Date Distributed:
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THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD INSPECTION CODE SUBCOMMITTEE PRESSURE RELIEF DEVICES

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MINUTES

Meeting of January 15th, 2025
Charleston, SC

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

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1. Call to Order

Chair Adam Renaldo called the meeting to order at 8:06 AM EST on Wednesday, January 15, 2025. Members and guests in attendance can be found on page 1 of the attachments.

2. Introduction of Members and Visitors

3. Check for Quorum

4. Announcements

- This meeting marks the end of Cycle A for the 2027 NBIC edition.
- The National Board will be hosting a reception on Wednesday evening from 5:30 p.m. to 7:30 p.m. at the Hyatt Place rooftop bar, the Pour Taproom.
- The National Board will be hosting breakfast and lunch on Thursday for those attending the Main Committee meeting. Breakfast will be served from 7:00 a.m. to 8:00 a.m. in Grand Magnolia Foyer, and lunch will be served from 11:30 a.m. to 12:30 p.m. in Sterling Hall Foyer.
- Meeting schedules, meeting room layouts, and other helpful information can be found on the National Board website under the **NBIC** tab → NBIC Meeting Information.
- The NBIC Committee has transitioned from NB File Share to SharePoint. Remember to add any attachments that you'd like to show during the meeting (proposals, reference documents, powerpoints, etc.) to the NBIC SharePoint site (nationalboard.sharepoint.com/sites/NBIC) **prior to the meeting**.
  - Note that access to the NBIC SharePoint site is limited to committee members only.
  - ALL powerpoint attachments/presentations must be sent to the NBIC Secretary for approval prior to the meeting.
  - Contact Jonathan Ellis (*nbicsecretary@nbbi.org*) for any questions regarding NBIC SharePoint access.
- When possible, please submit proposals in Word format showing "strike through/underline." Project Managers: please ensure any proposals containing text from previous NBIC editions are updated with text from the most current edition.
- If you'd like to request a new Interpretation or Action item, do so on the National Board Business Center.
  - Anyone, member or not, can request a new item.
- As a reminder, anyone who would like to become a member of a group or committee:
  - Should attend at least two meetings prior to being put on the agenda for membership consideration. The nominee will be on the agenda for voting during their third meeting.
  - The nominee must submit the formal request along with their resume to the NBIC Secretary **PRIOR TO** the meeting. *nbicsecretary@nbbi.org*
  - If needed, we can also create a ballot for voting on a new member between meetings.
- Thank you to everyone who registered online for this meeting. The online registration is very helpful for planning our reception, meals, room setup, etc. It is also a good way to make sure we have the most up-to-date contact information. Please continue to use the online registration for each meeting.

5. Adoption of the Agenda

A motion was made to adopt the amended agenda. The motion was seconded and approved unanimously.

6. Approval of Minutes from the July 17, 2024, Meeting

A motion was made to approve the minutes from the July 2024 meeting. The motion was seconded and unanimously approved.

7. **Awards/Special Recognition**
   Mr. Kim Beise – 10 years on SC PRD
   Mr. David McHugh – 10 years on SC PRD

8. **Review of the Roster**
   a. **Nominations**

      The following candidates requested membership on Subgroup PRD:

      i. Mr. Erik Heck
         i. A motion was made to confirm Mr. Heck's appointment to SG PRD. The Motion was seconded and approved unanimously.
      ii. Mr. Billy DeKeyzer.
         i. A motion was made to confirm Mr. DeKeyzer's appointment to SG PRD. The Motion was seconded and approved unanimously.
      iii. Mr. Nick Bailey
         i. A motion was made to confirm Mr. Bailey's appointment to SG PRD. The Motion was seconded and approved unanimously.

      The following candidates requested membership on Subcommittee PRD

      i. Mr. Nick Bailey
      i. A motion was made to recommend Mr. Bailey for SC PRD. The motion was seconded and approved unanimously.

   b. **Reappointments**
      i. The following **Subcommittee PRD** memberships are set to end prior to the July 2025 meeting: Mr. Alton Cox, Mr. Daniel Marek, Mr. Brandon Nutter, and Mr. Thakor Patel.
         i. A motion was made to reappoint Mr. Marek, Mr. Nutter, and Mr. Patel. The motion was seconded and approved unanimously.
         ii. Mr. Alton Cox did not wish to renew his membership to SC PRD.

   c. **Resignations**
      i. Mr. Alton Cox has announced his retirement and subsequent resignation from Subgroup and Subcommittee PRD.
      ii. Mr. Craig Theiler has changed employment and has resigned from Subgroup PRD.

   d. **Officer Selections**

9. Interpretation Requests

Item Number: 24-38	NBIC Location: Part 4, 2.5.4.2 & Part 1, 3.9.1.6 c)	No Attachment

General Description: T&P relief device installation on modular HWH supply header

Task Group: None assigned.

Explanation of Need: The NBIC does not address the installation or location of a common T&P valve for modular HWH's. Clarification is needed on whether the common supply header can be considered part of the HWH, and whether T&P valves can be installed in the horizontal position with the outlet pointed down, if installed directly to the header with no more than 4 in. maximum interconnecting piping.

January 2025 Meeting Action: This is an intent interpretation. The associated action item needs to be approved prior to any further action taking place with this interpretation.

Item Number: 24-46	NBIC Location: Part 4, 4.3.1 a)	No Attachment

General Description: Replacement of Bodies and Transfer of Nameplates During Repair

Task Group: None assigned.

Explanation of Need: Clarity on what defines "the valve". Is "the valve" the nameplate solely or the nameplate and serialized base; and subsequent ability to divorce the nameplate and base during repair when the base requires replacement.

January 2025 Meeting Action: This is an intent interpretation. The associated action item needs to be approved prior to any further action taking place with this interpretation.

New Interpretation Requests:

Item Number: 24-87	NBIC Location: Part 4, 4.7.3 a) and b)	Attachment Page 6

General Description: Changes to the original pressure relief device nameplate.

Task Group: None assigned.

Explanation of Need: Clarification is needed on the correct way to communicate changes to a relief device through nameplate stamping.

January 2025 Meeting Action: A motion was made to accept the proposed question and reply. The motion was seconded and approved unanimously. This represents an intent interpretation. A motion was made to open an action item to review and clarify guidelines for conversion nameplate stamping. The motion was seconded and approved unanimously, and Item 25-01 was opened.

10. Action Items

a. Items From other Committees

i. Item 24-18 – Definition of Controlled Fill (P. Gilston as PM) (Attachment Page 7)

1. A motion was made to accept the proposal as written. The motion was seconded and approved with 2 negative votes (E. Creaser, D. Sulllivan), and 1 abstention (D. McHugh). Reasoning for negative votes and abstention are included in the attachments. This item passes and will go to Main Committee.

b.

Item Number: NB15-0305	**NBIC Location: Part 4**	**No Attachment**
General Description: Create Guidelines for Installation of Overpressure Protection by System Design. **Task Group:** B. Nutter, A. Renaldo, D. Marek (PM), D. DeMichael, J. Wolf, D. Schirmer, J. Grace, D. Sullivan **January 2025 Meeting Action:** A proposal was presented. The proposal will go to letter ballot to SG Installation, Inspection, and PRD.		

Item Number: NB15-0315	**NBIC Location: Part 4, 2.5.6 and 2.6.6 and Part 1, 4.5.6 and 5.3.6**	**No Attachment**
General Description: Review isolation Valve Requirements, and reword to allow installation of pressure relief devices in upstream piping. **Task Group:** D. DeMichael, B. Nutter (PM), A. Renaldo, D. Marek, K. Beise **January 2025 Meeting Action:** Progress report. Work continues on this item. B. Nutter was reassigned as the PM.		

Item Number: 19-83	**NBIC Location: Part 4, Part 1**	**No Attachment**
General Description: Address alternate pressure relief valve mounting permitted by ASME CC2887-1. **Task Group:** D. Marek (PM), T. Patel, J. Ball, R. Ceccarelli **January 2025 Meeting Action:** Progress report. Work continues on this item. R. Ceccarelli was added to the task group.		

Item Number: 21-08	NBIC Location: Part 4, S4.4	No attachment

General Description: Additional guidance for tank vent repairs

Subgroup: PRD
Task Group: D. DeMichael, H. Cornett, B. Nutter (PM), K. Beise, J. Grace

Explanation of Need: The recently approved S4.4, "Weight Loaded Vents," (NB12-0901) provided new guidance for tank vent repairs. Several additional topics need to be addressed to enhance the guidance. These topics include: 1) Suggested test equipment and configuration for the prescribed tank vent testing. 2) Minimum requirements for replacement parts, 3) Guidance for painting tank vent components.

January 2025 Meeting Action: : Progress report. Work continues on this item. B. Nutter was reassigned as the PM

Item Number: 22-09	NBIC Location: Part 4, 4.6.1	No Attachment

General Description: Add language to NBIC Part 4 for valves manufactured to Code Case 2787

Subgroup: PRD

Task Group: A. Donaldson (PM), H. Cornett, B. Nutter, T. Tarbay, J. Simms, T. Patel

Explanation of Need: There are no requirements to address valve repairs that were manufactured or assembled to Code Case 2787 (use of more than one certified capacity on the pressure relief valve or the nameplate).

January 2025 Meeting Action: Progress report. Work continues on this item. Mr. Thakor Patel was added to task group.

Item Number: 22-20	NBIC Location: Part 4, 4.7.4	No Attachment

General Description: Inspection and testing of PRV's located above isolation valves.

Subgroup: PRD

Task Group: D. Marek (PM), K. Beise, J. Ball, E. Creaser, H. Cornett, A. Renaldo

Explanation of Need: Add requirement to make sure the internals of a PRV inlet and outlet are inspected when it is tested, and require tests to be done with a pressure vessel with volume.

January 2025 Meeting Action: Progress report. Work continues on this item.

Item Number: 23-32	NBIC Location: Part 4, 3.3 and Supp. 6	No Attachment

General Description: Rules for T/O activities related to Nuclear Class Valves

Subgroup: PRD

Task Group: E. Creaser (PM), P. Dhobi, D. McHugh, J. Simms

Explanation of Need: Nuclear facilities that perform repair and T/O activities would by allowing them to use T/O for nuclear class valves that were serviced but not in need of repair but need to be set and sealed again.

January 2025 Meeting Action: Progress report. Work continues on this item.

Item Number: 24-35	NBIC Location: Part 4, 4.6.2	Attachment Page 8

General Description: Update Testing of UV-Designated Steam valves on Air to match ASME XIII

Subgroup: PRD

Task Group: Tom Beirne (PM)

Explanation of Need: ASME Section XIII Table 3.6.3.1-1 Note 3 permits UV-designated steam valves to be tested using air when the valve is beyond the testing capabilities due to set pressure or capacity. The NBIC only permits steam valves to be tested on air by the owner/user. This should be permitted by any VR shop that has steam test equipment since it is permitted under the rules for new construction.

January 2025 Meeting Action: A motion was made to made to send the proposal back to SG PRD for rework. The motion was seconded and approved unanimously.

NOTE: The proposal was approved by Subgroup PRD via letter ballot on November 16, 2024.

Item Number: 24-72	NBIC Location: Part 4, 4.3.1	No Attachment

General Description: Add Language to Address Replacement of Valve Bodies and Bases

Subgroup: PRD

Task Group: A. Donaldson (PM), G. Salwan, E. Creaser, H. Cornett, B. Nutter, P. Dhobi, T. Tarbay, T. Patel

Explanation of Need: Under the current text of 4.3.1 there are no guidelines for the replacement of valve components to which the original nameplate is attached.

January 2025 Meeting Action: Progress report. Work continues on this item.

11. New Business

Item Number: 24-91	**NBIC Location: Part 4, 3.2.3, Part 1 S3.6 d)**	**No Attachment**

General Description: Require means to prevent safety valve discharge piping blockage for LCDSV (Part 4)

Subgroup: PRD

Task Group: A. Renaldo (PM), J. Simms, D. Schirmer, D. Sullivan, R. Ceccarelli

Explanation of Need: Adding verbiage to the NBIC Part 1, Part 2 and Part 4 to require a means to prevent foreign material introduction to the safety valve discharge pipe.

