



THE
NATIONAL
BOARD
OF BOILER AND
PRESSURE VESSEL
INSPECTORS

Date Distributed:

SUBCOMMITTEE ON INSTALLATION

Minutes

*Meeting of July 18, 2012
Columbus, Ohio*

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

1. Call to Order – 8:00 a.m.

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

2. Announcements

- Lunch will be served each day at 12:00 - 2nd floor - Training and Conference Center.
- A trip to the Clippers game will take place Wednesday evening (7/18/2012), with buses leaving the Crowne Plaza at 5:30 p.m. It was noted that attendees should plan to meet at the hotel at 5:00 p.m.
- A continental breakfast will be served Thursday morning (7/19/2012) - 2nd floor - Training and Conference Center.
- The Executive Committee meeting was re-scheduled from Monday (7/16/2012) to Tuesday (7/17/2012 – 5:00 p.m.)

3. Adoption of the Agenda

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

4. Approval of Minutes of January 18, 2012

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

**5. Review of the Roster
(Attachments 1, pages 7 – 10)**

There was a motion to approve the roster as published with the noted correction of Ms. Melissa Wadkinson would like to become a member of the SG Boiler in addition to SG Pressure Vessels and Piping. The motion was unanimously approved.

- There was a motion to approve the appointment of Melissa Wadkinson to both the SG's on Boiler and Pressure Vessels and Piping. The motion was unanimously approved.
- There was a motion to approve the reappointment of Brian Moore, Geoff Halley, Paul Bourgeois and Craig Hopkins memberships to the subgroup Boiler. The motion was unanimously approved.
- There was a motion to approve the reappointment of Mike Richards and Raymond Snyder memberships to the subgroup Pressure Vessels and Piping. The motion was unanimously approved.

6. Inquiries

There are no inquiries assigned to this subcommittee.

7. Action Items
(Attachments 2 – 8, pages 11 – 48)

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.

(Attachments 2, pages 11 – 16)

July 2012

Mr. Wielgoszinski presented a progress report with an updated handout. A discussion was held and editorial changes were noted.

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 (Chair), M. Richards, G. Scribner and B. Moore has been assigned.

(Attachments 3, pages 17 – 25)

July 2012

Mr. Halley presented a progress report with an updated handout. It was agreed that this document would be worked on in 4 parts being 1st – Approval of Definitions, 2nd – A Functional Description, 3rd – Installation Requirements, and 4th – Inspection Requirements. There was a motion to approve the Definitions proposed in this document. The motion was approved with 1 negative.

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 (Chair), M. Wadkinson, G. Halley, G. Scribner and P. Bourgeois has been assigned.

(No Attachment)

July 2012

Mr. Scribner and Mr. Patten presented a progress report. An updated handout is planned to be distributed in the January 2013 meeting.

NB10-1201 Part 1, SC Installation - Request for a format change to Part 1 Installation. A TG of G. Scribner (Chair), B. Moore, S. Konopacki and D. Patten was assigned.

(No Attachment)

July 2012

Mr. Scribner presented a progress report. A power point presentation is planned to go out to the group for comment from Section 2 and 3 and then look at moving to General. There was a motion to move this item to the SG Boilers agenda. The motion was unanimously approved.

NB11-0401 Part 4, SC on PRD The development of a possible fourth part of the NBIC to cover pressure relief devices.

(No Attachment)

July 2012

Mr. Scribner presented a progress report.

NB11-0802 Part 1, 1.4.5 SG on Boilers - Boiler installation report review. A task group of G. Scribner (Chair), B. Moore and M. Richards has been assigned.

(No Attachment)

July 2012

Mr. Scribner reported no progress at this time. The task group has been changed to include D. Patton as (Chair) in place of G. Scribner. M. Wadkinson and S. Konopacki have been assigned.

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)

July 2012

Mr. Richards presented a progress report. The item was letter balloted at the Main Committee level and failed. The SG on FRP is examining the document to satisfy the negative comments.

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). **(Attachments 4, pages 26 – 35)**

This item was sent out for letter ballot and Mr. Patten decided to pull the ballot for more work after several comments were made that he felt needed to be addressed before the item moved forward.

July 2012

Mr. Patten presented the negative feedback he had received. The group revisited with Mr. Pillow on his reasoning behind his negative vote. After taking into consideration Mr. Pillow's opinion and others the group unanimously agreed that there is no conflict and makes a motion to reaffirm. The motion was unanimously approved.

NB12-0302 Part 1, SG V&P 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 (Chair) and M. Richards has been assigned.

(No Attachment)

July 2012

Mr. Scribner presented a progress report. Concentration will be aimed in defining types and then identifying installation requirements.

NB12-0304 Part 1, SG Pressure Vessels and Piping - Installation requirements for carbonated beverage systems. The task group assigned is G. Scribner (Chair), P. Bourgeois, J. Ball, a rep from McDonalds, a rep from Chart Ind., and a rep from the fire service.
(Attachments 5 – 6, pages 36 – 45)

July 2012

Mr. Scribner presented a proposal. He has been working with a task group to come up with installation requirements for carbon dioxide storage vessels utilized mainly in carbonated beverage service. This task group was made up with representatives from the following interest groups, Jurisdictional Authorities, Insurance industry, Manufactures, Distributors, Fire Service, and the NB Test Lab. Considerable research, testing, and in-depth research went into developing this proposal. There is an urgent need to get installation requirements into a nationally recognized standard. Included for approval is a functional description of these systems (new action item NB13-0101). If approved it is to be published in the 2013 NBIC as a new supplement in Part 1. The functional description could also be added in a supplement in Part 2 once that group completes their work at a later date. There was a motion to approve the proposals (action item NB12-0304 and NB13-0101) as modified, and send out as letter ballots at the MC. The motion was approved with 1 negative.

NB12-1301 Part 1, SG on Boilers - Delete the definitions of power boiler and high temperature water boiler from this section. This action item is a result of NB07-1208.
(Attachments 7 – 8, pages 46 – 48)

July 2012

Mr. Moore presented a proposal. After extensive discussions in the SG level and then again in the SC level, the SC made a motion to approve both action items as proposed - NB13-0301, redefine a power boiler and the addition of a definition for boiler / action item NB12-1301, move the existing Definitions 2.2 and 3.2 to 9.1. The motion was unanimously approved.

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

July 2012

Mr. Scribner presented a progress report. Additional detail will be provided at the January 2013 meeting.

NB12-1901 All three parts SC on Inspection This action item was opened as a result of NB11-1501 to address the usage of the words "metal" and "material". The task group of Venus Newton (Chair), Brian Moore and Jim Pillow has been assigned to examine their respective parts.
(No Attachment)

July 2012

Mr. Moore reported no progress. There was a motion to close this item with no action based on feedback from Venus Newton. This action item will remain open on Part 2. The motion was unanimously approved.

8. New Business

- New Action Item NB13-0101: As a result of action item NB12-0304, new action item NB13-0101 was assigned to propose a functional description of these systems. Should NB12-0304 pass the description would be located in the front of the proposed Supplement and Figures would be located to the end of the Supplement.
- New Action Item NB13-0301: As a result of extensive discussions on action item NB12-1301, NB13-0301 was assigned to readdress the definition of a power boiler and add a definition of a boiler.

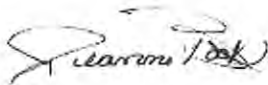
9. Future Meetings

January 14-18, 2013, Mobile, Alabama
July 15-19, 2013, Columbus, Ohio

10. Adjournment

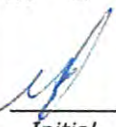
The meeting adjourned at 11:15 am

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Jeanne Bock", with a stylized flourish at the end.

