THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

Date Distributed: 1/25/2023

NATIONAL BOARD INSPECTION CODE
SUBGROUP INSPECTION

MINUTES

Meeting of January 10, 2023
Charleston, SC

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

The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, Ohio 43229-1183
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1. **Call to Order**
   Chair, Mr. Darrell Graf, called the Subgroup (SG) Inspection meeting to order at 8:02 am EST.

2. **Introduction of Members and Visitors**
   Secretary, Ms. Jodi Metzmaier, did a roll call of all SG members in person and online. The visitors in person stated their name and their company. Ms. Metzmaier then called on all visitors online, who then said their name and their company. All members and visitors are noted on the attendance sheet. (Attachment 1)

3. **Check for a Quorum**
   With all 25 members in attendance at the SG Inspection meeting, both in person and online, a quorum was established.

4. **Awards/Special Recognition**
   Jason Safarz – 5 Years as a member of SG Inspection
   Matt Sansone – 5 Years as a member of SG Inspection
   Mr. Safarz and Mr. Sansone were both recognized for their 5 years of services as a member of the SG. Both members were acknowledged through zoom and will be presented with their 5-year pins at the next meeting they attend in person.

5. **Announcements**
   Ms. Metzmaier gave announcements to the SG. (Attachment 2)

6. **Adoption of the Agenda**
   A motion was made and seconded to adopt the agenda.

   - Add presentation by Olley Scholer from HJ3 Composite Technologies on Vessel Repairs with Carbon Fiber.
   - Add presentation by Teresa Melfi from Lincoln Electric on Weld Metal Additive Manufacturing.
   - Nomination correction: Mr. Lee Burton

   The above items were added/changed to the agenda. The motion was revised to adopt the revised agenda. The motion was seconded and unanimously approved.

7. **Approval of the Minutes of the July 12, 2022, Meeting**
   A motion was made to approve the minutes from the July 2022 SG Inspection meeting. The motion was seconded and unanimously approved.

8. **Review of Rosters**
   a. **Membership Nominations**
      Mr. Chuck Becker (Manufacturers) and Mr. Lee Burton (National Board Certificate Holders) are interested in joining Subgroup Inspections.

      Mr. Becker spoke to the group stating his background and how he would be an asset to the SG. Mr. Scarcella & Mr. Vandini also spoke to the group on behalf of Mr. Becker, stating they both fully support this nomination.

      Mr. Burton was unable to attend the meeting; however, Mr. Graf spoke on his behalf. Mr. Graf discussed Mr. Burton's qualifications and how he would be an asset to the SG. Mr. Mangas also spoke to the group on behalf of Mr. Burton.

      Mr. Becker left the room, and the SG discussed the qualifications of each nominee, and what each person would add to the group. A motion was then made to accept both nominees to the SG. The motion was seconded and unanimously approved.

b. Membership Reappointments
The following Subgroup members are up for reappointment: Mr. Jeff Petersen, Mr. Vincent Scarcella, and Mr. Tom Vandini.

All three members confirmed they would like to be reappointed to the SG. A motion was made to accept all three members for reappointment to the SG. The motion was seconded and **unanimously approved**.

c. Officer Appointments - None.

9. Open Items Related to Inspection

a. PRD – there are currently no open PRD items related to Part 2.

b. R&A

i. **Item 21-53** – Post repair inspection of weld repairs to CSEF steels. (P. Gilston as PM)
Mr. Horbaczewski gave a progress report on this item explaining the changes that Part 3 will be proposing. Mr. Horbaczewski is hoping to open a new action item on this subject between now and the July 2023 meeting. The part 2 item that was opened to review changes in Part 3 is 22-06.

ii. **Item 21-67** – Add welding requirements to plugging firetubes. (P. Gilston as PM)
Mr. Horbaczewski gave a progress report on this item explaining the changes that Part 3 will be proposing. During conversation of this item, the SG decided to open a new item to discuss the changes that will be made to Part 3 based on this item. The new Part 2 item is 23-08.

iii. **Item 22-05 –** Clarify NDE requirements as it pertains to OCC edition. (D. Kinney as PM).
Mr. Bolden gave a progress report, stating item 22-22 was opened to address any changes needed in Part 2 based on the changes made to part 3 with this item.

10. Presentations

Teresa Melfi from Lincoln Electric gave a presentation on Weld Metal Additive Manufacturing (Attachment 3).
Olley Scholer from HJ3 Composite Technologies gave a presentation on Vessel Repairs with Carbon Fiber.
The floor was opened to questions & discussion after each presentation.

11. Interpretations

Item Number: 22-40	**NBIC Location: Part 2, 4.4.7.2**	**No Attachment**
General Description: Allowable stresses for t(required) calculation **Subgroup:** Inspection **Task Group:** None assigned. **Submitted by**: Tom Chen **Explanation of Need:** For the purpose of setting up inspection plans, especially with older equipment, we are calculating t(required) per Part 2, para 4.4.7.2. However, we would like to know if it is permissible to use the higher allowable stresses in later editions of ASME BPV Code.		
January 2023 Meeting Action: The group reviewed this interpretation and after a short discussion they decided to create a task group to come up with a reply. **TASK GROUP: T. Clark (PM), B. Ray, B. Wilson, J. Petersen**		

12. Action Items

Item Number: 20-57	NBIC Location: Part 2, 4.4.1 a)	No Attachment

General Description: Evaluate revision to Part 2, 4.4 FFS scope roles & responsibilities and API 579-1/ASME FFS-1.
Subgroup: Inspection
Task Group: M. Horbaczewski (PM), B. Williams, and B. Ray
Submitted by: George Galanes

Explanation of Need: Currently, there is confusion surrounding implementation of FFS for Part 2 inspection activities, where the FFS form is located and Part 3 activities regarding Part 3, 3.3.4.8 because it references Part 2 for FFS. In addition, we need to have a Part 2 Inspection member to be assigned to assist in the development of roles and responsibilities.

