Date Distributed:

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

SUBGROUP ON BOILERS

Minutes

Meeting of July 17, 2012
Columbus, OH

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 – 8:00 a.m.**

   Chairman, Mr. Craig Hopkins called the meeting to order at 8:05 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 January17, 2012**

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

5. **Review of the Roster**
   (Attachment 1, page 5)

   - Remove Paul Welch - he has retired. There was a motion to approve the roster as published with the noted correction. The motion was unanimously approved.

6. **Action Items**
(Attachments 2 – 4, pages 7 – 18)

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, H. Tyndall, R. Snyder, G. Scribner and B. Moore has been assigned.
(Attachment 2, pages 7 – 15)

July 2012
Mr. Halley presented a progress report with an updated handout. There was a motion to approve the Definitions section of this document, while next working to complete a functional description, then requirements for installation and inspection. The motion was approved with 1 negative.

NB11-0802 ***Part1, 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.

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.
(Attachment 3, pages 16 – 17)

July 2012
After extensive discussion by the SG, there was a motion to table this action item NB12-1301 (movement of existing 2.2 and 3.2 definitions to 9.1) and open a new action item NB13-0301, to readdress the definition of a power boiler and add a definition of a boiler. Brian Moore will re-work the proposal and present to the group. The group will re-visit both items upon the adjournment of the SG - Pressure Vessel and Piping meeting.

There was a motion to approve new action item NB13-0301, readdressing the definition of a power boiler and adding a definition for a boiler with the understanding that the SC could send this back to the SG for more work. The motion was unanimously approved. There was a motion to take off the table and approve action item NB12-1301, moving 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.

7. **New Business**
(Attachment 4, page 18)

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.

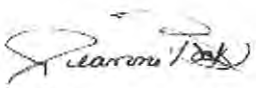
8. **Future Meetings**

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

9. **Adjournment**

The meeting recessed at 12:00 and reconvened at 3:10 p.m.
The meeting adjourned at 3:32 p.m.

Respectfully Submitted,



Jeanne Bock
Secretary

Attendance List Boiler Subgroup

Meeting Date: July 17, 2012

Craig Hopkins Seattle Boiler Works 500 South Myrtle Street Seattle, WA 98108 Ph: 206-762-0737 Fax: 206-762-3516 Email: chopkins@seattleboiler.com	Attended: Yes ☒ No ☐ Initial	**Geoffrey Halley** ABMA 1315 Ridge Road Wildwood, MO 63021 Ph: 636-394-3483 Fax: 636-527-2839 Email: ghalleysji@aol.com	Attended: Yes ☒ No ☐ Initial
Paul Bourgeois Traveler's 6812 5th. Street Northport, AL 35476 Ph:205-339-6314 Fax: 888-803-1522 Email: pcbourge@travelers.com	Attended: Yes ☒ No ☐ Initial	**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 ☐ Initial
Brian Moore Hartford Steam Boiler One State Street P.O. Box 5024 Hartford, CT 06102 Ph: 860-722-5657 Fax: 860-722-5530 Email: brian_moore@hsb.com	Attended: Yes ☒ No ☐ Initial	**Jeanne Bock** National Board 1055 Crupper Ave. Columbus, OH 43229 P: 614-888-8320 F: 614-847-1828 Email: jbock@nationalboard.org	Attended: Yes ☒ No ☐ Initial
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 ☐ Initial	**Stanley Konopacki** Midwest Generation 235 Remington Blvd. Suite A Bolingbrook, IL 60440 Ph: 630-771-7596 Fax: 847-599-2256 Email: SKonopacki@MWGen.com	Attended: Yes ☒ No ☐ Initial

Attendance List Boiler Subgroup

Meeting Date: **July 17, 2012**

Raymond Snyder Arise 150 Costa Loop Auburndale, FL 33823 Ph:865-965-4417 Cell: 732-778-6024 Fax: 865-967-0185 E-mail: Raymond.snyder@ariseinc.com	Attended: Yes ☒ No ☐ *Initial*	**Donald Patten** R.F. MacDonald Co. 25920 Eden Landing Road Hayward, CA 94545 P: 510-670-7422 F: 510-784-1004 Email: don.patten@rfmacdonald.com	Attended: Yes ☑ No ☐ Initial
Name: H. Michael Richards Company: Southern Co. Address: 42 Inverness Ctr. City/State/Zip: Birm AL 35242 Ph: 205/992-7111 Ext. Fax: E-mail: HMRICHAR@SOUTHERNCO.COM		Name: Company: Address: City/State/Zip: Ph: Ext. Fax: E-mail:	
Name: Melissa Wadkinson (visitor) Company: Fulton Address: PO Box 257 977 Centerville Rd City/State/Zip: Pulaski NY 13142 Ph: 315 298 7112 Ext. Fax: 315 298 6390 E-mail: melissa.wadkinson@fulton.com		Name: Company: Address: City/State/Zip: Ph: Ext. Fax: E-mail:	
Name: Paul Schuelke (visitor) Company: Weil-McLain Address: 500 Blaine St City/State/Zip: Michigan City IN Ph: 219-879-6561 Ext. 407 Fax: 219-877-0535 E-mail: pschuelke@weil-mclain.com		Name: Company: Address: City/State/Zip: Ph: Ext. Fax: E-mail:	

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, it 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) though 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 NOx 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 techique 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.

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).~~ See the Glossary in Section 9.
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.~~ See the Glossary in Section 9.

Submitted by Brian W Moore January 17, 2012

	9.1 DEFINITIONS **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. 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. The term power boiler includes fired units for vaporizing liquids other than water, but does not include fired process heaters and systems. b) 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). c) Steam Heating Boiler — a boiler installed to generate steam to operate at pressures not exceeding 15 psig (100 kPa). d) 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. e) 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. **Pressure Vessel** — A pressure vessel is a container other than a boiler 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.	4.2 DEFINITIONS ~~Pressure vessels are containers other than boilers or piping used for the containment of pressure.~~ See the Glossary in Section 9.
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.	

Submitted by Brian W Moore

January 17, 2012

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	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). 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.	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.

Submitted by Brian W Moore January 17, 2012