Jeanne Bock
Secretary

Attendance List SC on Installation**Meeting Date: July 17, 2012**

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

Attendance List SC on Installation**Meeting Date: July 17, 2012**

Paul Bourgeois Travelers ~~11441 Sarasota Lane~~ 6812 5th ST Northport, AL 35475 35476 P: 205-339-6314 F: 888-803-1522 E-mail: pcboursge@travelers.com	Attended: Yes ☒ No ☐ <i>PCB</i> Initial	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	Attended: Yes ☒ No ☐ <i>BW</i> Initial
Stanley Konopacki Midwest Generation 235 Remington ~~401 E. Greenwald Ave.~~ Suite A Waukegan, IL 60087 Bohingbrook IL 60440 630 771-7956 60440 P: 847-875-8382 F: 847-599-2252 949 225-7224 E-mail: SKonopacki@MWGen.com	<i>SK</i> Attended: Yes ☒ No ☐ <i>SK</i> Initial	Donald Patten R.F. MacDonald Co. 25920 Eden Landing Road Hayward, CA 94545 P: 510-570-7422 F: 510-784-1004 Email: don.patten@rfmacdonald.com	Attended: Yes ☒ No ☐ <i>D.P.</i> Initial
Melissa Wadkinson Fulton Companies 972 Centerville Rd (visitor) PO Box 257 Polaski NY 13142 ph 315 298 7112 melissa.wadkinson@ Fulton.com		Amy Kovarian McDonald's Corp. 2915 Jorie Blvd. Oak Brook, IL 60523 ph. 630-623-8274 amy.kovarian@us.mcd.com	
Paul Schuelke Weil-McLain 500 Blaine St Michigan City, IN 46360 219-879-6561 EXT 407 pschuelke@weil-mclain.com		<i>Bob WIELGOSZINSKI</i>	<i>RMW</i>

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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
M.S. Thesis: "Microprobe Sampling of Low-Pressure Propylene Flames and Modeling of High-Pressure Methane/Air Flames".

Bachelor of Science in Chemical Engineering, May 1990
University of Virginia, Charlottesville, Virginia
B.S. Thesis: "Corresponding States Correlation for the Volumetric Properties of Compressed Liquid and Liquid Mixtures".

PROFESSIONAL EXPERIENCE

The Fulton Companies, Pulaski New York

1994 – present

Chief Engineer

- Maintain system design integrity for all products by reviewing systems for technical feasibility, code approvals and engineering best practices
- Participate with design review and code approval requirements on all new products
- Provide engineering support for all products: vendor selection, component substitution, product/component approvals and code approval considerations
- Represent Fulton at ASME meetings and committees

Product Manager Thermal Systems, I/C Division

- Responsible for overall product integrity, advertising, development of marketing materials, coordination of trade shows, marketing research
- Specified and coordinated the development of new products and product improvements with the R&D department
- Designed, specified and provided quotations for customized engineered heat transfer systems working with representatives and OEMs to help secure sales and ensure compliance with specifications

Engineering Manager, I/C Division

- Reviewed all pressure vessel designs for compliance with ASME Code
- Provided design review for application of heat transfer products and system integrity

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www.fulton.com



Sales Engineer/Project Engineer/Manufacturing Engineer

- Designed, specified and provided quotations for customized engineered heat transfer systems
- Provided technical training seminars for customers
- Reviewed standard products for code compliance
- Recommended product improvements for quality improvements and cost savings

PUBLICATIONS

Melissa Wadkinson, *"Hot Oil, Cool Solution with Thermal Fluid Heaters,"* Process Heating, May 2012.

Melissa Wadkinson, *"Thermal Fluid Heater Maintenance Plans,"* Process Heating, May 2010.

Melissa Wadkinson, *"Nine Pointers on Thermal Fluid System Design,"* Process Heating, November 2009.

W. C. Pfefferle and M. M. Wadkinson, *"Catalytically Stabilized Thermal Incineration,"* National Science Foundation Final Report, 1994, Contract No ISI-9002844.

W. C. Pfefferle, J. R. Zurlo, M. G. Michaud and J. K. Burns, *"Catalytic Combustor-Based Coal Gasification Combined Cycle Gas Turbine System,"* Department of Energy Final Report, 1993, Contract No. DE-FG05-92ER81340.

M. G. Michaud, P. R. Westmoreland, and A. S. Feitelberg, *"Chemical Mechanisms of NO_x Formation for Gas Turbine Conditions,"* Twenty-fourth Symposium (International) on Combustion, 1992, pp. 879-887.

PROFESSIONAL LICENSES AND AFFILIATIONS

- Professional Engineer, Registered in State of New York (License #089694)
- NFPA 87 Committee on Recommended Practice for Thermal Fluid Heaters
- 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
- American Chemical Society

Change of Service

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RVW

**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 or vice versa

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

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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:

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- 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 of 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.

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 there are other elements that can influence the safe and reliable operation.

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

Change	Some Factors to Consider
LP gas to ammonia	• PWHT of vessel during construction • Wet-fluorescent magnetic particle testing (WFMT) on all internal surfaces • Internal access of vessel is necessary. May need to install manhole.

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Change	Some Factors to Consider
Ammonia to LP gas	- NFPA-58 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	- Requires alterations (additional nozzles). - Corrosion protection - See NFPA 58
LP gas to air receiver	- 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	May require replacement of smaller steam outlet nozzle with larger nozzle to accommodate condensate carryover
Sulfur dioxide service. Sweet to sour gas service.	Concern over hydrogen cracking
Lethal service to non-lethal	Design conditions and suitability for service
DOT railcars or ICC transport tanks to stationary service	- 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.

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ATTACHMENT 2 (PG 5 OF 6)

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NBIC Part 2

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.

NBIC Part 1

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.

NBIC Part 3

Add new paragraph:

1.9 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.

NB08-2101**Part 1, Section 6**
Supplement 3**Installation and Control of Solid Fuel (Wood/Biomass) Fired Boilers****(Draft for Review and Comment 6/29/12)****S3.1 – Scope**

- a) This supplement is intended to provide guidance for the installation and control of boilers which use biomass as a major fuel component. In this context Biomass is intended to mean various types of wood wastes, or wood byproducts. Many of the requirements of the earlier Sections of Part 1 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 control of the fuel handling and distribution systems.
- b) Fuels will vary widely depending upon source, moisture content, particle size and distribution, however once the fuel has been established, good practice dictates that the specification be adhered to as closely as possible in order to minimize handling, combustion and emissions problems.
- c) 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.
- d) The typical biomass fired boiler room will comprise not only the boiler with the normal water treatment and feed systems, blow off systems, condensate return systems, steam or hot water systems, but also 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.

S3.2 – 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.

S3.3 – Determination of Allowable Operating Parameters

- a) In the case of the combustion side of biomass fired boilers the determination of the allowable operating parameters is most often mandated by the local Air Pollution Control Authority. Thus provided that the defined fuel requirements are adhered to consistently, there is little for the inspector to get involved in.
- b) The pressure vessel operating parameters are defined by its design working pressure, rated capacity and safety valve, or relief valve, capacity and thus is no different than boilers fired by more traditional fuels, in terms of inspection requirements.
- c) All areas subject to corrosion and erosion shall be closely reviewed. Appropriate repairs shall be undertaken as necessary.

S3.4 – Boiler Installation Requirements

- a) Power boilers shall be installed in accordance with the requirements of Section 2 of this Standard. Additionally the requirements of paragraphs S3.5 and S3.6, below should be followed.
- b) Steam Heating and Hot Water Heating Boilers shall be installed in accordance with the requirements of Section 3 of this Standard. Additionally the requirements of paragraphs S3.5 and S3.6, below, should be followed.

S3.5 – Fuel System Requirements and Controls

- a) Fuel Transport Systems irrespective of type should address certain requirements, including preserving fuel particle size distribution, the prevention of the possibility of fire and the suppression of fires or explosions.
In a single installation various types of fuel transportation systems may co-exist, as follows:

- 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) Solid Fuel Metering Systems may take a variety of forms depending upon the fuel used and the particle size distribution, as follows:
- 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 flowrate. 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 flowrate.

S3.6 – 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.

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.

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 3, proof that the various air handling fans or blowers are operating properly is 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

While the need for pre-purging the boiler and its venting system is not as critical in solid fuel fired boilers, as it is in boilers firing the more volatile gaseous or liquid fuels, it is still a requirement. Unless defined otherwise by the manufacturer of the fuel burning equipment, the pre-purge can 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, 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.

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**

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.

S3.7 – 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.

S3.8 – 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) In systems in which the emissions control system incorporates a baghouse, appropriate fire detection and suppression systems shall be incorporated and functioning properly.

