

Date Distributed:



THE
NATIONAL
BOARD
OF BOILER AND
PRESSURE VESSEL
INSPECTORS

SUBCOMMITTEE ON INSTALLATION

Minutes

*Meeting of January 16, 2013
Mobile, Alabama*

“These minutes are subject to approval and are for 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
Phone: (614)888-8320
FAX: (614)847-1828

1. Call to Order –

Chairman, Mr. M. Richards called the meeting to order at 8:00 a.m.

2. Announcements

Wednesday, January 16, 2013 – Continental Breakfast at 7:00 a.m. to 8:00 a.m. (guests included) in the Mobile Bay Foyer and USS Alabama Tour & Reception from 6:00 p.m. to 9:00 p.m. The reception will be held in the ship’s Ward Room. Transportation by bus has been arranged to and from the ship. All (guests included) interested in attending must meet in the hotel lobby at 5:30 p.m. to board the bus going to and boarding to return at 8:45 p.m. 9:00 p.m. at the latest.

Thursday, January 17, 2013 – Breakfast Buffet at 6:30 a.m. to 8:00 a.m. and Lunch Buffet at 11:30 a.m. to 12:30 p.m. (guests included) in the Schooner room.

3. Adoption of the Agenda

M. Wadkinson was introduced as having an interest in becoming a member on the Subcommittee Installation. Her resume was distributed and will be added to and voted on in the Main Committee Meeting.

There was a motion to adopt the agenda as published. The motion was unanimously approved.

4. Approval of Minutes of July 18, 2012 meeting

There was a motion to approve the minutes as published. The motion was unanimously approved.

5. Review of the Roster (Attachment 1, pages 8-10)

Mr. Raymond Snyder is eligible for reappointment to Subgroup Boilers. A vote was taken. There was a motion to approve his reappointment. The motion was unanimously approved.

In the Subgroup Boilers meeting, Mr. Craig Hopkins announced his resignation as Chair. Mr. Gary Scribner and Mr. Brian Moore were nominated. A vote was taken resulting in the appointment of Mr. Scribner to Chair and Mr. Brian Moore to remain as Vice Chair of Subgroup Boilers. There was a motion to approve this appointment. The motion was unanimously approved.

Mr. Paul Welch should not be listed on the Attendance Sheet. Need to remove.

There was a motion to approve the roster as published with the removal of Mr. Paul Welch. The motion was unanimously approved.

6. Public Review Comments (Attachment 2, pages 11-22)

PR13-0101- Part 1, 4.7.3 SC on Installation - Revise text. 4.7.3 a) Each hot water storage tank that is designed to operate at or below 210° F (99° C) and served by a hot water supply boiler shall have a temperature relief valve installed and set to relieve at or below 210 F 99 C. This valve shall be installed within the top 6 in. of the system’s hot water storage tank. b) The temperature and pressure relieving device shall meet the requirements of NBIC Part 1, 4.5. (No Attachment)

An announcement was made of the reassignment of PR13-0101 to Subcommittee PRD.

PR13-0201 Part 1 4.7 SC on Installation - In 4.7.1 and 4.7.2 change "should" to "shall". Should indicate good practice. The referenced statements need to be stronger. (Attachment 2, page 13-14)

A motion was made to approve classifying PR13-0201 as 1 - Accepted comment, will incorporate into next draft. The motion passes, resulting in a vote of eight approved and one disapproved. A written response of the one disapproved has been received as required.

PR13-0202 Part 1, S3.4 SC on Installation – Revise to read, "Alarms shall be designed to activate a low level alarm at 1.5% concentration of CO₂ and a high alarm level at 3% concentration of CO₂. (Attachment 2, page 15)

A motion was made to approve classifying PR13-0202 as 6 – Rejected. The motion passes, resulting in a unanimous vote of nine approved. A new Action Item will be opened to address “will”

PR13-0203 Part 1, S3.5 a) SC on Installation – Revise instruction to say instructional. (Attachment 2, page 16)

A motion was made to approve classifying PR13-0203 as 4 – Accepted, changes are incorporated. The motion passes, resulting in a unanimous vote of nine approved. Editorial changes of correcting instruction to instructional and adding “a” before the word minimum.

PR13-0204 Part 1, S3.6 a) SC on Installation – Revise a) to read: Components shall be compatible with CO₂ in the phase (gas or liquid) in the applicable circuit. (Attachment 2, page 17)

A motion was made to approve classifying PR13-0204 as 4 – Accepted, changes are incorporated. The motion passes, resulting in a unanimous vote of nine approved.

PR13-0205 Part 1, S3.6.1 SC on Installation – The description of the system should be at the beginning of supplement 3. Re number S3.6.1 to S3.2 and renumber the following paragraphs appropriately. (Attachment 2, page 18)

A motion was made to approve classifying PR13-0205 as 6 – Rejected. The motion passes, resulting in a unanimous vote of nine approved. The committee believes the item is located in the applicable location.

PR13-0206 Part 1, S3.6 SC on Installation – S3.6: Relief Valves: Two comments:

- 1) The note concerning the discharge line does not comply with ASME Code. A line smaller in diameter than the relief valve will increase the back pressure and reduce the flow,
 - 2) the sizing of discharge lines need to be moved to the paragraph on Safety Relief/Vent Lines.
- (No Attachment)

An announcement was made of the reassignment of PR13-0206 to Subcommittee PRD.

PR13-0501 Part 1, S3.2 SC on Installation – Recommend deleting "Should not have a roof or overhead cover." In the northern US and Canada it is preferable to have an overhead cover on CO₂ storage tanks that are located outside. This prevents the buildup of snow and/or ice in the cold months. Having overhead cover on a gas that is heavier than air does not pose any potential hazard by allowing high concentrations to accumulate. S3.2b also allows for weather protection making the statement in S3.2, "Should not have a roof or overhead cover", confusing to readers. (Attachment 2, page 19)

A motion was made to approve classifying PR13-0501 as 4 – Accepted, changes are incorporated. The motion passes, resulting in a unanimous vote of nine approved.

PR13-0502 Part 1, S3.2 a) SC on Installation – Change the following section to read:
a) LCDSV's shall not be installed within 36' of the front of electrical panels. (Attachment 2, page 20)

A motion was made to approve classifying PR13-0502 as 6 – Rejected. The motion passes, resulting in a unanimous vote of nine approved. The committee feels the wording is correct and follows recognized standards. Editorial change to correct 36'(feet) to read 36"(inches).

PR13-0503 Part1, S3.2 c) SC on Installation – Recommend changing 1) a) as follows: a Shall be equipped with a gas detection system installed in accordance with paragraph S3.4, if the area that the tank is located in cannot be determined to have adequate ventilation to prevent a hazardous concentration of CO₂ buildup. Because the publication defines any indoor installation as an enclosed area, there needs to be provisions in this publication that identifies indoor installations that are located in kitchens that have very high rate of ventilation that would not result in hazardous concentration of CO₂ even if a leak was to develop. (Attachment 2, page 21)

A motion was made to approve classifying PR13-0503 as 6 – Rejected. The motion passes, resulting in a unanimous vote of nine approved

PR13-0601 Part 1, S3.2 SC on Installation – S3.2 GENERAL REQUIREMENTS STORAGE TANK LOCATION LCDSV's should be installed in an unenclosed area whenever possible. LCDSV's that do not meet all criteria for an unenclosed area shall be considered an enclosed area installation.

An unenclosed area:

- Shall be outdoors
- Shall be above grade
- ~~Should not have a roof or overhead cover~~
- Shall not obstruct more than three sides of the perimeter with supports and walls. At least 25% of the perimeter area as calculated from the maximum height of the storage container shall be open to atmosphere and openings shall be in direct conveyance with ground level.

Rationale: For the northern climates, overhead coverings are preferred in order to prevent the buildup of ice and snow. For southern climates, solar heat load affects container temperature. This statement conflicts with S3.2b of this draft standard. Note: Dissipation of carbon dioxide is not affected by a roof or cover since it is heavier than air. (Attachment 2, page 22)

A motion was made to approve classifying PR13-0601 as 4 – Accepted, changes are incorporated. The motion passes, resulting in a unanimous vote of nine approved.

PR13-0602 Part 1, S3.2 SC on Installation – S3.6 VALVES, PIPING, TUBING AND FITTINGS Safety Relief/Vent Lines-Safety relief/vent lines shall be as short and straight as possible with a continuous routing to an unenclosed area outside the building and installed in accordance with the manufacturer's instructions. The vent line shall be a continuous run from the vessel PRD vent piping to the outside vent line discharge fitting, without any splices. Mechanical joints in metallic piping and tubing shall be visible and inspectable. Any splices in plastic or polymeric tubing shall be done within three feet of the vessel and must be visible and inspectable. These lines shall be free of physical defects such as cracking or kinking and all connections shall be securely fastened to the LCDSV and the fill box. The minimum size and length of the lines shall be in accordance with table S3.6a and S3.6b. Fittings or other connections may result in a localized reduction in diameter have been factored into the lengths given by the tables S3.6a and S3.6b. Rationale: Allows the use of connectors but requires that they are seen and can be inspected. (No Attachment)

An announcement was made of the reassignment of PR13-0602 to Subcommittee PRD.

7. Inquiries

There are no inquiries assigned to this subcommittee.

8. Action Items (Attachment 3 – 8, pages 23-62)

NB08-0320 Part 1.4.3 SC Installation – This action item is a result of a request from the Federal Railroad Administration. Add a new paragraph in 4.3 General Requirements to address change of service for a pressure vessel. These requirements should caution installers, inspectors, owners, and jurisdictional authorities of the inherent dangers involved when changing service. A new supplement should be added to address the specific requirements for installation of pressure vessels that are being converted from one service to another. A task group has been formed from all three parts of the NBIC led by Robert Wielgoszinski. (Attachment 3, pages 23-31)

January 2013

A handout dated January 9, 2013 Rev. 5. was distributed for review.

All questions and or concerns are deferred to Mr. Robert Wielgoszinski.

NB08-2101 Part 1 SG on Boilers – CSD-1 does not address solid fuel firing and it would be appropriate for the NBIC to look into it. A task group of G. Halley (Project Manager), M. Richards, G. Scribner and B. Moore has been assigned. (Attachment 3, pages 32-39)

January 2013

Mr. Halley presented the below noted Document (1. and 2.) Draft for Review. Each have been reworked and reworded into a more prescriptive language. Discussion also took place concerning the location of definitions – If they are so distinct are they necessary to be in the glossary. This TG continues to work on noted Document 1. with plans to distribute to the SG for comment via the NB website. Mark Mooney, a member of Part 2-Inspection was invited into the meeting to assist with ‘wording’ so as to minimize any unforeseen conflicts common to both Parts 1-Installation and Part 2-Inspection. Mr. Mooney will take this to their TG to review, comment, and work on and will report back to the SC-Installation meeting to be held in July 2013.

1. Part 1, Section 6, Supplement 4 Installation of Biomass (Wood/Solid Fuel) Fired Boilers
2. Suggested Additions to NBIC, Part 2 – Inspection to cover Biomass Fired Boiler Installations (Section 6, Supplement X)

NB10-0201 Part 1 S3 SG on Pressure Vessels and Piping – Expand the section on installation of thermal fluid heaters. This action item is a result of splitting NB09-0501 into two parts. A task group of D. Patten (Project Manager), M. Wadkinson, G. Halley, G. Scribner and P. Bourgeois has been assigned. (Attachment 5, pages 40-53)

January 2013

D. Patten and M. Wadkinson presented a handout of proposed text for Part 1, Section 6 – Supplements. The committee reviewed and shared their feedback to include editorial additions, deletions, rewording and safety concerns. The TG will revise the document and will send out as letter ballot before the next meeting.

NB10-1201 Part 1, SG Boilers – Request for a format change to Part 1 Installation. A TG of G. Scribner (Project Manager), B. Moore, S. Konopacki and D. Patten was assigned. (No Attachment)

January 2013

Mr. Scribner presented a progress report. The TG continues to work on achieving consistency in Section 2 and 3 with all common wording and does it really need to be in both sections or in a general section. A partial draft should be completed to present at the July 2013 meeting with a final to be completed by the next edition.

