of Texas	(512) 638-2727	rob.troutt@tdlr.texas.gov	
Rick Valdez	ARB	(661) 331-6024	rvaldez@arbinc.com	

Name	Company	Phone Number	Email	Signature
Jamie Walker	Hayes Mechanical	(773) 292-2707	jwalker@hayesmechanical.com	
Tom White	NRG Energy	(281) 782-4972	thomas.white@nrg.com	
Riley Collins	Eastman Chemical Company			
Rick Sturm	State of Utq	512-554-9600		
Ray Ramey	Turner Industries	225-571-9311	RRamey@turnerindustries.com	
Frank Hamtak	Lloyd's Register	832-797-1314	frank.hamtak@LR.org	
Philip Gilston	GE Power	860-998-2652	philip.gilston@ge.com	
Robert McGuire	GE Power	860-719-2916	robert.b.mcguire@ge.com	
PAT BECKER	B&W	330 860-2807	pabecker@babcock.com	
BOB WIELGOSZINSKI	HSB	860 722 5064	ROBERT-WIELGOSZINSKI@HSB.COM	
Paul Shanks	one CIS	832 316 4249	Paul-Shanks@onecis.com	
Michael Ruisenberry	Allen's Mechanical	806 316-7174	michael@allentri.com	
Ralph Rockwood	HSB	630 955-5620	ralph_rockwood@hsb.com	
Robert Underwood	HSB	618 593 6231	robert_underwood@hsb.com	
TIM LEBEAU	SOUTHERN COMPANY	205-992-5396	telebeau@SOUTHERNCO.com	
Michael Pirchke	National Board	614-431-3243	mpirchke@nationalboard.org	
DON COOK	STATE OF CA	510 622-3050	dcook@dir.ca.gov	
Rick Musser	Strasburg Rail Road Co.	717-682-7589	rick@strasburgrailroad.com	
Linn W. Moedinger	Strasburg Rail Road	717 575 4478	linnwm@supernet.com	

Subgroup Repairs/Alterations

Last Name	First Name	Interest Category	Role	Exp. Date	More
Boseo	Brian	National Board Certificate Holders	Chair	07/30/2020	Details
Schaefer	Benjamin	National Board Certificate Holders	Vice Chair	07/30/2020	Details
Vallance	William		Secretary	01/30/2099	Details
Amato	Joel	Jurisdictional Authorities	Member	01/30/2021	Details
Carter	Nathan	Authorized Inspection Agencies	Member	08/30/2018	Details
Cauthon	Randal	Manufacturers	Member	07/30/2019	Details
Edwards	Paul	National Board Certificate Holders	Member	08/30/2018	Details
Galanes	George	Users	Member	08/30/2018	Details
Hopkins	Craig	National Board Certificate Holders	Member	01/30/2019	Details
Johnson	Frank	Users	Member	01/30/2021	Details
Jones	Wayne	Authorized Inspection Agencies	Member	08/30/2020	Details
Martinez	David	Authorized Inspection Agencies	Member	07/30/2019	Details
Miletti	Ray	Manufacturers	Member	08/30/2018	Details
Moore	Kathy	National Board Certificate Holders	Member	01/30/2021	Details
Morelock	Brian	Users	Member	01/30/2021	Details
Pillow	James	General Interest	Member	08/30/2018	Details
Sekely	James	General Interest	Member	08/30/2018	Details
Sperko	Walter	General Interest	Member	07/30/2019	Details
Toth	Marty	National Board Certificate Holders	Member	07/30/2019	Details
Troutt	Robby	Jurisdictional Authorities	Member	08/30/2020	Details
Valdez	Rick	Manufacturers	Member	08/30/2020	Details
Walker	Jamie	National Board Certificate Holders	Member	08/30/2018	Details
White	Tom	Users	Member	01/30/2021	Details

Action Item 18-30: Inquiry (Original)

Inquirer: Veera Kommisetti veera_kommisetti@oxy.com
Question: Does the NBIC prohibit interchanging the convection section of one OSTG with another OSTG?

Background information: Occidental of Oman has installed about 85 Nos OTSG (Once through steam generator) in one of oil concession. All OTSG are of similar configuration and they comprise of two main parts i.e. Radiant section and Convection section. Now, OTSGs have aged and Occidental intends to replace a few tubes of the convection section, which require dismantling of the convection section and shipping to repair shop ("R" stamp holder) for repair. We have shipped two convection sections of OTSG 100 and OTSG 200 to a fabrication shop and after repair we intend to use convection sections of OTSG 100 on OTSG 200 due to operational constraints.

Proposed Inquiry:

Question:

Does the NBIC allow for replacement parts of like construction originally installed in an in-service PRI to be used in a PRI having like materials of similar construction?

Reply:

Yes, provided the replacement parts are installed in accordance with the requirements of the NBIC, and if applicable, with concurrence from the Jurisdiction and the Authorized Inspection Agency.

Justification:

Ref. Interpretation 07-06, 01-28, 95-15

PROPOSED INTERPRETATION

Inquiry No.	**18-31**				
Source	Roderick Kaiser rjk834@cox.net				
Subject	PART 3, Paragraph 2.5.2, POSTWELD HEAT TREATMENT				
Edition	2017				
Question	**Question 1:** A full penetration groove weld repair was made on a 1" schedule 160 (0.250") flanged nozzle pipe section. When the vessel was originally fabricated it received PWHT per ASME BPVC. SECT. 1 PW-39-1 for P-No. 1 Group No. 1, 2, 3. Due to the nozzle thickness of 0.250" it was exempt from PWHT, but it went through the PWHT cycle with the vessel. Would the new full penetration groove pipe nozzle neck repair weld require PWHT? **Question 2:** Would the repair to the nozzle pipe require the Preheat requirements of Method 1? **Question 3:** Would the repair to the nozzle pipe be exempted from PWHT?				
Reply	None				
Committee's Question	In the original construction of a Section I Boiler, a full penetration groove weld, exempt from PostWeld Heat Treatment (PWHT) by the original Code of construction, was subjected to PWHT meeting the requirements of ASME BPV Section I, PW-39. May the repair of this weld be performed in accordance with the NBIC, Part 3 without PWHT or acceptable alternative to PWHT?				
Committee's Reply	Yes, as long as the WPS is qualified without PWHT. Note: For Pressure Vessels, see Interpretation 95-14.				
Rationale	Unlike Section VIII, Section I does not require that the PWHT time and temperature, if performed, be reported on the MDR. For Section I repairs, a "R" Certificate Holder only having the MDR and/or Nameplate would not necessarily know, if a weld exempt from PWHT, received a PWHT cycle"R" Certificate Holder"R" Certificate Holder anyway. As a result, if a weld is exempt from PWHT by PW-39, then the "R" Certificate Holder is not required to perform a PWHT of the repair weld.				
SC Vote		No. Affirmative	No. Negative	No. Abstain	No. Not Voting
NBIC Vote		No. Affirmative	No. Negative	No. Abstain	No. Not Voting
Negative Vote Comments					

BACKGROUND INFORMATION ONLY

INTERPRETATION 95-14

Subject: R-202 Alteration

1992 Edition with the 1994 Addendum

Question: May a welded repair to a pressure vessel be performed without postweld heat treatment or acceptable alternative to postweld heat treatment, when the pressure vessel as reported on the data report was postweld heat treated during construction?

Reply: No.

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Action Item 18-32: Inquiry

Inquirer: Melwin Dsouza melwin@uesoman.com

Purpose	Code Interpretation – Interchange of convective box (Economizers) in Once through steam Generators (OTSG).
Background Information	During the repair of Convictive box of Once through steam Generators, to meet the site requirement user would like to use Convictive box of other OTSG.
Inquiry	Is the interchange of Convective Box on the OTSG is allowed if we record the same on the R Form?
NBIC Reply	

Action Item 18-33: Inquiry

Inquirer: Mohammed Sirajudeen sirajudeenin@gmail.com

Subject: 3.4.4 c) Alteration of corroded Pressure Vessel

Edition: 2017 edition

Inquiry

1) The entire vessel corroded its corrosion allowance given data report. However by providing additional external stiffener ring the vessel meets design condition as per original code of construction. Is it considered as an alteration ?

2) if answer "yes" for the question 1 New corrosion allowance other than the one given in original data report can be considered if proposed by owner ?

Background: The vessel is governed by external pressure. Thickness survey carried out for complete vessel. Even in corroded condition still the vessel has required thickness plus corrosion allowance for internal pressure. By providing external stiffener ring vessel meets original design condition.

PROPOSED INTERPRETATION

Inquiry No.	**18-34**				
Source	**James Barlow jbarlow@performancepulsation.com**				
Subject	Scope of Work				
Edition	2017				
Question	**Background** We received a vessel for repair of a cracked nozzle weld. The repair was performed per Part 3. During this work a discussion was started concerning the scope of responsibility for the "R" Certificate Holder. One side of the team said we should only be responsible for the requested repair. That our scope of work is defined by the owner/user and completion of the requested repair meets the requirements of NBIC Part 3. The other side, that I am on, feels we have a responsibility to inspect the vessel to ensure that what we are sending back into service is safe. As a licensed Engineer I am struggling with balancing wanting to ensure the vessel integrity is sound with the wants of a customer who may think that a repair means "the vessel" and not just what was in our scope of work. **Question:** When an "R" Certificate Holder performs a repair on a vessel, does the Certificate Holder assume responsibility for the integrity or condition of the rest of the vessel outside the scope of the repair?				
Reply	No				
Committee's Question	When an "R" Certificate Holder performs a repair to a pressure retaining item, does the Certificate Holder assume responsibility for the integrity or condition of the rest of the pressure retaining item outside the scope of the repair?				
Committee's Reply	No				
Rationale					
SC Vote		No. Affirmative	No. Negative	No. Abstain	No. Not Voting
NBIC Vote		No. Affirmative	No. Negative	No. Abstain	No. Not Voting
Negative Vote Comments					