Definitions

The following definitions are to be added to the Glossary:

Biomass – Fuels which result from biological sources requiring a relatively short time for replenishment: Wood and bagasse are typical examples.

Emissions – The discharge of various Federal or State defined air pollutants into the surrounding atmosphere during a given time period.

Emissions Control System – An arrangement of devices, usually in series, used to capture various air pollutants and thereby reduce the amount of these materials, or gases, being admitted to the surrounding atmosphere, below Federal or State defined standards.

Metering Device – A method of controlling the amount of fuel, or air, flowing into the combustion zone.

Grate – The surface on which fuel is supported and burned and through which air is passed for combustion.

Fluidized Bed – A process in which a bed of granulated particles are maintained in a mobile suspension by an upward flow of air or gas.

Fluidized Bed (Bubbling) – A fluidized bed in which the fluidizing velocity is less than the terminal velocity of individual bed particles where part of the fluidizing gas passes through as bubbles.

Fluidized Bed (Circulating) - A fluidized bed in which the fluidizing velocities exceed the terminal velocity of the individual bed particles.

Suspension Burner – A combustion system in which the fuel is in the form of relatively small particles, Their buoyancy is maintained in the transport airstream and the fuel/air mixture flow stream, until combustion is completed.

Underfire Air – A method of introducing air beneath the grate surface/fuel bed.

Overfire Air – Air admitted to the furnace above the grate surface /fuel bed. Used to complete the combustion of fine particles, in suspension. Also aids in reducing NO_x formation.

Induced Draft Fan – A fan exhausting hot gases from the heat absorbing equipment.

Flyash – Suspended ash particles carried in the flue gas.

Flyash collector – A device designed to remove flyash in the dry form from the flue gas.

Flyash Recycle – The reintroduction of flyash/unburned carbon from the flyash collector into the combustion zone, in order to complete the combustion of unburned fuel, thereby improving efficiency.

Carbons Recycle – See Flyash Recycle

Fuel Transport Fan – A fan which generates airflow capable of moving fuel particles, in suspension, from a metering device to the combustion zone.

NB08-2101 – Explanation of negative vote

1. The definition of "Biomass" is not consistent with the EPA and DOE definitions as used in various regulations including the Area Source Rules under Boiler MACT.
2. Emissions Control System should delete the last phrase after the comma.
Replace "materials, or gases," and replace with "pollutants".
An arrangement of devices, usually in series, used to capture various air pollutants and thereby reduce the amount of these ~~materials, or gases, pollutants~~ being admitted to the surrounding atmosphere, ~~below Federal or State defined standards~~.
3. The definition of "Fluidized Bed" is appropriate to a generic fluidized bed reactor. However, in this document the usage is intended to be boilers firing a fuel. To be more in line with NFPA 85 definition, change "Fluidized Bed" as follows:
A ~~fuel-firing technique~~ process in which a bed of ~~noncombustible~~ granulated particles are ~~mixed with a fuel and~~ maintained in a mobile suspension by an upward flow of air ~~or gas~~.
4. The definition of "Fluidized Bed (Bubbling)" is appropriate to a generic bubbling fluidized bed reactor. To be consistent with the definition of "Fluidized Bed", change "Fluidized Bed (Bubbling)" as follows:
A fluidized bed ~~fuel-firing technique~~ in which the fluidizing ~~air~~ velocity is less than the terminal velocity of individual bed ~~and fuel~~ particles ~~when where part of~~ the fluidizing ~~gas air~~ passes through ~~the bed~~ as bubbles.
5. The definition of "Fluidized Bed (Circulating)" is appropriate to a generic circulating fluidized bed reactor. To be consistent with the definition of "Fluidized Bed" and "Fluidized Bed (Bubbling)", change "Fluidized Bed (Circulating)" as follows:
A fluidized bed ~~fuel-firing technique~~ in which the fluidizing ~~air velocity~~ ~~exceeds velocities exceed~~ the terminal velocity of the individual bed ~~and fuel~~ particles.
6. Correct typo in "Suspension Burner" by deleting the comma after particles and inserting a period.
7. Correct typo in "Overfire Air" by deleting the comma after "fine particles". The incomplete sentence is not appropriate for a definition. Delete "Also aids in reducing NOx formation."

Brian W. Moore, P.E.



Fw: LB NB11-2001
Robin Hough to: Jeanne Bock

07/24/2012 03:59 PM

From: Robin Hough/NationalBoard
To: Jeanne Bock/NationalBoard@NationalBoard

Robin Hough
NBIC Committee Coordinator
The National Board of Boiler and Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, OH 43229
614-888-8320 x 228
614-431-3236 Direct Line

----- Forwarded by Robin Hough/NationalBoard on 07/24/2012 03:59 PM -----

From: Robin Hough/NationalBoard
To: bryan.schulte@nrgenergy.com, chopkins@seattleboiler.com, david.parrish@fmglobal.com, canonicod@epbfi.com., DCook@dir.ca.gov, fhart@furmanite.com, Gary.Scribner@dfs.dps.mo.gov, ggalanes@MWGen.com, HMICHAELRICHARDS.PE@GMAIL.COM, Paul Welch <Paul.Welch@dol.state.ga.us>, banthony@dlt.state.ri.us, jim.riley@conocophillips.com, "Pate, Ralph" <Ralph.Pate@labor.alabama.gov>, jpillow@commonarc.com, jsekely@comcast.net, jwrchar@aol.com, pcbourge@travelers.com, paul.edwards@shawgrp.com, raymond.snyder@ariseinc.com, breetz@state.nd.us, Robert_Wielgoszinski@hsbct.com, RLPulliam@babcock.com, stanleys@dot.gov, Terry Parks/NationalBoard@NationalBoard, mike.webb@xcelenergy.com, Lmac@gLabap.com
Cc: Don.Patten@RFMacDonald.com
Date: 04/16/2012 10:47 AM
Subject: LB NB11-2001

Gentlemen:

The subject letter ballot has now closed. The ballot has passed but due to the concerns of the negative voters the project chair, Don Patten, has decided to withdraw the ballot and take it back to the subcommittee for more work. This item will appear on the agendas for the July meeting.

Thank you,

Robin Hough
NBIC Committee Coordinator
The National Board of Boiler and Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, OH 43229
614-888-8320 x 228
614-431-3236 Direct Line

COMMITTEE CORRESPONDENCE

COMMITTEE: NBIC

TO: NBIC Committee

ADDRESS WRITER CARE OF:

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

FROM: Robin Hough
NBIC Secretary

SUBJECT: Letter Ballot NB11-2001 MC

DATE: March 30, 2012

Committee Members,

Letter ballot NB11-2001 MC has now closed. The ballot was approved. The voting results are:

20	Approved
1	Disapproved
1	Abstained
1	Not Voting
3	Not Returned

Per the NBIC Procedures 7.3.2:

“NBIC Committee or subcommittee members shall be apprised of any unresolved comments and given two (2) weeks from notification to reconsider their original vote.”