NB11-0802 Part 1, 1.4.5 SG on Boilers – Boiler installation report review. A task group of D. Patten (Project Manager), G. Scribner, B. Moore, M. Wadkinson, S. Konopacki, and M. Richards has been assigned.
(No Attachment)

January 2013

Mr. Scribner presented a progress report. Discussion was held concerning who will use and who does use the I-1 form. Consensus was that there is a significant amount of difference from one state to another with respect to content of the form as well as use. Mr. Scribner will be developing a list of questions for a survey to distribute to jurisdictions and manufacturers, etc. to determine the appropriate content for the form. Paul Schuelke requested to be added to the task group and Terry Parks expressed that he is available to assist especially with regards to the questions on the survey.

NB11-1901 Installation of High Pressure Composite Pressure Vessels – The FRP Subgroup initiated this proposal to provide guidance for a safe installation of high pressure vessels operating in close proximity to the public. (No Attachment)

January 2013

Mr. Richards presented a progress report. FRP has resolved the ‘negative’ votes and the item is presently out for letter ballot. Results will be distributed once results of the letter ballot are received.

NB11-2001 Part 1, 2.9.4 SG on Pressure Vessels and Piping – Address the safe venting of isolatable economizers where the outlet is below the inlet of other communicable chambers (headers, drums, etc.). (Attachment 6, page 54)

January 2013

Mr. Patten presented a progress report. As of the July 2012 MC meeting, this item was letter balloted but the ballot was withdrawn before it closed due to the negative comments received. The negative votes were submitted to the SC and it was decided that there was no need for a wording change and it was unanimously approved to reaffirm this item. Mr. Richards made a motion to re-ballot the item to the NBIC Committee. In August 2012 Mr. Patten submitted a request for interpretation to ASME for their input so as to avoid any potential conflicts with ASME. An ASME number of 12-1509 has been assigned and Mr. Patten feels that this item is not ready for re-ballot until this interpretation is received back from ASME. As of the SG PVP January 2013 meeting no response from ASME has been received.

NB12-0302 Part 1 SG on Pressure Vessels and Piping – Define installation requirements for (PVHO) hyperbaric chambers) This action item is a result of splitting NB09-0601 into two parts. A task group of G. Scribner (Project Manager), M. Richards and B. Moore has been assigned. (No Attachment)

January 2013

Mr. Scribner presented a progress report. Part 2 has been and continues working on this with several conversations having took place. ASME standards have revealed a number of additional needs in specific areas such as, single chamber, multi-chamber, animals, etc. In addition, there is a belief that there should be a specific endorsement for an individual to sign off on these devices. This is being further investigated with NBIC. The direction is to define the different types of PVHO's by letter ballot before the next meeting. The TG will work with PVHO to come up with definitions. Mr. Brian Moore has been added to the TG.

NB12-1401- Part 1 SG on Boilers – Reference item NB09-0204. Address the installation of Potable Water Heaters. A task group of G. Scribner (Project Manager), P. Bourgeois, B. Moore, and H. Tyndall was assigned. (No Attachment)

January 2013

Mr. Scribner presented a progress report. Discussions have taken place concerning further definitions addressing specifically installation requirements only, not certifications for Boilers, Water Heaters, etc.. It was noted that with regard to "Boiler Room" that cautionary statements are needed and that there is unique stuff to each to define language by next meeting to review. Mr. Gary Scribner is the Project Manager of the TG for this item.

9. New Business

Resignation of Craig Hopkins from Chair SG Boilers / election of new 'Chairman'

Introduction of Melissa Wadkinson with interest to become a Member of the SC Installation. (Attachment 7, page 55)

Introduction of Paul Schuelke with interest to become a Member of the SC Installation and SG Boilers. Vote to take place for appointment to SG Boilers. (Attachment 8, pages 56-62)

10. Future Meetings

January 13-16, 2013, San Antonio, Texas

Three locations have been selected by committee members for the January 2015 meeting being either Orlando, FL; San Diego, CA; or Phoenix/Tucson, AZ. These locations will be submitted to the NBIC Committee for final approval of one location.

11. Adjournment

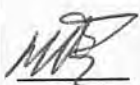
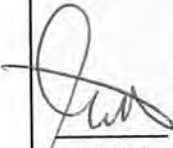
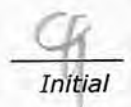

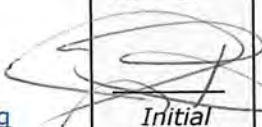
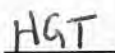

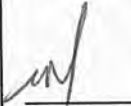
The meeting adjourned at 11:15 a.m.

Respectfully Submitted,

Jeanne Bock
Secretary

Attendance List SC on Installation

Meeting Date: January 16, 2013

<p>H. Michael Richards Southern Company 42 Inverness Center Pkwy. Birmingham, AL 35242</p> <p>Ph: 205-992-7111 Fax: 205-992-0361 E-mail: hmrichar@southernco.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>	<p>Geoff Halley ABMA 1315 Ridge Road Wildwood, MO 63021</p> <p>Ph: 636-394-3483 Fax: 636-527-2839 E-mail: geoff@abma.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>
<p>Craig Hopkins Seattle Boiler Works 500 South Myrtle Street Seattle, WA 98108</p> <p>Ph: 206-762-0737 Fax: 206-762-3516 E-mail: chopkins@seattleboiler.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>	<p>Paul Welch Director Georgia Department of Labor Safety Engineering 1700 Century Circle, Suite 100 Atlanta, GA 30345</p> <p>P; 404/679-0690 F: 404/982-3405 FAX Email: paul.welch@dol.state.ga.us</p>	<p>Attended: Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>
<p>Jeanne Bock The National Board of B&PVI 1055 Crupper Ave. Columbus, OH 43229</p> <p>Ph; 614-888-8320 Fax: 614-847-1828 Email: jbock@nationalboard.org</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>	<p>Harold Tyndall Zurich Services Corporation Risk Engineering 770 Corbett Street Winterville, NC 28590</p> <p>Ph: 252-215-1144 Fax: E-mail: Harold.tyndall@zurichna.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>
<p>Raymond Snyder 150 Costa Loop Auburndale, FL 33823</p> <p>Cell 863-956-7939 Ph: 865-965-4417 Fax: 865-967-0185 E-mail: Raymond.snyder@ariseinc.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>	<p>Gary Scribner Missouri Division of Fire Safety P.O. Box 844 Jefferson City, MO 65102</p> <p>Ph: 573-751-8708 Fax: 573-526-5971 E-mail: gary.scribner@dfs.mo.gov</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p> Initial</p>

NOT ON THIS COMM.

Attendance List SC on Installation

Meeting Date: **January 16, 2013**

<p>Paul Bourgeois Travelers 11441 Sarasota Lane <i>6812 5th St</i> Northport, AL 35475 <i>35476</i></p> <p>P: 205-339-6314 F: 888-803-1522 E-mail: pcbouрге@travelers.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>AB</i> Initial</p>	<p>Brian Moore Hartford Steam Boiler One State Street P.O. Box 5024 Hartford, CT 06102-5024 Ph: 860-722-5657 Fax: 860-722-5530 E-mail: brian_moore@hsb.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>DM</i> Initial</p>
<p>Stanley Konopacki Midwest Generation 401 E. Greenwald Ave. <i>235 Remington Blvd</i> Waukegan, IL 60087 <i>Bolingbrook IL 60440</i></p> <p>P: 847-875-8382 F: 847-599-2252 E-mail: SKonopacki@MWGen.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>SK</i> Initial</p>	<p>Donald Patten R.F. MacDonald Co. 25920 Eden Landing Road Hayward, CA 94545</p> <p>P: 510-570-7422 F: 510-784-1004 Email: don.patten@rfmacdonald.com</p>	<p>Attended: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>DP</i> Initial</p>
<p><i>Paul Schuelke</i> <i>Weil-Mclain</i> <i>500 Blaine St</i> <i>Michigan City, IN</i> <i>46360</i></p> <p><i>P 219-879-6561 EXT 407</i> <i>F 219 877-0535</i> <i>PSchuelke@weil-mclain.com</i></p>		<p><i>VICTOR KENNIEY</i> <i>PRAXAIR</i> <i>80 WESTCREEK BLVD</i> <i>BRAMPTON, ON</i> <i>L6T 0B8</i></p> <p><i>OFFICE: 905-595-3795</i> <i>CELL: 905-638-4800</i> <i>VICTOR_KENNIEY@PRAXAIR.COM</i></p>	

Attendance List SC on Installation

Meeting Date: January 16, 2013

Melissa Wadkinson Fulton Companies PO Box 257 Pulaski NY 13142 (315) 298-7112 melissa.wadkinson@ fulton.com	MW		
EDWARD F. WIGGINS JR LIBERTY MUTUAL INS 256-497-7092 EDWARD.WIGGINS@LIBERTY.MUTUAL.COM VISITOR	EW		

Members Attendance: 9
SC Installation
Main Committee

Installation Subcommittee Public Review Comments

PRC #	Reference Paragraph	Response	Vote A-D-AB-N	Action
PR13-0201	Part 1, 4.7	1 - Accepted comment, will incorporate into next draft	8 = A 1 = D 0 = AB 0 = N	Passed with 1 Disapprove (Hopkins; disapproved written response submitted.)
PR13-0202	Part 1, S3.4	6 - Rejected	9 = A 0 = D 0 = AB 0 = N	Rejected unanimously; opening an action item to address 'will'
PR13-0203	Part 1, S3.5 a)	4 - Accepted, changes are incorporated	9 = A 0 = D 0 = AB 0 = N	Passed unanimously; editorial to use "instructional" and add "a" before the word minimum.
PR13-0204	Part 1, S3.6	4 - Accepted, changes are incorporated	9 = A 0 = D 0 = AB 0 = N	Passed unanimously.

- | | |
|---|-------------------------------------|
| 1. Accepted comment, will incorporate into next draft | 5. Accepted for new business action |
| 2. Accepted comment, no revision required | 6. Rejected |
| 3. Accepted in principle | |
| 4. Accepted, changes are incorporated | |

Members Attendance: 9
SC Installation
Main Committee

PR13-0205	Part 1, S3.6.1	6 - Rejected	9 = A 0 = D 0 = AB 0 = N	Rejected unanimously; committee believes the item is located in the applicable location.
PR13-0501	Part 1, S3.2	4 - Accepted, changes are incorporated	9 = A 0 = D 0 = AB 0 = N	Passed unanimously.
PR13-0601	Part 1, S3.2	4 - Accepted, changes are incorporated	9 = A 0 = D 0 = AB 0 = N	Passed unanimously.
PR13-0502	Part 1, S3.2 a)	6 - Rejected	9 = A 0 = D 0 = AB 0 = N	Rejected unanimously; the wording is correct and follows recognized standards.
PR13-0503	Part 1, S3.2 c)	6 - Rejected	9 = A 0 = D 0 = AB 0 = N	Rejected unanimously.

- | | |
|---|-------------------------------------|
| 1. Accepted comment, will incorporate into next draft | 5. Accepted for new business action |
| 2. Accepted comment, no revision required | 6. Rejected |
| 3. Accepted in principle | |
| 4. Accepted, changes are incorporated | |

CRAIG HOPKINS VOTED NO
TO COMMENT ① ON PRB-0201
BECAUSE 4.7.2 b) MAY BE
APPLIED INAPPROPRIATELY. ACCESS
FOR ENTRY MAY NOT BE BEST FINAL
PLACEMENT FACTOR.

National Board of Boiler and Pressure Vessel Inspectors

National Board Inspection Code

Submission of Public Review Comment 2013 Draft Edition

PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE
Make additional copies as needed

Comments Must be Received No Later Than: December 17, 2012

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: 12/5/12

Commenter Name: Francis Brown

Commenter Address: 1055 Crupper Avenue
Columbus, OH 43229

Commenter Phone: 614-431-3226

Commenter Fax: 614-431-3208

Commenter Email: fbrown@nationalboard.org

Section/Subsection Referenced: Part 1 4.7

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

In 4.7.1 and 4.7.2 change "should" to "shall". Should indicates good practice. The

referenced statements need to be stronger.