January 2023 Meeting Action:
Progress Report: Mr. Horbaczewski stated he was not able to get in touch with Mr. Siefert to see if he wants to continue with this or if he wants to take it off our agenda. If he wants to continue, Mr. Horbaczewski will get more information from him to see where to go from here.

Item Number: 21-25	NBIC Location: Part 2	No Attachment

General Description: Autoclave/Quick opening device PP (submitted by Kevin Hawes)
Subgroup: Inspection
Task Group: V. Scarcella (PM), T. Bolden, M. Horbaczewski, J. Peterson, J. Clark, W. Hackworth, M.A. Shah, C. Becker.

Explanation of Need: Upon our AIA (Intact) QRR I produced a Power point presentation on Autoclave inspections. Your NB team leader Gary Scribner suggested I forward this inspection presentation to the NB for review of content as mention of good reference material for next NBIC edition. I have attached a copy of this PP for your considerations.

January 2023 Meeting Action:
Progress Report.: Mr. Scarcella presented and reviewed a proposal to the SG. There were a few changes made during discussion, and the TG also noted many other recommended changes. After much discussion, the TG would work more on the proposal and then they will send it out to Letter Ballot for review and comment between meetings.

Add to Task Group: J. Morgan

Item Number: 21-47	NBIC Location: Part 2, 2.2.4 & 2.2.5	No Attachment

General Description: To provide better guidance as it relates to carbon monoxide
Subgroup: Inspection
Task Group: W. Hackworth (PM), V. Scarcella, D. Buechel, T. Barker, T. Bolden
Submitted by: V. Scarcella

Explanation of Need: Need to provide more comprehensive items to be reviewed to guide the inspector on carbon monoxide and combustion air.

January 2023 Meeting Action:
Progress Report: Mr. Hackworth asked that a non-AIA member join the task group to get further input. He is hoping to have a proposal for the July 2023 meeting.

Add to Task Group: M. Sansone, Harrington Henry, J. Castle, J. Morgan, & J. Clark

Item Number: 22-03	NBIC Location: Part 2	Attachment 4

General Description: Create example inspection list
Subgroup: Inspection
Task Group: V. Scarcella (PM), M. Sansone, M. Mooney, T. Bolden, and D. Buechel
Submitted by: V. Scarcella

Explanation of Need: Average high and low mean failure rate has a 10 point plus gap which needs to be closed. The Chief of LA, Donnie LeSage brought up the item in COQ but resigned Part 2 due to other duties.

January 2023 Meeting Action:
Mr. Scarcella presented a proposal to the SG. There was a lot of discussion regarding having a column for comments, notes, and/or Satisfactory/Unsatisfactory/NA. The columns were removed, and a motion was made to accept the proposal as revised. **The motion was seconded and passed with one abstention (Brent Ray).**

Item Number: 22-06	NBIC Location: Part 2, 3.4.9 e)	No Attachment

General Description: Part 2 task group to review Part 3 Item 21-53
Subgroup: Inspection
Task Group: None assigned.
Submitted by: D. Graf

Explanation of Need: Part 2 task group to investigate further changes to Part 2/Part 3 that could be needed because of action item 21-53.

January 2023 Meeting Action:
Progress Report: Mr. Horbaczewski explained the changes that Part 3 will be proposing. Mr. Horbaczewski is hoping to open a new action item on this subject between now and the July 2023 meeting

Task Group: M. Horbaczewski (PM), J. Clark, B. Wilson, J. Mangas, P. Polick

Item Number: 22-22	NBIC Location: Part 2	No Attachment

General Description: Changes and additions to align with part III with in service inspections
Subgroup: Inspection
Task Group: T. Bolden (PM), J. Clark, J. Petersen, M. Sansone, B. Ray, D. Graf, and J. Mangas
Submitted by: V. Scarcella

Explanation of Need: Several areas where part III after repair in service inspections should be aligned with part II.

January 2023 Meeting Action:
Mr. Bolden presented a proposal to the SG. During review of the document, the group made a few changes to the proposal. After much discussion, the SG decided they wanted to send it out to **Letter Ballot for review and comment** before voting on the proposal.

13. New Items

Item Number: 22-26	NBIC Location: Part 2, 2.3.6.8	No Attachment

General Description: Addition of cast acrylic as a pressure vessel material
Subgroup: Inspection
Task Group: None assigned.
Submitted by: J. Calvert

Explanation of Need: Provide inspectors with the criteria necessary to competently inspect vessels like acrylic chromatography columns.

January 2023 Meeting Action:
Mr. Calvert reviewed this item with the SG. Mr. Scribner recommended having the TG contact Mr. Rob Smith for information involving this topic. After a short discussion, the group decided to create a Task Group.