The ballot will remain open until April 13, 2012 for your reconsideration.

rmh

Ballot Votes NB11-2001 MC

Name	Email	Votes	Vote Date
<u>Paul Edwards</u>	<u>paul.edwards@shawgrp.com</u>	Abstention	03/26/12
<u>Benjamin Anthony</u>	<u>banthony@dlt.state.ri.us</u>	Approve	03/20/12
<u>Bob Reeltz</u>	<u>breetz@nd.gov</u>	Approve	03/06/12
<u>Bryan Schulte</u>	<u>bryan.schulte@nrgenergy.com</u>	Approve	03/21/12
<u>Dave Parrish</u>	<u>david.parrish@fmglobal.com</u>	Approve	03/01/12
<u>Domenic Canonicod</u>	<u>canonicod@epbf.com</u>	Approve	02/29/12
<u>Don Cook</u>	<u>dcook@hq.dir.ca.gov</u>	Approve	03/01/12
<u>Frank Hart</u>	<u>fhart@furmanite.com</u>	Approve	02/29/12
<u>Gary Scribner</u>	<u>Gary.Scribner@dfs.dps.mo.gov</u>	Approve	03/05/12
<u>George Galanes, PE</u>	<u>ggalanes@mwgen.com</u>	Approve	03/02/12
<u>Jim Riley</u>	<u>jim.riley@conocophillips.com</u>	Approve	03/02/12
<u>Jim Sekely</u>	<u>jssekely@comcast.net</u>	Approve	02/29/12
<u>John Richardson</u>	<u>jwrchar@aol.com</u>	Approve	03/07/12
<u>Lawrence McManamon</u>	<u>lmac@glabap.com</u>	Approve	03/02/12
<u>Michael Richards</u>	<u>hmrichar@southernco.com</u>	Approve	03/02/12
<u>Michael Webb</u>	<u>mike.webb@xcelenergy.com</u>	Approve	03/01/12
<u>Paul Bourgeois</u>	<u>pcbourge@travelers.com</u>	Approve	03/06/12
<u>Paul Welch</u>	<u>paul.welch@dol.state.ga.us</u>	Approve	03/20/12
<u>Raymond Snyder</u>	<u>raymond.snyder@ariseinc.com</u>	Approve	03/01/12
<u>Ronald Pulliam</u>	<u>rloulliam@babcock.com</u>	Approve	03/04/12
<u>Stanley Staniszewski</u>	<u>stanley.staniszewski@dot.gov</u>	Approve	03/21/12
<u>James Pillow</u>	<u>jpillow@commonarc.com</u>	Disapprove	03/21/12
<u>Craig Hopkins</u>	<u>chopkins@seattleboiler.com</u>	Not Voted	N/A
<u>Ralph Pate</u>	<u>ralph.pate@labor.alabama.gov</u>	Not Voted	N/A
<u>Robert Wielgoszinski</u>	<u>Robert_Wielgoszinski@hsbct.com</u>	Not Voted	N/A
<u>Terry Parks</u>	<u>tparks@nationalboard.org</u>	Not Voting	02/29/12

Ballot Comments NB11-2001 MC

Ballot Comments

<u>Name</u>	<u>Document</u>	<u>Comment</u>	<u>Date Created</u>
Donald Patten	<u>NB11-2001</u>	I looked at ASME 2007 edition Addenda 2009 and found nothing stipulating the location of a relief valve for isolable economizers. Please see a copy of the attached from said edition. If anyone can point me in the direction of where I can find this information I would greatly appreciate it.	03/27/2012
Donald Patten	<u>NB11-2001</u>	I responded with a copy of the attached from ASME. I could not find any stipulation for isolable economizers relief valve location. I had asked Mr. Pillows to please provide this information so I could review.	03/27/2012
Donald Patten	<u>NB11-2001</u>	I look at ASME Section 1 2007 Addenda 2009. I could not find any stipulation of relief valve location. See attached copy of PG 67.2.6. If you could point me to the section that designates or stipulates installation location of a relief valve for an isolable economizer I would greatly appreciate it.	03/27/2012
Paul Edwards		I would like to see a response to Mr. Pillow's concern.	03/26/2012
James Pillow		Jpillow 3/21/12 I disapprove because the proposal is an attempt to re-write ASME Section I rules that already address mounting of pressure relief valves. Section I does not allow the mounting of the valves "as recommended by the Manufacturer". Keep in mind that Part 1 of the NBIC does not overrule the Section I rules.	03/21/2012
Donald Patten		Mr. Richardson, I queried Mr. Olson at Victory Energy and below is his comments: Locating the PSV at the outlet without specifying an outlet location does not support an idea that the outlet of an isolated economizer is the strategic location for the PSV. The commenter is correct that, when the economizer is isolated, rarified fluid will immediately begin to collect at the upper areas. Due to the fact that the PSV can be set very close to operating pressures, the time element may not always come into affect. Anyway we look at it, allowing or the PSV location to be determined by the Designer is most beneficial. Regards, David Olson	03/21/2012
John Richardson		I approve this ballot with some hesitation. During normal operation the cooler, more dense fluid if, water or wet steam would be entering the top of the exchanger. The valve is apparently sized for steam but is the slower discharge rate advisable ?? When isolation occurs a sudden transient would follow in which the more rarified fluid would collect at the top. Is it possible that the original requirement to place the PRV at or near the outlet was due to the time element?? How rapid is the pressure rise in the heat	03/07/2012

exchanger?? How long does the heat input continue?? I trust Victory Energy has looked at all the credible scenarios. Perhaps I will have a chance to look at this a bit closer before the ballot closes.

George
Galanes,
PE

This is more of an editorial comment, but I believe it would be better stated below; The safety valve shall be installed in a location either recommended by the manufacturer, or if no recommendation is provided shall be located as close as practical to the economizer outlet.

03/02/2012

Ballot Comments NB11-2001

<u>Name</u>	<u>Document</u>	<u>Comment</u>	<u>Date Created</u>
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George Galanes, PE		This is more of an editorial comment, but I believe it would be better stated below; The safety valve shall be installed in a location either recommended by the manufacturer, or if no recommendation is provided shall be located as close as practical to the economizer outlet.	03/02/2012
<u>Name</u>	<u>Document</u>	<u>Comment</u>	<u>Date Created</u>
Robin Hough		This comment comes from Donald Patten: I was unaware of any conflicts with ASME. When we as the subcommittee voted we all voted for the submitted change. Now that there is a conflict. I agree that this should be sent back to us and I will submit to the ASME on this subject. 04/13/2012	04/13/2012
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Donald Patten		I was unaware of any conflicts with ASME. When we as the subcommittee voted we all voted for the submitted change. Now that there is a conflict. I agree that this should be sent back to us and I will submit to the ASME on this subject.	04/13/2012
Robert Wielgoszinski		I vote negative on this in support of the other negative balloters. First, was this item discussed at the Part 1 Installation subcommittee meeting? If so, what was the result of the deliberation? Was there a vote taken? What was the result of that vote? Secondly, this proposal conflicts with the intent of the ASME Code Section I and inclusion in the NBIC would usurp the completion of ASME Code requirements. If this valve alignment is something that is allowed or common in other international boiler standards, then perhaps the	04/11/2012

		proposal should be revised accordingly.	
Michael Webb		To Jim Pillow's comment: Seemingly the original code of construction may be circumvented. As indicated by the statement of need, there is no intent to deviate from the requirements of ASME Section 1 or Section VIII, Div.I as applicable; but the proposed language as stated does not align the manufacturer to the original code of construction. In my opinion, Mr. Pillow's comment needs to be addressed and the language refined to reflect an alignment to the original code of construction. M. Webb	04/11/2012
George Galanes, PE		GWG 4/11/12; I am changing my vote from approve to disapprove. After further re-consideration and no follow-up response to Mr. Pillow's original comment regarding Section I rules by the PM, I believe the proposed change is unnecessary because the NBIC is not a construction code. There is no need to reference the Manufacturer's recommendation in locating a PRD. The original wording is acceptable and does not conflict with Section I.	04/11/2012
Bob Reetz		I would like to change my vote from approve to disapprove after viewing Mr. James Pillow's comments. We should not be addressing this issue as it is the jurisdiction of Section I and should be handled there. Part I of the NBIC cannot be used to overrule Section I. The request should be handled by Section I. Section I, Figure PG 58.3.1(b), shows the location of a safety valve for an isolable economizer to be the outlet and not the inlet. I am not sure if Donald Patten has viewed this section.	04/02/2012
Donald Patten	<u>NB11-2001</u>	I looked at ASME 2007 edition Addenda 2009 and found nothing stipulating the location of a relief valve for isolable economizers. Please see a copy of the attached from said edition. If anyone can point me in the direction of where I can find this information I would greatly appreciate it.	03/27/2012
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Donald Patten	<u>NB11-2001</u>	I look at ASME Section 1 2007 Addenda 2009. I could not find any stipulation of relief valve location. See attached copy of PG 67.2.6. If you could point me to the section that designates or stipulates installation location of a relief valve for an Isolable economizer I would greatly appreciate it.	03

Don Patten Comment

Copy from ASME Section I – 2007 Edition Addenda 2009

PG-67.2.6 Any economizer that may be shut off from the boiler, thereby permitting the economizer to become a fired pressure vessel, shall have one or more pressure relief valves with a total discharge capacity, in lb /hr (kg/hr), calculated from the maximum expected heat absorption in Btu/hr (W), as determined by the Manufacturer, divided by 1,000 (646). This absorption shall be stated in the stamping (PG-106.4). For overpressure conditions where the fluid relieved is water, the discharge capacity of the pressure relief valve, or valves shall be sufficient to prevent the pressure from exceeding the limits of PG-67.2.