January 2025 Meeting Action: A proposal was presented. A task group was assigned to develop the proposal further.

Item Number: 24-101	**NBIC Location: Part 4, Sections 3 and 4**	**No Attachment**

General Description: Revise NBIC to expand VR and T/O programs beyond ASME Certified Valves

Subgroup: PRD

Task Group: E. Creaser (PM), D. Marek, T. Beirne, H. Cornett, K. Beise, R. Viers, N. Bailey, A. Donaldson,

Explanation of Need: The National Board upper management and Board of Trustees have decided to expand the VR and T/O programs to valves that are constructed to standards other than ASME. The proposal file contains changes that would accomplish this goal. Changes to NB-514 and NB-528 will follow.

January 2025 Meeting Action: A proposal was presented. A task group was formed to further develop the proposal.

Item Number: 24-103	NBIC Location: Part 4, S4.3 f) and S7.2 a) 2)	Attachment Page 9

General Description: Sealing and Tagging of Pilot operated relief valve under VR Program

Subgroup: PRD

Task Group: None assigned.

Explanation of Need: The need for the above change is to have a way to ensure that both the pilot and main valve have been repaired to the requirements of NBIC during the same repair. Currently it is difficult to identify if both components have been repaired during the same repair. This makes it challenging under the T/O program to verify this required information. Additionally, under the current code there is the possibility for a non-accredited repair organization to change the pilot with a set and tested pilot which would have seals and repair the main without disturbing the seals. The previous VR tag would be intact as well as the seals upon completion.

January 2025 Meeting Action: A proposal was presented. A motion was made to close this item with a letter to the inquirer. The motion was seconded and approved unanimously.

Item Number: 25-01	NBIC Location: Part 4, 4.7.3	No Attachment

General Description: Review and Clarify Guidelines for Nameplate Stamping Following Conversion

Subgroup: PRD

Task Group: J. Simms (PM), E. Heck, C. Turner, N. Bailey, P. Dhobi, D. Mosley, B. Nutter, D. Schirmer

Explanation of Need: The current NBIC language lacks sufficient detail and instruction for modification of original nameplate information following conversion.

Background Information: This stems from I24-87, requesting guidance on how much information should be marked out from original model number/type.

January 2025 Meeting Action: A task group was assigned.

12. **Presentations**
    Autoclave Safety Incident

13. **Future Meetings**
    - July 7-10, 2025 – Cincinnati, OH
    - January 12-15, 2026 – New Orleans, LA

14. **Adjournment**

    A motion was made to adjourn the meeting. The motion was seconded and approved unanimously. The meeting adjourned at 12:04PM EST.

    Respectfully Submitted,

    Robert Viers
    Secretary, Subcommittee Pressure Relief Devices

Subcommittee PRD Attendees - January 2025

MEMBERS:	Interest Category	Registered For	In Person	Remote	Not In Attendance
Adam Renaldo	Users	In Person	x		
Jay Simms	Manufacturers	In Person	x		
Robert Viers	Secretary	In Person	x		
Kim Beise	National Board Certificate Holders	In Person		x	
Henry Cornett	Manufacturers	In Person			
Alton Cox	General Interest	In Person	x		
Eben Creaser	Jurisdictional Authorities	In Person	x		
Denis Demichael	General Interest				x
Prakash Dhobi	National Board Certificate Holders	In Person	x		
Alfred Donaldson	Manufacturers	Remote		x	
Daniel Marek	Users	In Person	x		
David McHugh	General Interest	In Person	x		
Brandon Nutter	National Board Certificate Holders			x	
Thakor Patel	Manufacturers			x	
Delton Schirmer	Authorized Inspection Agencies	In Person	x		
David Sullivan	Authorized Inspection Agencies	In Person	x		
Thomas Tarbay	General Interest				x
Jon Wolf	Authorized Inspection Agencies			x	

VISITORS:	Company/Title/Interest	Registered For	In Person	Remote
Timothy Achema	Los Angelas Dept. of Water and Power	In Person		
Hussein Alajrami	MTS Multi Task Services	Remote		
Sajjad Ali	Sinopec	Remote		
Joel Amato	National Board	In Person		
Scott Artrip	Cross Company	In Person	x	
Nick Bailey	JAC Consulting	In Person	x	
John Burpee	State of Maine	In Person		
Tom Cardy	Setpoint Integrated Solutions	In Person		
Ray Ceccarelli	FM Global	In Person	x	
Jeff Churchill	Blue Northern Engineering	Remote		x
Billy DeKeyzer	Trillium Flow Technology	In Person	x	
Jonathan Ellis	NBBI		x	
Jeremy Grace	Chemours	In Person	x	
Erik Heck	ARI Armaturen		x	
John Huntington	Midwest Valve Services	Remote		
Rajesh Kamboj	Technical Safety BC	Remote		
Junior Little	Cross Company	In Person	x	
Robert Lynn	Setpoint Integrated Solutions	Remote		x
Darris Mosley	Occidental Petroleum	In Person	x	
Tusharkumar Patel	Applus Certification Services	Remote		
Luis Ponce	National Board	In Person		
Christa Rogers	National Board	In Person		
Clark Turner			x	
Gabriel Salwan	Quality Valve	Remote		
Gary Scribner	NBBI		x	
William Valimento	Los Angelas Dept. of Water and Power	In Person		
Wendy White	National Board	In Person		

From: Eben Creaser
To: Bob Viers
Subject: Re: Negative vote for Item 24-18
Date: Wednesday, February 5, 2025 10:42:51 AM

Hi Bob,

I voted negative because in my opinion the proposal was poorly worded, to lengthy and arguably the concept may already be defined with an existing defied term “Controlled Disposition” making this proposal redundant. I think NBIC should align with other existing published and defined terms when ever possible.

Regards,

Eben

> On Feb 5, 2025, at 10:57 AM, Bob Viers <rviers@nationalboard.org> wrote:
>
> Gentlemen,
>
> I had both of you voting negatively for Item 24-18 (Phil Gilston’s definition of “Controlled Fill”). Can you please provide me with a written explanation for your negative vote? I need it for the meeting minutes. If you need me to send you a copy of the proposal, please let me know.
>
> Thank you both for your time.
>
> Sincerely,
>
> **Robert Viers**
> *Senior Staff Engineer*
> *Technical Department*
> *Pressure Relief Laboratory*
> *<image001.png>*
>
> The National Board of Boiler and Pressure Vessel Inspectors
> Testing Laboratory
> 7437 Pingue Dr.
> Worthington, OH 43085
> 614.888.8320 ext. 113
> rviers@nationalboard.org
> www.NBBI.org

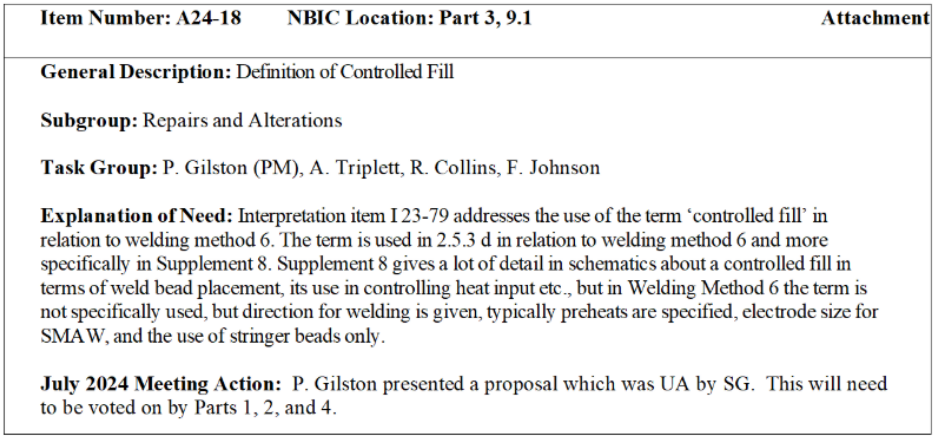
From: Dave Sullivan
To: Bob Viers; dave@dksully.com
Subject: Fwd: Item A24-18 negative vote
Date: Wednesday, February 5, 2025 10:49:38 AM
Attachments: image.png

Will this do?

---------- Forwarded message ---------
From: **Dave Sullivan** <dave.sullivan@bpcllcga.com>
Date: Wed, Jan 15, 2025 at 11:41 AM
Subject: Item A24-18 negative vote
To:
Cc: <dave@dksully.com>

I voted 'no' because I think the wording can be more concise.
I proposed something like.

A written welding technique which considers the metal properties of the weld and HAZ such as but not limited to distortion, tempering and cracking, by addressing weld variables.



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

General Description: Definition of Controlled Fill

Subgroup: Repairs and Alterations

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

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

July 2024 Meeting Action: P. Gilston presented a proposal which was UA by SG. This will need to be voted on by Parts 1, 2, and 4.

--
Dave Sullivan
Jurisdictional Inspector
Boiler & Property Consulting | XL Insurance America, Inc.
5018 Bristol Industrial Way, Suite 203, Buford, Georgia 30518
Direct: 501-442-3167 | Home Office: 770-614-3111
Chief Boiler Inspector Emeritus, State of AR
Email: Dave.Sullivan@bpcllcga.com
www.BoilerProperty.com

From:	David McHugh
To:	Bob Viers
Subject:	Re: Not Voting - Item 24-18
Date:	Wednesday, February 5, 2025 11:07:57 AM
Attachments:	image001.png

Bob,

Feel free to update minutes as mentioned.

Abstaining vote: my current welding experience and knowledge prevents me from providing an informed vote on subject item.

Best,
Dave

Sent from my Verizon, Samsung Galaxy smartphone
Get Outlook for Android

From: Bob Viers <rviers@nationalboard.org>
Sent: Wednesday, February 5, 2025 9:08:01 AM
To: dpmBstrg <dpmBstrg@outlook.com>
Subject: Not Voting - Item 24-18

Dave,

When we took the vote at SC PRD for Item 24-18 (Phil Gilston's definition of "Controlled Fill") you had responded as "not voting", but based on the NB-240 definitions, it seems like it should have been an abstention. First, do I have your permission to update the minutes to reflect this, and second, can you please send me an email stating your reason for abstaining? If you need me to send you the proposal to refresh your memory, please let me know.

Thanks for your time.

Sincerely,

Robert Viers
Senior Staff Engineer
Technical Department
Pressure Relief Laboratory
The National Board of Boiler and Pressure Vessel Inspectors
Testing Laboratory
7437 Pingue Dr.
Worthington, OH 43085
614.888.8320 ext. 113
rviers@nationalboard.org

NBIC Interpretation Item I24-87
Submitted by Darris Mosley (Darris_mosley@oxy.com)
12/16/2024

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

Subject:	Changes to the original pressure relief device nameplate.
NBIC Location:	2023 NBIC Part 4, 4.7.3 a) and b)
Statement of Need:	Clarification is needed on the correct way to communicate changes to a relief device through nameplate stamping.
Background Information:	A VR certificate holder has been audited and has received corrective actions for only stamping out the items of a relief device's part number that have been changed. The shop was given guidance to update their quality control manual to stamp out the entire part number even when not all components have been changed.
Proposed Question:	Part 4, paragraph 4.7.3 (a) second sentence states "For these repairs, the invalidated information on the original nameplate or stamping shall be marked out but left legible." Is the invalidated information considered the to be the entire field (for example entire model number or only a portion of model number)?
Proposed Reply:	No. Only the portion that is invalidated shall be marked out but left legible. However, the entire new model number shall be marked on the VR nameplate.
Committee's Question:	Part 4, paragraph 4.7.3 (a) second sentence states "For these repairs, the invalidated information on the original nameplate or stamping shall be marked out but left legible." Is the invalidated information considered to be the entire field?
Committee's Reply:	Yes, the intention is to mark out the entire field, but leave the old information legible.
Rationale:	

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

PROPOSED REVISION OR ADDITION

Item No.

A 24-18 Rev 01

Subject/Title

Controlled Fill Definition

NBIC Location

All Parts, Section 9, Glossary of Terms

Project Manager and Task Group

Philip Gilston (PM), A. Triplett

Source (Name/email)

Philip Gilston (philip_gilston@hsb.com)

Statement of Need

There is no definition of the term 'controlled fill'.