Task Group: J. Calvert (PM), V. Newton, D. Buechel, D. Rose

Item Number: 22-37	NBIC Location: Part 2, S11.4.2.6	No Attachment

General Description: Retention requirements should be those of the NBIC, not the construction code.
Subgroup: Inspection
Task Group: None assigned.
Submitted by: L. Ponce

Explanation of Need: The NBIC should not refer to the ASME Code but should refer to Part 3, Table 1.5.1 where record retention for repair/alteration activity and FFS are located. The scope para.S11.1 states in part, "This Supplement provides guidelines to be followed when a finite element analysis (FEA) is submitted as part of a quantitative engineering assessment for in-service equipment, or a repair or alteration for a pressure retaining item…"

January 2023 Meeting Action:
Mr. Ponce's proposal was presented to the SG. During discussion, it was determined that this item can be closed with no action, as it is referring to document requirements and not record retention. A motion was made to **close this item with no action**. The motion was seconded and **unanimously approved**.

Correction: General Description was corrected to add the word "be".

Editorial Changes:

1. Based on the conversation regarding this item, it was discovered that the reference in S11.4.2.6e) has an incorrect reference. The reference should be ASME Section VIII, Division 2, Part 2, 2.3.3.3 (c) (2).
2. Add/change the punctuation after each line item to have a semi colon, and at the end of d) add a semi-colon with "and".

Item Number: 22-38	NBIC Location: Part 2, 4.6.1 & S11.3.2 b)	No Attachment

General Description: Correction to S11.3.2 b) and 4.6.1
Subgroup: Inspection
Task Group: None assigned.
Submitted by: L. Ponce

Explanation of Need: The first part of this recommended correction is an incorrect reference in S.11.3.2 b). "4.6.1.2" does not exist and should be "4.6.1". The second part - Considering the statemen in paragraph S11.3.2 b), it seems the word 'review' in 4.6.1 should be in 'lieu' of instead of "rather". As it currently reads, 4.6.1 does not seem to provide 'justification for use of FEA rather than the rules in the code of construction' in S11.3.2 b).

January 2023 Meeting Action:
Mr. Ponce presented a proposal for this item to the SG. He reviewed the proposed changes with the SG, and it was determined that 4.6.1 is correct and does not need to be changed. It was also decided that the change to S11.3.2 b), changing the reference from 4.6.1.2 to 4.6.1 can be done editorial. A motion was made to **close this item with no action**. The motion was seconded and unanimously approved.

Editorial: Part 2, S11.3.2 b) - change the reference from 4.6.1.2 to 4.6.1.

Item Number: 22-39	NBIC Location: Part 2, 4.4.8.7 g)	No Attachment

General Description: Recommended clarification of requirements for Evaluating Local Thin Areas
Subgroup: Inspection
Task Group: None assigned.
Submitted by: L. Ponce

Explanation of Need: The existing text may lead to confusion due to a misplaced comma after 'specified' in the first sentence and no reference to what is being specified in the paragraph. The proposed text is a way to tie in the specified requirement in paragraph (f).

January 2023 Meeting Action:
Mr. Ponce presented a proposal for this item to the SG. He reviewed the proposed changes with the SG, and it was determined that a Task Group was needed.

Task Group: V. Newton (PM), T. Barker

During discussions, Mr. Newton noticed some revisions that needed to be made and opened item 23-07 to address these changes.

Item Number: 23-07	NBIC Location: Part 2, 2.2.4	No Attachment

General Description: 2.2.4 updated to include not allowing combustibles
Subgroup: Inspection
Task Group: None assigned.
Submitted by: Venus

Explanation of Need: Frequently see combustible materials stored in boilers rooms, specifically calling them out as not allowed would be helpful to Inspectors.

January 2023 Meeting Action:
Mr. Newton explained the need for opening this item to the SG. A task group was created to come up with a proposal.

Task Group: V. Newton (PM)

Item Number: 23-08	NBIC Location: Part 2	No Attachment
General Description: Part 2 task group to review Part 3 Item 21-67 **Subgroup:** Inspection **Task Group:** None assigned. **Submitted by:** D. Graf **Explanation of Need:** Part 2 task group to investigate further changes to Part 2/Part 3 that could be needed because of action item 21-67.		
January 2023 Meeting Action: Progress Report: Item was opened to address R&A item 21-67. Task Group assigned. **Task Group: M. Horbaczewski (PM), J. Clark, B. Wilson, J. Mangas, P. Polick**		

14. Future Meetings

- July 2023 – St. Louis, MO
- January 2024 – Charlotte, NC

Mr. Graf discussed future meetings with the SG.

15. Adjournment

A motion was made to adjourn the meeting at 3:00 pm EST.

Respectfully submitted,

Jodi Metzmaier
Subgroup Inspection Secretary

ATTACHMENT 1

Subgroup Inspection Attendees - January 2023

MEMBERS:	Interest Category	Registered For	In Person	Remote	Not In Attendance
Darrell Graf - Chair	National Board Certificate Holders		x		
Jim Clark - Vice Chair	Manufacturers	In Person	x		
Jodi Metzmaier - Secretary	NBBI	In Person	x		
Tim Barker	Authorized Inspection Agencies		x		
Tim Bolden	Authorized Inspection Agencies	In Person	x		
Ernest Brantley	Authorized Inspection Agencies	In Person	x		
David Buechel	Authorized Inspection Agencies	In Person	x		
James Calvert	National Board Certificate Holders	In Person	x		
Jim Getter	Manufacturers	In Person	x		
William Hackworth	Authorized Inspection Agencies	Remote		x	
Mark Horbaczewski	Users	In Person	x		
Jerry Jessick	Users	Remote		x	
John Mangas	General Interest	In Person	x		
Joe Morgan	Users			x	
Venus Newton	Authorized Inspection Agencies	In Person	x		
Jeff Petersen	Users	In Person	x		
Pat Polick	Jurisdictional Authorities	In Person	x		
Brent Ray	Users	In Person	x		
James Roberts	Manufacturers	In Person	x		
David Rose	Users	Remote		x	
Jason Safarz	General Interest			x	
Matt Sansone	Jurisdictional Authorities			x	
Vincent Scarcella	Authorized Inspection Agencies	In Person	x		
Thomas Vandini	National Board Certificate Holders	In Person	x		
Brandon Wilson	General Interest	In Person	x		