Interpretation IN18-35

PROPOSED INTERPRETATION

Inquiry No.	**IN18-35, Altering Pre-2017 ASME Section VIII-2 Vessel to 2017 ASME Section VIII Division 2 Code for Class 1 vessels**
Source	No background information.
Subject	ASME Section VIII, Division 2, Class 1 Vessels.
Edition	**2017**
INQUIRY QUESTION 1:	Can a vessel built to an ASME Section VIII Division 2 construction code, prior to 2017, that required a PE for design, be altered to the 2017 ASME Section VIII Division 2 Code for Class 1 vessels?
Inquirer's PROPOSED REPLY 1:	
Committee's Question-1	May a vessel built to an ASME Section VIII Division 2 construction Code between 2007 and 2017 be altered to the 2017 ASME Section VIII Division 2 Code for Class 1 vessels?
Committee's Reply-1	No.
Rationale Q-1	The 2007 Edition of ASME Section VIII, Division 2 incorporated a new design margin of 2.4. A 2017 ASME Section VIII, Division 2, Class 1 vessel would have a design margin of 3.0.
Committee's Question-2	May a vessel built to an ASME Section VIII Division 2 construction Code, prior to 2007, that required a PE for design, be altered to the 2017 ASME Section VIII Division 2 Code for Class 1 vessels, provided the User's Design Specification (UDS) and Manufacturer's Design Report (MDR) are available and the ASME Section VIII, Division 2 vessel that was built prior to 2007 has no fatigue analysis or design-by-analysis to determine materials thicknesses?
Committee's Reply-2	Yes.
Rationale Q-2	Prior to the 2007 Edition of ASME Section VIII, Division 2, the design margin was 3.0 which is identical to the 2017 ASME Section VIII, Division 2, Class 1 design margin. If the original UDS and MDR for the ASME Section VIII, Division 2 vessel that was built prior to 2017 shows that a fatigue analysis was performed or design-by-analysis was performed to determine materials thicknesses, the requirement for review by a registered professional engineer would still apply.
SC Vote	
NBIC Vote	
Negative Vote Comments	

Background from 2017 ASME Section VIII, Division 2:

1-B.2 DEFINITION OF TERMS

1-B.2.9 Class 1 Vessel – a vessel that is designed using the allowable stresses from Section II, Part D, Subpart 1, Table 2A or Table 2B.

1-B.2.10 Class 2 Vessel – a vessel that is designed using the allowable stresses from Section II, Part D, Subpart 1, Table 5A or Table 5B.

2.2.2 USER'S DESIGN SPECIFICATION

2.2.2.1 The User's Design Specification shall include but not necessarily be limited to the following:

2.2.1.1 Class 1. The User's Design Specification shall be certified by an individual or individuals meeting the requirements described in Annex 2-A when the user provides the data required by 2.2.2.1(f)(1) and 2.2.2.1(f)(2) to perform a fatigue analysis.

2.2.1.2 Class 2. The User's Design Specification shall be certified in accordance with Annex 2-A.

(f) Design Fatigue Life

(1) Cyclic operating conditions and whether or not a fatigue analysis of the vessel as required shall be determined in accordance with 4.1.1.4. When a fatigue analysis is required, provide information in sufficient detail so that an analysis of the cyclic operation can be carried out in accordance with 5.5.

(2) When a vessel is designed for cyclic conditions, the number of design cycles per year and the required vessel design life in years shall be stated.

2.3.3 MANUFACTURER'S DESIGN REPORT

2.3.3.1 See below.

(a) **Class 1**. The Manufacturer's Design Report shall be certified in accordance with Annex 2-B when either of the following are performed:

(1) fatigue analysis

(2) use of Part 5 to determine thickness of pressure parts when design rules are not provided in Part 4

(b) **Class 2**. The Manufacturer's Design Report shall be certified in accordance with Annex 2-B.

Inquiry No.	**18-37**
Source	Mr. Rob Cox / Matrix Service Company
Subject	**NBIC Part 3, 2.5.3.6 e)** Changing of Welding Consumables
Edition	2017
Question: Background:	Since this is specific to Grade 91 material, shouldn't the required filler metal (Fno4 or Fno6) be a closer metallurgical match? (i.e. E9015-B9, E9018-B9 or ER90S-B9) The below referenced welding method is specific to Grade 91 material: Subsection e) States: A martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.
Reply:	None
Committee's Question:	For Welding Method 6 in 2.5.3.6 (e), Part 3 of the NBIC 2017 Edition, may welding consumables E9015-B9, E9018-B9 and ER90S-B9 also be used for weld repair of Grade 91 material?
Committee's reply:	No

Item 18-39

Item Number: 18-39	NBIC Location: Part 3, 2.5.3.6	Attachment Page 25

General Description: If the original welding procedures used for construction of the vessel are not available, is it acceptable to PWHT the original welds if the R-certificate holder or client can demonstrate with sufficient PQRs that the entire range of reasonably plausible essential variables are supported in the PWHT'd condition?

Subgroup: Repairs and Alterations CONSULTING. It is up to the Certificate holder and owner/user and possibly the Jurisdiction to decide on what demonstration is required to ensure PWHT does not adversely affect the performance of the vessel welds after PWHT.

Task Group: None Assigned.

Inquiry No.	NB18-42
Source	Kevin Kurtz
Subject	NBIC Part 3 3.3.4
Edition	2017
Question: Background:	Would reducing a pressure vessel shell overall length be considered an Alteration? A pressure vessel shell overall length was reduced from 16'-6" down to 15'-10" (8" length reduction). All other requirements of the Original Code of Construction were met including Spot RT on the Cat. B joint.
Reply:	No, provided all other requirements of the original Code of Construction were met.
Committee's Question:	Is changing a pressure vessel shell overall length considered an Alteration?
Committee's reply:	Yes
Rationale:	The definition of Alteration is a change in the item described on the original Manufacturer's Data Report which affects the pressure containing capability of the pressure-retaining item. 3.4.4 Examples of Alterations d) A change in dimensions or contour of a pressure-retaining item.

Action Item 18-53: Interpretation Request

Inquirer: Angel Rodriguez AGRodriguez@dow.com

Subject:
Definition of Alteration (NBIC Part 3, Section 9, 9.1)
Examples of Alteration (NBIC Part 3, 3.4.3)

Question:
Is changing the corrosion allowance noted on the original Manufacturer's Data Report considered an alteration per NBIC, when this task is performed solely for the purpose of establishing minimum required thicknesses on an internal Owner / User mechanical integrity database?

Item NB16-0303, add Fillet Welded Patch as a method of Repairing a Pressure Retaining Item (PRI)

All New 3.4.4 Paragraph PROPOSED:

3.4.*4* FILLET WELDED PATCH

A *fillet welded patch* is a repair method used to maintain the pressure retaining capability of *shells, heads, drums and* pipe by providing a pressure containing boundary over the *area exhibiting damage* in the form of a *"fillet welded patch"* as described by ASME PCC-2, *Article 2.7 or Article 2.12*.

a) Except as required in 3.4.*4* c)(1), ASME PCC-2 ~~should~~ shall be used ~~as a guideline~~ for the design of the *fillet welded patch* and shall be in accordance with the original code of construction, when practicable. Design of the fillet welded patch shall consider original design conditions, taking in to account current service conditions and damage mechanisms. Use of this method shall be acceptable to the inspector and when required, the jurisdiction and shall be limited to pressure containing equipment owned and operated by an Owner-User.~~.~~

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

b) The "R" Certificate Holder responsible for the design of the *fillet welded patch* shall ensure a Fitness for Service Assessment (FFSA) has been performed on the portion of the item being patched in accordance with NBIC, Part 2, 4.4.1, supporting the continued service of the item. The *fillet welded patch* repair method shall not remain in place beyond the calculated remaining life of the *covered* portion of the pressure retaining item.

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

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

   3) A *fillet welded patch* method shall not be used where cracks are present unless the cracks have been removed and repaired in accordance with Part 3, Paragraph 3.3.4.2 a); the condition that led to the crack formation and propagation have been eliminated.

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

   1) When the pressure retaining item will remain in service while implementing *a fillet welded patch*, the requirements and limitations described within ASME PCC-2, Part-1 shall be used in conjunction with ASME PCC-2, Part-2, Article 2.10.

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

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

e) Completion of the FORM R-1 shall follow the requirements for PREPARATION, DISTRIBUTION, and REGISTRATION as described in Part 3, Section 5.

Additional actions required by accepting this item:

Revise the succeeding paragraph numbering order *(ref.2017-edition)* ***to:***

3.4.*5* EXAMPLES OF Repairs

   l) The installation of a *fillet* welded patch.

TABLE 1.6.2

"NR" QUALITY ASSURANCE PROGRAM (QAP) REQUIREMENTS

Category of Activity	Owner	Organizations other than Owner
Category 1	10 CFR Part 50 Appendix B[1, 2] and ASME Section III NCA-4000 & NQA-1 Part 1	10 CFR Part 50 Appendix B[1, 2] and ASME Section III NCA-4000 & NQA-1, Part 1
Category 2	10 CFR Part 50, Appendix B[1, 2] or NQA-1[3], Part 1 and ASME Section XI, IWA-4142	10 CFR Part 50, Appendix B[1, 2] supplemented as needed with Owner's QA program; or ASME NQA-1[3], Part 1; or ASME Section III, NCA-4000
Category 3	ASME NQA-1[3], Parts 1, or Specify the Standard to which certification is desired	ASME NQA-1[3], Parts 1, or Specify the Standard to which certification is desired

Note 1:
Code of Federal Regulations (CFR) – rules and regulations published by the executive departments and agencies of the federal government of the United States.

Note 2:
10 CFR 50 Appendix B – Title 10 of the Code of Federal Regulations Part 50 Appendix B describes the quality assurance criteria for nuclear plants and fuel reprocessing plants.

Note 3:
The Edition (and Addenda , as applicable) of NQA-1 to be utilized shall be the latest endorsed by the Regulatory Authority, or as specified in the Owner's QA Program descriptions reviewed and approved by the Regulatory Authority.

(17) **1.6.2.1 DEFINITIONS**

The NBIC terms and definitions shall be supplemented, as applicable, by the terms and definitions of ASME Section III, Section XI, NQA-1, or other standards specified by the Regulatory Authority.