Background Information

Interpretation item I 23-79 addresses the use of the term 'controlled fill' in NBIC Part 3, 2.5.3 d in relation to Welding Method 6 for Grade 91 material.

While the term 'controlled fill' is not specifically used in the text of Welding Method 6 (2.5.3.6), directions are given for such variables as typical preheats, electrode size for SMAW, and the use of stringer beads only. The term is used explicitly in Supplement 8 for CSEF repairs, where S8.3.b says that "To control heat input the weld repair shall be performed using a "controlled fill" technique"; details are also given on such items as preheats, electrode size, required fill pass overlap, etc., and a lot of detail is provided in schematics including specifics on weld bead placement.

Existing Text	Proposed Text	Clean Copy
None	**Changes form Rev 00 shown** **Controlled Fill** – ~~requirements specified~~control of weld technique for a ~~permitted weld~~ repair process ~~in order to manage heat input~~ to ensure satisfactory weld properties by controlling distortion, promoting tempering and minimizing the risk of cracking by addressing variables including but not limited to heat input, ~~such as~~ preheat and interpass temperature, weld consumable type and ~~diameter~~size, weld technique (string or weave~~),~~) and bead placement ~~etc~~.	**Controlled Fill** – control of weld technique for a repair process to ensure satisfactory weld properties by controlling distortion, promoting tempering and minimizing the risk of cracking by addressing variables including but not limited to heat input, preheat and interpass temperature, weld consumable type and size, weld technique (string or weave) and bead placement.

	VOTE						
Committee	Approved	Disapproved	Abstained	Not Voting	Passed	Failed	Date

ITEM 24-35 Proposal 3/25/24 based on previously approved changes

4.6.2 ~~OWNER-USER~~ TESTING OF ASME "UV" DESIGNATED STEAM SERVICE VALVES USING AIR

~~When~~ ASME "UV" designated steam valves may be tested with air by the VR Certificate Holder provided either, the valve to be tested is beyond the capabilities of the qualified steam test equipment due to size or set pressure, or the valve to be tested is repaired by the owner for the owner's own use and the following conditions are met:
~~are repaired by the owner for the owner's own use, valves for steam service may be tested on air for set pressure and, if possible, blowdown adjustment, provided the valve manufacturer's corrections for differential in set pressure between steam and air are applied to determine the test pressure as follows:~~

a) The test pressure using air as the test medium shall be the product of the Manufacturer's correction factor for the differential between steam and air multiplied by the set pressure. If a cold differential test pressure is applicable due to superimposed back pressure and/or service temperature, then the manufacturer's correction factor shall be applied to the cold differential test pressure. The test pressure shall be recorded on the valve repair document described in 4.8.5.4 i).

b) The correction factor between steam and air shall not be included in the cold differential test pressure marked on the valve repair nameplate per 4.7.2 b) 8).

For reference only below are changes that were approved by voice vote at MC at the January 2023 meeting.

ITEM 22-35 1/10/23

4.6.2 OWNER-USER ~~ASME CODE SECTION VIII STEAM~~ TESTING OF ASME "UV" DESIGNATED STEAM SERVICE VALVES

When ASME ~~Code Section VIII~~ "UV" designated valves are repaired by the owner for the owner's own use, valves for steam service may be tested on air for set pressure and, if possible, blowdown adjustment, provided the valve manufacturer's corrections for differential in set pressure between steam and air are applied to determine the test pressure as follows:

Staff editorial note: Table of Contents will need to be updated

NBIC Action Item A24-103
Submitted by John Huntington (jhuntington@mwvalve.com)
January 7, 2025

THE NATIONAL BOARD
OF BOILER AND PRESSURE VESSEL INSPECTORS

Subject:	Sealing and Tagging of Pilot operated relief valve under VR Program
NBIC Location:	2023 NBIC, Part 4, S4.3 f) and S7.2 a) 2)
Statement of Need:	The need for the change is to have a way to ensure that both the pilot and main valve have been repaired to the requirements of NBIC during the same repair. Currently it is difficult to identify if both components have been repaired during the same repair. This makes it challenging under the T/O program to verify this required information. Additionally, under the current code there is the possibility for a non-accredited repair organization to change the pilot with a set and tested pilot which would have seals and repair the main without disturbing the seals. The previous VR tag would be intact as well as the seals upon completion.
Background Information:	The discussion around the code allowing the repair of the pilot or main has led to the answer being no, with that said the current code does have measures in place under tagging and sealing to eliminate the possibility of repairing one component.

Proposed Text:

S4.3 PILOT OPERATED PRESSURE RELIEF VALVES

f) Sealing

After final adjustment and acceptance by quality control, all external adjustments shall be sealed by means assuring positive identification of the organization performing the repair. The tagging process for pilot operated pressure relief valves shall include installing the repair tag on the main valve and pilot valve.

[redacted]

Incident Investigation Report

Attachment 1- BSB-0101-05 R4

NC Number- [redacted]

Incident Location Name & Address- [redacted]

Owner's Name & Contact Information- [redacted]

Report Type- **Preliminary** ☒ **Final** ☐

Date of Incident- 19 October 2017 **Time of Incident-** 6:07 PM

Date Notified- 20 October 2017 **Time Notified-** 11:30 AM

Date Investigated- 20 October 2017 **Time Investigated-** 2:30 PM

How Bureau Notified- Phone call to Assistant Chief

Also Investigated By-

Police☐ Fire☐ OSH☐ Federal Agency☐

Other- [redacted]

Type of Facility-

Factory/Industrial☒ Petro/Chemical☐ Educational☐ Medical☐ Arena☐ Office☐

Other-

[redacted]

Incident Investigation Report

Attachment 1- BSB-0101-05 R4

Injuries? NO **OSH Notified?** NO

Describe the Incident and Investigation- On October 20, 2017 [redacted] Manager, stated that on October 19, 2017 at approximately 6:07 PM the #2 autoc[redacted] failed. The failure consisted of the door separating from the autoclave at 80 PSI and traveling approximately 80 feet across the plant floor causing extensive damage. This information was verified from a steam flow chart (see attached). The autoclave traveled approximately 30 feet backwards into the rear yard causing damage only to the autoclave itself and the building where it was attached. The investigation revealed the locking ring wedges failed in the weld, causing the door to separate (see attached pictures). The locking ring contained 24 wedges and 12 of those failed. [redacted] stated that in May of 2017 repairs were made to the autoclave [redacted] (See attached documents). The repair consisted of removing the locking ring, transporting it to their shop and welding 24 wedges to the ring. A new insert was installed between the locking ring and the shell. [redacted] has requested that [redacted] have material composition analysis performed on both the locking ring and the wedges to determine weldability, and to have a weld failure analysis performed on the wedges.

Probable Cause (s) of Accident- Failure of the wedge welds to the locking ring.

Violations- NO **If yes, violation entered into JO?** N/A

If yes, describe-

Did violation cause or possibly contribute to the incident? N/A

Directives Issued- (a) For repairs (b) To prevent reoccurrence- Material composition analysis on the locking ring and wedges and a weld failure analysis on the failed welds.

Persons Involved/Contacted-

Name & Title	Address	Phone Number	Injured?	Type of Injury	Statement Taken?	How Involved
[redacted]	[redacted]	[redacted]	No		Yes	Engineering Manager
[redacted]	[redacted]	[redacted]	No		No	Third Party Engineer

Has the Incident Scene Been Disturbed, Tampered with, or Items Moved or Removed Before Arrival of the Inspector? NO

If yes, describe-

Items Removed for Investigation/Testing? NO

If yes;

By who?

Where Sent-

[redacted]

Incident Investigation Report

Attachment 1- BSB-0101-05 R4

Photographs Taken? YES

By who? [redacted]

Object Involved-

Boiler☐ Pressure Vessel☒ Heat Exchanger☐ Piping System☐ Valve☐ Fitting☐

Other-

Manufactured By- Miami **Year Built-** 1960 **MAWP-** 100 **Size-** 60 Sq. Ft.

Type- Pressure Vessel **Temperature-** N/A **ASME Designator-** U

National Board Number- 399 **Model Number-** N/A

Serial Number- N/A

Compressor Horsepower- N/A **Boiler Capacity-** N/A **Burner Capacity-** N/A

Fuel Type/Energy Source- Unfired **North Carolina Exempt?** NO

Any Recent Repairs or Maintenance? YES **If yes, describe-** Repair to Locking Ring and Wedges

Are Copies of Repair/Maintenance Paperwork Available? YES

Are Copies of Repair/Maintenance Paperwork Attached? YES

Is a Log Book Available- NO **Was the Log Book Reviewed by the Inspector?** N/A

Certificate Issued? YES **Expiration Date-** 31 August 2019 **Insured?** YES **Insured By-** [redacted]

Last Inspection Date- 31 August 2017 **Last Inspected By-** [redacted]

Have Changes Been Made to Object Since Last Inspection? NO **If yes, describe-**

Fuel Train Inspection- N/A	Acceptable? N/A
Pressure Relieving Device Inspection- YES	Acceptable? YES
PRD Discharge Inspection- YES	Acceptable? YES
Pressure Gauge Inspection- NO	Acceptable? N/A
Temperature Gauge Inspection- N/A	Acceptable? N/A
High Limit Inspection- N/A	Acceptable? N/A
High Limit w/Manual Reset Inspection- N/A	Acceptable? N/A
LWCO Inspection- N/A	Acceptable? N/A
LWCO w/Manual Reset Inspection- N/A	Acceptable? N/A
Emergency Fuel Shut Off Inspection- N/A	Acceptable? N/A
Material Condition Inspection- N/A	Acceptable? N/A
Stack/Venting Inspection- N/A	Acceptable? N/A
Combustion Air Inspection- N/A	Acceptable? N/A
Amount of Combustion Air (if applicable) N/A	Acceptable? N/A
Flow Switch Inspection- N/A	Acceptable? N/A
Burner Controls Inspection- N/A	Acceptable? N/A
Closure(s) & Opening(s) Inspection- N/A	Acceptable? N/A
Safety Interlock(s) Inspection N/A	Acceptable? N/A
"Accident Inspection" entered in JO? **YES**	

Pressure Relieving Devices-

Number of PRD's- 1 **Manufacturer(s) -** Kunkle **Set Pressure(s) -** 100 PSI

Capacity Rating(s) - 7525 PPH **ASME/NB Stamped?** YES **Sealed?** YES **Size(s) -** 2 Inch