VISITORS:	Company/Title/Interest	Registered For	In Person	Remote
Chuck Becker	Quality Steel Corporation	In Person	x	
Jeff Castle	Zurich	In Person	x	
Mark Mooney	NBBI	In Person	x	
Luis Ponce	NBBI	In Person	x	
Gary Scribner	NBBI	In Person	x	
Mike Whitlock	Hartford Steam Boiler	In Person	x	
Harrington Henry	ARISE Inc.	In Person	x	
Benjamin Calderon	Liberty Mutual Insurance	In Person	x	
Craig Bierl	Chubb Insurance	Remote		x
John King	Zurich	Remote		x
Jessica Robertson	Chemours	Remote		x
Todd Mitchell				x
Jeremy Smith	NC Department of Labor Boiler Safety Bureau	Remote		x
Dave Dexter	Dow			x
Joseph Beaureg	Los Alamos		x	

ATTACHMENT 2

Announcements

- Zoom Notes:
  - Make sure your actual name is on your zoom account.
  - Please add an "M" for Member, "V" for Visitor, or "S" for Staff at the end of your name. Example: Jodi Metzmaier - S
  - Please stay muted during the meeting. If you would like to speak, please use the "raise hand" feature, and then you can unmute as you are called on.

- For the July meeting we will begin using MS Teams instead of Zoom.

- The National Board will be hosting a reception on Wednesday evening from 5:30pm to 7:30pm in the Colonial Ballroom at the hotel. We will also host a breakfast and lunch on Thursday. Breakfast will be served from 7:00am to 8:00am, and lunch will be served from 11:30am to 12:30pm. Both meals will be served at the hotel in the Colonial Ballroom. Members, visitors, and guests are all welcome.

  Please register now if you have not already done so.

- Meeting schedules, meeting room layouts, and other helpful information can be found on the National Board website under the **Inspection Code** tab → NBIC Meeting Information.

- We now have a review and comment Letter Ballot type. When we send out a LB for review and comment, the layout of the ballot will look different, as it will not have any voting options.

- Remember to add any attachments that you'd like to show during the meeting (proposals, reference documents, power point, etc.) to the cloud **prior to the meeting**.
  - If needed, we can go over how to do this.
  - ALL power point attachments/presentations must be sent to Jonathan prior to the meeting for approval.

- Always submit attachments in word format showing "strike through/underline"
  - Please contact me if you need any help with this.

- If you'd like to open a new Interpretation or Action item, this should be done on the National Board Business Center.
  - Anyone, member or not, can open a new item.

- As a reminder, anyone who would like to become a member of a group or committee:
  - Should attend at least 2 meetings prior to being put on the agenda for membership consideration. The nominee will be on the agenda for voting during their 3rd meeting.
  - The nominee must submit the formal request along with their resume to Jonathan **PRIOR TO** the meeting. *nbicsecretary@nbbi.org*
  - If needed, we can also create a ballot for voting on a new member between meetings. To do this, you will need to contact Jonathan.

- Thank you to everyone who registered online for this meeting. The online registration is very helpful for planning our reception, meals, the room set up, etc. Please continue to use the online registration for each meeting. If you are here in person, and did not register, please visit the National Board website to register now. Registering will make sure we have an accurate count for the reception, breakfast, and lunch. It also is a good way to make sure we have the most up-to-date contact information.

ATTACHMENT 3

Weld Metal Additive Manufacuring

Using weld metal as a replacement material

Teresa Melfi

NBIC Meeting

January 2023

Outline

- Chevron Case Study: weld metal as material for replacement parts
- Current projects and trends in weld metal manufacture
- How codes treat weld metal as a replacement material
- NBIC approach
  - Interpretation
  - Code change
  - Wait for ASME rules

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ICAM2022

ASTM INTERNATIONAL
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API and ASME Qualification of a Printed Pressure Component

Robert Rettew, Chevron
Teresa Melfi, Lincoln Electric
Matt Sanders, Stress Engineering

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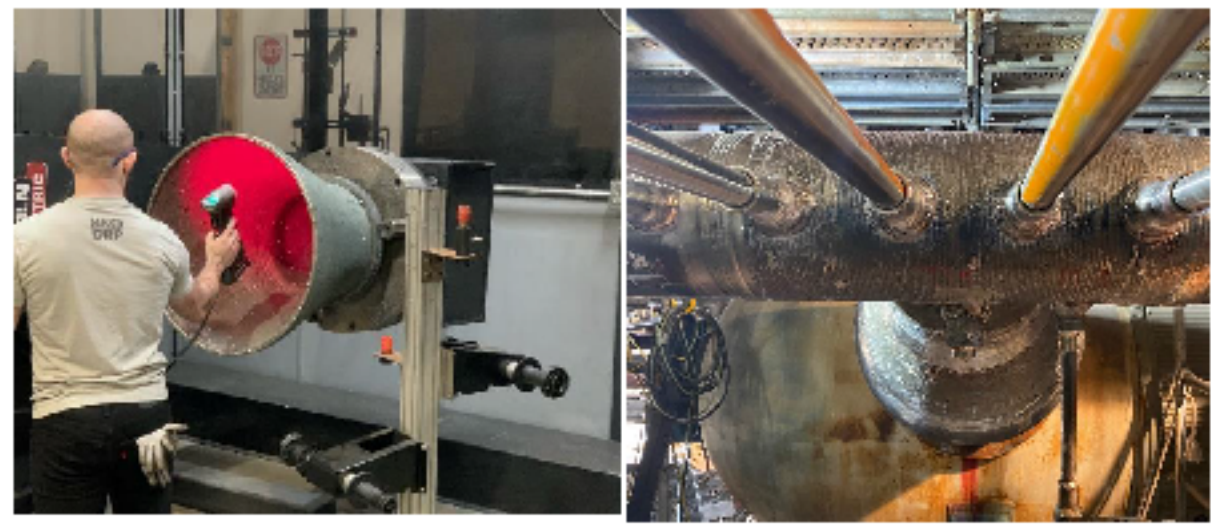
Selected slides are shown in this presentation. The entire Chevron ICAM presentation will be attached to the meeting minutes.