The following terms are as defined in the NBIC Glossary of Terms Section 9:

a) Authorized Inspection Agency

b) Authorized Nuclear Inspection Agency

c) Jurisdiction

d) "NR" Certificate Holder

TABLE 1.6.2.1
ACRONYMS

ASME	American Society of Mechanical Engineers
Applicant	An Organization applying for "NR" *Certificate of Authorization* (new or renewal)
CFR	Code of Federal Regulations
Code	ASME Code of Construction, Section III, Division I, (NCA, NB, NC, ND, NE, NF, NG, and NH) or ASME Section XI Rules for Inservice Inspection of Nuclear Power Plant Components as applicable.
Jurisdiction	Enforcement Authority
NB	National Board of Boiler and Pressure Vessel Inspectors
NBIC	National Board Inspection Code
NB-263, RCI-1	Rules for Commissioned Inspectors
NCA	ASME Section III, Subsection NCA, General Requirements for Division 1 and Division 2
NQA–1*	ASME Quality Assurance Requirements for Nuclear Facility Applications
NR	Nuclear Repair
"NR" CH	"NR" Certificate Holder
QA	Quality Assurance
QAI–1	ASME Qualifications for Authorized Inspection
QAM	Quality Assurance Manual
QAP	Quality Assurance Program
QC	Quality Control
WA	ASME Section III, Division 3, Subsection WA, General Requirements

Note:

* ~~Latest~~ Edition(s) endorsed by the Regulatory Authority

1.6.3 PREREQUISITES FOR ISSUING A NATIONAL BOARD "NR" *CERTIFICATE OF AUTHORIZATION* (17)

Before an organization can obtain a National Board "NR" *Certificate of Authorization*, the organization shall:

a) Have and maintain an inspection agreement with an Authorized Nuclear Inspection Agency accepted in accordance with NB-360, Criteria for Acceptance of Authorized Inspection Agencies for New Construction or accredited in accordance with NB-369, Qualifications and Duties for Authorized Inspection Agencies (AIAs) Performing Inservice Inspection Activities and Qualification of Inspectors of Boilers and Pressure Vessels.

b) Have a written Quality Assurance Program that complies with the requirements of this section and address all controls for the intended category and scope of activities.

c) Have a current edition of the NBIC.

s) Authorized Nuclear Inspector

Measures shall be taken to reference the commissioned rules for National Board Authorized Nuclear

Inspector, in accordance with NB-263, RCI-1 *Rules for Commissioned Inspectors*. The “NR” Certificate Holder shall ensure that the latest documents including the Quality Assurance Manual, procedures and instructions are made available to the Authorized Nuclear Inspector. The Authorized Nuclear Inspector shall be consulted prior to the issuance of a repair/replacement plan by the “NR” Certificate Holder in order that the Authorized Nuclear Inspector may select any in-process inspection or hold points when performing repair/replacement activities. The “NR” Certificate Holder shall keep the Authorized Nuclear Inspector informed of progress of the repair/replacement activity so that inspections may be performed. The Authorized Nuclear Inspector shall not sign Form NR-1 or Form NVR-1, as applicable, unless satisfied that all work carried out is in accordance with this Section. The Authorized Nuclear Inspector and Authorized Nuclear Inspector Supervisor shall have access to areas where work is being performed including subcontractors facilities in order to perform their required duties. The ANI shall be involved in dispositions and verification for non-conformances and corrective actions involving quality or code requirements.

t) Exhibits

Forms and exhibits referenced in the Quality Assurance Manual shall be explained in the text and included as part of the referencing document or as an appendix to the Quality Assurance Manual. Forms shall be controlled and identified to show the latest approved revision, name, and other corresponding references as stated in the Quality Assurance Manual.

Proposal NB17-0701 – Hellman – 7-16-18

NOTE: 7/16/18 - TG NR has voted to not add the originally proposed verbiage in 1.6.7.1 and 1.6.8.1, effectively closing Item NB17-0701 with no action.

1.6.7 QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR CATEGORY 2 ACTIVITIES

1.6.7.1 SCOPE

Owners or organizations other than owners shall have a written Quality Assurance Program meeting one of the criteria specified in Table 1.6.2 of this section. Organizations applying for a Category 2 "NR" *Certificate of Authorization* shall specify in their written Quality Assurance Program which program criteria their Quality Assurance Program follows. Owners shall have a Quality Assurance Program meeting the requirements of either 10 CFR 50, Appendix B or NQA-1 Part 1 and shall include the additional requirements specified in ASME Section XI, IWA-4142 when applicable. Organizations other than the owner shall comply with requirements specified in either 10 CFR 50, Appendix B supplemented as needed with the owner's QAP; NQA-1 Part 1; or NCA-4000. Organizations may elect to choose to follow all the rules specified in one of the allowed QAP criteria specified in Table 1.6.2 or they may elect to combine or supplement requirements from other specified QAP's. When organizations elect to combine QAP requirements, it shall be clearly specified and understood in the QAM which QAP requirement is being followed for each activity specified in their QAM. The following quality elements shall be specified and described within the QAM. ~~When Commercial Grade Dedication (CGD) is utilized, it shall be performed in accordance with NQA-1, Subpart 2.14.~~

(17)

1.6.7.2 QUALITY PROGRAM ELEMENTS

a) Organization

The authority and responsibility for individuals involved in activities affecting quality shall be clearly established and documented throughout the Quality Assurance Program and identified on a functional organizational chart contained within the QA Manual.

b) Quality Assurance Program (QAP)

1) Qualification of non-destructive examination personnel shall be as required by the code or as specified in the owner's Quality Assurance Program.

1.6.8 QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR CATEGORY 3 ACTIVITIES

1.6.8.1 SCOPE

Organizations requesting a Category 3 "NR" *Certificate of Authorization* may elect to follow the requirements specified in ASME NQA-1 Part 1 or follow specific Quality Assurance Program requirements outlined in other specified standards as required by the owner, Regulatory Authority or Jurisdiction. Organizations shall specify in the QAM what QAP requirements are followed. When standards other than ASME NQA-1 are followed, the organization shall have available a copy of that standard for review by the NB Survey Team and the ANIA, as applicable. Each organization shall, as a minimum, include in their written QAM the specified elements listed in Category 1 and/or 2 (1.6.6, 1.6.7) QAP requirements. Additional requirements, as specified within NBIC Part 3, 1.6.8 and 1.6.9 shall be included within the QAP. Also, limitations or additions to ASME NQA-1, as specified for Category 1 or 2 may be incorporated and referenced within the QAM. ~~When Commercial Grade Dedication (CGD) is utilized, it shall be performed in accordance with NQA-1, Subpart 2.14~~

(17) ### 1.6.8.2 QUALITY PROGRAM ELEMENTS

a) Organization

Persons and organization shall have authority and freedom to identify quality problems; initiate, recommend or provide solutions and verify implementation of solutions.

b) QAP

Shall account for special controls, processes, test equipment, tools and skills to obtain quality and for verification of quality by inspections and tests. Indoctrination, training and maintaining proficiency of personnel effecting quality shall be described. The status and adequacy of the QAP shall be regularly reviewed. The scope shall be included within the written QAM. The "NR" Certificate Holder shall make a current controlled copy of the Quality Assurance Manual available to the Authorized Nuclear Inspector and Authorized Nuclear Inspector Supervisor. The "NR" Certificate Holder shall address in their QAM the requirements for interfacing with the owner specified in 1.6.9 of this section.

c) Design Control

Established measures to assure approximate quality standards are specified and included in design documents. Any deviations shall be identified and controlled.

d) Document Control

Documents for procurement of material, equipment and services shall ensure regulatory requirements, design bases and other quality requirements and are included or referenced. Procurement documents shall require contractors or subcontractors provide a Quality Assurance Program consistent with the provisions specified in this NBIC Part 3, 1.6.8.

e) Instructions, Procedures and Drawings

Activities affecting quality shall be accomplished in accordance with prescribed instructions, procedures or drawings and shall include approximate quantitative or qualified acceptance criteria to determine activities are satisfactorily accomplished.

f) Document Control

Shall define measures to control the preparation, issuance, use, approval, revisions and distribution of all documents related to quality.

17-179

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

5.1 SCOPE

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

5.2 DOCUMENTATION

a) Repairs that have been performed in accordance with the NBIC shall be documented on a Form R-1, *Report of Repair*, as shown in this section. A Form R-4, *Report Supplement~~ary~~ Sheet*, 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 this section. A Form R-4, *Report Supplement~~ary~~ Sheet*, 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.

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

a) Using the instructions found at NBIC Part 3, 5.12.4.1 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.

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

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

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

a) Using the instructions found at NBIC Part 3, 5.12.4.2, 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 ~~reports~~ 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 ~~Parts~~ 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

a) Using the instructions found at NBIC Part 3, 5.12.4.3 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

a) Using the instructions found at NBIC Part 3, 5.12.4.4 preparation of Form R-4 shall be the responsibility of the "R" Certificate Holder responsible for performing the work.

SKIP 5.3 through 5.11

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~~S~~*, NB-229

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

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

5.12.4.1 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM ~~"R" REPORTS~~ R-1

These instructions are to be used when completing the National Board Form ~~"R" Reports~~ R-1, Report of Repair. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form ~~"R" Reports~~ R-1 shown in NBIC Part 3, 5.12.1 ~~through 5.12.4~~. 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.

INFO NOTE: DELETE NUMBERS 1 THROUGH 55 and INSERT 1 THROUGH 40 LISTED BELOW ALONG WITH 5.12.4.2, 5.12.4.3, and 5.12.4.4

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 organization performing 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 or Authorization number.

29) Indicate month, day, and year that the "R" Certificate or 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) 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.

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

INFO NOTE: THE FORM R-2 ON PAGE 91 DOES NOT HAVE THE "BUBBLED' NUMBERS. USE (INSERT) TEMPLATE FROM THE R-2 GUIDE FOR NUMBERING

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 organization performing 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 or Authorization number.

30) Indicate month, day, and year that the “R” Certificate or 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) 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.

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 manufacturers "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) 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.

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) 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 Province numbers.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 15, (03/10/18)

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.)

1. WORK PERFORMED BY: 5 (name of repair organization) — 4 (P.O. no., job no., etc.)

(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) 15 (addenda)

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

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

18

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

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

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

. REMARKS:

24

Attachment Page 32 of 94

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 15, (03/10/18)

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, 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

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.)

1a. DESIGN PERFORMED BY: 5 (name of "R" organization responsible for design) 4 (P.O. no., job no., etc.)

(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

Attachment Page 34 of 94

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

25
(Form "R" Registration no.)

26
(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)

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.)