NB 11-2001 Part 1, 2.9.4 SG Pressure Vessels and Piping - Address the safe venting isolatable economizers where the outlet is below the inlet of other communicable chambers (Headers, drums, etc.)

Current Language:

2.9.4 ECONOMIZERS

An economizer that may not be isolated from a boiler does not require a safety relief valve. Economizers that may be isolated from a boiler or other heat transfer device, allowing the economizer to become a fired pressure vessel, shall have a minimum of one safety relief valve. Discharge capacity, rated in lbs/hr (kg/hr), of the safety relief valve or valves shall be calculated from the maximum expected heat absorption rate in Btu/hr (Joules/hr) of the economizer, and will be determined from manufacturer data, divided by 1000. The safety relief valve shall be located as close as possible to the economizer outlet.

Proposed Language:

2.9.4 ECONOMIZERS

An economizer that may not be isolated from a boiler does not require a safety relief valve. Economizers that may be isolated from a boiler or other heat transfer device, allowing the economizer to become a fired pressure vessel, shall have a minimum of one safety relief valve. Discharge capacity, rated in lbs/hr (kg/hr), of the safety relief valve or valves shall be calculated from the maximum expected heat absorption rate in Btu/hr (Joules/hr) of the economizer, and will be determined from manufacturer data, divided by 1000. The safety relief valve shall be installed in a location recommended by the manufacturer. when no recommendation exists the location shall be as close as practical possible to the economizer outlet.

Statement of Need

Victory Energy intends to design isolatable economizers, in accordance with ASME Section I and VIII Div1, and have the PSV located on the uppermost chamber instead of the Outlet connection. ASME requirements for PSVs ensure that the PSV is large enough to vent the energy in the form of steam. The same size PSV venting hot water potentially releases many more times the energy as venting steam. The amount of energy released in a given time is often excessive for vent piping, condensate tanks, and drains to handle. It is preferred to vent the energy as steam, over a longer period of time. Rapid draining of the economizer also allows the economizer to rapidly increase in temperature, causing undue stress. Furthermore, this request should serve to more closely align this part of the code with the ASME codes.

Background Information

An example would be a vertical counterflow economizer where the inlet header is located above the outlet (as in Figure 1). If the designer can specify where the PSV be located then the PSV may be placed such that the release of energy, via steam, happens more slowly through the same size PSV.

Figure 1 illustrates a counter-flow economizer, in a vertical up gas path, having horizontal headers, with the outlet header below the inlet. When this type of economizer is isolated during operation, and the PSV is tripped, steam will begin to collect in the upper "inlet" header. This design allows a more controlled venting of isolatable economizers by venting steam instead of hot water. Figure 1 also illustrates moving the safety relief valve from the outlet to the preferred location.

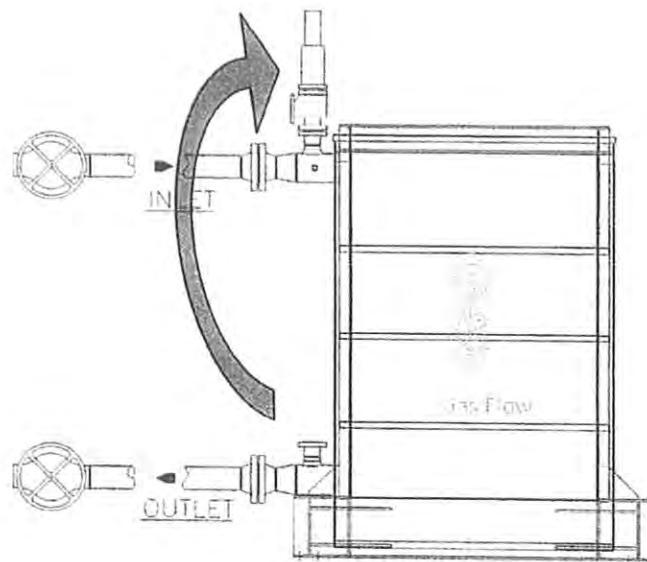


Figure 1

David Olson

QCM

Victory Energy Operations, LLC

918-340-9942

NB12-0304**NBIC Part 1****SUPPLEMENT 3****INSTALLATION OF LIQUID CARBON DIOXIDE STORAGE VESSELS****S3.1 SCOPE**

This section provides requirements for the installation of Liquid Carbon Dioxide Storage Vessels (LCDSV's), fill boxes, fill lines and pressure relief discharge/vent circuits used for carbonated beverage systems, swimming pool PH control systems and other fill in place systems storing 1,000lbs or less of liquid CO₂.

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.

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

- 1) LCDSV's shall not be located within 10 feet of elevators, unprotected platform ledges or other areas where falling would result in dropping distances exceeding half the container height.
- 2) LCDSV's shall be installed with sufficient clearance for filling, operation, maintenance, inspection and replacement.
- 3) Orientation of nozzles and attachments shall be such that sufficient clearance between the nozzles, attachments, and the surrounding structures is maintained during the installation, the attachment of associated piping, and operation.
- 4) LCDSV's shall not be installed on roofs.
- 5) LCDSV's shall be safely supported. Vessel supports, foundations and settings shall be in accordance with jurisdictional requirements, manufacturer recommendations and/or other industry standards as applicable. The weight of the vessel when full of liquid carbon dioxide shall be considered when designing vessel supports. Design of supports, foundations, and settings shall consider vibration (including seismic and wind loads where necessary), movement (including thermal movement), and loadings. Vessel foundations or floors in multistory buildings must be capable of supporting the full system weight and in accordance with building codes.
- 6) LCDSV's shall not be installed within 36 in. (914 mm) of electrical panels.

- 7) LCDSV's installed outdoors in areas in the vicinity of vehicular traffic shall be guarded to prevent accidental impact by vehicles. The guards or bollards shall be installed in accordance with local building codes or to a national recognized standard when no local building code exists.
- 8) LCDSV's shall be equipped with isolation valves in accordance with paragraph S3.6.

S3.2 b) Unenclosed area LCDSV installations.

If LCDSV's are installed outdoors and exposed to the elements, appropriate additional protection may be provided as necessary based on the general weather conditions and temperatures that the tank may be exposed to. Some possible issues include:

- a. Exposure to high solar heating loads will increase the net evaporation rate and will decrease hold times in low CO₂ usage applications. The vessel may be covered or shade provided to help reduce the solar load and increase the time needed to reach the relief valve setting in low use applications.
- b. If supply line is not UV resistant then supply line should be protected via conduit or appropriate covering.

S3.2 c) Enclosed area LCDSV Installations

- 1) Permanent LCDSV installations with remote fill connections.
 - a. Shall be equipped with a gas detection system installed in accordance with paragraph S3.4
 - b. Shall have signage posted in accordance with paragraph S3.5
 - c. Shall be equipped with fill boxes; fill lines and safety relief/vent valve circuits installed in accordance with paragraph S3.6
- 2) Portable LCDSV installations with no permanent remote fill connection. Warning: LCDSV's shall not be filled indoors or in enclosed areas under any circumstances. Tanks must always be moved to the outside to an unenclosed, free airflow area for filling.
 - a. Shall be equipped with a gas detection system installed in accordance with paragraph S3.4
 - b. Shall have signage posted in accordance with paragraph S3.5
 - c. Shall have safety relieve/vent valve circuit connected at all times except when the tank is being removed for filling. Connects may be fitted with quick disconnect fitting meeting the requirements of paragraph S3.6
 - d. Shall be provided with a pathway that provides a smooth rolling surface to the outdoor, unenclosed fill area. There shall not be any stairs or other than minimal inclines in the pathway.