A Refinery 3D Printing Success Story

- In early 2022, a facility turnaround needed replacements for several components in hydrogen furnace service. These components were critical path to restart the facility.
- Service requirements were 1500F and 300psi, with a design lifetime of 20 years.
- Application was for a furnace header. Previous installation was Alloy 800H with Alloy 617 weldments.
- Existing components were damaged and unusable. Replacement using traditional methods estimated ~3 months.
- 3D printing was used to deliver replacements in just under 4 weeks, **avoiding a significant shutdown.**

Piping components being printed at Lincoln Electric Additive Services



(left) Digital part verification, (right) Final Installation

Inspection & Testing Summary

- Testing Conducted on Each Piece
  - Dimensional Checks
  - 100% Dye Penetrant surface inspection
  - Phased Array UT of Critical Locations
- Testing Conducted on Witness Coupons
  - Hardness Survey
  - Metallographical Assessment
  - Tensile Testing in multiple orientations
  - Chemistry
- Additional Testing Conducted on First Article
  - Pressure Testing at 6,000psi
  - Tensile Tests at elevated temperature, from wall thickness at various critical locations
  - Local RT Inspection
  - Creep testing using samples from sacrificial part

Production Images

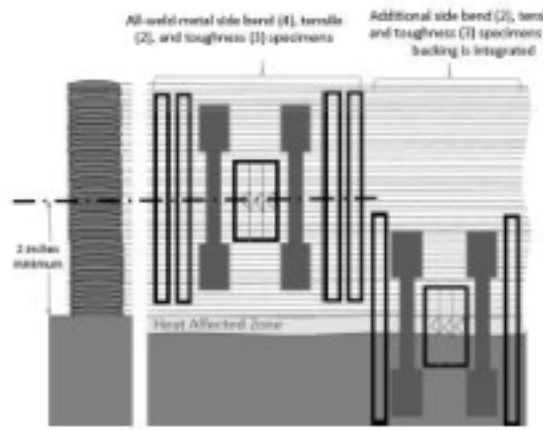
Printed Components Testing

- Hydrotest (photo on right)
- Acoustic Emissions
- Phased Array Ultrasonics in critical areas, require special qualification
- Radiographic Inspection of 100% Volumetric
- Dye Penetrant 100% surface