1. MANUFACTURED BY: 4 (name of "R" certificate holder) — 5 (P.O. no., job no., etc.)

(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.
	21	22	23	24	25	26	27	28	29

7 REMARKS:

30

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)

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)

Subject	Code Revision to Part 3, 2.5.3.6
File Number	NB18-12 **Prop. on Pg.** 2
Proposed Revision	
Statement of Need	The revision is to Welding Method 6 to allow for weld build-up limited to 100 square inches on only Grade 91 tube OD surfaces for local erosion or mechanical damage.
Project Manager	John Siefert/G. Galanes
SubGroup	**SG Meeting Date**
Negatives	

Background;
Welding Method 6 was successfully introduced into the NBIC, part 3 to permit butt weld repair with no PWHT. This action permits weld build-up of the Grade 91 tubes within the boiler setting and same limitations to repair erosion or mechanical damage without the need for complete tube replacement. To ensure adequate controls, the size of the repair are using a weld overlay is limited to 100 square inches.

Item 18-12

2.5.3.6 WELDING METHOD 6

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

a) This method is limited to butt welds or weld build-up repairs limited to 100 square inches (64,500 square mm) or less in size in tubing NPS 5 (DN 125) or less in diameter and ½ in. (13 mm) or less in wall thickness for which the applicable rules of the original code of construction did not require notch toughness testing;

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

c) Upon the completion of weld repair, the repair area shall be kept above the dew point temperature so that condensation does not form on the repair surface before returned to service or a moisture-barrier coating shall be applied to the surface.

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

2) The welding shall be limited to the SMAW and/or GTAW processes, manual or automatic, using suitably controlled maintenance procedures to avoid contamination by hydrogen producing sources. The surface of the metal shall be free of contaminants and kept dry.

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

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

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

a. The minimum preheat for the GTAW process shall be 200°F (100°C). The minimum preheat for the SMAW process shall be 300°F (150°C). The preheat temperature shall be checked to ensure the minimum preheat temperature is maintained during welding and until welding is completed. The maximum interpass temperature shall be 550°F (290°C).

b. When the SMAW process is specified for a fill pass layer, the electrode diameter is restricted to a maximum size of 1/8 in. (3.2 mm). When the GTAW-process is specified any limits in filler size is to be shown on the WPS.

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

d. The filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43 and limited to the following consumables: ERNiCr-3, ENiCrFe-3, ENiCrFe-

2, ASME B&PV Code Cases 2733 and 2734 (e.g. EPRI P87); or
e. A martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.
f. For weld build-up repairs due to wastage, the filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43. There is not a limit on the consumable for this repair application.

Subject Code Revision to Part 3, 2.5.3.6

File Number NB18-13 **Prop. on Pg.** 2

Proposed Revision

Statement of Need The revision is to add a new Welding Method 7 to allow for dissimilar metal welding of Grade 91 to austenitic steels and low alloy steels in a boiler setting and limited to butt welds, in accordance with approved welding method 6.

Project Manager John Siefert/G. Galanes

SubGroup **SG Meeting Date**

Negatives

Background;
Welding Method 7 is being introduced to permit dissimilar metal weld repair with no PWHT between Grade 91 boiler tubes to austenitic steels and low alloy ferritic steels. This action permits DMW of Grade 91 tubes within the boiler setting following welding method 6 with no PWHT.

NB Item 18-13
2.5.3.7 WELDING METHOD 7

This repair method provides requirements for dissimilar metal welding (DMW) of Grade 91 tube material to either austenitic or low alloy ferritic steel tubing within the steam boiler setting. When using this welding method, the following applies:

a) This method is limited to butt welds in tubing NPS 5 (DN 125) or less in diameter and ½ in. (13 mm) or less in wall thickness for which the applicable rules of the original code of construction did not require notch toughness testing;

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

c) Upon the completion of weld repair, the repair area shall be kept above the dew point temperature so that condensation does not form on the repair surface before returned to service or a moisture-barrier coating shall be applied to the surface.

For DMW of Grade 91 to austenitic steel steel tubing;

1) The materials shall be limited to P-No 15E, Group 1, Grade 91, creep strength enhanced ferritic steel (CSEF) joined to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45, as permitted for welded construction by the applicable rules of the original code of construction.~~.~~

2) The welding shall be limited to the SMAW and GTAW processes, manual or automatic, using suitably controlled maintenance procedures to avoid contamination by hydrogen producing sources. The surface of the metal shall be free of contaminants and kept dry.

3) The welding procedure qualification test coupon shall be P-No 15 E, Group 1, Grade 91 joined to either P-No. 8, P-No. 42, P-No. 43, or P-No. 45 and as required for the repair application.

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

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

a). The minimum preheat for the GTAW process shall be 200°F (100°C). The minimum preheat for the SMAW process shall be 300°F (150°C). The preheat temperature shall be checked to ensure the minimum preheat temperature is maintained during welding and until welding is completed.

The maximum interpass temperature shall be 550°F (290°C).

b). When the SMAW process is specified for a fill pass layer, the electrode diameter is restricted to a maximum size of 1/8 in. (3.2 mm). When the GTAW-process is specified any limits in filler size is to be shown on the WPS.

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

d). The filler metal shall be limited to an austenitic, nickel-base filler metal having a designation F-No. 43 and limited to the following consumables: ERNiCr-3 (e.g., Filler Metal 82), ENiCrFe-3 (e.g., INCONEL Welding Electrode 182), ENiCrFe-2 (e.g., INCO-WELD A), ASME B&PV Code Cases 2733 and 2734 (e.g. EPRI P87);
~~e. A martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.~~

For DMW of Grade 91 to low alloy (P-No 5A) steel tubing;

1) The materials shall be limited to P-No 15E, Group 1, Grade 91, creep strength enhanced ferritic steel (CSEF) joined to P-No. 5A steel.

2) The welding shall be limited to the SMAW and/or GTAW processes, manual or automatic, using suitably controlled maintenance procedures to avoid contamination by hydrogen producing sources. The surface of the metal shall be free of contaminants and kept dry.

3) The welding procedure qualification test coupon shall be P-No 15 E, Group 1, Grade 91 joined to P-No. 5A steels.

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

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

(a). The minimum preheat for the GTAW process shall be 200°F (100°C). The minimum preheat for the SMAW process shall be 300°F (150°C). The preheat temperature shall be checked to ensure the minimum

preheat temperature is maintained during welding and until welding is completed. The maximum interpass temperature shall be 550°F (290°C).

(b). When the SMAW process is specified for a fill pass layer, the electrode diameter is restricted to a maximum size of 1/8 in. (3.2 mm). When the GTAW-process is specified any limits in filler size is to be shown on the WPS.

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

(d). The filler metal shall be limited to a martensitic, iron-base filler metal having a designation F-No. 4 or F-No. 6 and limited to the following consumables: E8015-B8, E8018-B8 or ER80S-B8.

NB Item # 18-14, Update NBIC Part 3, Clause 2.3 and Table 2.3

Revise Clause 2.3 to recognize Re-affirmed, Amended and Revised SWPS confirming that suitability is as listed in Table 2.3

EXISTING TEXT

2.3 STANDARD WELDING PROCEDURE SPECIFICATIONS

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 SWPSs. 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.

b) The AWS reaffirms SWPSs in accordance with ANSI procedures. When reaffirmation occurs without revision to the SWPS, the letter "R" is added to the SWPS designation prior to the year. Such designation is considered to be identical with the previously published version and may be used pending incorporation herein, on the same basis as the version listed in NBIC Part 3, Table 2.3.

PROPOSED REVISION

2.3 STANDARD WELDING PROCEDURE SPECIFICATIONS

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 SWPSs. 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.

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

- Reaffirmed SWPSs: When reaffirmation occurs without revision to the SWPS, the letter R is added to the SWPS designation.
- Amended SWPSs: When an amendment occurs the initials 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.
- 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.

See the addition of 5 amended SWPS Highlighted in Red Type and 1 SWPS correction also Highlighted in Red; Type

Carbon Steel — (P1 Materials)

SMAW — Shielded Metal Arc Welding	
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Carbon Steel, (M-1/P-1, Group 1 or 2), 3/16 in. (5 mm) through 3/4 in. (19 mm), in the As-Welded Condition, With Backing.	B2.1.001-90 and B2.1-1-001: 90(R2006)
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E7018, As-Welded or PWHT Condition.	B2.1-1-016-94 and B2.1-1-016-94R
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E6010, As-Welded or PWHT Condition.	B2.1-1-017-94 and B2.1-1-017-94R
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E6010 (Vertical Uphill) followed by E7018, As-Welded or PWHT Condition.	B2.1-1-022-94 and B2.1-1-022-94R
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E6010 (Vertical Downhill) followed by E7018, As-Welded or PWHT Condition.	B2.1-1-026-94 and B2.1-1-026-94R
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. (3.2 mm) through 3/4 in. (19 mm) Thick, E6010 (Vertical **Uphill**) followed by E7018, (Vertical Uphill) As-Welded Condition, Primarily Pipe Applications.	B2.1-1-201-96, and B2.1-1-201-96(R2007)
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. (3.2 mm) through 3/4 in. (19 mm) thick, E6010 (Vertical Downhill) followed by E7018 (Vertical Uphill), As-Welded Condition, Primarily Pipe Applications.	B2.1-1-202-96(R2007)
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. (3.2 mm) through 3/4 in. (19 mm) Thick, E6010 (Vertical Uphill), As-Welded Condition, Primarily Pipe Applications.	B2.1-1-203-96 and B2.1-1-203-96(R2007)
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. (3.2 mm) through 3/4 in. (19 mm) Thick, E6010 (Vertical downhill root with balance vertical uphill), As-Welded Condition, Primarily Pipe Applications.	B2.1-1-204-96 and B2.1-1-204-96(R2007)
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E6010 (Vertical Uphill) followed by E7018 (Vertical Uphill), As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-205-96 and B2.1-1-205-96(R2007)
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. (3.2 mm) through 3/4 in. (19 mm) Thick, E6010 (Vertical Downhill) followed by E7018 (Vertical Uphill), As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-206-96 and B2.1-1-206-96(R2007)
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. (3.2 mm) through 3/4 in. (19 mm) Thick, E7018, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-208-96
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. (3.2 mm) through1 ½ in. (38 mm) Thick, E7018, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-208-96(R2007)
GTAW — Gas Tungsten Arc Welding	
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel, (M-1/P-1, Group 1 or 2), 3/16 in. (5 mm) through 7/8 in. (22 mm) Thick, in the As-Welded Condition, With or Without Backing.	B2.1-002-90, B2.1-002-90(R2006) and B2.1-1-002-90R
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Application.	B2.1-1-207-96

Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1 ½in. (38 mm) Thick, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Application.	B2.1-1-207-96 (R2007)
Standard Welding Procedure Specification for Gas Tungsten Arc Welding (Consumable Insert) of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, INMs1 and ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Application.	B2.1-1-210-96
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. (3.2 mm) through 1-1/2 in. (38 mm) Thick, INMs-1, ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-210:2001 R2012
FCAW — Flux Core Arc Welding	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E71T-8, As-Welded Condition.	B2.1-1-018-94 and B2.1-1.018-94R
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E70T-1 and E71T-1, As-Welded Condition.	**B2.1-1-019-94, B2.1-1-019-94R and B2.1-1-94 AMD1**
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. (3.2 mm) through 1-1/2 in. (38 mm) Thick, E70T-1M and E71T-1M, As-Welded or PWHT Condition.	**B2.1-1-020-94, B2.1-1-020-94R and B2.1-1-020 94-AMD1**
Standard Welding Procedure for Self-Shielded Flux Cored Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 1/2 in. (13 mm) Thick, E71T-11, As-Welded Condition.	B2.1-1-027:1995 and B2.1-1-027-1998
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E7XT-XM, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-234: 2006
GMAW – Gas Metal Arc Welding	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER70S-3, Flat Position Only, 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. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER70S-3, Flat Position Only, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-235: 2006
GTAW/SMAW Combination of Welding Processes	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER70S-2 and E7018, As-Welded or PWHT Condition.	B2.1-1-021-94 and B2.1-1-021-94R
Standard Welding Procedure Specification for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2), 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, ER70S-2 and E7018, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-209-96
Standard Welding Procedure Specification for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2), 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER70S-2 and E7018, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-209-96 (R2007)
Standard Welding Procedure Specification for Gas Tungsten Arc Welding (Consumable Insert) Followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, INMs1 and E7018, As-	B2.1-1-211-96

Welded or PWHT Condition, Primarily Pipe Applications.	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, INMs-1, ER70S-2, and E7018 As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-211:2001 R2012
GMAW/FCAW – Combination of Welding Processes	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER70S-3 and EXT-X, As-Welded or PWHT Condition, Primarily Pipe Applications.	B2.1-1-232:2006

Austenitic Stainless Steel — (M8/P8/S8 Materials)

SMAW — Shielded Metal Arc Welding	
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1½ in. (38 mm) Thick, As-Welded Condition.	B2.1-8-023-94
Standard Welding Procedure Specification for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1½ in. (38 mm) Thick, E3XX-XX, As-Welded Condition, Primarily Pipe Application.	B2.1-8-213-97 and B2.1-8-213-96(R2007)
GTAW — Gas Tungsten Arc Welding	
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition.	B2.1-8-024-94
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1 ½ in. (38 mm) Thick, ER3XX, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-8-024:2001
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1 ½ in. (38 mm) Thick, ER3XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-212-97
Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 in. (1.6 mm) through 1 ½ in. (38 mm) thick, ER3XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-212:2001 R2012
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, IN3XX and ER3XX As-Welded Condition, Primarily Pipe Applications.	B2.1-8-215:1998 B2.1-8-215:2001 R2012
Combination Processes GTAW/SMAW	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition.	B2.1-8-025-94
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Plate and Structural Applications.	B2.1-8-025:2001
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-214-97
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Pipe Applications.	B2.1-8-214:2001 R2012

Standard Welding Procedure Specification for Gas Tungsten Arc Welding With Consumable Insert Followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) thick, IN3XX, ER3XX, and E3XX-XX As-Welded Condition, Primarily Pipe Application.	B2.1-8-216-1998
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, IN3XX, ER3XX, and E3XX-XX As-Welded Condition, Primarily Pipe Applications.	B2.1-8-216:2001 R2012

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

SMAW — Shielded Metal Arc Welding	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, E309 (L)-15, -16, or -17, As-Welded Condition, Primarily Pipe Applications.	B2.1-1/8-228:2002 R2013
GTAW — Gas Tungsten Arc Welding	
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. (38 mm) Thick, ER309 (L), As-Welded Condition, Primarily Pipe Applications.	**B2.1-1/8-227:2002, 2002 AMD1 and R2013**
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. (38 mm) Thick, IN309 and ER309(L), As-Welded Condition, Primarily Pipe Applications.	**B2.1-1/8-230:2002, 2002 AMD1 and R2013**
GTAW/SMAW Combination of Welding Processes	
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. (3.2 mm) through 1½ in. (38 mm) Thick, ER309(L) and E309(L)-15, -16, or -17, As-Welded Condition, Primarily Pipe Applications.	**B2.1-1/8-229:2002, 2002-AMD1 and R2013**
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. (3.2 mm) through 1¼ in. (38 mm) 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.	B2.1-1/8-231:2002 R2015

Chromium Molybdenum Steel (M4/P4 and M5a/P5A Materials)

SMAW — Shielded Metal Arc Welding	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1½ in. (38 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-4-218:1999 R2009
Standard Welding Procedure Specifications for Shielded Metal Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), E9018-B3, 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1½ in. (38 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-5A-223:1999 R2009
GTAW — Gas Tungsten Arc Welding	
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-4-217:1999 R2009
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19	B2.1-4-220:1999

mm) Thick, PWHT Condition, IN515 and ER80S-B2, Primarily Pipe Applications.	R2009
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding of Chromium-Molybdenum Steel (M-5A/P-5A), ER90S-B3, 1/8 in. (3.2 mm) through 1½ in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, PWHT Condition, Primarily Pipe Applications.	B2.1-5A-222:1999 R2009
Standard Welding Procedure Specifications for Gas Tungsten Arc Welding (Consumable Insert Root) of Chromium-Molybdenum Steel (M-5A/P-5A), 1/8 in. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 3/4 in. (19 mm) Thick, PWHT Condition, IN521 and ER90S-B3, Primarily Pipe Applications.	B2.1-5A-225:1999 R2009
Chromium-Molybdenum Steel Processes GTAW/SMAW	
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. (3.2 mm) through 1-1/2 in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) Thick, PWHT Condition, IN515, ER80S-B2, and E8018-B2, Primarily Pipe Applications.	B2.1-4-221:1999 R2009
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) Thick, PWHT Condition, ER90S-B3 and E9018-B3, Primarily Pipe Applications.	B2.1-5A-224:1999 R2009
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. (3.2 mm) through 1 ½ in. (38 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) Thick, PWHT Condition, IN521, ER90S-B3, and E9018-B3, Primarily Pipe Applications.	B2.1-5A-226:1999 R2009
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. (3.2 mm) through 1/2 in. (13 mm) Thick, As-Welded Condition, 1/8 in. (3.2 mm) through 1 ½ in. (38 mm) Thick, PWHT Condition, ER80S-B2 and E9018-B2, Primarily Pipe Applications.	B2.1-4-219:199 R2009

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

1.1 SCOPE

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

b) The National Board administers ~~three~~ four specific accreditation programs:

1) “R” — Repairs and Alterations to Pressure-Retaining Items
2) “NR” — Repair and Replacement Activities for Nuclear Items
3) “VR” — Repairs to Pressure Relief Valves
4) “T/O” – Test Only ~~In-service testing only~~ of Pressure Relief Valves

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

1) NB-415, ACCREDITATION OF “R” REPAIR ORGANIZATIONS
2) NB-417, ACCREDITATION OF “NR” REPAIR ORGANIZATIONS
3) NB-514, ACCREDITATION OF “VR” REPAIR ORGANIZATIONS
4) NB-528, ACCREDITATION OF “T/O” TEST ONLY ORGANIZATIONS

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

REQUEST FOR CODE REVISION

The following are proposed revisions to Part 3 Section 2 and the Glossary. The proposal expands Section 2 to include rules for brazing and fusing and definitions for brazing, fusing and welding in the Glossary.

EXPLANATION

In a recent request for revision to the rules relating to locomotive boilers, it was proposed to allow brazing on certain boiler parts. While considering the proposal, it was noted that the NBIC does not yet provide rules for brazing. While developing this proposal for revision, it was decided to expand Part 3 Section 2 to include fusing as well as brazing.

CURRENT	PROPOSED	MODIFIED
PART 3, SECTION 2 REPAIRS AND ALTERATIONS — WELDING AND HEAT TREATMENT	**PART 3, SECTION 2 REPAIRS AND ALTERATIONS — WELDING, BRAZING, FUSING AND HEAT TREATMENT**	No changes to proposal.
2.1 SCOPE This section provides requirements and guidelines for welding and heat treating when performing welded repairs and alterations to pressure-retaining items. Careful consideration shall be given to pressure-retaining items that have been fabricated of either creep strength enhanced ferritic materials or ferritic materials enhanced by heat treatment. The tensile and creep strength properties of these materials can be degraded by not following specific welding and heat treatment requirements. The user is cautioned to seek technical guidance for welding and heat treating requirements in accordance with the original code of construction.	**2.1 SCOPE** a) This section provides requirements and guidelines for welding, brazing, fusing and heat treating when performing ~~welded~~ repairs and alterations to pressure-retaining items. b) Careful consideration shall be given to pressure-retaining items that have been fabricated of either creep strength enhanced ferritic steel materials or ferritic steel materials enhanced by heat treatment. The tensile and creep strength properties of these materials can be degraded by not following specific welding procedure specification and heat treatment requirements. The user is cautioned to seek technical guidance for welding and heat treating requirements for these materials in accordance with the original code of construction.	Add subparagraph (c) in response to Mr. Richard's comment. (c) Careful consideration shall be given to pressure-retaining items that have been previously ~~repaired by brazing~~ brazed to preclude the possibility of degrading the prior work.
2.2 WELDING Welding shall be performed in accordance with the	**2.2 WELDING, BRAZING AND FUSING** Welding, brazing and fusing shall	No change to proposal.

requirements of the original code of construction used for the pressure-retaining item whenever possible.	be performed in accordance with the requirements of the original code of construction used for the pressure-retaining item whenever possible.	
2.2.1 WELDING PROCEDURE SPECIFICATIONS Welding shall be performed in accordance with Welding Procedure Specifications (WPS) qualified in accordance with the original code of construction or the construction standard or code selected. When this is not possible or practicable, the WPS may be qualified in accordance with ASME Section IX.	**2.2.1 ~~WELDING~~ 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 ~~Welding Procedure Specifications (WPS)~~ 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 ~~WPS~~ procedure specification may be qualified in accordance with ASME Section IX.	No change to proposal.
2.2.2 STANDARD WELDING PROCEDURE SPECIFICATIONS An “R” Certificate Holder may use one or more applicable Standard Welding Procedure Specifications (SWPS) shown in NBIC Part 3, Table 2.3 without supporting Procedure Qualification Records (PQRs) since SWPS are pre-qualified.	No change to this paragraph.	No change to proposal.
2.2.3 PERFORMANCE QUALIFICATION Welders and welding operators shall be qualified for the welding processes that are used. Such qualification shall be in accordance with the requirements of the original code of construction, the construction standard, code selected or ASME Section IX. Use of a Standard Welding Procedure Specification shown in NBIC Part 3, 2.3 is permitted for performance qualification testing.	**2.2.3 PERFORMANCE QUALIFICATION** ~~Welders and welding operators shall be qualified for the welding processes that are used~~. The “R” Certificate Holder shall qualify the performance of personnel for each process they will use for repairs and alterations of pressure retaining items. Such qualification shall be in accordance with the requirements of the original code of construction, the construction standard, code selected, or ASME Section IX. Use of a Standard Welding Procedure Specification shown in NBIC Part 3, 2.3 is permitted for performance qualification testing.	No change to proposal.