S3.3 FILL BOX LOCATION / SAFETY RELIEF/VENT VALVE CIRCUIT TERMINATION

Fill boxes and/or vent valve terminations shall be installed above grade, outdoors in an unenclosed, free airflow area. The fill connection shall be located so not to impede means of egress or the operation of sidewalk cellar entrance doors, including during the delivery process and shall be:

- a) At least three (3) feet from any door or operable windows.
- b) At least three (3) feet above grade.
- c) Shall not be located within ten (10) feet from side to side at the same level or below, from any air intakes.
- d) Shall not be located within ten (10) feet from stair wells that go below grade.

S3.4 GAS DETECTION SYSTEMS

Rooms or areas where carbon dioxide storage vessel(s) are located indoors or in enclosed or below grade outdoor locations shall be provided with a gas detection and alarm system for general area monitoring that is capable of detecting and notifying building occupants of a CO₂ gas release. Alarms will be designed to activate a low level pre-alarm at 1.5% concentration of CO₂ and a full high alarm at 3% concentration of CO₂ (which is the OSHA & ACGIH 15 minute and NIOSH 10 minute Short Term Exposure Limit for CO₂.) These systems are not designed for employee personal exposure monitoring. Gas detection systems shall be installed and tested in accordance with manufactures installation instructions and the following requirements;

- a) Activation of the gas detection system shall activate an audible alarm within the room or area in which the carbon dioxide storage vessel is located.
- b) Audible alarms shall also be placed at the entrance(s) to the room or area where the carbon dioxide storage vessel and/ or fill box is located to notify anyone who might try to enter the area of a potential problem.

S3.5 SIGNAGE

Warning signs shall be posted at the entrance to the building, room, enclosure, or enclosed area where the container is located. The warning sign shall be at least 8 in (200mm) wide and 6 in (150mm) high. The wording shall be concise and easy to read and the upper portion of the sign must be orange as shown in figure S3.5. The size of the lettering must be as large as possible for the intended viewing distance and in accordance with jurisdictional requirements. When no jurisdictional requirements exist, the minimum letter height shall be in accordance with NEMA American National Standard for Environmental and Facility Safety Signs (ANSI Z535.2). The warning signs shall state the following:

“WARNING – CARBON DIOXIDE GAS. Ventilate the area before entering. A high carbon dioxide (CO₂) gas concentration in this area can cause suffocation.”

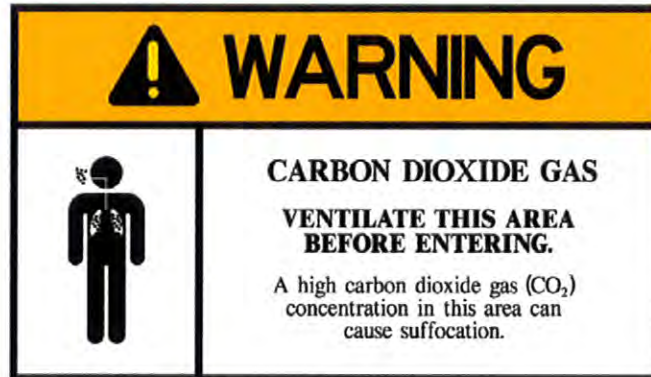


Figure S3.5

- a) Additional instruction signage shall be posted outside of the area where the container is located and such signage shall contain at minimum the following information;

Carbon Dioxide Monitors for general area monitoring (not employee personal exposure monitoring) are provided in this area. These monitors are set to alarm at 15,000ppm (1.5% concentration) for the low level alarm and at 30,000ppm (3% concentration) for high level alarm.

Low Level Alarm (15,000ppm) – Provide appropriate cross ventilation to the area. Personnel may enter area for short periods of time (not to exceed 15 minutes at a time) in order to identify and repair potential leaks.

High Level Alarm (30,000ppm) – Personnel should evacuate the area and nobody should enter the affected area without proper self contained breathing apparatus until the area is adequately ventilated and the concentration of CO₂ is reduced below the high alarm limit.

S3.6 VALVES, PIPING, TUBING AND FITTINGS

Materials - Materials selected for valves, piping, tubing, hoses and fittings used in the LCDSV system shall meet following requirements:

- Components must be compatible for use with CO₂ in the phase, (gas, or liquid) it encounters in the system.
- Components shall be rated for the operational temperatures and pressures encountered in the applicable circuit of the system.
- Shall be stainless steel, copper, brass, or plastic/polymer materials rated for CO₂.

- d) Only fittings and connections recommended by the manufacturer shall be used for all hoses, tubes, and piping.
- e) All valves and fittings used on the LCDSV shall be rated for the maximum allowable working pressure stamped on the tank.
- f) All piping, hoses and tubing used in the LCDSV system shall be rated for the working pressure of the applicable circuit in the system and have a burst pressure rating of at least four times the maximum allowable working pressure of the piping, hose or tubing.

Relief Valves – Each LCDSV shall have at least one ASME stamped relief valve at or below the MAWP of the tank. The relief valve shall be suitable for the temperatures and flows experienced during relief valve operation. The minimum relief valve capacity shall be designated by the manufacturer. Additional relief valves that do not require ASME stamps may be added per CGA S-1.3 recommendations. Discharge lines from the relief valves shall be sized in accordance with tables S3.6a & S3.6b. Note: due to the design of the LCDSV the discharge line may be smaller in diameter than the relief valve outlet size.

Caution: Company's and or individuals filling or refilling LCDSV's shall be responsible for utilizing fill equipment that is acceptable to the manufacture to prevent over pressurization of the vessel.

Question - What is the ANSI number for CGA S-1.3?

Isolation Valves - Each LCDSV shall have an isolation valve installed on the fill line and tank discharge, or gas supply line in accordance with the following requirements:

- a) Isolation valves shall be located on the tank or at an accessible point as near to the storage tank as possible.
- b) All valves shall be designed or marked to indicate clearly whether it is open or closed.
- c) All valves shall be capable of being locked or tagged in the closed position for servicing.
- d) Gas Supply and Liquid CO₂ Fill Valves shall be clearly marked for easy identification.

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 PRD to outside vent line discharge fitting, without any splices. 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.

Tank Size (Pounds)	Fire Flow Rate Requirements (Pounds per Minute)	Maximum length of 3/8" ID Nominal Metallic Tube Allowed	Maximum length of 1/2" Metallic Tube Allowed
Less than 500	2.60 maximum	80'	100'
500-750	3.85 maximum	55'	100'
Over 750 to 1000	5.51 maximum	18'	100'

Table S3.6a Minimum LCDSV System Safety Relief/Vent Line Requirements (Metallic)

Tank Size (Pounds)	Fire Flow Rate Requirements (Pounds per Minute)	Maximum length of 3/8 ID plastic/polymer materials Tube Allowed	Maximum length of 1/2 ID plastic/polymer materials Tube Allowed
Less than 500	2.60 maximum	100'	100'
500-750	3.85 maximum	100'	100'
Over 750 to 1000	5.51 maximum	N/A (See 1/2" column)	100'

Table S3.6b Minimum LCDSV System Safety Relief/Vent Line Requirements (plastic/polymer)

NB13-0101

➤ **Note:** Place the System Description at the beginning of S3

4.6.1 System Description

The Liquid Carbon Dioxide Beverage systems include the Liquid Carbon Dioxide Storage Vessel -or LCDSV (tank) and associated sub-system circuits - Liquid CO₂ fill circuit, and Pressure relief / vent line circuit. The LCDSV s are vacuum insulated pressure vessels, constructed of stainless steel, with Super Insulation wrapping between the inner pressure vessel and the outer vacuum jacket. (See Figure) These Pressure vessels are typically designed for a Maximum Allowable Working Pressure (MAWP) of either 300 psig or 283 psig. The LCDSV come equipped with a ASME/NB certified "UV" Primary Relief Valve (PRV) set at or below the MAWP of the vessel. Additionally as recommended by CGA S-1.3, (PRESSURE RELIEF DEVICE STANDARDS PART 3 - STATIONARY STORAGE CONTAINERS FOR COMPRESSED GASES) a secondary relief valve may be installed. This secondary relief valve is beyond the scope of ASME Section VIII, Division 1 and is not required to be ASME/NB stamped and certified. This additional PRV is typically rated no higher than 1.5 times the vessel MAWP.