ASME 3020 Qualification

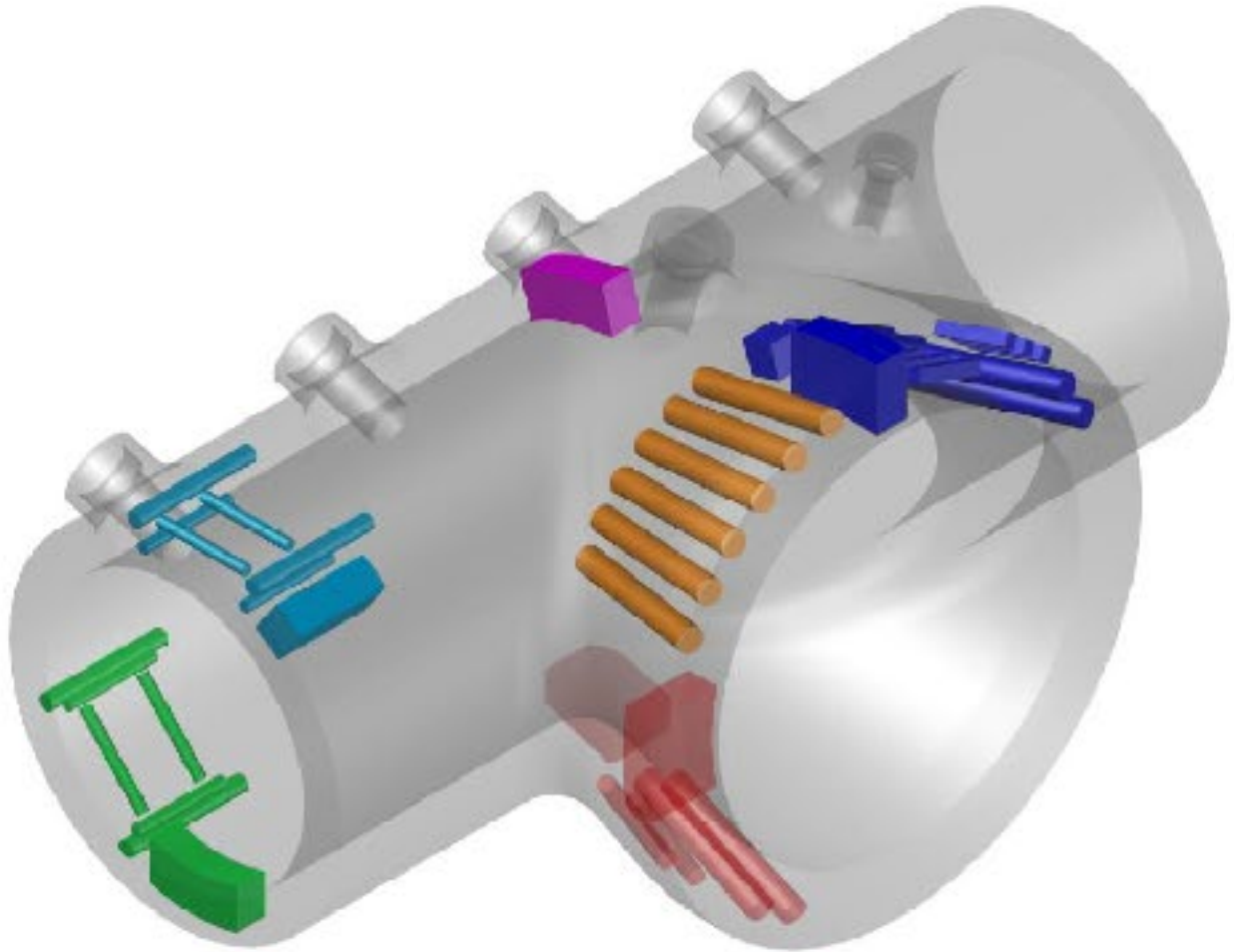
Cooling Rate	Wall Thickness	Yield Strength	Ultimate Strength
(type)	*(type)*	*(ksi)*	*(ksi)*
Slow *High Heat Input & High Interpass*	Thin	49.9	99.0
		51.0	100.0
	Thick	59.0	103.0
		60.5	102.0
		58.0	103.0
		58.0	102.0
		61.5	104.0
		58.0	103.0
Fast *Low Heat Input & Low Interpass*	Thin	57.0	96.5
		56.0	96.5
	Thick	63.5	107.0
		63.5	98.0

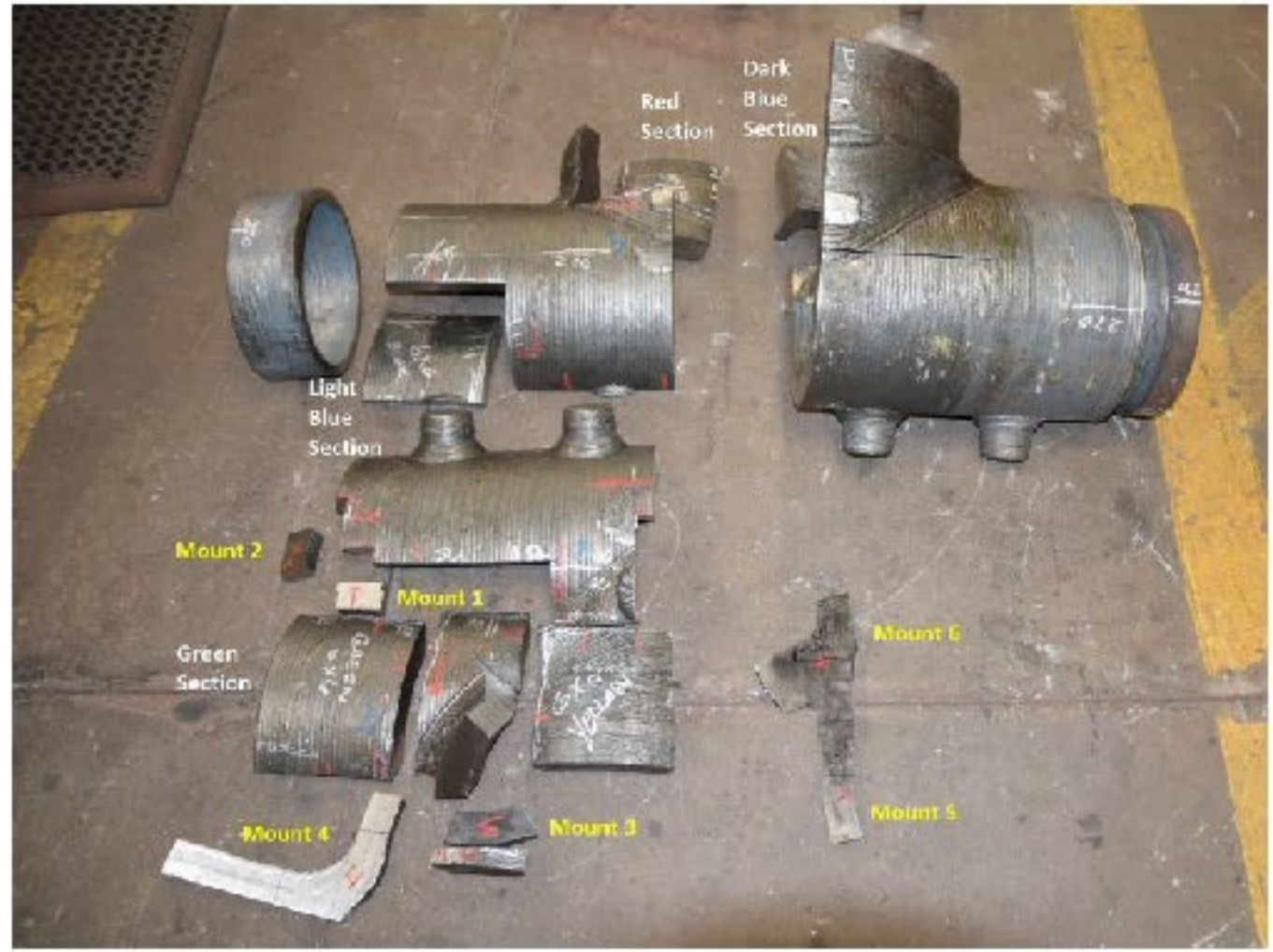
Figure 1
Specimen Locations for Layer Widths Less Than or Equal to $\frac{1}{2}$ in. (12 mm)