2.2.4 WELDING RECORDS The "R" Certificate Holder shall maintain a record of the results obtained in Welding Procedure Qualifications, except for those qualifications for which the provisions of NBIC Part 3, 2.2.2 are used and of the results obtained in welding performance qualifications. These records shall be certified by the "R" Certificate Holder and shall be available to the Inspector.	**2.2.4 ~~WELDING~~ QUALIFICATION RECORDS** The "R" Certificate Holder shall maintain a record of the results obtained in ~~Welding Procedure Qualifications,~~ procedure specification qualification (except for those qualifications for which the provisions of NBIC Part 3, 2.2.2 are used) and of the results obtained in ~~welding~~ performance qualifications. These records shall be certified by the "R" Certificate Holder and shall be available to the Inspector.	No change to proposal.
2.2.5 WELDER'S IDENTIFICATION The "R" Certificate Holder shall establish a system for the assignment of a unique identification mark to each welder/welding operator qualified in accordance with the requirements of the NBIC. The "R" Certificate Holder shall also establish a written procedure whereby welded joints are identified as to the welder or welding operator who made them. This procedure shall use one or more of the following methods and be acceptable to the Inspector. The welder's or welding operator's identification mark may be stamped (low stress stamp) adjacent to welded joints made by the individual, or the "R" Certificate Holder may keep a documented record of welded joints and the welders or welding operators used in making the joints.	**2.2.5 ~~WELDER'S~~ QUALIFIED PERSONNEL IDENTIFICATION** The "R" Certificate Holder shall establish a system for the assignment of a unique identification mark to each ~~welder/welding operator~~ person qualified in accordance with the requirements of the NBIC. The "R" Certificate Holder shall also establish a written procedure whereby ~~welded~~ production joints are identified and traceable to the person ~~as to the welder or welding operator~~ who made them. This procedure shall use one or more of the following methods and be acceptable to the Inspector. a) The ~~welder's or welding operator's~~ person's identification mark may be stamped (low stress stamp, if used) adjacent to ~~welded~~ production joints made by the individual, or, b) the "R" Certificate Holder may keep a documented record of ~~welded~~ production joints and the ~~welders or welding operators~~ persons used in making the joints.	No change to proposal.
2.2.6 WELDER'S CONTINUITY The performance qualification of a welder or welding operator shall be affected when one of the following conditions occur: a) When the welder or welding operator has not welded using a specific process during a period of six months or more, their	**2.2.6 ~~WELDER'S~~ CONTINUITY OF QUALIFIED PERSONNEL** The performance qualification of a ~~welder or welding operator~~ qualified person shall be affected when one of the following conditions occur: a) When the ~~welder or welding operator~~ person has not ~~welded using~~ used a specific process during a period of six months or	No change to proposal.

qualifications for that process shall expire; or b) When there is specific reason to question a welder's ability to make welds that meet the specification, the qualification which supports the welding that is being performed shall be revoked. All other qualifications not questioned remain in effect.	more, their qualifications for that process shall expire; or b) When there is specific reason to question ~~a welder's~~ the person's ability to make ~~welds~~ joints that meet the specification, the qualification which supports the ~~welding~~ process that is being performed shall be revoked. All other qualifications not questioned remain in effect.	
2.2.6.1 WELDER'S CONTINUITY RECORDS a) The "R" Certificate Holder shall maintain a welding continuity record and shall make the record available to the Inspector. b) The method of recording welding continuity and the record retention period shall be described in the "R" Certificate Holder's Quality System Manual. c) When there is specific reason to question a welder's ability to make welds that meet the specification, the qualification which supports the welding that is being performed shall be revoked. All other qualifications not questioned remain in effect.	**2.2.6.1 ~~WELDER'S~~ PROCESS CONTINUITY RECORDS** a) The "R" Certificate Holder shall maintain ~~a welding~~ process continuity records and shall make the records available to the Inspector. b) The method of recording ~~welding~~ process continuity and the record retention period shall be described in the "R" Certificate Holder's Quality System Manual. c) When there is specific reason to question a ~~welder's~~ person's ability to make ~~welds~~ joints that meet the specification, the qualification which supports the ~~welding~~ process that is being performed shall be revoked. All other qualifications not questioned remain in effect.	No change to proposal.
2.3 STANDARD WELDING PROCEDURE SPECIFICATIONS	No change to this paragraph	No change to proposal.
2.4 AWS REFERENCE STANDARDS	No change to this paragraph.	No change to proposal.
2.5 HEAT TREATMENT	**2.5 HEAT TREATMENT**	No change to proposal.
2.5.1 PREHEATING a) Preheating may be employed during welding to assist in completion of the welded joint. The need for and the temperature of preheat are dependent on a number of factors such as chemical analysis, degree of restraint of the items being joined, material thickness, and mechanical properties. The Welding Procedure Specification for the material being welded shall specify the preheat temperature requirements.	**2.5.1 PREHEATING** a) Preheating may be employed during ~~welding~~ use of a process to assist in completion of the ~~welded~~ joint. The need for and the temperature of preheat are dependent on a number of factors such as chemical analysis, degree of restraint of the items being joined, material thickness, and mechanical properties. The ~~Welding Procedure Specification~~ procedure specification for the material being ~~welded~~ joined shall specify the preheat temperature requirements. b) See minimum temperatures for	No change to proposal.

b) See minimum temperatures for preheating given in NBIC Part 3, Table 2.5.1 as a general guide. It is cautioned that the preheating temperatures listed do not necessarily ensure satisfactory completion of the welded joint. Requirements for individual materials within the P-Number listing may have preheating requirements more or less restrictive than this general guide. When reference is made in this section to materials by the ASME designation, P-Number and Group Number, the suggestions of this section apply to the applicable materials of the original code of construction, either ASME or other, which conform by chemical composition and mechanical properties to ASME materials having the ASME P-Number and Group Number designations.	preheating given in NBIC Part 3, Table 2.5.1 as a general guide. It is cautioned that the preheating temperatures listed may not be the same as those of the original code of construction and do not necessarily ensure satisfactory completion of the ~~welded~~ joint. Requirements for individual materials within the P-Number listing may have preheating requirements more or less restrictive than this general guide. When reference is made in this section to materials by the ASME designation, P-Number and Group Number, the suggestions of this section apply to the applicable materials of the original code of construction, either ASME or other, which conform by chemical composition and mechanical properties to ASME materials having the ASME P-Number and Group Number designations.	
TABLE 2.5.1 MINIMUM TEMPERATURES FOR PREHEATI	No change to this Table.	No change to proposal.
2.5.2 POSTWELD HEAT TREATMENT (PWHT) a) Postweld heat treatment shall be performed as required by the original code of construction, the construction standard or code selected in accordance with a written procedure. The procedure shall contain the parameters for postweld heat treatment.	No change to this paragraph.	No change to proposal.
No additional changes for the remainder of Part 3 Section 2.		No change to proposal.
PART 3, SECTION 9 REPAIRS AND ALTERATIONS—GLOSSARY OF TERMS **9.1 DEFINITIONS**	**PART 3, SECTION 9 REPAIRS AND ALTERATIONS—GLOSSARY OF TERMS** **9.1 DEFINITIONS**	No change to proposal.
	Add the following:	

	Brazing – see Welding	No change to proposal.
	Fusing – see Welding	No change to proposal.
	Welding (Brazing, Fusing) – a group of processes which produce a localized coalescence of metal or nonmetal materials.	Add “d” to “localize” so it reads “localized”.

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Repair Form Guides on Web – Hellman – 3-23-18

CODE REVISION AND ADDITION

Proposed Revisions or Additions

Proposing revision to Part 3, 5.12 by removing:

- the general instructions for completing all "R" Report forms in paragraph 5.12.4.1,
- the instructions for completing "NR" Report forms in paragraph 5.12.5.1, and
- the instructions for completing "NVR" Report forms in paragraph 5.12.6.1

Proposing revision to Part 3, by adding a new paragraph (5.13 – Instructions for Completing National Board Form "R", "NR", and "NVR" Reports) that would make reference to the National Board website for the latest revision and current instructions on completing each specific form.

Blank "R", "NR", and "NVR" forms can be left in place as "example forms", but the balloon numbers identifying each field within the forms are to be deleted.

The proposed text revision can be seen in the attached document: 2017NBICPart3 – R and NR Forms and Guides – Web Reference – Hellman – 3-23-18 (ATTACHMENT 1).

Statement of Need

Currently, instructions for completing all National Board "R" Reports are under a single paragraph (5.12.4.1). Due to revisions of specific forms, these general instructions no longer coincide with all intended report forms (R-1, R-2, R-3, and R-4).

Proposed addition of paragraph 5.13 will reference the National Board website for the instructions specific to each Report of Repair, as well as the instructions for "NR" and "NVR" forms. This will help ensure that the most current revision of all Report forms are used and completed correctly.

Background Information

A screen shot of the NBIC website with the specific instructions for reference is attached (ATTACHMENT 2).