Operating conditions of the system can cause temperatures and pressures to range from 90 psig (-56° F) to 300 psig (+2°F). Below 60 psig in the tank, liquid CO₂ begins changing to solid phase (dry ice). If the tank becomes completely depressurized to 0 psig, temperatures inside the tank could reach -109°F (solid dry ice). When liquid CO₂ turns to solid dry ice in a completely depressurized tank, all CO₂ gas flow in the system ceases and the tank becomes non-functional. See the attached CO₂ Phase Diagram figure 4.6.xxx, showing the typical operating range of these systems. Components external to the LCDSV inner tank pressure vessel may encounter temperatures and pressures between 90 psig, (-56°F) and 300 psig (+2°F). Typical operating pressures and temperatures vary in each of the associated sub-system circuits. See Table 4.6.xxx

➤ **Note: Place the Figures at the end of S3**

Figure 4.6.xxx Carbon Dioxide Phase Diagram

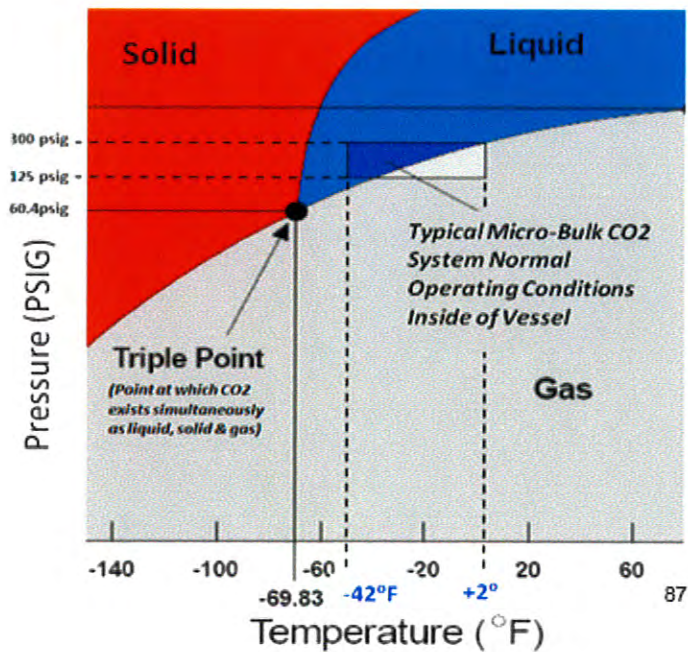
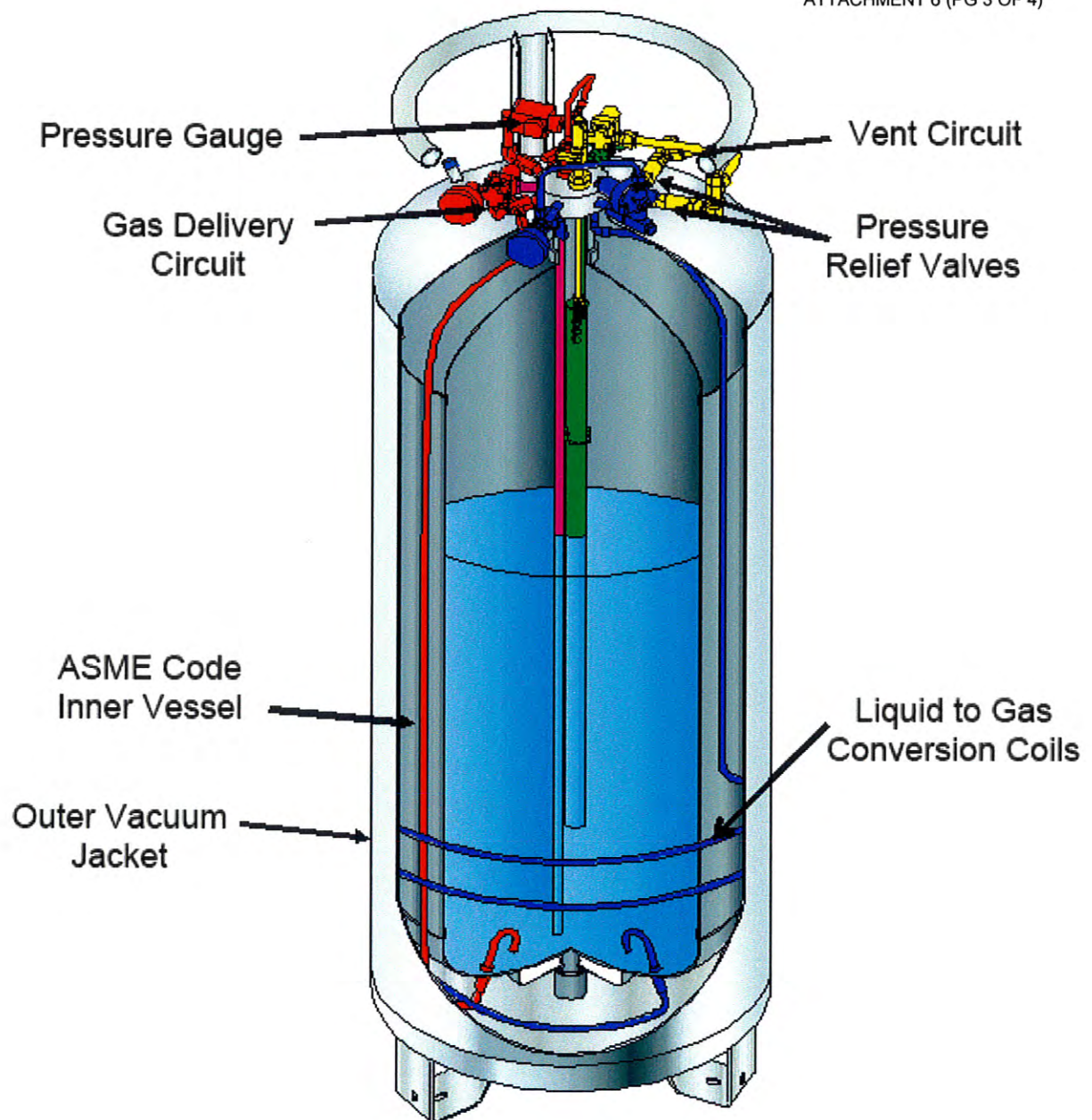


Table 4.6.xxx Typical Operating Pressures & Temperatures of the LCDSV System

System Component	Operating Pressure	Operating Temperature
Storage Vessel (tank internal conditions)	90 - 300 psig	-56°F to +2° F
Liquid CO ₂ Fill Line	150 - 300 psig	-34°F to +2° F
Pressure Relief Gas Vent Line	0 - 120 psig	ambient to -50° F



NB13-0101 – Explanation of negative vote

1. The phase diagram included as part of the proposal is not consistent with publically available data. For example, the published triple point is -56.6°C (-69.88°F) at 5.11 atmospheres (60.417 psig) (1 atm = 14.7 psia). Four significant figures of precision requires the change.

Alternative: If the figure is changed to -70.0°F (three significant figures consistent with 60.4), I would withdrawn my negative.

2. The figure shows an intersection at 125 psig and -42°F with no corresponding explanation in the text.

Suggested solution: delete the axis labels and intersection lines or provide and explanation in the text.

1. The second paragraph of the System Description confusing as written. I suggest the following revision:

Operating conditions ~~of in~~ the system, components, and inner pressure vessel can vary between ~~cause temperatures and pressures to range from~~ 90 psig (-56°F) ~~to and~~ 300 psig ($+2^{\circ}\text{F}$). Below about 60 psig in the tank, liquid CO₂ begins changing to solid phase (dry ice). If the tank becomes completely depressurized to 0 psig, temperatures inside the tank could reach -109°F (solid dry ice). When liquid CO₂ turns to solid dry ice in a completely depressurized tank, all CO₂ gas flow in the system ceases and the tank becomes non-functional. See the attached CO₂ Phase Diagram ~~figure~~ Figure 4.6.xxxS3.2xxx, showing the typical operating range of these systems. ~~Components external to the LCDSV inner tank pressure vessel may encounter temperatures and pressures between 90 psig, (-56°F) and 300 psig ($+2^{\circ}\text{F}$).~~ Typical operating pressures and temperatures vary in each of the associated sub-system circuits. See Table ~~4.6.xxx~~ S3.2xxx.