North Carolina Boiler Safety Bureau

Incident Investigation Report

Attachment 1- BSB-0101-05 R4

Investigating Inspector- Gregory Davis

NC Commission Number- 1435

Date- 20 October 2017

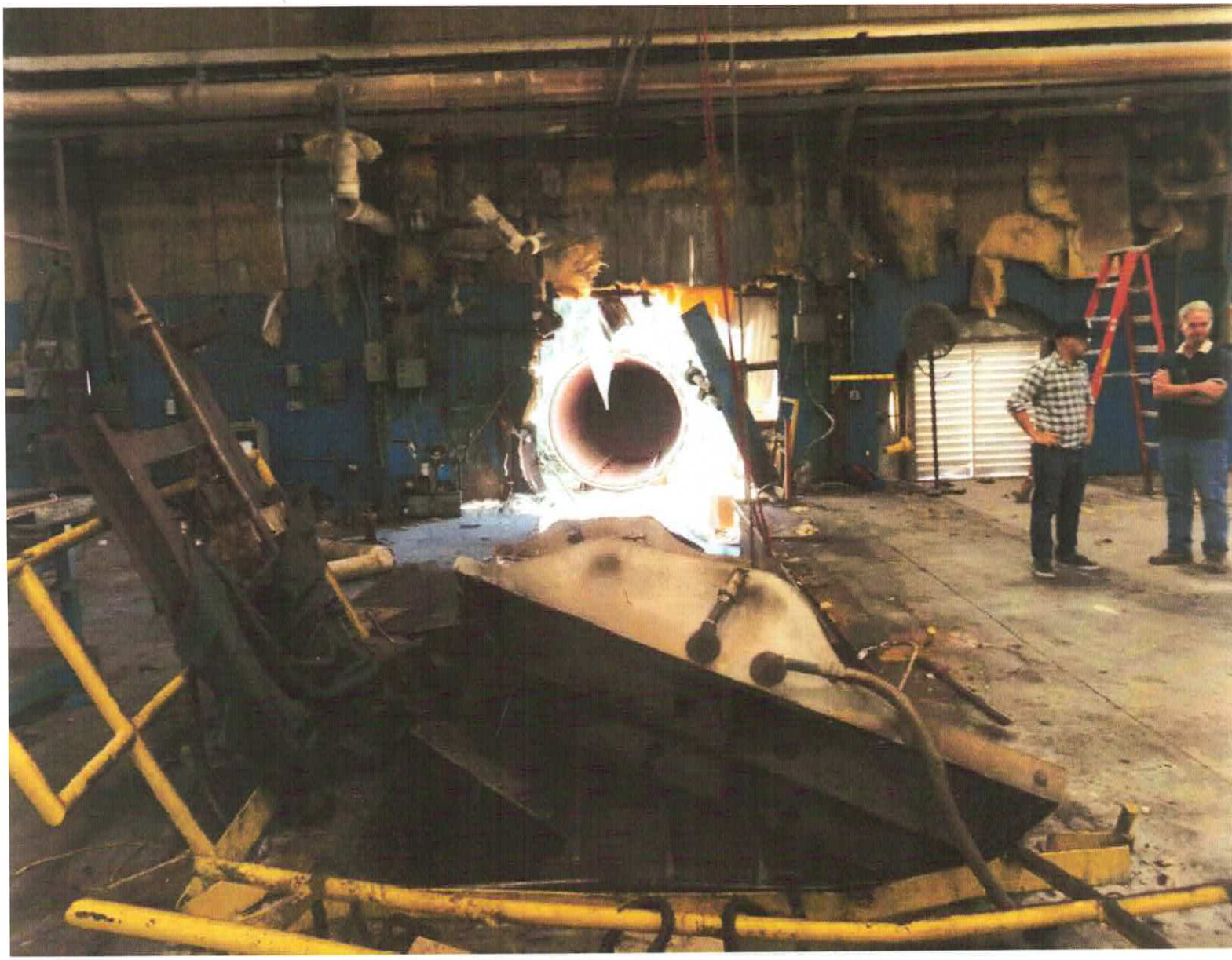
Signature- Gregory Davis

Reviewing Supervisor- Don Kinney

NC Commission Number- 1619

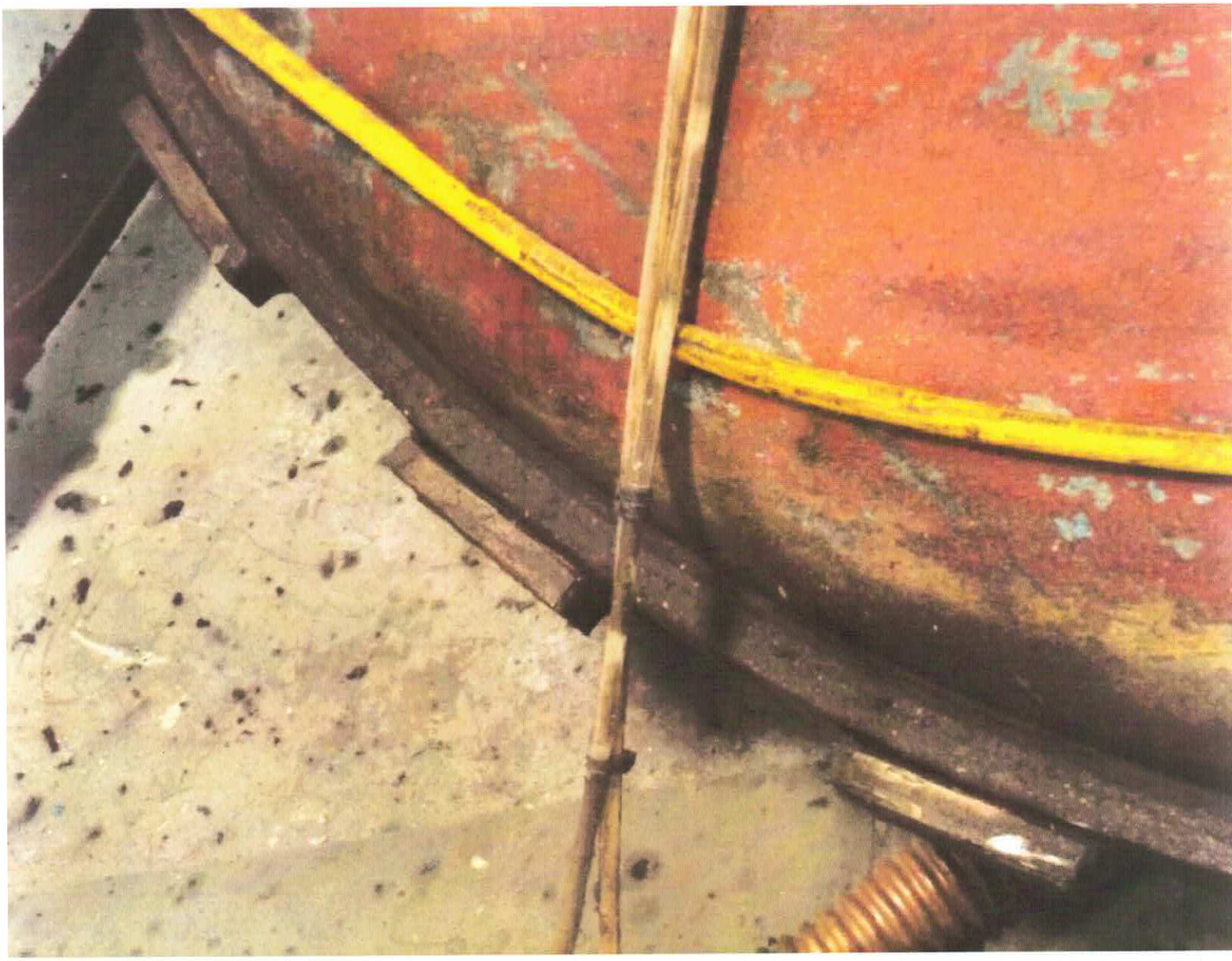
Date- 10/23/2017

Signature- Don Kinney




DANGER
HOT
STEAM


OPEN/CLOSE



Arc Energy Services, Inc. Rock Hill, SC 29730 Office 803.327.6009 Fax 803.327.6146

Date: April 13, 2017

Customer: Blackford RP Corporation

Attn: Fred Heckler

Subject: Autoclave Repairs

Quote No.: 172025, Revision 1

In response to your request, Arc Energy Services, Inc. (AES) is pleased to present your company with the following proposal.

Project Scope

Arc Energy Services (AES), will provide welding repairs on Autoclave #2 and Autoclave #5 as follows:

- Autoclave #5
  - Replace section of 3" sch40 Carbon Steel piping with sch80 piping from top of autoclave to (and including) flanged connection at first valve.
  - Piping will be pre-fabricated in our facility then brought to site and installed.
  - Authorized Inspector will be required for "R" Stamp work.
- Autoclave #2
  - Replace all locking wedges on door and rotating lock ring.
  - The door will be completed on site while the locking ring is brought to our shop.

Arc Energy Services, Inc. (AES) to Supply

AES will provide the following as a part of our bid:

- A designated AES site representative for this project with the overall responsibility to prepare and execute all AES tasks in a safe and timely manner.
- All welding wire.
- All welding gases.
- Required hand tools.
- Required consumables.
- AES will supply all Equipment necessary to complete job in a safe and timely manner.
- Personnel AES will be supplying:
  - 1x QC
  - 4x Welder
  - 4x Fitter

- 1x Machinist
- 1x Authorized Inspector

[redacted] to Supply

[redacted] shall assist [redacted] in the completion of this project by supplying the following items or having them supplied by their designee:

- [redacted] will require assistance to load, unload and place equipment at needed locations for the duration of this project, which may require forklifts, cranes and manpower, based on size and weight of equipment.
- [redacted] electrical power requirements that customer will have to connect, maintain and disconnect are as follows:
  - 480 volt, 60 amp, 3 phase power for welding equipment
  - 120 volt, 15 amp, single phase power outlets for general work areas
- Air supply requirements for pneumatically driven equipment:
  - 90 cfm / 35 psi for small hand tools
- Clearly mark cut locations for field machining, or sign off on AES marked cut locations.
- Provide adequate work areas for AES personnel, which may include but not limited to scaffolds, tents, lighting, ventilation, etc.
- Removal, disposal and reinstallation of insulation and lagging.

Assumptions

The following assumptions must be provided by others [redacted] awarded this project:

- Prior to the project start date all system termination and tag out procedures will be completed.
- All equipment interferences in and around work areas must be removed prior to project start date.
- Any and all related technical drawings, procedures and data must be supplied at earliest possible date.
- [redacted] requires uninterrupted access to work area(s) for duration of project.
- All required NDE will be performed before PWHT.
- [redacted] project management will receive site direction from designated [redacted] site representative.
- The site safety program of [redacted] will be used this project.
- [redacted] personnel are required to wear protective clothing and respirators while performing work it will be provided by [redacted]
- Customer will provide crew break area, crew sanitary facilities, first aid, and secure storage area for duration of project.

QA/QC Requirements

- Authorizing Inspector (AI) services will be provided by [redacted]
- All NDE services will be provided by [redacted]
- [redacted] QA/QC program will be used for this project.
- All work performed by [redacted] will be in accordance with applicable code.
- All inspection requirements on work performed by [redacted] will be in accordance with applicable code.
- The addressed scope of work will be performed in accordance with the [redacted] manual, which meets all code requirements.
- Prior to starting work [redacted] will provide all applicable documents for welding such as WPS, PQR and welder certifications.
- All [redacted] welders will be qualified in accordance with ASME Section IX.

Schedule

- [redacted] requires 10 days prior notification and an acceptable purchase order from customer before [redacted] will mobilize to site.
- During this project [redacted] will be working 12 hours, 1 shift, 7 days per week.
- Per customer request, the work will start on a Friday and continue through the weekend until completed. It is estimated that the scope can be completed in three days.

Pricing

- Actual cost of the project will be billed based on attached T&M rate sheet, it is estimated that proposed services can be provided for **$32,737.30** if the full scope is completed together.
  - The pricing breakdown between the two autoclaves, if performed at different times, is as follows:
    - Autoclave #5: **$10,800.00**
    - Autoclave #2: **$27,134.00**
- Additional scope, scope changes, schedule changes or change in Assumptions and Understandings will be billed in accordance with the T&M rates attached to this quote.
- If project is pushed back or delayed [redacted] requires a minimum of 10 days prior notice. Customer will be billed for cost incurred if the minimum prior notification is not received by AES. Billing will be based on T&M rates attached to quote.
- [redacted] will bill in accordance with the T&M rates attached for any stand-by time or delays to project not caused by [redacted]
- Required time for [redacted] to remain on site between project completion and hydro completion will be billed in accordance with the T&M rate sheet attached to this offer.
- Time spent for [redacted] personnel to comply with customer's Fitness for Duty (FFD) Program will be billed in accordance with attached T&M rate sheet.

- Time spent for welder qualifications and materials will be billed in accordance with attached T&M rate sheet.
- NDE and AI services will be billed in accordance with the attached T&M rate sheet.
- Time spent for required training, badging, etc. will be billed in accordance with attached T&M rate sheet.

Invoicing and Payments

- All invoices are due net 30 days from date of invoice.
- [redacted] will bill 1.5% per month service charge for invoices that remain unpaid beyond 30 days.
- Any dispute customer has with invoices must be given t[redacted] in writing within 10 days of invoice date. I[redacted] does not receive any type of disputes, charges shall be due and payable as described.

  Terms of payment are as follows:
  - 100% amount due upon [redacted] completion of project.
- Time and Material projects will be billed weekly.