A copy of the "GUIDE FOR COMPETING NATIONAL BAORD FORM R-2, REPORT OF ALTERATION" is attached as an example of the instructions available on the website (ATTACHMENT 3).

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*, see Pg. ~~89~~

5.12.2 FORM R-2, *REPORT OF ALTERATIONS*, see Pg. ~~91~~

5.12.3 FORM R-3, *REPORT OF PARTS FABRICATED BY WELDING*, see Pg. ~~93~~

5.12.4 FORM R-4, *REPORT SUPPLEMENTARY SHEET*, see Pg. ~~95~~

~~5.12.4.1 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM "R" REPORTS~~

~~These instructions are to be used when completing the National Board Form "R" Reports. When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the Form "R" Reports shown in NBIC Part 3, 5.12.1 through 5.12.4.~~

~~1)The name and address of the "R" Certificate Holder performing the work as it appears on the "*Certificate of Authorization*". On a Form R-2, the organization that performed the design work will complete line 1a) and the organization completing the construction activities will complete line 1b).~~

~~2)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 3,5.6, a log shall be maintained identifying sequentially, any Form "R" registered with the National Board. For re-rating only, the Design Organization registers the Form R-2. Where physical work is also performed, the Construction Organization registers the Form R-2.~~

~~3)Name and address of the owner of the pressure-retaining item.~~

~~4)Name and address of plant or facility where the pressure-retaining item is installed.~~

~~5)Description of the pressure-retaining item, such as boiler or pressure vessel, or piping. Include the applicable unit identification.~~

~~6)Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, indicate by, "unknown."~~

7) 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."

8) 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."

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

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

11) Indicate the name, section, division, edition, and addenda of the original code of construction for the pressure-retaining item. Also indicate the name, section, division, edition, and addenda of the construction code used for the work being performed. If code cases are used, they shall be identified in the "Remarks" section.

12) 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 or alteration (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 or alteration 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 needed to describe the scope of work, a Form R-4 shall be used and attached. Information determined to be of a proprietary nature need not be included, but shall be stated on the form.

13) Indicate test pressure applied.

14) 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.

15) Indicate any additional information pertaining to the work involved (e.g., routine repairs, code cases). For Form R-3, 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.

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

17) Indicate National Board "R" Certificate or Authorization number.

18) Indicate month, day, and year that the "R" certificate expires.

19) Enter date certified.

20) 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.

21) Signature of authorized representative.

22) Type or print name of Inspector.

23) Indicate Inspector's Jurisdiction.

24) Indicate Inspector's employer.

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

26) Indicate month, day, and year of inspection by Inspector. In case of routine repairs this shall be the month, day, and year the Inspector reviews the completed routine repair package.

27) Signature of Inspector.

28) National Board commission number of Inspector, and when required by the Jurisdiction, the applicable State or Provincial numbers.

29) 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.

30) Document name of organization responsible for specifying the code design conditions, if known. If origin of design conditions are unknown, state "unknown."

31) Document name of organization responsible for performing the code design, if known. If code design organization is unknown, state "unknown."

32) Name, section, and division of the design code, if known. If the design is unknown, state "unknown"

33) Indicate code edition year used for fabrication.

34) Indicate code addenda date used for fabrication.

35) Indicate the code paragraph reference for formula used to establish the MAWP, if known. If the code reference of the formula is unknown, state "unknown."

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

37) Indicate quantity of named parts.

38) Match line number references for identification of parts and description of parts.

39) Indicate manufacturer's serial number for the named part.

40) Indicate drawing number for the named part.

41) Indicate maximum allowable working pressure for the part, if known.

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

43) Indicate the complete material specification number and grade.

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

45) Indicate shape as fat, dished, ellipsoidal, or hemispherical.

46) Indicate minimum thickness after forming.

47) Indicate outside diameter.

48) Indicate minimum thickness of tubes.

49) Complete information identical to that shown on the Form "R" to which this sheet is supplementary.

50) Indicate the Form "R" type. Example: Form R-1, Form R-2, Form R-3.

51) Indicate the reference line number from the Form R to which this sheet is supplementary.

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

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

54)Indicate the maximum allowable working pressure of the pressure-retaining item.

55)Indicate the type of repair, e.g., welded, graphite pressure equipment, or fiber-reinforced plastic pressure equipment.

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.

5.13 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM “R”, “NR”, and “NVR” REPORTS

The current National Board Form "R", “NR”, and “NVR” Reports, and the instructions for completing them, can be found on the National Board website: https://www.nationalboard.org. . When computer generated, the format of the form shall replicate the type and relative location of the information depicted on the example Form "R", “NR”, and “NVR” Reports shown in NBIC Part 3, 5.12.1 through 5.12.6.

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 14, (12/07/16)

FORM R-1 REPORT OF REPAIR

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

1 (Authorized Rep. initials)

2 (Inspectors initials)

3 (Form "R" Registration no.)

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

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

(address)

2. OWNER: 6 (name)

(address)

3. LOCATION OF INSTALLATION: 7 (name)

(address)

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

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

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

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

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

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

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

19

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

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

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

23

10. REMARKS: 24

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NB-66, Rev. 14, (12/07/16)

3
(Form "R" Registration no.)

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

CERTIFICATE OF COMPLIANCE

I, 25 _____, 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. 26 _____ expires on 27 _____, _____

Date 28 _____, 29 _____ Signed 30 _____

(name of repair organization) (authorized representative)

CERTIFICATE OF INSPECTION

I, 31 _____, 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 32 _____ and employed by 33 _____ of 34 _____ have inspected the work described in this report on 35 _____, _____ 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 36 _____ Signed 37 _____ 38 _____

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

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*

(Authorized Rep. initials)

(Inspectors initials)

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

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

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

(address)

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

(address)

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

(address)

3. LOCATION OF INSTALLATION: _____
(name)

(address)

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

5. IDENTIFYING NOS: _____ _____ _____ _____ _____
(mfg. serial no.) (National Board no.) (jurisdiction no.) (other) (year built)

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

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

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

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

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

_____ Pressure Test, if applied _____ psi MAWP _____ psi

SECTION 5

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

(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)

9. REMARKS:

DESIGN CERTIFICATION

I,_____, 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. _____ expires on _____

Date_____, _____ Signed _____
(name of design organization) (authorized representative)

CERTIFICATE OF DESIGN CHANGE REVIEW

I,_____, 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_____ and employed by _____ of _____ 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_____ Signed_____ Commissions _____
(inspector) (National Board and jurisdiction no. including endorsement)

CONSTRUCTION CERTIFICATION

I,_____, 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._____ expires on _____

Date_____, _____ Signed _____
(name of alteration organization) (authorized representative)

CERTIFICATE OF INSPECTION

I,_____, 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_____ and employed by _____ of _____ have inspected the work described in this report on_____, _____ 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_____ Signed _____ _____
(inspector) (National Board and jurisdiction no. including endorsement)

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.)

1. MANUFACTURED BY: ~~4~~ (name of "**NR**" certificate holder) ~~5~~ (P.O. no., job no., etc.)

(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~~

SECTION 5

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

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

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

CERTIFICATE OF COMPLIANCE

I, 31 _____, 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. 32 — expires on: _____ 33 , —

Date 34 , _____ 35 _____ Signed 36 _____

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

CERTIFICATE OF INSPECTION

I, 37 _____, 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 38 _____ and employed by 39 _____ of 40 _____ have inspected the part described in this report on 41 — , _____ 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 42 , _____ Signed 43 _____ Commissions 44 —

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

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)

SECTION 5

REFERENCE
LINE NO. CONTINUED FROM FORM R– 6

7	8

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

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

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

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

(**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)

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

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.				

(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)

SECTION 5

Online Ordering

- ASME BPV Manufacturers' Data Reports - Ordering Information
- NBIC Report Forms

National Board Inspection Code Report Forms

The National Board recommends the Electronic Data Transfer (EDT) system for the completion and registration of data report forms. It is an interactive document management system that both simplifies and expedites the process of registering data reports, conveniently accomplished through the Internet. The entire process is completed electronically with just a few clicks of a button. The NBIC R-1 and R-2 forms are available through EDT.

The following forms are available in .PDF format for downloading. Forms marked with an asterick (*) are .PDF fillable.

2017 R-1 Form* NB-66, *Report of Repair* Available Through EDT 2017 Sample Form R-1 with Guide for Completion 2015 R-1 Form* 2015 Sample Form R-1 with Guide for Completion	**2017 R-3 Form*** NB-230, *Report of Parts Fabricated by Welding* 2017 Sample Form R-3 with Guide for Completion 2015 R-3 Form* 2015 Sample Form R-3 with Guide for Completion
2017 R-2 Form* NB-229, *Report of Alteration* Available Through EDT 2017 Sample Form R-2 with Guide for Completion 2015 R-2 Form* 2015 Sample Form R-2 with Guide for Completion	**2017 R-4 Form*** NB-231, *Report Supplementary Sheet* 2017 Sample Form R-4 with Guide for Completion 2015 R-4 Form* 2015 Sample Form R-4 with Guide for Completion

Linked document is ATTACHEMENT 3

NR-1 Form* NB-81, *Report of Repair/Replacement Activities for Nuclear Facilities* Sample Form NR-1 with Guide for Completion	**NVR-1 Form*** NB-160, *Report of Repair/Replacement Activities for Nuclear Pressure Relief Devices* Sample Form NVR-1 with Guide for Completion

ATTACHMENT 3

NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

GUIDE FOR COMPLETING NATIONAL BOARD FORM R-2, REPORT OF ALTERATION

This guide is to be used when completing the National Board Form R-2, Report of Alteration. 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.

When additional space is needed, a Form R-4 shall be used and attached. Information determined to be of a proprietary nature need not be included, but shall be stated on the form.

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

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

3) 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. For re-rating only, the Design Organization registers the Form R-2.

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

10) Name of the original manufacturer of the pressure-retaining item. If the original manufacturer is unknown, state "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, state "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) Record the Jurisdiction Number, if available.

14) Document any other unique number assigned to the pressure retaining item such as a unique number assigned by the owner or user. If unknown, state "unknown."

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

16) Indicate edition and addenda, if applicable, 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.

20) The information to be considered when describing the 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 3.4.8 to remain in place, and the method of alteration described as listed in the examples of NBIC Part 3, Section 3 or applicable supplement.