GENERAL NOTES:
(a) Weld specimen is shown with one bead per layer. Multiple weld beads per layer are permitted with the layer width and number of weld beads per layer qualified in accordance with Table 2.
(b) Three Charpy V-notch toughness specimens shall be located with the notch at approximately $\frac{1}{16}$ in. (2 mm) from the edge of the weld beads.
(c) With integrated backing, an additional three Charpy V-notch toughness specimens shall be located with the notch within the heat-affected zone.
(d) Full-width bend and tensile specimens shall be tested and examined.
(e) The order of specimen removal is not mandatory.

Specimen Locations from Sacrificial Article

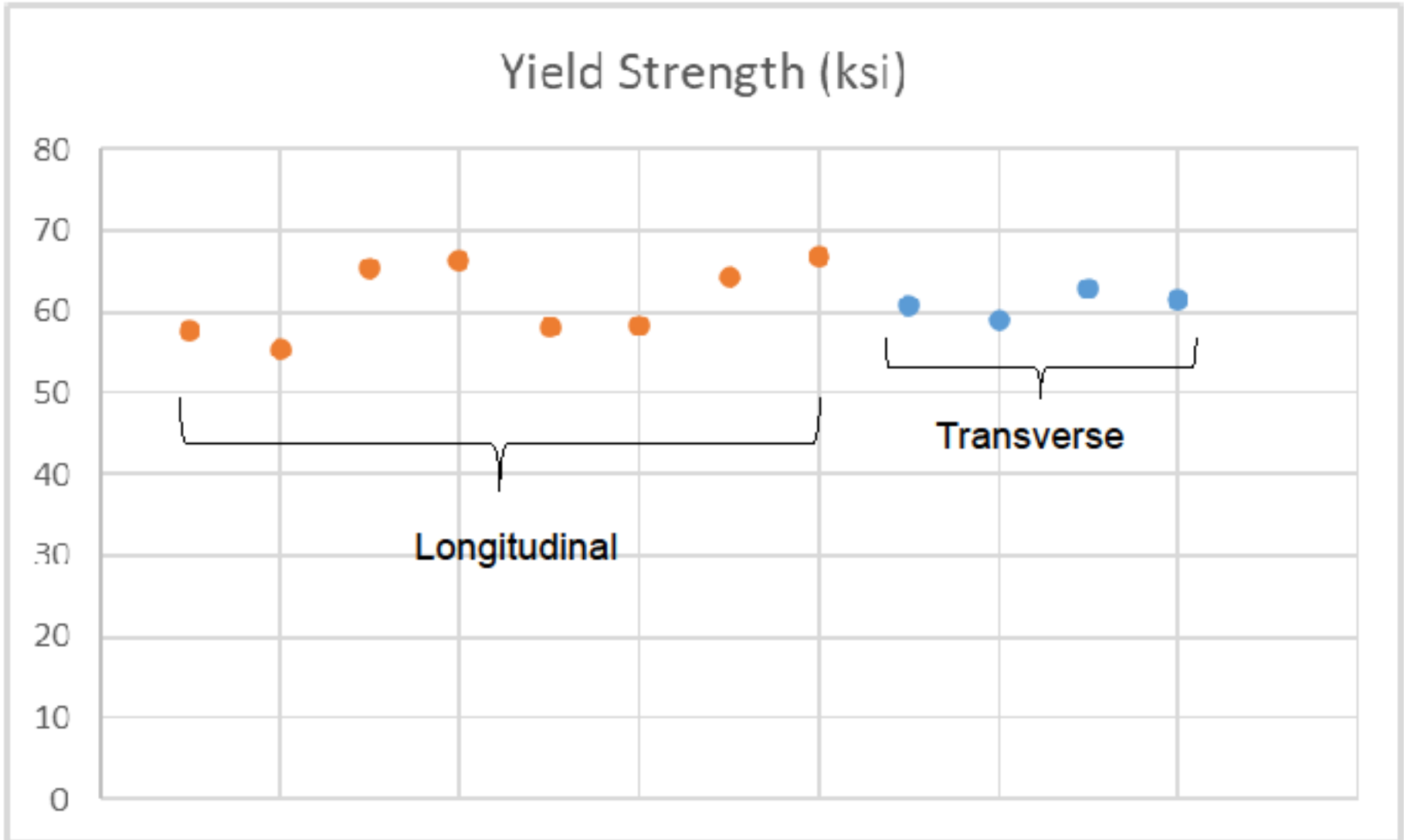




Tensile Testing from Sacrificial Part

Section	Orientation	Location	Yield Strength (ksi)	Tensile Strength (ksi)	Elongation (%)	Reduction of Area (%)
Light Blue	Longitudinal	ID	57.6	102.5	44.8	53.7
			56.4	99.9	40.1	52.6
	Longitudinal	OD	65.5	108.7	40.4	56.0
			66.4	108.7	40.5	51.0
	Transverse	Mid wall	60.9	106.1	45.5	42.5
			59.0	102.7	34.9	31.1
	Transverse	Mid-wall	63.0	107.0	39.9	51.4
			61.6	107.9	37.4	44.0
Green	Longitudinal	ID	58.0	101.8	43.1	49.4
			58.3	102.2	44.9	57.2
		OD	64.3	109.4	42.1	44.7
			66.7	108.6	42.5	45.8
Red	Longitudinal	Mid-wall	60.9	101.8	47.0	55.2
			60.4	102.4	48.6	55.7
	Transverse		61.0	104.2	44.4	58.7
			61.5	104.7	43.7	51.0
Dark Blue	Longitudinal	Mid wall	60.6	101.1	46.5	59.2
			60.5	101.1	46.8	59.2
	Transverse		61.4	103.5	40.3	48.7
			62.5	105.4	40.5	54.0

Tensile Testing



Timeframe Recap

- Week One
  - First Inquiry
  - Meetings & Printability Assessment with Lincoln Electric
  - Determined code case and API guidance
- Week Two
  - Risk Assessment, supported by review of Lincoln and Industry Data
  - Visit to Lincoln, review QA/QC and manufacturing
  - Initial Mechanical Results, Surface Roughness, and FEA model
- Week Three
  - Hydrotest, PAUT, and RT on test piece
  - Grinding & photography of surface indications
- Week Four
  - Delivery of subsequent parts for final machining, inspection, & installation

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Questions & Discussion

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Weld Metal Manufacture Today … and trends

- Huge use in repair – due to supply chain constraints on large forgings, castings and specialty metals
- Still used in prototyping and in tooling (no code rules)
- Significant work on multi-metal and functionally gradiant parts – pups for dissimilar metal joining, moving field welds outside of critical zones, corrosion and heat resistance, etc.
- Significant work on redesigns to remove excess thickness required for metal flow (castings, forgings)

Weld Metal AM Code Rules

- Code case 3020 is incorporated into 2023 Section IX as QW-600 series – bracketed qualifications required
- Scattered specific BPV code cases allow use of additive materials
- Broad code case has been balloted by ASME BPV AM group.
  - Will go on to VIII and III quickly. Possibly to B31, B16, I – as they choose.