Terms and Conditions

- The terms and conditions of this effort shall be mutually agreed on and accepted by [redacted] customer.
- The terms and condition of this proposal will be used exclusively for any work that is performed as a result of this proposal which includes services, equipment and materials. Any additions or deletions of the terms and conditions included in this proposal must be in writing and mutually agreed upon by [redacted] customer.
- The customer has the right to make additions, deletions or revision to scope of work at any time [redacted] requires that these changes be provided in writing and include adjustments for but not limited to schedule, resources and price.
- It [redacted] policy that any changes to scope be provided in writing and comply with the articles of the prevailing contract.

Validity Date

This offer will remain valid for 90 days unless it is modified, extended or withdrawn in writing b[redacted]

Proprietary Statement

[redacted] considers the information contained in this proposal to be proprietary information [redacted] prohibits the release of this information to any other company other tha[redacted] without written approval.

Summary

Thank you for this opportunity, we look forward to working with you on this upcoming project. Please feel free to contact us if we can be of further assistance.

Sincerely,

[redacted]
Stella Hammond
NC/SC Business Development
shammond@arc24-7.com
803-414-1900

[redacted]

From: [redacted]
Sent: Saturday, May 20, 2017 2:54 PM
To: [redacted]
Subject: Additional Autoclave repairs

[redacted],

Please review the quotation below. Let me know ASAP is you would like to proceed or hold off until a later date.

The budgetary estimate to perform the repairs on the autoclave vessel and locking ring is an additional $44,406.00
The repairs would be performed as follows:

- Repairs on vessel
  - Remove interferences on vessel OD, i.e. hydraulic piston mount and sensor mounts
  - Machine out existing wear on the backside of the vessel face (the race that the locking ring rides on) to approximately ¾" x 1"
  - Insert rolled hardened steel bar stock into machined void around OD and weld in place
  - Re-attach all removed interferences.
  - Mount machine on door and machine added weld off of face to return to original
- Repairs on Locking ring
  - Remove existing worn out "race" insert from ID of ring
  - Machine and roll new hardened insert
  - Weld new insert into locking ring
  - Reinstall locking ring onto autoclave

A couple of things to keep in mind:

- The machine will be coming from [redacted] I would plan on having it on-site by Tuesday, but would have to get the ball rolling very quickly to make that happen.
- The new insert material would have to be ordered on Monday, machined on Tuesday, and sent off to be rolled. Actually installing them once the machining is done will not be a long process.
- I estimate that the repairs will be complete and the autoclave reassembled and ready for service by Saturday the 27th.

[redacted]
Machining Operations Manager
Arc Energy Services
office: 803.327.6009
cell: 803.389.8088
fax: 803.327.6146
email: jcolon@Arc24-7.com
web: www.Arc24-7.com

	Steam Flow	
10/19/2017 18:00	3782.2	
10/19/2017 18:00	3731.3	
10/19/2017 18:00	3680.3	
10/19/2017 18:00	3643.7	
10/19/2017 18:00	3606.2	
10/19/2017 18:00	3558.7	
10/19/2017 18:01	3511.1	
10/19/2017 18:01	3454.6	
10/19/2017 18:01	3403.3	
10/19/2017 18:01	3362.5	
10/19/2017 18:01	3303.1	
10/19/2017 18:01	2074.7	
10/19/2017 18:02	2200.6	End of Cycle
10/19/2017 18:02	982	
10/19/2017 18:02	65.6	
10/19/2017 18:02	50.9	
10/19/2017 18:02	-4.2	
10/19/2017 18:02	-5.3	
10/19/2017 18:03	-5.6	
10/19/2017 18:03	-5	
10/19/2017 18:03	-4.7	
10/19/2017 18:03	-6	
10/19/2017 18:03	-5.4	
10/19/2017 18:03	-5	
10/19/2017 18:04	-5.7	
10/19/2017 18:04	-3.8	
10/19/2017 18:04	-5	
10/19/2017 18:04	-4	
10/19/2017 18:04	-5.3	
10/19/2017 18:04	-4.6	
10/19/2017 18:05	-5.2	
10/19/2017 18:05	-6	
10/19/2017 18:05	-5.5	
10/19/2017 18:05	-4.8	
10/19/2017 18:05	-5	
10/19/2017 18:05	-5.1	
10/19/2017 18:06	-5.1	
10/19/2017 18:06	-5.9	
10/19/2017 18:06	-5.5	
10/19/2017 18:06	-4.7	
10/19/2017 18:06	-5.9	
10/19/2017 18:06	249	- Begin Cycle
10/19/2017 18:07	1743.8	
10/19/2017 18:07	2043.4	
10/19/2017 18:07	2045.2	
10/19/2017 18:07	1203.2	
10/19/2017 18:07	2	- Incident
10/19/2017 18:07	-5.5	
10/19/2017 18:08	-4.5	
10/19/2017 18:08	-5.8	
10/19/2017 18:08	-5.6	
10/19/2017 18:08	-5.9	
10/19/2017 18:08	-6	
10/19/2017 18:08	-5.7	
10/19/2017 18:09	-5.2	

[redacted]

From: [redacted] Jared Colon <jcolon@arc24-7.com>
Sent: Friday, October 20, 2017 2:50 PM
To: [redacted] Fred Heckle; Stella Hammond
Cc: [redacted] Gordon Black
Subject: RE: R1 report

[redacted]

Prior to starting work on the autoclave, we consulted with the Authorized Inspector, and it was determined that the repairs we made did not fall under R Stamp work because there wasn't any welding on the vessel itself. If you can provide the name of the [redacted] inspector requesting the information, our QC Manager [redacted] will call him and explain.

[redacted]
Jared Colon
Machining Operations Manager
Arc Energy Services
office: 803.327.6009
cell: 803.389.8088
fax: 803.327.6146
email: jcolon@Arc24-7.com
web: www.Arc24-7.com

[redacted]

[redacted] From: Fred Heckle [mailto:fheckle@blachfordrp.com]
Sent: Friday, October 20, 2017 4:09 PM
[redacted] To: Stella Hammond <shammond@arc24-7.com>
Cc: Jared Colon <jcolon@arc24-7.com>
Subject: R1 report

[redacted]
Hi Stella,
[redacted] Inspection is requesting the R1 report ASAP.

Thanks

[redacted]
Fred Heckle
Engineering Manager
Blachford Acoustics Group
704-730-1005 ext. 215
fheckle@blachfordrp.com

[redacted]

[redacted]

From: [redacted] Kinney, Don
Sent: Friday, October 20, 2017 11:33 AM
To: [redacted] Davis, Greg
Cc: [redacted] Dautrich, Cliff; Hooper, Phil; Quesenberry, Dollaree; Shuffler, Jimmy; Luce, Michael; Hartford-Remote-HSB
Subject: Pressure vessel accident
Attachments: [redacted] NC301137.pdf; 0101-05-incident-investigation-attach-1_7.docx; R-1 NC301137 (2013).pdf

[redacted] Greg, I was just notified of a pressure vessel accident that occurred last night at Blachford RP Corporation in King's Mountain. I spoke with Fred Heckle from the location, and there were no injuries, however, there was extensive building damage. Attached is the last inspection report, done by HSB this past August, along with our investigation report form. I have also attached an R-1 from 2013 where a crack on the door was repaired by Boilermasters. We do not have any R forms here in the office for the repairs done by ARC. Below is the info we have so far;

- Address: 707 Broadview Dr. Kings Mountain, NC (JO location #1768670)
- Location contact: Fred Heckle (Dir. Of Engineering) Cell-803-412-2015, office 704-730-1005 ext. 215
- NC301137 1960 Miami autoclave
- Door blew off during operation, traveled app. 80 feet
- Vessel traveled app. 30 feet backward
- Repairs were done to the locking ring and door wedges this past spring, by ARC of Rock Hill, SC (no R forms on file)
- According to Heckle, the locking ring failed after vessel was operating for app. 1 ½ minutes at operating pressure (80psi)

Keep us posted.

Arrived 2:10 PM

[redacted] Don Kinney, CPM
Assistant Bureau Chief
NCDOL Boiler Safety Bureau
1101 Mail Service Center
Raleigh, NC 27699
Office: 919-807-2754
Cell Phone: 919-608-5315
Main Office: 919-807-2760
don.kinney@labor.nc.gov
http://www.nclabor.com/boiler/boiler.htm

INSPECTION REPORT

NCDOL FORM BB101

NCDOL
BOILER SAFETY BUREAU
1101 MAIL SERVICE CENTER
RALEIGH, NC 27699-1101
919-807-2790

Asterisk (*) Indicates a Required Field

1. Number *	2. Nat'l Board #	3. Other ID Info	4. Date Inspected *	5. Cert Exp Date *	6. Ins Co Policy #
[redacted]	399		08/31/17	08/31/2019	

7. Type of Inspection *	8. Certificate Inspection *	9. Object Satisfactory for Certificate *	10. Code Stamp
☐INT ☑EXT ☐FOLLOWUP	☑YES ☐NO	☑YES ☐NO ☐OOU ☐N/A (If NO, explain fully in Sections 47-49)	3 9 U 9

11. Manufacturer *	12. Yr Built *	13. Type Code *	14. Use Code *	15. Method of Firing *	16. Fuel *
Miami	1960	201 - Pressure Vessel	02 - Process	UNF	N/A

17. MAWP (PSI) *	18. Size (SQFT) *	19. Safety Valve Mfr	20. SV Size (IN)	21. SV Set Pressure (PSI)	22. SV Capacity
100	60 (Surface Area ONLY)	1) Kunkle 2) 3)	1) 2 2) 3)	1) 100 2) 3)	1) 4886 SCFM 2) 3)

23. Current Insp Fee	24. Overdue Insp Fee	25. Government Type of This Facility *
[redacted]		☑N/A (Privately Held) ☐Local ☐County ☐State ☐Federal

Owner Data	Location Data
26. Owner Company Name * [redacted]	27. User Company Name * [redacted]
28. Owner Address 1 * [redacted]	29. User Address 1 * [redacted]
30. Owner Address 2	31. User Address 2
32. ATTN/Billing Code Info [redacted]	33. User City * [redacted] 34. ST * [redacted] 35. Zip Code * [redacted]
36. Owner City * [redacted] 37. ST * [redacted] 38. Zip Code * [redacted]	39. County * [redacted] 40. NCDOL District
41. Owner Telephone * [redacted] 42. Nature of Business * 270 - Manufacturing / Assembly / Industrial	43. User Telephone * [redacted] 44. Specific Object Location in Plant Plt Flr
45. Owner Email	46. User Email

47. Repair Codes	48. Conditions and Comments:

49. Repairs:

50. Name and Title of Person Contacted During Inspection *	51. Mail Invoice To *	52. Mail Certificate To *
[redacted]	☑Owner ☐User ☐Other	☑Owner ☐User ☐Other

I HEREBY CERTIFY THAT THIS IS A TRUE REPORT AS A RESULT OF MY INSPECTION

53. Signature of Inspector *	54. Insp # *	55. Ins Co # *	56. Employed by *
[redacted]	[redacted]		[redacted]

Currently Insured By [redacted]

FORM U-1 MANUFACTURERS' DATA REPORT FOR UNFIRED PRESSURE VESSELS

As required by the Provisions of the ASME Code Rules

1 of 3

1. Manufactured by Miami Boiler & Machine Co., Inc., Akron 11, Ohio
(Name and address of Manufacturer)

2. Manufactured for [redacted] Crossville, Tennessee
(Name and address of Purchaser)

3. Type Horz. Kind Vulcanizer Vessel No. ( ) (953) Nat'l Bd. No. 399 Yr. Built 1960
(Horiz. or Vert.) (Tank, Jacketed, Heat Exch.) (Mfrs' Serial) (State & State No.)

Items 4-9 incl. to be completed for single wall vessels (such as air tanks), jackets of jacketed vessels, or shells of Heat Exchangers

4. SHELL: Material SA-285 Gr C T.S 55,000 Nominal Thickness 1/2 in. Corrosion Allowance in. Diam. 7 ft. 0 in. Length 23 ft. 0 in.
(Kind and Spec. No.) (Fig. or F B & Lowest T S)

5. SEAMS: Long Dbl Butt welded S.R. no X.R. no Sectioned no Efficiency 80 %
(Welded, Dbl., Single, Lap, Butt) (Yes or No) (Spot or Complete) (Yes or No)
If riveted describe seams fully on reverse side of form

Girth Dbl. Butt welded S.R. no X.R. no Sectioned no No. of Courses 2

6. HEADS (a) Material SA-285 Gr C T.S 55,000 (b) Material Flange Quality T.S.

	Location (Top, bottom, ends)	Thickness	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	End	3/4"	84"						Concave
(b)	Other end Harris Quick Operating Door- See partial data sheet attached.								