Source: Own Experience/Idea Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rough@nationalboard.org

NB Use Only

Commenter No. Issued: PR13-02

Committee Referred To:

Comment No. Issued: 01

SC Installation

National Board of Boiler and Pressure Vessel Inspectors

National Board Inspection Code

Submission of Public Review Comment 2013 Draft Edition

PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE
Make additional copies as needed

Comments Must be Received No Later Than: December 17, 2012

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: 12/5/12

Commenter Name: Francis Brown

Commenter Address: 1055 Crupper Avenue

Columbus, OH 43229

Commenter Phone: 614-431-3226

Commenter Fax: 614-431-3208

Commenter Email: Part 1, S3.4

Section/Subsection Referenced: _____

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

Revise to read: "Alarms shall be designed to activate a low level alarm at 1.5% concentration of CO2 and a high alarm level at 3% concentration of CO2..."

Source: Own Experience/Idea Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rough@nationalboard.org

NB Use Only

Commenter No. Issued: PR13-02

Committee Referred To:

Comment No. Issued: 02

SC Installation

National Board of Boiler and Pressure Vessel Inspectors

National Board Inspection Code

Submission of Public Review Comment 2013 Draft Edition

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Make additional copies as needed

Comments Must be Received No Later Than: December 17, 2012

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: 12/5/12

Commenter Name: Francis Brown

Commenter Address: 1055 Crupper Avenue

Columbus, OH 43229

Commenter Phone: 614-431-3226

Commenter Fax: 614-431-3208

Commenter Email: fbrown@nationalboard.org

Section/Subsection Referenced: Part 1 S3.5a)

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

Revise "instruction" to "instructional"

Source: Own Experience/Idea Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rough@nationalboard.org

NB Use Only

Commenter No. Issued: PR13-02

Committee Referred To:

Comment No. Issued: 03

SC Installation

National Board of Boiler and Pressure Vessel Inspectors

National Board Inspection Code

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Commenter Address: 1055 Crupper Avenue

Columbus, OH 43229

Commenter Phone: 614-431-3226

Commenter Fax: 614-431-3208

Commenter Email: fbrown@nationalboard.org

Section/Subsection Referenced: Part 1: S3.6a)

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

Revise a) to read: Components shall be compatible with CO2 in the phase (gas or liquid) in the applicable circuit,

Source: Own Experience/Idea Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rough@nationalboard.org

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Commenter No. Issued: PR13-02

Committee Referred To:

Comment No. Issued: 04

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Commenter Address: 1055 Crupper Avenue

Columbus, OH 43229

Commenter Phone: 614-431-3226

Commenter Fax: 614-431-3208

Commenter Email: fbrown@nationalboard.org

Section/Subsection Referenced: Part 1: S3.6.1

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

The description of the system should be at the beginning of supplement 3. Renumber S3.6.1 to S3.2 and renumber following paragraphs appropriately.

Source: Own Experience/Idea Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rough@nationalboard.org

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Comment No. Issued: 05 _____ SC Installation

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Date: _____

Commenter Name: VICTOR KENNEY

Commenter Address: 80 WESTCREEK BLVD.
BRAMPTON, ON L6T 0B8

Commenter Phone: 905-595-3795

Commenter Fax: _____

Commenter Email: VICTOR-KENNEY@PRAXAIR.COM

Section/Subsection Referenced: Part 1, S3.2

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

S3.2 GENERAL REQUIREMENTS STORAGE TANK LOCATION _____

Recommend deleting "Should not have a roof or overhead cover." _____

In the northern US and Canada it is preferable to have an overhead cover on CO2 storage tanks that are located outside. This prevents the buildup of snow and/or ice in the cold months. _____

Having overhead cover on a gas that is heavier than air does not pose any potential hazard by allowing high concentrations to accumulate. _____

S3.2 b also allows for weather protection making the statement in S3.2, "Should not have a roof or overhead cover.", confusing to readers. _____

Source: Own Experience/Idea Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rhough@nationalboard.org

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Commenter No. Issued: PR13-05 Committee Referred To: _____

Comment No. Issued: 01 SC Installation _____

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Date: _____

Commenter Name: VICTOR KENNEY

Commenter Address: 80 WESTCREEK BLVD.
BRAMPTON, ON LGT 088

Commenter Phone: 905-595-3795

Commenter Fax: _____

Commenter Email: VICTOR-KENNEY@PRAXAIR.COM

Section/Subsection Referenced: Part 1, S3.2 a)

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

S3.2 a) General Requirements (enclosed and unenclosed areas)

Change the following section to read;

6) LCDSV's shall not be installed within 36' of *the front of* electrical panels.

NB Use Only	
Commenter No. Issued: <u>PR13-05</u>	Committee Referred To:
Comment No. Issued: <u>02</u>	<u>SC Installation</u>

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Commenter Address: 80 WESTCREEK BLVD.
BRAMPTON, ON L6T 0B8

Commenter Phone: 905-595-3795

Commenter Fax: _____

Commenter Email: VICTOR-KENNEY@PRAXAIR.COM

Section/Subsection Referenced: Part 1, S3.2 c)

Comment/Recommendation: Proposed Solution: New Text Revise Text Delete Text

S3.2c ENCLOSED AREA LCDSV INSTALLATIONS

Recommend changing 1) a. as follows;

a. Shall be equipped with a gas detection system installed in accordance with paragraph S3.4 ***if the area that the tank is located in cannot be determined to have adequate ventilation to prevent a hazardous concentration of CO2 to build up.***

Because this publication defines any indoor installation as an enclosed area, there needs to be provisions in this publication that identifies indoor installations that do not pose a hazard. As an example, there are many indoor installations today that are located in kitchens that have very high rates of ventilation that would not result in a hazardous concentration of CO2 even if a leak was to develop.

Source: Own Experience/Idea Other Source/Article/Code/Standard _____

Submit Form To: Robin Hough, Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, fax 614-847-1828, email, rhough@nationalboard.org

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Commenter No. Issued: PR13-05

Committee Referred To:

Comment No. Issued: 03

SC Installation

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Comments Must be Received No Later Than: December 17, 2012

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: December 14, 2012

Commenter Name: Richard Craig, CGA Technical Director

Commenter Address: The Compressed Gas Association, Inc.

14501 George Carter Way, Suite 103, Chantilly, VA 20151

Commenter Phone: (703) 788-2730

Commenter Fax: 703-961-1831

Commenter Email: rcraig@cganet.com

Section/Subsection Referenced: Supplement 3, S3.2, General Requirements Storage Tank Location

Comment/Recommendation: *Proposed Solution:* New Text Revise Text Delete Text

S3.2 GENERAL REQUIREMENTS STORAGE TANK LOCATION

LCDSV's should be installed in an unenclosed area whenever possible. LCDSV's that do not meet all criteria for an unenclosed area shall be considered an enclosed area installation.

An unenclosed area:

- Shall be outdoors
- Shall be above grade
- ~~Should not have a roof or overhead cover~~
- Shall not obstruct more than three sides of the perimeter with supports and walls. At least 25% of the perimeter area as calculated from the maximum height of the storage container shall be open to atmosphere and openings shall be in direct conveyance with ground level.

Rationale: For the northern climates, overhead coverings are preferred in order to prevent the buildup of ice and snow. For southern climates, solar heat load affects container temperature. This statement conflicts with S3.2b of this draft standard. Note: Dissipation of carbon dioxide is not affected by a roof or cover since it is heavier than air.

Source: Own Experience/Idea Other Source/Article/Code/Standard **Submit Form To:** Robin Hough,
Secretary, NBIC Committee, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue,
Columbus, OH 43229, fax 614-847-1828, email, r_hough@nationalboard.org

NB Use Only

Commenter No. Issued: PR13-06

Committee Referred To:

Comment No. Issued: 01

2C

SC Installation

**Part 2 Revision
New Supplement 9**

**Supplement 9
Requirements for Change of Service**

S9.1 Scope:

This Supplement provides requirements and guidelines to be followed when a change of service or service type is made to a pressure retaining item.

Whenever there is a change of service, the local jurisdiction where the pressure retaining item is to be operated shall be notified for acceptance, when applicable. Any specific jurisdictional requirements shall be met.

S9.2 Classification of Service Changes

S9.2.1 Service Contents

A change in service contents is considered to be any modification to the commodity or contents that the pressure retaining item was originally intended to contain when the pressure retaining item was constructed.

For example, a change:

- a) From LP gas service to ammonia service.
- b) From lethal to non lethal service.

S9.2.2 Service Type or Change of Usage

A change in service type is considered to be a change of how the pressure retaining item is being used.

For example, a change:

- a) From above ground service to underground service for LP gas tanks.
- b) From mobile or transport use to stationary use

S9.3 Factors to Consider

Before a change of service is to be made, the owner or user shall consider and evaluate the effects of the new operating conditions or environment on the existing condition and suitability for service of the

pressure retaining item. Various factors will have an impact on the reliability of the pressure retaining item in its new service environment. Changes can be successfully adopted providing there is an understanding of the effect on the pressure retaining item. However, there are some cases where changes are detrimental to the existing pressure retaining item. The owner or user should seek technical guidance of experienced personnel in appropriate areas affected by the change of service (e.g. design, metallurgy, or operations of the pressure retaining item).

The following is a listing of criteria that should be evaluated as appropriate. The criterion is not limited to that listed herein. Other factors may be considered as necessary;

- 1) Design Consideration:
 - a) Thickness of existing vessel material
 - b) Vessel or system flow rate or pressure
 - c) Weight of vessel with new contents
 - d) Existing or additional loads imposed on nozzles and highly stressed areas
 - e) Change in pressure or temperature cycling
 - f) Compliance to product or industry standards, such as ANSI K61, API 579, or NFPA 58

- 2) Material Consideration:
 - a) Chemical and mechanical properties of existing material or any new material to be added or replaced to assure it has the required strength and toughness to withstand the pressure and temperature effects of the new environment.
 - b) Effects of erosion or corrosion
 - c) Time dependent effects on service life - creep or fatigue.

- 3) Environment
 - a) Physical condition of the pressure retaining item
 - b) Overpressure protection needs
 - c) Regulatory environment - Verification of compliance to new or existing jurisdictional rules or regulations.

- 4) Operational History
 - a) A review of current and past operational logs or records should be made to assure that no conditions existed where any further use would render the pressure retaining item hazardous or otherwise unsafe.
 - b) Records to be obtained and reviewed would include Data Reports, Repair and Alteration Forms, Inspection reports.

- 5) Repairs and Alterations Made:

Change of Service

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RVW

- a) A review of any repairs, alterations, reratings, or reconfigurations that have been performed on the pressure retaining item, so as to assure that they will not have a detrimental impact on the intended use.

- 6) Proposed rework
 - a) Any physical work to be performed to restore the material to the existing or intended state or to meet any requirements for the new operating conditions.
 - b) Repairs and alterations shall be performed in accordance with NBIC, Part 3.
 - c) The effects of heat applied as a result of welding or heat treatment on the material or shaped parts.
 - d) The method and extent of any physical or non destructive examination should be considered.
 - e) Any physical testing or pressure testing to be performed to determine or verify leak tightness or structural integrity of the pressure retaining item.
 - f) The pressure retaining item shall meet the Code requirements for the new environment at the time of change.

- 7) Documentation
 - a) Review existing records that are required to satisfy customer, user, or legal requirements.
 - b) Review the need for any marking, stamping, or labeling required for the intended service.
 - c) Review the need for developing or revising an inspection plan to ensure safe operation. Refer to Part 2, Section 1.5.2.1 Inspection Plan.

S9.4 Some Examples for Change of Service

The following is a typical list of examples of what constitutes a change in service and some factors to consider. Note: This list is not all inclusive. There may other service changes not mentioned.