  - Limited materials including mild, low alloy, stainless and nickel-alloy steels.
  - Limited to time-independent use.
- AM has been applied in BPV using weld metal buildup rules
- API 20S, AWS D20, DNV and others have use rules in place

NBIC Possible Approaches

- Don’t add or subtract any rules
  - Let repairs and alterations language cover this, along with jurisdictions/AIs
  - Wait for rules to be adopted into BPV codes (2025-2027 for III and VIII)

- Add specific rules for repair or alteration using weld metal

- Issue interpretation(s) to address how this is covered
  - See B31.3 interpretation on the next slide

Dr. Amir Farzadfar
Emerson Process Management
301 S. 1st Avenue
Marshalltown, IA 50158
Email: amir.farzadfar@emerson.com

Subject: B31.3-2014, Interpretation of Paras. 302.3.2(f), 304.7.2, 323.1.2 Additive Manufacturing Materials

Reference: Your September 9, 2015 Request for Interpretation; ASME C&S File #15-2052

Dear Dr. Farzadfar:

Your request for interpretation has been reviewed by the B31.3 Process Piping Committee. Following is the Committee's understanding of your question and official response:

Question: Does ASME B31.3 permit the use of an unlisted piping component manufactured using the additive manufacturing process?

Reply: Yes, provided it meets all of the requirements of the Code including material being qualified in accordance with the requirements of para. 323.1.2, and the component meeting the requirements of paras. 326.1.2 and 326.2.2.

Sincerely,

Riad Mohamed

Riad Mohamed
Secretary, B31.3 Process Piping Committee
212-591-8528
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Item 22-03
Scarcella
December 6, 2022

ATTACHMENT 4

PART 2, SUPPLEMENT 14
LOW PRESSURE BOILER EXTERNAL INSPECTION LIST

S14.1 SCOPE

Table S14.1 is a list for guidance of a general nature and does not cover all service conditions. This list does not include all jurisdictional requirements. Use of a checklist to perform in-service inspections is recommended (1.5.1).

TABLE S14.1

NBIC Part 2 Section Reference	Inspection Component
2.2.3	General Conditions of the boiler room; lighting, ventilation, housekeeping, and general/personal safety/clearance tripping hazard
2.2.10.6c)	Verify combustion air is supplied to the boiler room
2.2.5	General condition/leakage of the boiler, and appurtenances; water, steam, fuel, flue and fuel train components
2.2.10.6d)	Remote Emergency stop button
1.5.2a) 3)	Stamping/Code Construction
2.2.10.4	Verify gage glass reading/condition
2.2.10.4b) - d)	Pressure gage reading/condition
2.2.10.6l) 3)	Thermometer reading/condition
2.5.4	Relief valve installed properly
2.5.7	Relief valve testing
2.5.2	Relief valve set pressure and capacity
2.5.3	Relief valve condition
2.2.10.6e)	Witness test of low water/flow protection devices/rating
2.2.10.6l) 1) & 2)	Pressure and temperature controls installed
2.2.10.6b)	Verify controls and safety devices are tested and documented
2.2.11	Review logs and maintenance records
1.5.4	Explain and report violations and deficiencies