If removable, bolts used (Material, Spec. No., T.S., Size, Number) Other fastening (Describe or Attach Sketch)

7. STAYBOLTS (Material) If hollow (Size of Hole) Attachment (Threaded, Welded) Pitch (Horiz.) X (Vert.) Diam. (Nominal)

8. JACKET CLOSURE (Describe as ogee & weld, bar, etc. If bar give dimensions. If bolted, describe or sketch)

9. Constructed for { Int. / Ext. } pressure of 100 psi Max Temp 338 °F Subzero °F Hydrostatic Test 200 psi

Items 10 and 11 to be completed for tube sections

10. TUBE SHEETS: Stationary Material (Kind & Spec. No.) Diam (Subject to Pressure) in Thickness in Attachment (Welded, Bolted)

Floating Material (Kind & Spec. No.) Diam in Thickness in Attachment

11. TUBES: Material (Kind & Spec. No.) O.D. inches or gage Number Type (Straight or U)

Items 12-15 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

12. SHELL: Material (Kind and Spec. No.) T S (Fig. or F B & Lowest T S) Nominal Thickness in Corrosion Allowance in. Diam. ft. in. Length ft. in.

13. SEAMS: Long (Welded, Dbl., Single, Lap, Butt) S R (Yes or No) X R (Spot or Complete) Sectioned (Yes or No) Efficiency %
If riveted describe seams fully on reverse side of form

Girth S R X R Sectioned No. of courses

14. HEADS (a) Material T S (b) Material T S (c) Material T.S.

	Location	Thickness	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	Top, bottom, ends								
(b)	Channel								
(c)	Floating								

If removable, bolts used (a) (Material, Spec. No., T.S., Size, Number) (b) (c) Other fastening (Describe or Attach Sketch)

15. Constructed for { Int. / Ext. } pressure of psi Max Temp °F Subzero °F Hydrostatic Test psi.

Items below to be completed for all Vessels where applicable

16. SAFETY VALVE OUTLETS: Number 1 Size 4", 3000# coupling Location shell

17. NOZZLES:

Purpose (Inlet, Outlet, Drain)	Number	Diam. or Size	Type	Material	Thickness	Reinforcement Material	How Attached
Nozzles	3	4"	3000#	pipe coupling			welded

18. INSPECTION OPENINGS: Manholes, No. Size Location; Handholes, No. Size Location; Threaded, No. Size Location

19. SUPPORTS: Skirt (Yes or No) Lugs (Number) Legs (Number) Other 3 saddles (Describe) Attached shell weld (Where & How)

20. REMARKS: Horizontal Vulcanizer

(Brief description of purpose of the vessel, as Air Tank, After Cooler, Jacketed Cooler, etc. State contents of each part.) (Over)

We certify that the statements made in this report are correct and that all details of material, construction, and workmanship of this unfired pressure vessel conform to the ASME Code for Unfired Pressure Vessels.

Date 1/ 7 19 60 Signed Miami Boiler & Machine Co., Inc. By George Weiler, Supt.,
(Manufacturer)

Certificate of Authorization Expires December 31, 1961

CERTIFICATE OF SHOP INSPECTION

Inspection Agency's Serial No. 409

VESSEL MADE BY Miami Boiler & Machine Co., Inc., at Akron 11, Ohio

I, the undersigned, holding a Certificate of Competency as an Inspector of Boilers and Unfired Pressure Vessels in THE STATE OF Natl. Bd. and employed by American Motorists Insurance Co. of Chicago, Ill.

inspected internally and externally, the vessel described in this report on 1/ 7 19 60, and certify that the statements made in this report are correct corresponding with mill test reports of materials furnished by the builders, and measurements made of the vessel and that this vessel is constructed in accordance with the ASME Code for Unfired Pressure Vessels.

Date 1/ 7 19 60

James E. Raber
Inspector's Signature

Commissions Ohio # 632 N.B.#1874
State or Nat'l Bd. & Number

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a Certificate of Competency as an Inspector of Boilers and Unfired Pressure Vessels in THE STATE OF ..... and employed by ..... of ..... have compared the statements in this manufacturer's data report with the completed vessel, and certify that parts referred to as data items ..... were completed in the field in accordance with the requirements of the ASME Code for Unfired Pressure Vessels. The completed vessel was inspected and subjected to a hydrostatic test of ..... psi.

Date ..... 19.....

..... Commissions .....
Inspector's Signature State or Nat'l Bd. & Number

2 of 3

FORM No. U-2 MANUFACTURERS' PARTIAL DATA REPORT

A Part of an Unfired Pressure Vessel Fabricated by One Manufacturer for Another Manufacturer As Required by the Provisions of the A.S.M.E. Code Rules

1. (a) Manufactured by Harris Products Inc. 11500 Wright Rd. Lynwood, Calif.
(Name and address of manufacturer of part)

(b) Manufactured for Miami Boiler & Machine Co., Inc. 764 Miami St. Akron, Ohio
(Name and address of manufacturer of boiler or vessel)

2. Identification—Manufacturer's Serial No. of Part 5183

(a) Constructed According to Blueprint No. D-858 B.P. Prepared by E. Ben Sady

(b) Description of Part Inspected Harris Quick Operating Door

3. Remarks: Door head-Columbia-38374-15-3 F.B. 55,000
Shell- Columbia-78558-4-5- F.B. 55,000

CERTIFICATE OF SHOP INSPECTION

Inspecting Agency's Serial Number

We certify the above data to be correct and that all details of material, construction, and workmanship of the object conform to A.S.M.E. Code requirements for parts 5183 Per Table UW-12-1-b

Date Sept. 18, 1959 Signed Harris Products, Inc. (Manufacturer)

Marvin Harris (Representative)

Certificate of Authorization Expires Dec. 31, 1961

[signature] Inspector for State or Boiler Insurance Company

Commissions Calif 792 Ohio Comm. State or Natl. Board and No.

Items 4-9 incl. to be completed for single wall vessels (such as air tanks), jackets or jacketed vessels, or shells of Heat Exchangers.

4. SHELL: Material A-285-C (Kind and Spec. No.) T.S. 55,000 (Fig. or F. B. & lowest T. S.) Nominal Thickness 1/2 in. Corrosion Allowance 1/16 in. Diam. 7 ft. 0 O.D. in. Length 2 ft. 0 in.

5. SEAMS: Long Buttweld (Welded, Dbl., Single, Lap, Butt) S.R. No (Yes or No) X.R. Spot (Spot or Complete) Sectioned No (Yes or No) Efficiency 85 %

Girth ..... S.R. ..... X.R. ..... Sectioned ..... No. of Courses .....

If riveted describe seams fully on reverse side of form.

6. HEADS: (a) Material A-285-C T.S. 55,000 (b) Material ..... T.S. .....

	Location (Top, bottom, ends)	Thickness	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	end	.6875"	78"	5.46"					concave
(b)									

If removable, bolts used ..... (Material, Spec. No., T.S., Size, Number) Other fastening Davis Quick Opening Door (Describe or Attach Sketch)

7. STAYBOLTS: ..... (Material) If hollow ..... (Size of Hole) Attachment ..... (Threaded, Welded) Pitch ..... (Horiz.) × ..... (Vert.) Diam. ..... (Nominal)

8. JACKET CLOSURE: ..... (Describe as ogee & weld, bar, etc. If bar give dimensions, if bolted, describe or sketch)

9. Constructed for {Int. / Ext.} pressure of 170 psi. Max. Temp. 650 °F. Subzero -20 °F. Hydrostatic Test ..... psi.

Items 10 and 11 to be completed for tube sections.

10. TUBE SHEETS: Stationary. Material ..... (Kind & Spec. No.) Diam. ..... (Subject to Pressure) in. Thickness ..... in. Attachment ..... (Welded, Bolted)

Floating. Material ..... Diam. ..... in. Thickness ..... in. Attachment .....

11. TUBES: Material ..... (Kind & Spec. No.) O.D. ..... in. Thickness ..... inches or gage. Number ..... Type ..... (Straight or U)

Items 12-15 incl. to be completed for inner chambers of jacketed vessels, or channels of heat exchangers.

12. SHELL: Material ..... (Kind and Spec. No.) T.S. ..... (Fig. or F.B. & Lowest T.S.) Nominal Thickness ..... in. Corrosion Allowance ..... in. Diam. ..... ft. ..... in. Length ..... ft. ..... in.

13. SEAMS: Long ..... (Welded, Dbl., Single, Lap, Butt) S.R. ..... (Yes or No) X.R. ..... (Spot or Complete) Sectioned ..... (Yes or No) Efficiency ..... %

Girth ..... S.R. ..... X.R. ..... Sectioned ..... No. of Courses .....

If riveted describe seams fully on reverse side of form.

14. Heads (a) Material ..... T.S. ..... (b) Material ..... T.S. ..... (c) Material ..... T.S. .....

	Location	Thickness	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	Top, bottom, ends								
(b)	Channel								
(c)	Floating								

If removable, bolts used (a) ..... (Material, Spec. No., T.S., Size, Number) (b) .....

(c) ..... Other fastening ..... (Describe or Attach Sketch)

15. Constructed for {Int. / Ext.} pressure of ..... psi. Max. Temp. ..... °F. Subzero ..... °F. Hydrostatic Test ..... psi.

Items below to be completed for all Vessels where applicable.

16. SAFETY VALVE OUTLETS: Number ..... Size ..... Location .....

17. NOZZLES:

Purpose (Inlet, Outlet, Drain)	Number	Diam. or Size	Type	Material	Thickness	Reinforcement Material	How Attached

RECEIVED JAN 11 1960 BOILER INSPECTORS

INSPECTION OPENINGS:	Manholes, No.	Size	Location		
	Handholes, No.	Size	Location		
	Threaded, No.	Size	Location		

19. SUPPORTS: Skirt ..... (Yes or No) Lugs ..... (Number) Legs ..... (Number) Other ..... (Describe) Attached ..... (How)

Alterations:

3/3

FORM U-1A MANUFACTURERS' DATA REPORT FOR PRESSURE VESSELS

Alternate Form for Single Chamber Completely Shop-Fabricated Vessels Only
As Required by the Provisions of the ASME Code Rules, Section VIII, Division I

1. Manufactured by **Miami Boiler & Machine Co., Inc., Akron, Ohio 44312** (Name and address of Manufacturer)
2. Manufactured for **Crossville Rubber Products, Inc. Crossville, Tenn. 38555** (Name and address of Purchaser)
3. Type **Horiz.** (Horiz. or Vert.) Vessel No. (**953**) (Mfrs. Serial) ( ) (State & State No.) Nat'l. Bd. No. **399** Yr. Built **1960**
4. SHELL: Matl. **SA-285 Gr C** (Kind and Spec. No.) T.S. **55,000** (Flg. or F B. & Spec. Min T.S.) Nom. Thk. **1/2** In. Corr. Allow ___ In. Diam. **7** Ft. **0** In. Length **23** Ft. **0** In.
5. SEAMS: Long **DBL** (Welded, Dbl., Single, Lap, Butt) H.T. ___ (Yes or No)[1] R.T. ___ (Spot or Complete) Sectioned ___ (Yes or No) Efficiency **80** %
   Girth **DBL** H.T. ___ R.T. ___ Sectioned **no** No. of Courses ___
   (If riveted or brazed describe seams fully under remarks)
6. HEADS: (a) Material ___ T.S. ___ (b) Material ___ T.S. ___

Location (Top, bottom, ends)	Thickness	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)								
(b) end	Harris Quick Opening Door - See Partial Report							Concave

If removable, bolts used ___ (Material, Spec. No., T.S., Size, Number) Other fastening ___ (Describe or Attach Sketch)