21) Indicate the type of Pressure test performed (Liquid, Pneumatic, Vacuum)

22) Indicate test pressure applied.

23) Indicate the maximum allowable working pressure of the part. (As altered)

24) As applicable, identify which 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.

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

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

27) Indicate National Board "R" Certificate or Authorization number.

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

29) Indicate the date the alteration was certified.

30) Record the name of National Board "R" Certificate of Authorization 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 National Board "R" Certificate of Authorization authorized representative.

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

33) Indicate the Inspector's Jurisdiction.

34) Indicate the Inspector's employer; also indicate the address of the Inspector's employer (city and state or province).

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

36) Signature of the Inspector certifying the design review.

37) 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.

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

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

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

41) Indicate the date the alteration was certified.

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

43) Signature of National Board "R" Certificate of Authorization authorized representative

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

45) Indicate the Inspector's Jurisdiction.

46) Indicate the Inspector's employer; also indicate the address of the Inspector's employer (city and state or province).

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

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

49) Signature of the Inspector certifying the construction inspection.

50) 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.

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.)

1a. DESIGN PERFORMED BY: (5) (name of "**R**" organization responsible for design) (P.O. no., job no., etc.)

(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) (11) (addenda)

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

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

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

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

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

(4) _____
(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)

(24) _____

9. REMARKS: (25) _____

Design Certification

I, (26) _____, 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. (27) _____ expires on (28) _____

Date (29) _____, (30) _____ Signed (31) _____
(name of design organization) (authorized representative)

certificate of design change review

I, (32) _____, 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 (33) _____ and employed by (34) _____ of _____

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 (35) _____ Signed (36) _____ Commissions (37) _____
(inspector) (National Board and jurisdiction no. including endorsement)

CONSTRUCTION CERTIFICATION

I, (38) _____, 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. (39) _____ expires on (40) _____

Date (41) _____, (42) _____ Signed (43) _____
(name of alteration organization) (authorized representative)

CERTIFICATE OF INSPECTION

I, (44) _____, 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 (45) _____ and employed by (44) _____ of (44) _____

have inspected the work described in this report on (46) _____, (47) _____ 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 (48) _____ Signed (49) _____ (50) _____
(inspector) (National Board and jurisdiction no. including endorsement)

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7/17/18

Request for NBIC Part 3, Section 2 Revision

Robert V. Underwood-The Hartford Steam Boiler Inspection & Insurance Company

Purpose	To clarify and revise paragraph 2.5.3(e) of NBIC Part 3 relating to Alternative Welding Methods Without Postweld Heat Treatment.
Scope:	1) Replace reference to "boiler, pressure vessel, and piping systems" with "pressure retaining items." 2) Replace references to radiography with volumetric examination. 3) Replace the last sentence of 2.5.3(e) relating to MT/PT of final weld if RT is not practical and re-evaluation of maximum allowable working pressure and/or design temperature with reference to existing requirements in 4.2(a) of Part 3.
Background	1) Using "pressure retaining items" in lieu of specific items such as boilers, pressure vessels, and piping systems is consistent with other areas of the NBIC. 2) The construction Codes were recently revised to permit UT in lieu of radiography. Replacing references to radiography in the 2.5.3(e) with volumetric examination is consistent with other areas of the NBIC Part 3. 3) The last sentence of 2.5.3(e) is redundant and NDE requirements are already addressed in 4.2(a) of Part 3.
Proposed Revision	See page 2 for proposed revisions.

2.5.3 ALTERNATIVE WELDING METHODS WITHOUT POST WELD HEAT TREATMENT

(revising Paragraph (e) only)

e) Nondestructive Examination of Welds

Prior to welding, the area prepared for welding shall be examined using either the Magnetic Particle (MT) or the Liquid Penetrant (PT) examination method to determine that no defects exist. After the finished weld has reached ambient temperature, and, when required by the specific welding method, the surface temper bead reinforcement layer has been removed substantially flush with the surface of the base metal, the weld shall be examined again by either of the above methods to determine that no defects exist using acceptance standards acceptable to the Inspector or original code of construction. In addition, welds greater than 3/8 in. (9.6 mm) deep or welds in a ~~boiler, pressure vessel, or piping system~~ pressure retaining item that were originally required to be ~~radiographed~~ volumetrically examined by the rules of the original code of construction, shall be ~~radiographically~~ examined in accordance with paragraph 4.2 of Part 3. ~~In situations where it is not practical to perform radiography, the accessible surfaces of each non radiographed repair weld shall be fully examined using the MT or PT method to determine that no defects exist and the maximum allowable working pressure and/or allowable temperature shall be re-evaluated to the satisfaction of the jurisdiction at the location of installation.~~

4.2 NONDESTRUCTIVE EXAMINATION

a) The nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction for the pressure-retaining item. Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used.

b) NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice Nondestructive Testing Personnel Qualification and Certification* (2006 edition), or ANSI/ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel* (2006 edition), shall be used as a guideline for employers to establish their written practice. Provisions for training, experience, qualification, and certification of NDE personnel shall be described in the "R" Certificate Holder's written quality system.

18-51

CODE REVISION OF NBIC PART 3, SECTION 6, SUPPLEMENT 6

REPAIR, ALTERATION, AND MODIFICATION OF DOT TRANSPORT TANKS, S6.10.3

a) Proposed Revision to S6.10.3:

S6.10 HEAT TREATMENT

S6.10.1 PREHEATING

Preheating may be employed during welding to assist in completion of the welded joint (see NBIC Part 3, 2.5.1). The need for and the temperature of preheat are dependent on a number of factors such as chemical analysis, degree of restraint of the items being joined, material thickness, and mechanical properties of the base metals being joined. The Welding Procedure Specification for the material being welded shall specify the preheat temperature requirements.

S6.10.2 POSTWELD HEAT TREATMENT

Postweld heat treatment may be performed as required by the original code of construction in accordance with a written procedure. The procedure shall contain the parameters for postweld heat treatment. Local PWHT that is not specified by the original code of construction may be performed in accordance with an Alternative Postweld Heat Treatment Method described in NBIC Part 3, 2.5.~~3~~ 2 with acceptance by the Inspector and required by the Competent Authority.

S6.10.3 ALTERNATIVES TO POSTWELD HEAT TREATMENT

a) Under certain conditions, postweld heat treatment in accordance with the original code of construction may be inadvisable or impractical. In such instances, alternative methods of postweld heat treatment or special welding methods in accordance with NBIC Part 3, 2.5.3, and acceptable to the Inspector and Competent Authority may be used.

b) When the standard governing the original construction is the Code of Federal regulation for DOT/MC 331 cargo tanks for propane, butane, anhydrous ammonia, and other DOT permitted commodities, and the tanks are made to the ASME Code, Section VIII, Division 1, Part UHT, repairs, alterations, or modifications shall conform insofar as possible, to the edition of the construction standard or specification most applicable to the work. Where this is not possible or practicable, it is permissible to use other codes, standards, or specifications provided the "TR" Certificate Holder has the concurrence of the DOT. Shells and heads of MC 331 cargo tanks were made from quenched and tempered alloy steel plate, SA517, Grade E (originally Code Case 1298) and Grade F (originally Code Case 1204) prior to 1994.

c) The 1994 ASME Code Addenda revised UHT-5(b) to permit the joining of UHT materials to UCS or UHA materials in head and shell sections. Propane, butane, and anhydrous ammonia are the most common transported commodities and the shipper is required by DOT to comply with certain composition limitations. Propane and butane transported must have sufficiently low hydrogen sulfide content so as not to exceed the limitations for Classification One of the ASTM D1838-74 copper strip test, and the anhydrous ammonia transported must be inhibited with a minimum water content of 0.2% by weight. In addition, such cargo tanks made for propane, butane, and anhydrous ammonia service must be postweld heat treated, unless specifically exempted by a DOT special permit that exempts PWHT.

S6.11 NONDESTRUCTIVE EXAMINATION

b) The nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction used for the pressure vessel, and repairs, alterations, and modifications shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Competent Authority may be used on a case-by-case basis.

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

Testing Personnel Qualification and Certification (2006 Edition), or ANSI/ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel (2006 Edition)*, shall be used as a guideline for employers to establish their written practice. The ASNT Central Certification Program (ACCP) may be used to fulfill the examination and demonstration requirements of the employer's written practice. Provisions for training, experience, qualification and certification of NDE personnel shall be described in the "R" Certificate Holder's written quality system.

b) Statement of Need:

- NBIC Part 3, Supplement 6 (DOT) allows alternatives to PWHT (S6.10.3) and NDE (S6.11) however they do not have the controls in place in accordance with NBIC Part 3, 2.5.3 and 4.4.1e). Lack of these controls when utilizing alternative methods have the potential to become a major safety issue.

- Editorial correction in S6.10.3 for reference to NBIC Part 3, 2.5.2 Postweld Heat Treatment (PWHT). Original reference to 2.5.3 (Alternative Welding Methods Without Postweld Heat Treatment) was incorrect.

18-52

Request for NBIC Part 3, Revision to definition of "Jurisdiction"

Terrence Hellman
National Board
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Purpose	Revise the definition of "Jurisdiction" in the NBIC.
Scope:	Revision to the glossary of Parts 1-4 of the NBIC to have the definition of "Jurisdiction" revised.
Background:	The first sentence in the current definition does not include non-members jurisdictions. The second sentence refers to jurisdictional involvement in reviews, and is not relevant to the definition of "jurisdiction".
Proposed Revision:	See below:

CURRENT DEFINITION	PROPOSED DEFINITION
Jurisdiction — The National Board member Jurisdiction where the organization is located. Alternatively, where the Jurisdiction elects not to perform the review or where there is no Jurisdiction or where the Jurisdiction is the organization's Authorized Inspection Agency, The National Board of Boiler and Pressure Vessel Inspectors will represent the Jurisdiction. At the Jurisdiction's discretion, the Jurisdiction may choose to be a member of the review team if the Jurisdiction chooses not to be the team leader.	**Jurisdiction** — A governmental entity with the power, right, or authority to interpret and enforce law, rules, or ordinances pertaining to boilers, pressure vessels, or other pressure-retaining items where the pressure retaining item is installed. It includes National Board member jurisdictions defined as "jurisdictional authorities." Where there is no National Board Member Jurisdiction, the National Board shall act on behalf of the Jurisdiction.