Also, the listing of “Factors to Consider” is also not all inclusive. There may be other elements that can influence the safe and reliable operation.

The Owner shall check with the Jurisdiction where the pressure retaining item is to operate in the new environment, and review local building Codes, laws, and regulations for additional requirements or prohibitions against a change of service.

Some examples of Change of Service conditions	
Change	Some Factors to Consider
LP gas to ammonia	<ul style="list-style-type: none"> • PWHT of vessel during construction • Wet-fluorescent magnetic particle testing (WFMT) on

Change of Service

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RVW

Some examples of Change of Service conditions	
Change	Some Factors to Consider
	<p>all internal surfaces</p> <ul style="list-style-type: none"> Internal access of vessel is necessary. May need to install manhole.
Ammonia to LP gas	<ul style="list-style-type: none"> NFPA-58, paragraph 5.2.1.5 should be consulted. i.e. restriction on maximum volume Wet-fluorescent magnetic particle testing (WFMT) on all internal surfaces Internal access of vessel is necessary. May need to install manhole. Also see, NBIC Part 2, 2.3.6.4
LP gas service: from above ground to underground	<ul style="list-style-type: none"> Requires alterations (additional nozzles). Corrosion protection See NFPA 58
LP gas to air receiver	<ul style="list-style-type: none"> Assurance of vessel cleanliness. i.e. removal of mercaptan. Appropriateness and number of inspection and drain openings. Corrosion allowance
Boiler service: Steam to Hot Water	<ul style="list-style-type: none"> May require replacement of smaller steam outlet nozzle with larger nozzle to accommodate condensate carryover Change of Pressure Relief Device
Sulfur dioxide service. Sweet to sour gas service.	<ul style="list-style-type: none"> Concern over hydrogen cracking
Inert to Oxidizing atmosphere	<ul style="list-style-type: none"> Inspection for damage mechanisms that may be present from previous service life that is detrimental to the vessel in the new environment.
Lethal service to non-lethal	<ul style="list-style-type: none"> Design conditions and suitability for service
DOT railcars or ICC transport tanks to stationary service	<ul style="list-style-type: none"> Prohibited by DOT regulations (49 CFR 180) for permanent service. Temporary stationary service permitted as per NFPA 58 Inspection for damage mechanisms that may be present from previous service life that is detrimental to the vessel in the new environment.

S9.5 Documentation of Change of Service

Any records, forms, or reports required documenting the change of service event that may be required by contract or the jurisdiction where the pressure retaining item operates shall be completed as specified. Such documentation should be retained by the owner or user for future reference or use as needed.

1.4.5.1.1 GUIDE FOR COMPLETING NATIONAL BOARD BOILER INSTALLATION REPORT

1. **INSTALLATION:** Indicate the type and date of installation — new, reinstalled, or second hand.
2. **INSTALLER:** Enter the Installer's name and physical address.
3. **OWNER-USER:** Enter the name and mailing address of the owner-user of the boiler.
4. **OBJECT LOCATION:** Enter the name of the company or business and physical address where the installation was made.
5. **JURISDICTION NO.:** Enter the Jurisdiction number if assigned at the time of installation.
6. **NATIONAL BOARD NO.:** Enter the assigned National Board number.
Note: Cast-iron section boilers do not require National Board registration.
7. **MANUFACTURER:** Enter the boiler manufacturer's name.
8. **MFG. SERIAL NO.:** Enter the assigned boiler manufacturer's serial number.
9. **YEAR BUILT:** Enter the year the boiler was manufactured.
10. **BOILER TYPE:** Enter the type of boiler, i.e., watertube, firetube, cast iron, electric, etc.
11. **BOILER USE:** Enter the service the boiler will be used for, i.e., heating (steam or water), potable water, etc.
12. **FUEL:** Enter the type of fuel, i.e., natural gas, diesel, wood, etc. If more than one fuel type, enter the types the boiler is equipped for.
13. **METHOD OF FIRING:** Enter the method of firing, i.e., automatic, hand, stoker, etc.
14. **Btu/KW INPUT:** Enter the Btu/hr or kw input of the boiler.
15. **Btu/KW OUTPUT:** Enter the Btu/hr or kw output of the boiler.
16. **OPERATING PSI:** Enter the allowed operating pressure.
17. **ASME CODE STAMP(S):** Check the ASME Code stamp shown on the code nameplate or stamping of other certification mark (specify).
18. **STAMPED MAWP:** Enter the maximum allowable working pressure shown on the nameplate or stamping.
19. **HEATING SURFACE SQ. FT.:** Enter the boiler heating surface shown on the stamping or nameplate. **Note:** This entry is not required for electric boilers.
20. **CAST IRON:** Enter the total number of sections for cast-iron boilers.
21. **MANHOLE:** Indicate whether the boiler has a manway.
22. **SPECIFIC ON-SITE LOCATION:** Enter the on-site location of the boiler in sufficient detail to allow location of that boiler.

Part 1 Revision

SECTION CODE 2011

SECTION 1

- 23. PRESSURE RELIEF VALVE SIZE: Enter the inlet and outlet size of all installed boiler safety or safety relief valves.
- 24. PRESSURE RELIEF VALVE SET PRESSURE: Enter the set pressure of all installed boiler safety or safety relief valves.
- 25. PRESSURE RELIEF VALVE CAPACITY: Enter the capacity in either lbs. of steam per hour or Btu/hr for each installed boiler safety or safety relief valve.
- 26. MANUFACTURER: Enter the manufacturer of each installed boiler safety and safety relief valve.
- 27. LOW-WATER FUEL CUTOFF: Enter the manufacturer's name, type, number, and maximum allowable working pressure of all installed low-water fuel cutoff devices.
- 28. PRESSURE/ALTITUDE GAGE: Enter the dial range of the installed pressure or altitude gage, cutout valve or cock size, a maximum allowable working pressure, and gage pipe connection size. For steam boilers, indicate gage siphon or equivalent device installed.
- 29. EXPANSION TANK: Indicate code of construction of installed expansion tank, tank maximum allowable working pressure, and tank capacity in gallons.
- 30. VENTILATION AND COMBUSTION AIR: Indicate total square inches of unobstructed opening or total cubic feet per minute of power ventilator fan(s) available for ventilation and combustion air.
- 31. WATER LEVEL INDICATORS: Enter the number of gage glasses and/or remote indicators and connecting pipe size.
- 32. FEED WATER SUPPLY: Enter the total number of feeding means, connecting pipe size, stop and check valve size, and maximum allowable working pressure.
- 33. STOP VALVE(S): Enter the number of stop valves installed, valve size, and maximum allowable working pressure.

Add new paragraph:

1.5 Change of Service

See NBIC Part 2, Supplement 9 for requirements and guidelines to be followed when a change of service or service type is made to a pressure retaining item.

Whenever there is a change of service, the local jurisdiction where the pressure retaining item is to be operated, shall be notified for acceptance, when applicable. Any specific jurisdictional requirements shall be met.

- 37. ADDITIONAL REMARKS: Enter any remarks or comments you deem appropriate.
- 38. INSTALLER'S NAME AND SIGNATURE: Print installer name and registration number and sign completed report.
- 39. BOTTOM BLOWDOWN CONNECTIONS: Indicate number of valves, valve size, and MAWP. Indicate if piping run is full size to point of discharge.
- 40. EXTERNAL PIPING ASME CODE AND FUEL TRAIN: Indicate if external piping is ASME Code, if not, indicate what code or standard external piping is manufactured to. Indicate if the fuel train meets the requirements of CSD-1 or NFPA-85. If other indicate code or standard used.

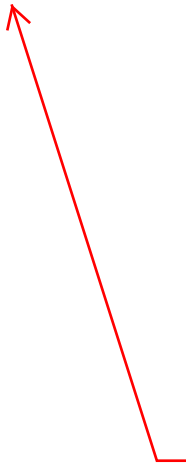


Part 2 Revision

Note: If a vessel has not been properly prepared for an internal inspection, the Inspector shall decline to make the inspection.

1.5.4 POST-INSPECTION ACTIVITIES

- a) During any inspections or tests of pressure-retaining items, the actual operating and maintenance practices should be noted by the Inspector and a determination made as to their acceptability.
- b) Any defects or deficiencies in the condition, operating, and maintenance practices of the pressure-retaining item shall be discussed with the owner or user at the time of inspection and recommendations made for correction. Follow-up inspections should be performed as needed to determine if deficiencies have been corrected satisfactorily.
- c) Documentation of inspection shall contain pertinent data such as description of item, classification, identification numbers, inspection intervals, date inspected, type of inspection, and test performed, and any other information required by the inspection agency, jurisdiction, and/or owner-user. The Inspector shall sign, date, and note any deficiencies, comments, or recommendations on the inspection report. The Inspector should retain and distribute copies of the inspection report, as required.
- d) The form and format of the inspection report shall be as required by the Jurisdiction. Where no Jurisdiction exists, forms NB-5, NB-6, or NB-7 (see NBIC Part 2, 5.3) or any other form(s) required by the inspection agency or owner-user may be used as appropriate.



Add new paragraph:
1.6 Change of Service
 Supplement 9 provides requirements and guidelines to be followed when a change of service or service type is made to a pressure retaining item.
 Whenever there is a change of service, the local jurisdiction where the pressure retaining item is to be operated, shall be notified for acceptance, when applicable. Any specific jurisdictional requirements shall be met.

Part 3 Revision

SECTION 3

3.2.5 CALCULATIONS

For alterations, calculations shall be completed prior to the start of any physical work. All design calculations shall be completed by an organization experienced in the design portion of the standard used for construction of the item. All calculations shall be made available for review by the Inspector accepting the design.

3.2.6 REFERENCE TO OTHER CODES AND STANDARDS

Other codes, standards, and practices pertaining to the repair and alteration of pressure retaining items can provide useful guidance. Use of these codes, standards and practices is subject to review and acceptance by the Inspector, and when required, by the Jurisdiction. The user is cautioned that the referenced codes, standards and practices may address methods categorized as repairs; however, some of these methods are considered alterations by the NBIC.

In the event of a conflict with the requirements of the NBIC, the requirements of the NBIC take precedence. Some examples are as follows:

- (a) National Board *Bulletin* - National Board Classic Articles Series;
- (b) ASME PCC-1, Guidelines for Pressure Boundary Bolted Flange Joint Assembly;
- (c) ASME PCC-2, Repair of Pressure Equipment and Piping.

3.3 REPAIRS TO PRESSURE-RETAINING ITEMS

3.3.1 DEFECT REPAIRS

Add new paragraph:
3.2.7 Change of Service
 See NBIC Part 2, Supplement 9 for requirements and guidelines to be followed when a change of service or service type is made to a pressure retaining item.
 Whenever there is a change of service, the local jurisdiction where the pressure retaining item is to be operated, shall be notified for acceptance, when applicable. Any specific jurisdictional requirements shall be met.

- b) The Inspector, with the knowledge and understanding of jurisdictional requirements, shall be responsible for meeting jurisdictional requirements and the requirements of this Code;
- c) The "R" Certificate Holder's Quality System Program shall describe the process for identifying, controlling, and implementing routine repairs. Routine repairs shall be documented on Form R-1 with this statement in the Remarks section: "Routine Repair.";
- d) Repairs falling within one or more of the following categories may be considered routine:

Part 1, Section 6
Supplement 4

Installation of Biomass (Wood/Solid Fuel) Fired Boilers

(Draft for Review and Comment January 2013)

S4.1 – Scope

NBIC Part 1, Section 6, Supplement 4 provides requirements for the installation of Biomass (Wood/Solid Fuel) Fired Boilers as defined in NBIC Part 1, Glossary.