7. Constructed for max. allowable working press.[2] **100** psi at max. temp. **338** °F. Min. temp. (when less than −20°) ___ °F. Hydrostatic, Pneumatic or Combination Test Press **200** psi.
8. SAFETY OR RELIEF VALVE OUTLETS: Number ___ Size ___ Location ___
9. NOZZLES:

Purpose (Inlet, Outlet, Drain)	Number	Diam. or Size	Type	Material	Thickness	Reinforcement Material	How Attached

10. INSPECTION OPENINGS: Manholes, No. ___ Size ___ Location ___
    Handholes, No. ___ Size ___ Location ___
    Threaded, No. ___ Size ___ Location ___
11. SUPPORTS: Skirt ___ (Yes or No) Lugs ___ (Number) Legs ___ (Number) Other ___ (Describe) Attached ___ (Where & How)
12. REMARKS (List applicable special services in accordance with UG-120(d)): **Horiz. Vulcanizer.** [redacted] **Shell portion of door and ring received in our shop. Alterations consist of installing ring thickness to original ring. This was accomplished by welding additional ring to the original ring, using full penetration welds. The additional ring is in four segments, each segment is stamped on outside edge with required material stampings. No hydrostatic test was performed. Machining was sub-contracted in Akron, Ohio. Miami Serial No. 7607. Ring material SA-515 Grade 70. Entire structure stress relieved (2" Thick) after welding.**
(Brief description of purpose of the vessel as Air Tank, Water Tank, L.P.G., Etc. State Contents)
[1] If postweld heat-treated
[2] List other internal or external pressures with coincident temperature when applicable

We certify that the statements made in this report are correct and that all details of design, material, construction and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division I

Date **9/22** 19 **75** Signed **Miami Boiler & Machine Co Inc.** (Manufacturer) By *Robert Simon* **Robert Simon, Supt.,**

Certificate of Authorization No. **115** Expires **March 31, 1977**

CERTIFICATE OF SHOP INSPECTION

VESSEL MADE BY **Miami Boiler & Machine Co Inc. Akron, Ohio**

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province **Ohio** and employed by **Lumbermens Mutual Casualty Co. Chicago, Illinois** have inspected the pressure vessel described in this manufacturer's data report on **9/22** 19**75**, and state that to the best of my knowledge and belief, the manufacturer has constructed this pressure vessel in accordance with the applicable sections of the ASME Boiler and Pressure Vessel Code.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this manufacturer's data report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date **9/22** 19 **75** *E. J. Anderson* **E. J. Anderson** Inspector's Signature Commissions **NB #2661**

Printed in U.S.A. ... This form (U-1A) ...

FORM R-1 REPORT OF REPAIR

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

Work performed by [redacted] (name of repair organization) NA (Form Registration No.)

[redacted] (address)

2. Owner [redacted] (name)

[redacted] (address)

3. Location of installation [redacted] (name)

(address)

4. Item identification PRESSURE VESSEL (boiler, pressure vessel or piping) Name of original manufacturer MIAMI

5. Identifying nos.: (mfg. serial no.) 399 (National Board No.) [redacted] (Jurisdiction No.) (other) 1960 (year built)

6. NBIC Edition/Addenda: 2011 (edition) (addenda)

Original Code of Construction for Item: ASME SECT. VIII DIV. 1 (name / section / division) (edition / addenda)

Construction Code Used for Repair Performed: ASME SECT. VIII DIV. 1 (name / section / division) 2010/2011 (edition / addenda)

7. Repair Type: ☒ Welded ☐ Graphite Pressure Equipment ☐ FRP Pressure Equipment

8. Description of work: ☐ Form R-4, Report Supplementary Sheet is attached ☐ FFSA Form (NB-403) is attached (use Form R-4, if necessary)

WELDED 12" CPNCH ON LEFT SIDE / BACK SIDE OF DOOR FLANGE

STEAM Pressure Test, if applied 50 psi MAWP 100 psi

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

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

10. Remarks: [redacted]

CERTIFICATE OF COMPLIANCE

I, [redacted], 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 Repair conforms to the *National Board Inspection Code*.

National Board "R" Certificate of Authorization No. [redacted] expires on [redacted]

Date 6-20-13, [redacted] (name of repair organization) Signed [redacted] (authorized representative)

CERTIFICATE OF INSPECTION

I, [redacted], 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 [redacted] and employed by [redacted] of [redacted] have inspected the work described in this report on [redacted] 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.

RECEIVED JUN 2 8 2013 [redacted]

Date 6-20-13 Signed [redacted] Commissions [redacted]

FORM R-1 REPORT OF REPAIR

In accordance with provisions of the National Board Inspection Code

1. Work performed by C & C Boiler Sales & Service, Inc. (name of repair organization) (Form R No.)
3401 Rotary Drive, Charlotte, NC 28269 (address) TM10535 (P.O. No. Job No. etc.)
2. Owner Blachford Corporation (name)
707 Broadview Street, Kings Mountain, NC 28086 (address)
3. Location of installation BlachfordCorporation (name)
707 Broadview Street, Kings Mountain, NC 28086 (address)
4. Unit identification Boiler (boiler or pressure vessel) Name of original manufacturer Miami Boiler & Machine
5. Identifying nos.: 953 (mfg serial no.) 399 (National Board No.) 30137NC (jurisdiction no.) (other) 1960 (year built)
6. NBIC Edition / Addenda: 2004 (edition) 2005 (addenda)
Original Code of Construction for Item: ASME Sec. VIII, Div. 1 (name / section / division) (edition / addenda)
Construction Code Used for Repair Performed: ASME Sec. VIII, Div. 1 (name / section / division) 2004/2006 (edition / addenda)
7. Repair Type: [X] Welded [ ] Graphite Pressure Equipment [ ] FRP Pressure Equipment
8. Description of work: A 7" shell repair where the middle leg adjoins the vessel. (use supplemental sheet, Form R-4, if necessary)
Made (2) 20" attachment welds from the leg to the saddle.

Pressure Test, if applied _____ psi MAWP 100 psi

9. Replacement Parts. Attached are Manufacturer's Partial Data Reports of Form R-3s properly completed for the following items of this report:

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

10. Remarks: In service operating inspection in lieu of hydro

CERTIFICATE OF COMPLIANCE

I, Donald R. Poush, 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 Repair conforms to the National Board Inspection Code.
National Board "R" Certificate of Authorization No. 2454 expires on August 4, 2009
Date 20-Sep-06 C & C Boiler Sales & Service, Inc. Signed (authorized representative)
(name of repair organization)

CERTIFICATE OF INSPECTION

I, Carl E. Schmitt, holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency issued by the jurisdiction of North Carolina and employed by HSB CT of Hartford, CT have inspected the work described in this report on 25 Sept 2006 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 25 Sept 2006 Signed Carl E Schmitt Commissions NC 1532
(Inspector) (National Board and jurisdiction, and no.)

3-1-18
CGO

February 12, 2018

[redacted]
Mr. Cliff Dautrich
North Carolina Department of Labor
[redacted] Hillsborough Street
Raleigh, NC 27603

SUBJECT: **Investigation Test Report for Pressure Relief Valve from Accident at Blachford Industries, Kings Mountain, North Carolina**

[redacted]
Dear Mr. Dautrich:

On January 17, 2018 a test was performed at the National Board Testing Laboratory for the purpose of obtaining operation and flow data for a pressure relief valve received from EDT Engineers related to an accident at Blachford Industries, Kings Mountain, North Carolina.

This test was performed in accordance with the provisions of the National Board Testing Laboratory quality control manual and Special Test Procedure STP18-01. Steam was the test medium.

Please find attached the Investigation Test Report and attachments as listed in the report.

We hope this information will be of assistance to you in your work.

Yours Truly,

[redacted]
Joseph F. Ball, P. E.
Director, Pressure Relief Department

[redacted]
Ref: Blachford Industries Test Report 2-18

[redacted]
cc: Mr. D. Doutn, Executive Director
Curtis Sharpe, Pentair
Kenny McClure, EDT Engineers
Eric Dempsey, Amset Inc.
Jeff Lindsay, Mecklenburg Valve

[redacted]
RECEIVED
FEB 28 2018

National Board Testing Laboratory

Investigation Test Report

Sponsor: [redacted]
Test Number: 46254S
Date of Test: January 17, 2018

Prepared By: Joseph F. Ball 2/12/18
Joseph F. Ball, P.E. Date
Director, Pressure Relief Department

7437 Pingue Drive, Worthington, Ohio 43085
(614) 888-8320

Investigation Test Report

I. Purpose

To determine and report on the as found operating performance of a pressure relief valve on behalf of the [redacted] (hereinafter referred to as Sponsor) as part of an investigation into an accident at [redacted].

II. Scope

A. Test scope includes testing for the set pressure, reclosing pressure and capacity of the pressure relief valve with steam as the test medium. The scope excludes any evaluations as to the possible causes for the as found performance or contribution to the incident described. Also excluded is disassembly for internal inspection of the valve.

III. Test Methods and Procedures, Pressure Relief Valve

Test methods and procedures followed the National Board Testing Laboratory quality control manual supplemented by STP18-01, Rev. 1 (Attachment 1).

The valve was received and an inspection performed as documented on the attached Inspection Report (Attachment 2). See attachment 4 for pictures of the valve as tested.

The valve was tested for the set pressure where the set pressure definition was the "pop" pressure. Reclose pressure was recorded. Several additional test cycles were performed until consistent results were obtained. A capacity test preformed at 3% above the nameplate set pressure (representing the ASME Code Section I marking on the valve), and the reclose pressure after the flow test was recorded.

Following is a listing of the test cycles and the data obtained. Detailed data for test number 46254S is included as Attachment 3.

IV. Summary of Results for Pressure Relief Valve

Test Number 46254S: Kunkle Valve Type 6010JHM01-AM, Nameplate Set pressure = 100 psig			
Test Cycle	Meas. Set Press.(psig)	Blowdown (psi)	Measured Cap.
1	102.5	10.7	
2	98.1	6.3	
3	98.9	8.2	
4	100.2	8.8	
5 (flow test)	100.6	11.2	7737 PPH

V. Conclusion:

The test valve met operational requirements from the original Code of Construction, and met its rated capacity when flow tested. No other anomalies or concerns were noted.

Attachments

1. Test Procedure STP18-01, Rev. 1 (5 pages)
2. Inspection Report (1 page)
3. Report of flow test for test 46254S (2 pages)
4. Pictures of the tested object (3 pages)
5. Attendance list (1 page)

National Board Testing Laboratory

7437 Pingue Dr., Worthington OH, 43085

Special Test Procedure

STP18-01

Investigation Testing for [redacted]

Approved By: Joseph Bodi **Date:** 1/9/18

Director, Pressure Relief Department

I. Scope

A. To determine and report on the as found operating performance[1] of a pressure relief valve on behalf of the State of North Carolina (herein referred to as Sponsor) as an extension of their investigation into an accident at Blachford Industries, 707 Broadview Street, Kings Mountain NC. Date of the incident was 10/19/17.

B. Testing will be conducted in accordance with standard National Board Testing Laboratory (NBTL) Procedures (which conform to ASME PTC 25-2014 and the 2017 edition of the ASME Boiler and Pressure Vessel Code, Section I) except as noted in this Special Test Procedure. ASTM Standard Practice E 860 - 82 (Re-approved 1991), Examining And Testing Items That Are Or May Become Involved In Products Liability Litigation, will be observed.

C. The scope excludes any evaluations as to the possible causes for the valves as found performance or contribution to the accident. Also excluded is the disassembly and internal inspection of valve components prior to or following performance testing.

II. Responsibilities

A. The Sponsor, or their designee, shall notify the principle interested parties the planned testing and provide them an opportunity to witness the tests.

B. Parties to the test (Sponsor, Valve Owner, and the Valve Manufacturer) may have designated representatives present to witness the tests. All personnel shall observe laboratory safety practices and follow safety instructions from laboratory personnel. Witnesses shall address all questions or comments only to the NBTL Authorized Observer while tests are being conducted.

C. The Sponsor will ship the pressure relief valve to the NBTL personnel. Upon completion of testing, the valve will be repackaged and returned to the Sponsor.