Brian W. Moore, P.E.

**New Action Item assigned:
NB12-1301**

~~NB07-1208~~ Part 1 Glossary

NBIC Part 1 – Installation

Existing Text	Proposed Text Changes
2.2 DEFINITIONS A power boiler is a closed vessel in which water or other liquid is heated, steam or vapor generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of energy from the combustion of fuels or from electricity or solar energy. The term boiler includes fired units for vaporizing liquids other than water but does not include fired process heaters and systems. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with such apparatus or the closed vessel. a) Power Boiler — a boiler in which steam or other vapor is generated at a pressure in excess of 15 psig (100 kPa) for use external to itself. b) High-Temperature Water Boiler — a boiler in which water is heated and operates at a pressure in excess of 160 psig (1.1 MPa) and/or temperature in excess of 250°F (121°C).	2.2 DEFINITIONS ~~A power boiler is a closed vessel in which water or other liquid is heated, steam or vapor generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of energy from the combustion of fuels or from electricity or solar energy. The term boiler includes fired units for vaporizing liquids other than water but does not include fired process heaters and systems. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with such apparatus or the closed vessel.~~ ~~a) Power Boiler — a boiler in which steam or other vapor is generated at a pressure in excess of 15 psig (100 kPa) for use external to itself.~~ ~~b) High-Temperature Water Boiler — a boiler in which water is heated and operates at a pressure in excess of 160 psig (1.1 MPa) and/or temperature in excess of 250°F (121°C).~~ <u>See the Glossary in Section 9.</u>
3.2 DEFINITIONS 3.2.1 STEAM HEATING BOILERS Steam heating boilers are steam boilers installed to operate at pressures not exceeding 15 psig (100 kPa). 3.2.2 HOT-WATER HEATING AND HOT-WATER SUPPLY BOILERS Hot-water heating and hot-water supply boilers are hot water boilers installed to operate at pressures not exceeding 160 psig (1100 kPa) and/or temperatures not exceeding 250°F (121°C), at or near the boiler outlet. 3.2.3 POTABLE WATER HEATERS Water heaters are exempted from NBIC Part 1, Section 3 when none of the following limitations are exceeded: a) Heat input of 200,000 Btu/hr (59 kW); b) Water temperature of 210°F (99°C); and c) Nominal water containing capacity of 120 gal. (454 l), except that they shall be equipped with safety devices in accordance with the requirements of NBIC Part 1, 3.9.4.	3.2 DEFINITIONS 3.2.1 STEAM HEATING BOILERS ~~Steam heating boilers are steam boilers installed to operate at pressures not exceeding 15 psig (100 kPa).~~ 3.2.2 HOT-WATER HEATING AND HOT-WATER SUPPLY BOILERS ~~Hot-water heating and hot-water supply boilers are hot water boilers installed to operate at pressures not exceeding 160 psig (1100 kPa) and/or temperatures not exceeding 250°F (121°C), at or near the boiler outlet.~~ 3.2.3 POTABLE WATER HEATERS ~~Water heaters are exempted from NBIC Part 1, Section 3 when none of the following limitations are exceeded:~~ ~~a) Heat input of 200,000 Btu/hr (59 kW);~~ ~~b) Water temperature of 210°F (99°C); and~~ ~~c) Nominal water containing capacity of 120 gal. (454 l), except that they shall be equipped with safety devices in accordance with the requirements of NBIC Part 1, 3.9.4.~~ <u>See the Glossary in Section 9.</u>

Submitted by Brian W Moore

January 17, 2012

	9.1 DEFINITIONS <u>Boiler — A boiler is a closed vessel in which water or other liquid is heated, steam or vapor generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of energy from the combustion of fuels or from electricity or solar energy. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with such apparatus or the closed vessel.</u> a) <u>Power Boiler — a boiler in which steam or other vapor is generated at a pressure in excess of 15 psig (100 kPa) for use external to itself. The term power boiler includes fired units for vaporizing liquids other than water, but does not include fired process heaters and systems.</u> b) <u>High-Temperature Water Boiler — a power boiler in which water is heated and operates at a pressure in excess of 160 psig (1.1 MPa) and/or temperature in excess of 250°F (121°C).</u> c) <u>Steam Heating Boiler — a boiler installed to generate steam to operate at pressures not exceeding 15 psig (100 kPa).</u> d) <u>Hot-Water Heating Boiler — a Hot-Water Heating Boiler is a boiler installed to generate hot water at pressures not exceeding 160 psig (1100 kPa) and/or temperatures not exceeding 250°F (121°C), at or near the boiler outlet.</u> e) <u>Hot-Water Supply Boiler — A Hot-Water Supply Boiler is a boiler installed to generate hot water at pressures not exceeding 160 psig (1100 kPa) and/or temperatures not exceeding 250°F (121°C), at or near the boiler outlet.</u> <u>Pressure Vessel — A pressure vessel is a container other than a boiler or piping used for the containment of pressure.</u>
4.2 DEFINITIONS Pressure vessels are containers other than boilers or piping used for the containment of pressure.	4.2 DEFINITIONS ~~Pressure vessels are containers other than boilers or piping used for the containment of pressure.~~ <u>See the Glossary in Section 9.</u>
RATIONALE: These definitions have remained in the body of the text since reformatting of the NBIC to include Section 9 – Glossary. Moving definitions to the glossary is consistent with the overall approach to have definitions located in one place. Each definition has been slightly rearranged for readability and consistency. If these changes are accepted, then the glossaries in Part 2 and Part 3 will also have to be changed.	

NB13-0301 Part 1

NBIC Part 1 – Installation

EXPLANATION:

The current definition of "power boiler" in NBIC Part 1 is confusing because the term is defined twice: once in a complete paragraph and once in a subparagraph. The first paragraph is actually a common definition used for "boiler".

The NBIC currently does not have a definition for the term "boiler". It should also be noted that the ASME does not currently define the term "boiler". Although most jurisdictions have their own definition of "boiler" in statute or regulation, it is felt that the NBIC needs to add a definition for completeness.

The intent of this proposal is to merge all elements of the current term "power boiler" into a single definition and to add a new definition for "boiler" for inclusion into Section 9 Glossary for all books of the NBIC.

Proposal**Existing Text****2.2 DEFINITIONS**

A power boiler is a closed vessel in which water or other liquid is heated, steam or vapor generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of energy from the combustion of fuels or from electricity or solar energy. The term boiler includes fired units for vaporizing liquids other than water but does not include fired process heaters and systems. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with such apparatus or the closed vessel.

a) Power Boiler — a boiler in which steam or other vapor is generated at a pressure in excess of 15 psig (100 kPa) for use external to itself.

b) High-Temperature Water Boiler — a boiler in which water is heated and operates at a pressure in excess of 160 psig (1.1 MPa) and/or temperature in excess of 250°F (121°C).

Repeated for clarity:

A power boiler is a closed vessel in which water or other liquid is heated, steam or vapor generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of energy from the combustion of fuels or from electricity or solar energy. The term boiler includes fired units for vaporizing liquids other than water but does not include fired process heaters and systems. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with such apparatus or the closed vessel.

Proposed Text Changes

Power Boiler — a boiler in which steam or other vapor is generated at a pressure in excess of 15 psig (100 kPa) for use external to itself. The term power boiler includes fired units for vaporizing liquids other than water, but does not include fired process heaters and systems. (See also High-Temperature Water Boiler).

High-Temperature Water Boiler — a power boiler in which water is heated and operates at a pressure in excess of 160 psig (1.1 MPa) and/or temperature in excess of 250°F (121°C).

Boiler — A boiler is a closed vessel in which water or other liquid is heated, steam or vapor generated, steam or vapor is superheated, or any combination thereof, under pressure for use external to itself, by the direct application of energy from the combustion of fuels or from electricity or solar energy. The term boiler also shall include the apparatus used to generate heat and all controls and safety devices associated with such apparatus or the closed vessel.