S4.2 PURPOSE

- a) The purpose of these rules is to establish minimum requirements, for the installation of Biomass Boilers.
- b) It should be recognized that many of the requirements included in these rules must be considered in the design of the boiler by the manufacturer. However, the owner-user is responsible for ensuring that the installation complies with all the applicable requirements contained herein. Further the installer is responsible for complying with the applicable sections when performing work on the behalf of the owner user.
- c) This supplement provides requirements for the installation and control of boilers which use biomass as a major fuel component and will address the differences that occur when solid fuels, such as Biomass, are being used. Thus the primary thrust of this section ~~will be~~ directed toward the control of the fuel handling and distribution systems. ¹⁵
- d) Fuels ~~will~~ vary widely depending upon source, moisture content, particle size and distribution, however once the fuel has been established, the owner-user should adhered to as closely as possible in order to minimize handling, combustion and emissions problems.
- e) Additionally the emissions control equipment is designed around the initial fuel specification. Any changes in fuel fired will impact on the performance of the various elements of the emissions control system.
- f) Biomass boilers and boiler rooms require additional considerations than traditionally fueled boilers that may include
 - Transportation of the fuel from a storage facility to a metering device within the boiler room
 - Transportation of the metered fuel to the boiler, for distribution to a combustion system whether it be a grate upon which the combustion takes place, a bubbling fluidized bed, circulating fluidized bed or suspension burner.

- In grate based combustion systems combustion air is typically divided into an underfire air system and an overfire air system, each of which must be closely controlled in order to produce clean, efficient combustion.
- Induced draft fans to overcome the pressure drop of the emissions control equipment
- A fly ash or carbons recycle system, to return unburned carbon to the combustion zone.

S4.3 – Determination of Allowable Operating Parameters

The allowable operating parameters of the combustion side shall be installed in accordance with jurisdictional and environments requirements, manufacturer's recommendations, and/or industrial standards, as applicable.

S4.4 – General Requirements

- a) Power Boilers utilizing biomass as the primary fuel source shall meet the requirements of NBIC Part 1, Section 2 and this supplement.
- b) Steam Heating, Hot Water Heating, and Hot Water Supply Boilers utilizing biomass as the primary fuel source shall meet the requirements of NBIC Part 1, Section 3 and this Supplement.

S4.5 – Fuel System Requirements and Controls

- a) Fuel Transport Systems shall address preserving fuel particle size distribution, fire prevention, and the suppression of fires or explosions.
In a single installation various types of fuel transportation systems may co-exist, the most common systems are
 - Conveyor systems- In these systems fuel is dropped onto a moving belt, bucket elevator, drag link conveyor or a screw or auger mechanism. Speed of the conveyor may be varied to meet fuel demand.
 - Lean phase pneumatic systems
In these systems fuel is dropped into a moving airstream, mixes with the air, and travels through a pipe at a velocity of approximately 5000 ft/min. Air pressures are in the region of 25 inches water column.
- b) Fuel Transport Solid Fuel Metering Systems vary depending upon the fuel used and the particle size distribution, these metering systems include but are not limited to:

- Variable speed augers
Variable speed, helically flighted, augers can be located in the bottom of a fuel metering bin. Alternatively they could be a part of a retort type stoker. The auger dimensions, flighting, and speed range are selected on the basis of fuel being burned, its size range, heating value and required boiler turndown range. The metered fuel typically is then dropped into the throat of a venturi, (or in some cases a plain pipe) through which the fuel transport air flows to carry the fuel into the boiler combustion zone, for distribution on a grate, upon which the burning of the fuel takes place.
- Variable speed air-lock valves
This valve is basically a rotating slotted cylinder, operating within an outer cylinder, suitably sealed to prevent leakage. Rotational speed and slot dimensions can be varied to accommodate changes in fuel flow rate. The fuel passing through the valve, typically, is deposited onto a moving grate type stoker.
- Variable stroke rams
This is another device that can be located on the bottom of a metering bin, is typically used on smaller units and is essentially a batch feed mechanism. The stroke of the ram is adjusted to set fuel flow rate.

S4.6 – Combustion Requirements

a) Overfire Air/Underfire Air Distribution

When solid fuels are burned on a grate, rather than in fluidized bed units or in suspension, it is normal practice to introduce some of the combustion air under the grate, or bed, and the remainder over the bed. In many cases fuel transport air becomes a part of the over-the-bed combustion air. The proportioning of the overfire to underfire airflow rates is dependent upon several factors, such as fuel particle size, fuel density, burn rate and volatiles. In general the objective is to get as complete a burn on the grate as possible, without creating large quantities of particulate emissions, and then using the overfire air to complete burning of the volatile and small particulate matter, leaving the fuel bed.

Loss of combustion air from either the underfire or overfire source shall cause shutoff of the fuel supply and a lockout condition.

The control system shall be capable of maintaining the correct relationship between underfire air and overfire air, over the complete firing range of the boiler, while promoting complete burning with minimum particulate emissions.

b) Programming Controls

Programming controls may be relay based, or on more current units, PLC based.

Interactive graphics displays may also be incorporated into the system.

Access to PLC based controls and interactive graphic displays shall be limited to qualified individuals and password protected. PLC functions shall be confined to the normal boiler operating logic, covering startup, interlocks, and normal shutdown sequences.

→ Safety controls, which cause boiler safety shutdown when activated, shall not be interfered with by the PLC logic. *shall not interfere with*
 Consideration should be given to having the PLC logic comply with the requirements of NFPA-85.

c) Pre-firing Checks/interlocks

In addition to the Safety Controls defined in Section 4.5 and 4.6 proof of air handling fans or blowers are operating properly shall be required. This includes:

- Induced draft fans
- Fuel transport fans
- Underfire air and Overfire air fans, and
- Carbon, or flyash, re-injection fans.

In cases where variable speed drives are used on fans, the combustion system manufacturer's instructions shall be followed in terms of the allowable upper and lower limits of the power supply frequency (Hz).

d) Pre-purging

Pre-purging the boiler and its venting system shall be required. Unless defined otherwise by the manufacturer of the fuel burning equipment, the pre-purge may be achieved by operating the induced draft fan prior to starting the remaining fans in the installation.

Purge air volume shall be set during commissioning by the combustion system manufacturer, or the manufacturer's representative, in accordance with applicable Codes or Standards and shall not be capable of being reset by operating personnel.

e) Ignition Systems

Solid fuel ignition systems and/or methods can vary from the placement of manually ignited, oil soaked rags on the fuel bed, to gas or oil fired pilot burners or lances but in all cases shall be in accordance the manufactures recommendations.

f) Firing Rate Control and Fuel/Air Ratio Control

The control system shall be capable of maintaining the desired air to fuel ratio over the entire firing range of the boiler, while promoting clean, stable combustion.

g) Re-injection Systems

In installations where fly ash is re-injected from a multi-cyclone collector into the combustion zone for carbon re-burn; precautions should be taken to ensure that plugging of the reinjection pipe work does not occur. Consideration should be given to installing cleanouts in the pipe work.

h) Shutdown and Post Purge

add

i)

Unless the boiler manufacturer's instructions state otherwise, the fuel supply shall be terminated at shutdown, and the overfire air should remain on until the fuel bed is burned out, and the residue cooled.

New definitions

Conveyor system(s)- A fuel transport system utilized on biomass boilers that drops fuel onto a moving belt, bucket elevator, drag link conveyor or a screw or auger mechanism. (The Speed of the conveyor may be varied to meet fuel demand.)

Lean phase pneumatic system(s)- A fuel transport system utilized on biomass boilers that drops fuel into a moving airstream, mixes with the air, and travels through a pipe at a velocity of approximately 5000 ft/min. Air pressures are in the region of 25 inches water column.

Suggested Additions to NBIC, Part 2 – Inspection, to Cover Biomass Fired Boiler Installations (Section 6, Supplement X)

(Draft for Review and Comment 10/31/12)

SX.1 - Scope

- a) This supplement is intended to provide additional inspection requirements to cover Biomass fired boilers and the additional equipment utilized in these installations. In this context Biomass is intended to mean various types of wood wastes, or wood byproducts.
- b) Many of the requirements of the earlier Sections of Part 2 are common to all boiler installations irrespective of the fuel being fired; therefore this supplement will address the differences that occur when solid fuels, such as Biomass, are being used. Thus the primary thrust of this section will be directed toward the inspection of the fuel handling and distribution systems, and the impact these systems may have on the pressure vessel itself.

SX.2 – Assessment of Installation

- a) A general assessment of the complete installation shall be undertaken, in terms of observable results of operating and maintenance practices. Indicators include the general boiler room cleanliness, for example significant quantities of fuel particles (dust) should not be apparent in the boiler room.
- b) The combustion air inlet shall be free of any debris or dust particle build up, and where moveable louvered intakes exist, the actuating mechanisms shall be clean and operate freely. Corrective action is required when non-compliance is noted.
- c) The flue gas venting system shall be checked for tightness, with no observable signs of leakage. Corrective action is required if leakage is noted.
- d) The intakes of the various fans or blowers shall be free of fuel particle build up or signs of other debris. Corrective action in terms of cleaning is required when discrepancies are noted.
- e) The fuel metering equipment and the fuel transportation system shall be free from signs of particulate or dust leakage. Corrective action in terms of cleaning and repair work is required as necessary.

- f) Electrical equipment and controls shall be properly protected from the ingress of dust, by ensuring that all cover plates are properly installed and all panel doors are intact, operable and closed.
- g) Verify that all guards for rotating equipment (shafts, bearings, drives) are correctly installed and fan inlet screens are in place.
- h) On the boiler, generally check for signs of potential problems, including:
 - Water leaks
 - Missing or misaligned pieces or parts
 - Condition of support systems
 - Provision of “Danger” or “Caution” signs
 - Excess vibration
 - Excess noise.
- i) Verify that the Owner/User has established function test, inspection, requirements, maintenance and testing of all controls and safety devices in accordance with the manufacturer’s recommendations. Verify that these activities are conducted at assigned intervals in accordance with written procedures, non-conformances which impact continued safe operation of the boiler are corrected and the results are properly documented. These activities shall be at a frequency recommended by the manufacturer, or frequency required by the jurisdiction. Where no frequencies are recommended, or prescribed, the activity should be conducted at least annually

SX.3 – Boiler Room Cleanliness

- a) While boiler room cleanliness is of primary importance in all boiler rooms it is of particular importance in biomass fired boiler rooms. Biomass can contain fine particulate, which if allowed to leak from the transportation system into the surrounding boiler room, will eventually be drawn into fans, resulting in the possibility of combustion air systems becoming plugged.
- b) Boiler rooms containing quantities of fine dusts are susceptible to fire or explosion, again emphasizing the need for high standards of cleanliness.

SX.4 – Emission Control Requirements

- a) Emission control is dependent upon the fuel being fired and the emission requirements prevailing at the location of the boiler installation. As such they are a part of the initial design and installation process, and apart from ensuring that they are

kept in top working condition, so that emission requirements are not violated; there is little that can be done from the inspector's point of view.

- b) When Continuous Emissions Monitors (CEM's) are in use, they should be demonstrated to be functioning properly and have a current calibration sticker.
- c) Delta-P pressure gauges which measure the pressure drop across the various elements of the emission control system should all be functioning correctly.
- d) There should be no sign of erosion caused by entrained particulate matter, in any part of the breaching, ductwork, stack or the individual emission control elements.
- e) On systems in which the emissions control system incorporates a baghouse, appropriate fire detection and suppression systems shall be incorporated and functioning properly.

National Board Inspection Code Subcommittee Installation Subgroup on Pressure Vessels and Piping

NB10-0201

Members:

Donald Patten
Stan Konopacki
Gary Scribner
Melissa Wadkinson

Task Group Assignment

Address Thermal Fluid Heater Installation

Source

PR 07 – 2102

Proposal

Insert the following text as Part 1, Section 6 Installation – Supplements

Proposed Text

PART 1, SECTION 6 SUPPLEMENT 4 INSTALLATION OF THERMAL FLUID HEATERS

S4.1 SCOPE

This Supplement describes guidelines for the installation of a Thermal Fluid Heater. A Thermal Fluid Heater System consists of the Heater, Expansion Tank, Circulating Pump with the proper Piping and Controls to heat jacketed kettles, presses, reactors, ovens, exchangers, etc.

S4.2 DEFINITION

A thermal fluid heater is a closed loop liquid phase heater (flooded pressure vessel) in which the heat transfer media is heated but no vaporization takes place within the vessel. Depending on the fluid selection and operating parameters, systems may be open or closed to the atmosphere. Closed systems may be pressurized with an inert gas blanket.

A thermal fluid vaporizer is a heater in which the thermal fluid is vaporized within the pressure vessel.

Thermal fluid: A fluid (other than water) that is chemically stable over a large temperature range and is specifically designed for use as a heat transfer medium.

S4.3 General Requirements

S4.3.1 Supports, Foundations, and Settings

Each thermal fluid heater and its associated piping must be safely supported. Design of supports, foundations, and settings shall consider vibration (including seismic where necessary), movement (including thermal movement), and loadings (including the weight of the fluid in the system) in accordance with jurisdictional requirements, manufacturer's recommendations, and/or other industry standards, as applicable.

S4.3.2 STRUCTURAL STEEL

a) If the thermal fluid heater is supported by structural steel work, the steel supporting members shall be so located or insulated that the heat from the furnace will not affect their strength.

b) Structural steel shall be installed in accordance with jurisdictional requirements, manufacturer's recommendations, and/or other industry standards, as applicable

S4.3.3 SETTINGS

The thermal fluid heater must be installed on a level, hard, non-combustible surface preferably of concrete to protect against any fire hazard. A 4" containment curb or 2" steel welded drip lip around the thermal fluid heater equipment skid shall be provided.

S4.3.4 CLEARANCES

a) Thermal fluid heater installations shall allow for normal operation, maintenance, and inspections. There shall be at least 36 in. (915 mm) of clearance on each side of the thermal fluid heater to enable access for maintenance and/or inspection activities. Thermal fluid heaters operated in battery shall not be installed closer than 48 in. (1220 mm) from each other. The front or rear of any thermal fluid heater shall not be located nearer than 36 in. (915 mm) from any wall or structure. Alternative clearances in accordance with the manufacturer's recommendations are subject to acceptance by the Jurisdiction.

S.4.4 THERMAL FLUID HEATER ROOM REQUIREMENTS

S.4.4.1 EXIT

Two means of exit shall be provided for thermal fluid heater rooms exceeding 500 sq. ft. (46.5 sq. m) floor area and containing one or more thermal fluid heaters or boilers having a combined fuel capacity of 1,000,000 Btu/hr (293 kW) or more. Each elevation shall be provided with at least two means of exit, each to be remotely located from the other. A platform at the top of a single thermal fluid heater is not considered an elevation.

S.4.4.2 LADDERS AND RUNWAYS

a) All walkways, runways, and platforms shall be:

- 1) of metal construction;
- 2) provided between or over the top of boilers that are more than 8 ft. (2.4 m) above the operating floor to afford accessibility for normal operation, maintenance, and inspection;
- 3) constructed of safety treads, standard grating, or similar material and have a minimum width of 30 in. (760 mm);
- 4) of bolted, welded, or riveted construction;
- 5) equipped with handrails 42 in. (1070 mm) high with an intermediate rail and 4 in. (100 mm) toe-board.

b) Stairways that serve as a means of access to walkways, runways, or platforms shall not exceed an angle of 45 degrees from the horizontal and be equipped with handrails 42 in. (1070 mm) high with an intermediate grid.

c) Ladders that serve as a means of access to walkways, runways, or platforms shall:

- 1) be of metal construction and not less than 18 in. (460 mm) wide;
- 2) have rungs that extend through the side members and are permanently secured;
- 3) have a clearance of not less than 30 in. (760 mm) from the front of rungs to the nearest permanent object on the climbing side of the ladder;
- 4) have a clearance of not less than 6-1/2 in. (165 mm) from the back of rungs to the nearest permanent object;
- 5) have a clearance width of at least 15 in. (380 mm) from the center of the ladder on either side across the front of the ladder.

d) There shall be at least two permanently installed means of exit from walkways, runways, or platforms that exceed 6 ft. (1.8m) in length.

S4.5 SOURCE REQUIREMENTS

S4.5.1 THERMAL LIQUIDS (HEAT TRANSFER FLUIDS)

It is extremely important that the proper heat transfer fluid be selected by competent personnel knowledgeable of the system. Heat transfer fluids should meet the following basic requirements:

- a) Resist deterioration at the temperatures involved, to assure long useful life and a clean system.
- b) Possess good heat transfer characteristics.
- c) Have low vapor pressures at operating temperatures, to permit operation at moderate pressures. Note: Processes requiring thermal fluid temperatures higher than 650F will require the use of specialty fluids with high vapor pressures (150 psi). These fluids also tend to have special environmental, safety and health considerations.
- d) Have low viscosities to decrease pumping losses (due to pipe friction) and the power required for circulation.
- e) Be suitable for outside temperatures involved to prevent freeze up unless a means of heat trace has been implemented
- f) Meet Environmental Regulations.

The heat transfer fluid must be kept clean and in proper condition. Tests should be made periodically to determine the condition of the fluid and for recommendations by the fluid manufacturer. Any heat transfer fluid that is added must be clean and of the proper specification and added at a temperature below 200 Deg. F at the low point in the system. Fluids should not be mixed, refer to the fluid manufacturer's recommendations.

S4.5.2 Volume

The expansion tank must have sufficient volume to handle the required expansion of the total system thermal liquid at the required operating temperature.

The expansion tank should be sized so that when the thermal liquid in the system is cold, the tank will be one quarter full or as recommended by the manufacturer. When the system is up to operating temperature, the expansion tank will not be over three quarters full. A high expansion tank liquid level alarm may be used for indication of high liquid level in the expansion tank(s). An expansion tank low level switch (or similar device) should be used to ensure the appropriate minimum level of fluid in the tank per the manufacture's recommendation. Tripping of this switch should shut down the pump and burner. The activation of this switch should activate an audible alarm. All expansion tank vents and drains must be piped to a safe catchment.

If the expansion tank is to be pressurized with an inert gas, a safety relief valve shall be installed on the expansion tank. This safety relief valve shall be piped to a safe catchment.

S4.5.3 CONNECTION

The circulating pump shall be piped to the return inlet connection to the thermal fluid heater.

The expansion tank shall be installed at an elevation above all piping when possible. If the tank is not at the highest elevation, an inert gas blanket shall be used to pressurize the system to overcome the weight of the fluid above the tank.

- a) Vented – To provide a Net Positive Suction Head for the circulating pump the expansion tank should be accommodate the NPSH requirements of the circulating pump. For non-pressurized tanks, a vent connection (open to the atmosphere) is part of the design and should be piped to a safe catchment with no valve in the piping.
- b) Pressurized – The expansion tank can be pressurized with nitrogen or other inert gas as recommended by the fluid manufacturer and provisions made to provide a continuous recommended pressure. The pressure can be adjusted to meet the Net Positive Suction Head requirements of the

circulating pump. Compressed air is not recommended as it oxidizes the thermal fluid. Carbon Dioxide is not recommended as it dissolves into the fluid and can create cavitation or other problems in the system.

S4.5.4 CIRCULATING PUMP

It is essential that the pump selection be made by competent personnel that are knowledgeable of the requirements of the specific system. Special attention to hot and cold alignment requirements and pump cooling requirements must be considered. The circulating pump must provide:

- a) The required velocity flow across the heater tube surface.
- b) Handle the Total System Head.
- c) Be specifically designed to handle the thermal fluid used at the high temperatures involved including cold start conditions.

A strainer should be located in each pump suction piping.

Dual pumps are often installed to provide 100% redundancy in the case of a pump failure. A flexible connection in and out of each pump is recommended.

S4.5.5 PIPING AND VALVES

Carbon Steel Pipe such as ASTM A-53 or ASTM A-106 is preferred for the entire piping system. Seamless pipe should be used for thermal fluid piping. Copper, copper alloys, brass, bronze aluminum or cast iron **shall not** be used since they are incompatible with thermal fluid. All joints and connections 1" and over should be welded. When it is not possible to weld, forged steel fittings and flanges suitable for the temperature and pressure of the system may be used. All flange gaskets should be suitable for the operating temperature, pressure and fluid used. Special attention shall be given to the expansion of the piping due to the high temperatures involved.

Valves shall be of steel material compatible for the thermal fluid and temperatures and shall be flanged or weld type manufactured from cast or forged steel or ductile iron. Valve internals and gland seals shall be made from materials suitable for use with high temperature fluids and compatible with the specific fluid utilized in the system.

When 2-way valves are utilized in the piping system, a back pressure regulating valve or automatic bypass valve shall be incorporated to ensure the proper flow through the heater at all times regardless of control valve position if 3-way valves are used, balancing valves should be included.

Design of piping supports should be in accordance with jurisdictional requirements, manufacture's recommendations and/or other industry standards as applicable.

Hot oil pipe insulation should be a minimum of 2" thick high temperature, laminated foam glass or cellular glass (non-absorbent) insulation.

S4.5.6 FUEL

Fuel trains for thermal fluid heaters with burner inputs

- a) less than 12.5 MM Btu/hr shall meet the requirements of ASME CSD-1,
- b) 12.5 MM Btu/hr or greater shall meet the requirements of NFPA 87,

and shall be installed in accordance with jurisdictional and environmental requirements, and manufacturer's recommendations.

S4.5.7 ELECTRICAL

a) All wiring for controls, heat generating apparatus, and other appurtenances necessary for the operation of the thermal fluid heater(s) should be installed in accordance with the provisions of national or international standards and comply with the applicable local electrical codes.

b) A manually operated remote shutdown switch or circuit breaker shall be located just outside the equipment room door and marked for easy identification. Consideration should also be given to the type and location of the switch to safeguard against tampering.

c) If the equipment room door is on the building exterior, the shutdown switch shall be located just inside the door. If there is more than one door to the equipment room, there shall be a shutdown switch located at each door of egress.

- 1) For atmospheric-gas burners, and oil burners where a fan is on a common shaft with the oil pump, the complete burner and controls should be shut off.

- 2) For power burners with detached auxiliaries, only the fuel input supply to the firebox need be shut off.

d) Controls for Heat Generating Apparatus

- 1) Oil and gas-fired and electrically heated thermal fluid heaters shall be equipped with suitable primary (flame safeguard) safety controls, safety limit switches and controls, and burners or electric elements as required by a nationally or internationally recognized standard.

The symbol of the certifying organization that has investigated such equipment as having complied with a nationally recognized standard shall be affixed to the equipment and shall be considered as evidence that the unit was manufactured in accordance with that standard. Thermal fluid heater shall have a;

- a) Expansion tank low level switch- liquid level switch (or similar device) interlocked with the circulating pump operation to confirm minimum level in the expansion tank when the system is cold. This interlock prevents pump cavitation. The function of this device shall prevent burner and pump operation if the liquid level is not adequate.
- b) Thermal fluid temperature operation control. This temperature actuated control shall shut down the fuel supply when the system reaches a preset operation temperature. This requirement does not preclude the use of additional operation control devices when required.
- c) High temperature limit safety switch on the located on the thermal fluid heater outlet. This limit shall prevent the fluid temperature from exceeding the maximum allowable temperature of the specific fluid. The high temperature limit safety switch set point should be set no higher than the maximum temperature specified by the fluid manufacturer, heater design or downstream process limits, whichever is lowest. Functioning of this control shall cause a safety shutdown and lockout. The manual reset may be incorporated in the temperature limit control. Where a reset device is separate from the temperature limit control, a means shall be provided to indicate actuation of the temperature sensing element. Each limit and operating control shall have its own sensing element and operating switch.
- d) Primary flame safety control for each main burner assembly. This control shall de-energize the main fuel shut off valve and shut off pilot fuel upon loss of flame at the point of supervision. The function of this control shall cause a safety shutdown and lockout.
- e) Power burners and mechanical draft atmospheric burners shall provide for the preignition purging of the combustion chamber and flue passes. The purge shall provide no fewer than four air changes or greater as specified the manufacturer.
- f) Proof of flow interlock- thermal fluid heaters require a minimum flow rate to ensure proper velocities and film temperatures through the heater. A low flow condition can cause overheating, degradation of the fluid or heater coil or tube failure. Activation of this interlock shall cause

a safety shutdown of the burner and pump. This requirement should be accomplished by:

- 1) Utilizing A differential pressure switch is the recommended method for proving flow and allow for a discrete setpoint. The normally open switch senses pressure on the inlet and outlet heater at operating temperature. Tripping of this switch indicates improper flow through the heater.
 - 2) Utilizing a flow switch to provide an alternative means of proving flow.
 - 3) Utilizing a orifice in the piping system in conjunction with a differential pressure switch.
 - 4) Utilizing **vortex** shedding meters may also be employed, however the meter must be selected based on the fluid and operating temperature for proper performance.
- 2) Thermal fluid heaters should also have:
- a) A high stack temperature switch interlock - in the event of a high stack temperature (indication of improper combustion or cracked coil) this device shall shut off the burner and circulating pump and cause a lockout condition.
 - b) An inert gas smothering system (steam or CO₂)- this system is used to quench combustion in the event of a cracked heater coil or tube. The gas smothering system should be installed per local codes and requirements. A typical system may include two stack limit switches, an alarm and valve to allow inert gas to enter the combustion chamber. One stack limit is set at a value above the typical stack temperature for the equipment (1000 deg. F) and the second is set at 100 deg. F above the first. If the limit is tripped, the pump and burner will shut down. If the second limit is tripped, the inert gas enter the combustion chamber to quench the flame.
 - c) A high inlet pressure switch – this normally closed switch senses pressure at the heater inlet and its setpoint is determined based on the system design pressure when the system is cold. Activation of this switch indicates a restriction in flow and shall shutdown the thermal burner and pump and cause a lockout condition.
 - d) A low inlet pressure switch- this normally open switch senses pressure at the heater inlet and its setpoint is determined based on system pressure when the system is operating at temperature. Activation of this switch indicates a restriction in flow and shall shutdown the thermal burner and pump and cause a lockout condition.
 - e) A high outlet pressure switch – this normally closed switch senses pressure at the heater outlet and it's setpoint is determined based on

the system pressures when the system is at operating temperature. Activation of this switch indicates a restriction in flow and shall shutdown the thermal burner and pump and cause a lockout condition. Note: the setpoint of this switch should be lower than the safety relief valve setting.

- 3) These devices shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and/or industry standards, as applicable.

S4.5.8 VENTILATION AND COMBUSTION AIR

- a) The thermal fluid heater room shall have an adequate air supply to permit clean, safe combustion, minimize soot formation, and maintain a minimum of 19.5% oxygen in the air of the boiler room and sufficient to maintain ambient temperatures of less than 100 Deg. F. The combustion and ventilation air should be supplied by either an unobstructed air opening or by power ventilation or fans.
- b) Unobstructed air openings shall be sized on the basis of 1 sq. in. (650 sq. mm) free area per 2000 Btu/hr (586 W) maximum fuel input of the combined burners located in the boiler room, or as specified in the National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular job conditions. The boiler room air supply openings shall be kept clear at all times.
- c) Power ventilators or fans shall be sized on the basis of 0.2 cfm (0.0057 cu meters per minute) for each 1000 Btu/hr (293 W) of maximum fuel input for the combined burners of all boilers located in the boiler room. Additional capacity may be required for any other fuel burning equipment in the boiler room. Pressure in the room should be neutral.
- d) When power ventilators or fans are used to supply combustion air they shall be installed with interlock devices so that the burners will not operate without an adequate number of ventilators/fans in operation.
- e) The size of openings specified in (b) may be reduced when special engineered air supply systems approved by the Jurisdiction are used.
- f) Care should be taken to ensure that thermal fluid lines are not routed across combustion air openings, where freezing may occur in cold climates.

¹ Fans – When combustion air is supplied to the thermal fluid heater by an independent duct, with or without the employment of power ventilators or fans, the duct shall be sized and installed in accordance with the manufacturer's recommendations. However, ventilation for the boiler room must still be considered.

S4.5.9 LIGHTING

The thermal fluid heater room should be well lighted and it should have an emergency light source for use in case of power failure.

S4.5.10 EMERGENCY VALVES AND CONTROLS

All emergency shut-off valves and controls shall be accessible from a floor, platform, walkway, or runway. Accessibility shall mean within a 6 ft. (1.8 m) elevation of the standing space and not more than 12 in. (305 mm) horizontally from the standing space edge.

S4.6 DISCHARGE REQUIREMENTS

S4.6.1 CHIMNEY OR STACK

Chimneys or stacks shall be installed in accordance with jurisdictional and environmental requirements, manufacturer's recommendations, and/or industry standards, as applicable.

S4.6.2 DRAINS

A drain outlet connection and valve shall be installed at the low point of the system piping. This drain connection shall be provided with a cap or plug to prevent leakage or accidental discharge of the thermal fluid. This is for draining the fluid should this become necessary. Copper and copper alloys should not be used. Cast iron should not be used because of the tendency to shock fracture. Drain piping 1" or above should be welded. The valve should never be opened when there is temperature on the system.

S4.6.3 AIR VENT

A manual air vent valve must be installed on the high point of the system piping. Copper and copper alloys should not be used. Cast iron should not be used because of its tendency to shock fracture. Vent piping 1" or above should be welded. The valve should never be opened when there is temperature on the system.

S4.7 CONTROLS and INSTRUMENTATION

General

- a) Safety valves are designed to relieve steam.
- b) Safety relief valves are valves designed to relieve either steam or water, depending on the application.
- c) Safety and safety relief valves are to be manufactured in accordance with a national or international standard.
- d) Deadweight or weighted-lever pressure-relieving valves shall not be used.

- e) Thermal fluid heater, safety relief valves shall have a closed bonnet, and safety relief valve bodies shall not be constructed of cast iron.
- f) Safety and safety relief valves with an inlet connection greater than NPS 3 (DN 80) used for pressure greater than 15 psig (103 kPa), shall have a flange inlet connection or a welding-end inlet connection. The dimensions of flanges subjected to boiler pressure shall conform to the applicable standards.
- g) When a safety or safety relief valve is exposed to outdoor elements that may affect operation of the valve, it is permissible to shield the valve with a cover. The cover shall be properly vented and arranged to permit servicing and normal operation of the valve.

S4.8.1.1 Number

At least one National Board capacity certified safety or safety relief valve shall be installed on the boiler. If the boiler has more than 500 sq. ft. (46 sq. m.) of heating surface, or if an electric boiler has a power input of more than 3.76 million BTU/hr (1100 kW), two or more National Board capacity certified safety or safety relief valves shall be installed.

S4.8.1.2 Location

- a) Safety or safety relief valves shall be placed on, or as close as physically possible, to the boiler proper.
- b) Safety or safety relief valves shall not be placed on the feedline.
- c) Safety or safety relief valves shall be connected to the boiler independent of any other connection without any unnecessary intervening pipe or fittings. Such intervening pipe or fittings shall not be longer than the face-to-face dimension of the corresponding tee fitting of the same diameter and pressure rating as listed in the applicable standards.

S4.8.1.3 Capacity

- a) The pressure-relieving valve capacity for each boiler shall be such that the valve or valves will discharge all the steam that can be generated by the boiler without allowing the pressure to rise more than 6% above the highest pressure at which any valve is set and in no case to more than 6% above the maximum allowable working pressure of the boiler.
- b) The minimum relieving capacity for other than electric boilers and forced-flow steam generators with no fixed steam line and waterline shall be estimated for the boiler and waterwall heating surfaces as given in Table 2.9.1.3, but in no case should the minimum relieving capacity be less than the maximum designed steaming capacity as determined by the manufacturer.
- c) The required relieving capacity in pounds per hour of the safety or safety relief valves on a high temperature water boiler shall be determined by dividing the maximum output in Btu at the boiler nozzle obtained by the firing of any fuel for which the unit is designed by one thousand.
- d) The minimum safety or safety relief valve relieving capacity for electric boilers is 3.5 lbs/hr/kW (1.6 kg/hr/kW) input.

e) If the safety or safety relief valve capacity cannot be computed, or if it is desirable to prove the computations, it should be checked by any one of the following methods; and if found insufficient, additional relieving capacity shall be provided:

1) By performing an accumulation test, that is, by shutting off all other steam discharge outlets from the boiler and forcing the fires to the maximum. This method should not be used on a boiler with a superheater or reheater or on a high temperature water boiler.

2) By measuring the maximum amount of fuel that can be burned and computing the corresponding evaporative capacity upon the basis of the heating value of the fuel.

3) By determining the maximum evaporative capacity by measuring the feedwater. The sum of the safety valve capacities marked on the valves shall be equal to or greater than the maximum evaporative capacity of the boiler. This method should not be used on high temperature water boilers.

S4.10 Testing and Acceptance

S4.10.1 General

- a) Care shall be exercised during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the thermal fluid system. Where possible, an inspection of the interior of the thermal fluid heater and its appurtenances shall be made for the presence of foreign debris prior to making the final closure.
- b) Safe operation should be verified by a person familiar with boiler system operations for all boilers and connected appurtenances and all pressure piping connecting them to the appurtenances and all piping.
- c) The wall thickness of all pipe connections shall comply with the requirements of the code of construction for the thermal fluid heater.
- d) All threaded pipe connections shall engage at least five full threads of the pipe or fitting.
- e) In bolted connections, the bolts, studs, and nuts shall be marked as required by the original Code of Construction and be fully engaged (e.g., the end of the bolt or stud shall protrude through the nut).
- f) Washers shall only be used when specified by the manufacturer of the part being installed.

S4.10.2 Pressure Test

Prior to initial operation, the completed thermal fluid heater system, including pressure piping, pumps, stop valves, etc., shall be pressure tested in accordance with the manufactures recommendations. Hydrostatic testing of the system is not recommended due to possible contamination of the system. All pressure testing should be witnessed by an Inspector.

S4.8.3 Nondestructive

Examination

Thermal fluid heater components and subcomponents shall be nondestructively examined as required by the governing Code of Construction.

S4.8.4 System Testing

Prior to final acceptance, an operational test shall be performed on the complete installation. The test data shall be recorded and the data made available to the jurisdictional authorities as evidence that the installation complies with the provisions of the governing code(s) of construction. This operational test may be used as the final acceptance of the unit.

S4.8.4 Final Acceptance

A thermal fluid heater may not be placed into service until its installation has been inspected and accepted by the appropriate jurisdictional authorities.

S4.8.5 Installation Report

- a) Upon completion, inspection, and acceptance of the installation, the installer shall complete and certify the *Boiler Installation Report* I-1. See 1.4.5.1.
- b) The *Boiler Installation Report* I-1 shall be submitted as follows:
 - 1) one copy to the Owner; and
 - 2) one copy to the Jurisdiction, if required.



CORPORATE:
25920 Eden Landing Road
Hayward, CA 94545-3816
Phone: 510.784.0110
Fax: 510.784.1004
www.rfmacdonald.com

August 21, 2012

Mr. Umberto D'Urso
ASME
Three Park Avenue
New York, NY 10016

FRESNO
LAS VEGAS
LOS ANGELES
MODESTO
RENO
SAN DIEGO

Subject: NB11-2001 Economizers – ASME Request for Interpretation

Mr. D'Urso,

I am on the NBIC Sub-Group for Pressure Vessels & Piping and Sub-Committee for Installations. We have a request for change of current language in Part 1, 2.9.4 – Economizers. See attached copy of current language and proposed language.

In order to be consistent and compliant with ASME it was brought to our attention that this might conflict with ASME. So I have the following requests for interpretation.

Question: Does PG71.2 apply to the mounting of a safety relief valve for an economizer?

Answer: No

Question: Does Figure 58.3.1(b) dictate that the safety relief valve for an economizer be located at its outlet?

Answer: No

Your prompt reply will be greatly appreciated. If you have any questions regarding the above interpretation please contact me at (510) 670-7422 or by email at don.patten@rfmacdonald.com.

Sincerely yours,

Donald Patten

Donald Patten
Director of Project Management and Technical Support

Melissa Michaud Wadkinson, PE

EDUCATION

Masters of Business Administration, June 2001

Syracuse University, Syracuse, New York

Master of Science in Chemical Engineering, September 1992

University of Massachusetts, Amherst, Massachusetts

Bachelor of Science in Chemical Engineering, May 1990

University of Virginia, Charlottesville, Virginia

PROFESSIONAL EXPERIENCE

The Fulton Companies, Pulaski New York

1994 – present

Chief Engineer

Responsibility for system design integrity of all products, including the review of systems for technical feasibility, code approvals and engineering best practices; participation with design review and engineering support for all products; Fulton representative for ASME meetings and committees

Product Manager Thermal Systems, I/C Division

Responsibility for overall product integrity, advertising, development of marketing materials, coordination of trade shows, and marketing research; new product development and product improvements, including customized engineered heat transfer systems

Engineering Manager, I/C Division

Responsibility for the review of all pressure vessel designs for compliance with ASME Code; design review for application and system integrity of heat transfer products

Sales Engineer/Project Engineer/Manufacturing Engineer

Responsibility for design of custom engineered heat transfer systems; technical training seminars for customers; review of standard products for code compliance; product improvements

PROFESSIONAL LICENSES AND AFFILIATIONS

- Professional Engineer, Registered in State of New York (License #089694)
- NFPA 87 Committee on Recommended Practice for Thermal Fluid Heaters
- National Board of Boiler and Pressure Vessel Inspectors, National Board Inspection Code (NBIC) Committee: Member Subgroup Installation (Boilers) and Member Subgroup Installation (Pressure Vessels and Piping)
- American Society of Mechanical Engineers;
 - Member Boiler Pressure Vessel (BPV) Committee on Heating Boilers (IV)
 - Member ASME Boiler Pressure Vessel Code (I), Subgroup Design
 - Member ASME Boiler Pressure Vessel Code (I), Subgroup General Requirements
 - Member ASME Boiler Pressure Vessel Code (II), Subgroup External Pressure
 - Member ASME Boiler Pressure Vessel Code (IV), Subgroup Welded Boiler
 - Vice Chair ASME Boiler Pressure Vessel Code (IV), Subgroup on Materials
 - Chair of the ASME Subgroup on Care and Operation of Heating Boilers (BPV IV)
- American Chemical Society

January 7, 2013

Mr. Don Cook
Chair, NBIC Committee

Hand Delivered

Dear Mr. Cook:

I am requesting consideration for membership to the National Board Inspection Code Subcommittee on Installation and Subgroup on Boilers. This is my 40th year in the boiler industry and I have been an active member in the ASME-CSD committee for the past 20 years.

With this letter I am providing a one-page summary of my boiler experience and a more detailed multi-page list of my work experience. Weil-McLain has supported my work on the ASME-CSD committee and will support my involvement in the NBIC.

Please contact me if you have any questions and thank you for your consideration.

Sincerely,



Paul H. Schuelke, P.E.
Director, Technical Services
Weil-McLain

Cc: Gordon Stretch
VP, Product Engineering
Weil-McLain

Experience Summary

PERSONAL DATA:

Name: **Paul H. Schuelke**
Home: Address: 1587 N. Rustic Drive
La Porte, IN 46350

EDUCATION:

1983 Masters of Business Administration
St. Ambrose University
Davenport, Iowa
1974 Bachelor of Science in Mechanical Engineering
South Dakota School of Mines and Technology
Rapid City, South Dakota

CERTIFICATIONS:

California Professional Engineer
Certificate No. M 18867

Six Sigma Black Belt

TECHNICAL MEMBERSHIP:

1993 to today
Committee Member
The American Society of Mechanical Engineers
Controls and Safety Devices for Automatically Fired Boilers

EXPERIENCE:

I have worked in the boiler industry for over 35 years, holding positions of salesman, consulting engineer and various engineering positions for boiler/burner manufactures. These include Manager Customer Engineering, Engineering Manager, Chief Engineer, Director Product Application, and Director Product Compliance. Currently I hold the position of Director, Technical Services for Weil-McLain.

I am or have been responsible for pressure vessel design, boiler control system design, boiler and burner applications, service, and product compliance with ASME Section I, Section IV, CSD-AFB, Underwriters Laboratories, and other state and industry requirements.

Paul H. Schuelke

1587 N. Rustic Drive

La Porte, IN 46350

EXPERIENCE:

Jan 2006 to Present Director, Technical Services

Weil-McLain
500 Blaine Street
Michigan City, IN 46360

I have the responsibility to insure that products manufactured by Weil-McLain meet and exceed customer expectations and industry standards. Specific areas of responsibilities are providing technical support for resolving insurance claims and product liability litigation. Also, I am the chairperson of the product safety design review committee.

Activities involved with resolving claims and litigation include working with attorneys, coordinating experts, and participating in site investigations and product inspections for personal injury and property damage claims due to fires, explosions, water damage freeze damage, scalding, and construction accidents. Expert reports, affidavits, deposition and trial testimony are provided when needed.

The chair of the product safety design review committee oversees the activities of the committee to verify that new products are designed and supplied to industry standard and installation instructions and warnings are suitable for the foreseeable use and misuse of the product. In addition, a Failure Mode Effect Analysis (FMEA) and appropriate follow-up action is completed on all items on the engineering bill-of-materials.

In addition, I oversee the Technical Service Technicians and Consumer Relations. These groups answers boiler questions, heating system installation questions and operation questions, asked by the Weil-McLain sales force, distributors, contractors, engineers, and consumers.

Aug 1997 to Jan 2006 Director, Product Compliance

Weil-McLain
500 Blaine Street
Michigan City, IN 46360

I had the responsibility to insure that products manufactured by Weil-McLain meet and exceed customer expectations and industry standards. Specific areas of responsibilities were providing technical support for resolving insurance claims and product liability litigation. Also, I was the chairperson of the product safety design review committee.

Activities involved with resolving claims and litigation include working with attorneys, coordinating experts, and participating in site investigations and product inspections for personal injury and property damage claims due to fires, explosions, water damage freeze

damage, scalding, and construction accidents. Expert reports, affidavits, deposition and trail testimony were provided when needed.

The chair of the product safety design review committee oversees the activities of the committee to verify that new products are designed and supplied to industry standard and installation instructions and warnings are suitable for the foreseeable use and misuse of the product. In addition, a Failure Mode Effect Analysis (FMEA) and appropriate follow-up action is completed on all items on the engineering bill-of-materials.

Jan 1989 to
Aug 1997

Director, Product Applications

Weil-McLain
500 Blaine Street
Michigan city, IN 46360

I was responsible for engineering and technical staff of eleven people who performed all product application functions, provided technical field support, and wrote all technical publications including installation manuals. The Product Applications Department provided all job specific drawings, quotations and submittals for special boiler applications, answered all technical product and application questions from installers, distributors, consulting engineers, and sales personnel. All technical manual and service guides were developed and written by this group.

July 1987 to
Jan 1989

Engineer

Williams & Davis Boilers, Inc.
P. O. Box AF
Hutchins, TX 75141

I was responsible for all product engineering, product design, product drafting for a regional boiler manufacturer with 5 to 7 million dollars of annual sales. They provided additional customer support preforming service, and boiler installations.

July 1984 to
July 1987

Chief Engineer

Stone Johnston Corporation
300 Pine Street
Ferrysburg, MI 49409

I was responsible for the pressure vessel, mechanical and electrical design for fluidized bed boiler systems, including fans, coal handling, limestone handling, natural gas delivery, control and instrumentation. Also, providing assistance to the Manager of Engineering in the day to day questions form manufacturing, sales, and management; the processing of standard boiler order; and providing support to the field sales force. Completed extensive research on CAD/CAM systems and the integration with the existing NC plasma-cutting equipment.

Mar 1984 to
July 1984

Manager of Engineering

Kewanee Boiler Corporation
101 Franklin Street

Kewanee, IL 61443

I was responsible of all product engineering activities, including product design, order processing, and research and development.

Feb 1983 to
Mar 1984

Product and Sales Manager

Kewanee Boiler Corporation
210 W 22nd Street
Oak Brook, IL 60521

I was responsible for the sale of firebox boilers, burners, waste heat boilers, and repair parts. More than half of my time was spent at the plant in Kewanee, IL assisting the engineering department process sales orders. The remainder was spent on national market studies and sales support of the representative sales force.

Mar 1980 to
Feb 1983

Manager of Customer Engineering

Kewanee Boiler Corporation
101 Franklin Street
Kewanee, IL 61443

I was responsible for the activities of 14 engineers and professional people who were engaged in quotations, order entry, and boiler application engineering. This included pricing, terms and conditions of sales; order submittals preparation; compliance with Underwriters' Laboratories; Factory Mutual; Industrial Rick Insurers; ASME section I and IV; and preparation of shop manufacturing drawings. In addition, I served as the technical contact for the sales force on boilers, boiler systems, burners, economizers and waste heat boilers. We implemented process systems to reduce the order processing time from 14 days to 4 days. Prepared the background studies on cost effectiveness of word processing and CAD systems, and over saw the design and the beginning of an in-house customer relations seminar.

May 1979 to
March 1980

Chief Engineer

Electric Boiler Corporation of America
Subsidiary of Kewanee Boiler Corporation
Atlantic, IA

I was responsible for the design, research and development, quality control, service and application for the electric boilers. The capacity ranged from 20 Kw to 1600 Kw and the pressure ranged from 15 psig to 1500 psig.

I was also responsible for the quality control of the guardian safety relief valve and the Kewanee retrofit burner. In addition, I helped coordinate the burner field service with the Kewanee Boiler Corporation Field Service Manager.

I was the primary customer contact for all products.

Sept 1978 to
May 1979

Mechanical Engineer

Donald Bentley and Associates
San Francisco, CA

I was a boiler specialist and energy analyst working with a team of engineers on a 22 building survey of the Lawrence Berkeley Laboratory. Primary responsibility was the detailing of existing mechanical systems and alternative system cost for a DOE 1 computer analysis. In addition, I was the primary writer of the mechanical reports and assistant editor of the project.

Jan 1975 to
Sept 1978

Engineering Sales

L. O. Schuelke Company, Inc.
San Carlos, CA 94070

I worked with purchasing agents, engineers, contractors and maintenance personnel in Northern California on the selection and operation of industrial boilers, burners, and heat exchangers. I was responsible for the sales, coordinating shipments, original start-up, warranty and emergency service.

May 1974 to
Sept 1974

Summer Laboratory Assistant

Kewanee Boiler Corporation
Kewanee, IL 61443

Assisted in the research and development of burners, also, conducted Environmental Protection Agency Tests on boiler stack emissions, and addicted in various other experiments in the laboratory.

May 1973 to
Sept 1973

Summer Office Engineer

L. O. Schuelke Company, Inc.
San Carlos, CA 94070

I was responsible for the selection and sales for American Standard shell and tube heat exchangers. This was done by working with factory personnel to provide economical selections to the customer.

1970 to
1972

Part time and summer employment.

Christian Candles, Inc.
Redwood City, CA

I was responsible for general maintenance and construction at the factory.

EDUCATION:

1983

Masters of Business Administration
St. Ambrose University
Davenport, IA

1974 Bachelor of Science in Mechanical Engineering
South Dakota School of Mines and Technology
Rapid City, SD

Organizations:
Theta Tau Fraternity
Wrestling Team
American Society of Mechanical Engineers Student

1970 San Carlos High School
San Carlos, CA

CERTIFICATION:

California Professional Engineer
Certificate Number M 18867

Six Sigma Black Belt

**TECHNICAL
MEMBERSHIPS:**

1993 to Committee Member
Present The American Society of Mechanical Engineers
Controls & Safety Devices for Automatically Fired Boilers

SEMINARS:

DRI Product Liability
NAFI – Fire and Explosion Cause and Origin