D. A National Board employee whom is National Board/ASME accepted as an Authorized Observer will supervise the test. National Board personnel will install and remove the valve from the test system, operate NBTL equipment and conduct all portions of the test in accordance with this testing procedure.

[1]Performance includes initial set pressure, re-closing pressure and relieving capacity.

3. Set Pressure Test
   a. Continue raising pressure and record set pressure[1].
   (Caution: Test vessel pressure shall not exceed 150% of the marked set pressure.)

   b. Increase pressure to 3% above the recorded set pressure and observe valve action. Note any chatter or flutter or other abnormal characteristics. Decrease the inlet pressure until the valve closes. Record the reseating pressure. Record any abnormal closing characteristics.

   c. Repeat test cycle for a minimum of two additional cycles or until a consistent set pressure is obtained.

4. Erratic Action
   If erratic action of the test object is noted or the procedure cannot be followed, the Authorized Observer shall be informed by laboratory personnel before proceeding with the test.

5. Capacity Test
   a. The flow capacity test will be conducted at a pressure[2] as a function of the nominal set pressure or measured set pressure as required by the table below. Increase inlet pressure to value as required in the following table. During the pressure increase, note and record the set pressure. If set pressure drops from zone 2 to zone 1 on opening for flow test, conduct test as noted for zone 1.

Pressure Zone	Actual Set Pressure	Flow-rating Pressure (based upon Section I valve application)
1	≤ 103% of Stamped Set Pressure	Flow at 103 % of nameplate set pressure
2	> 103% of Stamped Set Pressure	Flow at actual popping pressure (- 0%, + 1%)
3	≥ 150% of Stamped Set Pressure	No Test Conducted

   b. Conduct the flow capacity test in accordance with appropriate NBTL Test Procedure.
   c. Slowly decrease tank pressure. Note and record reseating pressure.

---

[1]Set pressure is the popping pressure as defined in ASME PTC 25. Popping pressure is that static inlet pressure at which significant increase in disk lift and capacity is observed.

[2]Capacity tests may be conducted at flow-rating pressures other than those listed here provided all parties witnessing the test agree and the agreement noted in the test report.

III. Test System and Medium

The NBTL steam test system will be utilized with steam as the test medium. This system includes a test vessel on which the test valve will be directly installed. Flowing capacity will be measured using the timed weight method in accordance with ASME PTC 25.

IV. Methods of Measurement and Reference Procedures

A. All measurement and test equipment shall be calibrated in accordance with the NBTL Quality Control Manual, Section 6.

B. NBTL Operating and Test procedures shall be used for operation of test equipment and systems as supplemented by the procedure in Section V of this STP.

V. Pressure Relief Valve Inspection and Test Procedure

A. The valve will be identified, tagged and measured in accordance with standard laboratory procedures.

B. The Authorized Observer will visually inspect the valves for damage or unusual characteristics and note them on the inspection report. Photos and/or videos may be taken to record the visual condition of each valve. Care should be taken during valve inspections to ensure handling will not alter the valve condition, and no valve adjustments will be made during any portion of this test procedure.

C. Install the valve for test onto the steam test vessel. Final installed configuration will be photographed and documented for the test report.

(Caution: Due to the unknown operating condition of the valve, opening can occur at any pressure. Hearing protection should be worn at all times while the test vessel is under pressure.)

1. System Leak Check
   Increase the tank pressure to 70% of the stamped set pressure. From this pressure, increases in pressure will occur at a rate of 2 psi per second or less (excluding pressure changes to reach the flow capacity test pressure).

2. Leak Tightness Test
   Slowly raise pressure to 90% of the stamped set pressure. Listen for and record any audible noise or visual discharge from the valve. Visually check for leakage from the valve outlet.

d. Compute the flow capacity results in accordance with standard laboratory practice.

D. Remove the valve from the test vessel.

E. The valve will be examined for any change to its physical condition. Note any observed changes.

VII. Reporting Results

Results will be collected and reported to parties as specified by the Sponsor.

VIII. Acceptance of Special Testing Procedure

By my signature below, I confirm that I have reviewed the attached special testing procedure prior to commencing testing and do not object to its contents. I also understand that by subjecting these valves to the test described herein, it is possible that the condition of the devices may be altered so as to preclude further testing to obtain repeatable results.

Date	Name	Affiliation	Signature
[redacted]			

VIII. Record of Revisions

National Board Testing Laboratory
Pressure Relief Device Inspection Report

INSPECTION DONE

Date: 1/11/18 Test Number: 462545 Test Sponsor: [redacted]

Nameplate Information

Device Mfg.: Kunkle Valve Div.

Type: 6010 J HM01-AM

"NB" Marked: ■ Yes ☐ No

ASME Code Symbol Stamp: ☐ None,
■ V, ☐ NV, ☐ HV, ☐ UV, ☐ UD

(See Test Data Form for Additional Information)

General Body Condition

	Y	N
Cracked	☐	☑
Deformations	☐	☑
Erosion	☐	☑
Deposits of Foreign Substances	☑	☐
Other Abnormalities	☐	☑

Remarks: Slight rust, ~~Body to Inlet~~ OB
~~Locking Screw missing~~ ~~witness mark~~ intact

Inlet Connection

	Y	N
Flange Face or Threads Damaged	☐	☑
Cracked	☐	☑
Deformations	☐	☑
Erosion	☐	☑
Deposits of Foreign Substances	☑	☐
Other Abnormalities	☐	☑

Remarks: Teflon Tape, Slight rust
Pipe wrench marks on Hex

Inlet Internal Condition

Bore Diameter: 1.347 inches (C4)

	Y	N
Cracked	☐	☑
Deformations	☐	☑
Erosion	☐	☑
Deposits of Foreign Substances	☑	☐
Other Abnormalities	☐	☑

Remarks: Inlet I.D. = 1.870" (C4)
Slight Rust

Set Screw in Body to Bonnet is present

Outlet Connection

	Y	N
Flange Face or Threads Damaged	☐	☑
Cracked	☐	☑
Deformations	☐	☑
Erosion	☐	☑
Deposits of Foreign Substances	☐	☑
Other Abnormalities	☐	☑

Remarks:

Outlet Internal Condition

	Y	N
Cracked	☐	☑
Deformations	☐	☑
Erosion	☐	☑
Deposits of Foreign Substances	☐	☑
Other Abnormalities	☐	☑

Remarks: Both Rings free

Adjustment Seals

	Y	N	N/A
In place for Set Pressure	☑	☐	
In place for Blowdown	☑	☐	☐
Identifying Marks Present	☑	☐	

Describe ID marks: MV on top seal
M on BD seal

Additional Observations:

Lifting Assembly

Type: ☑ Open Lever, ☐ Packed Lever
☐ Closed Cap, ☐ Other

	Y	N
Cracked	☐	☑
Deformations	☐	☑
Jammed ☐ Not Observable	☐	☑

Lift lever taped down, NO deficiencies noted after tape Removed. JB

Authorized Observer: Joseph Bell

Ref: Inspec. Form Shell.doc

National Board Testing Laboratory
Steam Test - Timed Weight Method

	Valve ID Data	Revision 4	apps\Labview Programs\DATA\Steam Tests\46254S.xls
1	Test Number	46254S	
2	Test Sponsor	National Board Testing Lab	
3	Company Type	NA	Worthington, OH
4	Test Date	1/17/2018	LAB
5	Valve Type	6010JHM01-AM	
6	Manufacturer	Kunkle Valve Div. (ASSEMBLED BY MECKLENBURG	
7	Cap. Cert. ID No.	36324	VALVE)
8	Set Pressure	100 psig	
9	Inlet Size	2 M	
10	Outlet Size	2 1/2 F	
11	Stamped Capacity	7525. PPH	
12	Code Section	I	
13	Serial Number	461920101	
14	Date Code	C17	
	Operational Data and Measured Dimensions		
15	Warn Pressure		psig
16	Set Pressure	99.1	psig
17	Reset Set Pressure		psig
18	Blowdown	7.8	psi
19	Reset Blowdown		psi
20	Bore Diameter	1.347	inch
21	Lift		inch
	Measured Data		
22	Flow Area	1.42503	in^2
23	Vessel Pressure	102.7	psig
24	P_b	14.50	psia
25	Calorimeter Temp.	295.6	°F
26	Time of Run	4.0	minutes
27	Weight	510.2	lbm
28	Leakage	80.3	PPH
	Calculated Data		
29			
30	Vessel Pressure	117.2	psia
31	Enthalpy, calorimeter	1,190.7	BTU/lbm
32	Saturation Temp., Vessel	339.5	°F
33	Saturation Volume, Vessel	3.8131	ft^3/lbm
34	Steam Quality, Vessel	100.0	%
35	Vessel Temp. (Theoretical)	340.1	°F
36	Vessel Volume	3.8168	ft^3/lbm
37	Degrees Superheat	0.6	°F
38	Capacity Correction	1.0005	
39	**Measured Capacity**	**7736.9**	PPH
40	Slope	66.014	PPH/PSIA
41	Coefficient	**0.89950**	
42	Rated Capacity For Measured Set	7,493.5	PPH
43	Red Book Kd	0.878	
44	Nominal Area	1.414	in^2

National Board Testing Laboratory
Steam Test - Timed Weight Method: Test Summary

Test Summary for test 46254S: V:\apps\Labview Programs\DATA\Steam Tests\"S.xls

1. Valve tested for Investigation.
2. Valve tested for [redacted]
3. Leakage calculated based upon drain hole area relative to outlet area.
4. See STP18-01 for detailed test procedure.

I certify that the data on the attached test data sheets was obtained under my supervision in accordance with the provisions of ASME PTC 25, the applicable sections of the ASME Boiler and Pressure Vessel Code, and the National Board Testing Laboratory Quality Control Manual. To the best of my knowledge and belief the objects tested were of the same type and design as indicated.

Joseph Ball
Authorized Observer: Joseph Ball

1/17/18
Date

Test Personnel

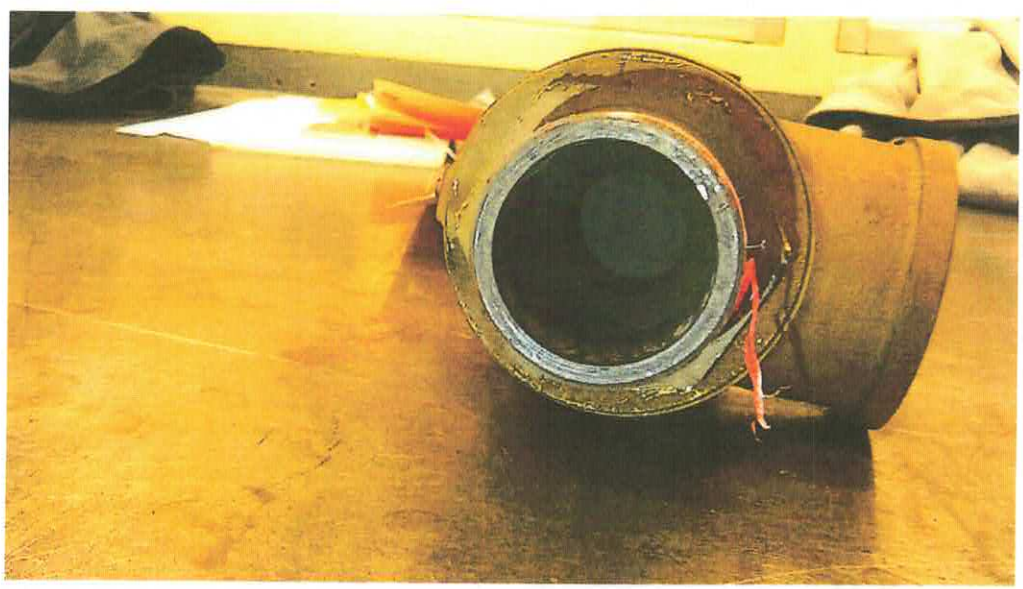
Tim Brown
Thomas Beirne
Robert Viers
Joseph Ball

Company Representatives

see attendance sheet

Attachment 4, page 1/3: Test Object as received

Inlet



Attachment 4, page 2/3: Outlet

On steam test stand for performance test: