Attachment 2

NB08-0320

Secretary, NBIC Committee
The National Board of Boiler and
Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, OH 43229

The following addition to the NBIC is proposed;

Add requirements to change the service of pressure vessels in Part 1, Installation, Part 2, Inspection, and Part 3 Repairs and Alterations.

Statement of Need

The Federal Railroad Administration has a proposal out on railcars carrying Poison Inhalation Hazard (PIH) that will require a number of existing tank cars to be retired early. There is a potential that some of these tanks will be recycled into stationary tanks for service other then what they were design for.

Additionally, this practice already occurs in some industries without any consideration for any damage mechanisms that made have been present in the initial service. The NBIC does not currently address these types of events.

Background Information

Part 1 – 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.

NB08-0321

Secretary, NBIC Committee
The National Board of Boiler and
Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, OH 43229

The following addition to the NBIC is proposed;

Add requirements to change the service of pressure vessels in Part 1, Installation, Part 2, Inspection, and Part 3 Repairs and Alterations.

Statement of Need

The Federal Railroad Administration has a proposal out on railcars carrying Poison Inhalation Hazard (PIH) that will require a number of existing tank cars to be retired early. There is a potential that some of these tanks will be recycled into stationary tanks for service other then what they were design for.

Additionally, this practice already occurs in some industries without any consideration for any damage mechanisms that made have been present in the initial service. The NBIC does not currently address these types of events.

Background Information

Part 2 – Add in Paragraph 1.5 Inspection Activities verbiage to address change of service for a pressure vessel. These requirements should caution inspectors, owners, and jurisdictional authorities of the inherent dangers involved when changing service. A new supplement or new Subject under 2.3.6, Description and Concerns of Specific Types of Pressure Vessels, should be added to address the specific requirements for inspection of pressure vessels that have been converted from one service to another.

2/K

NB08-0322

Secretary, NBIC Committee
The National Board of Boiler and
Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, OH 43229

The following addition to the NBIC is proposed;

Add requirements to change the service of pressure vessels in Part 1, Installation, Part 2, Inspection, and Part 3 Repairs and Alterations.

Statement of Need

The Federal Railroad Administration has a proposal out on railcars carrying Poison Inhalation Hazard (PIH) that will require a number of existing tank cars to be retired early. There is a potential that some of these tanks will be recycled into stationary tanks for service other then what they were design for.

Additionally, this practice already occurs in some industries without any consideration for any damage mechanisms that made have been present in the initial service. The NBIC does not currently address these types of events.

Background Information

Part 3 - Add a new paragraph to 3.2 General Requirements for Repairs and Alterations to address change of service for a pressure vessel. These requirements should caution inspectors, owners, repair organizations and jurisdictional authorities of the inherent dangers involved when changing service. A new supplement should be added to address the specific requirements for repairs and alterations of pressure vessels that have been converted from one service to another.

3/5

NB08-0322 Part 3 3.2 General Requirements for Repairs and Alterations to address change of service for a pressure retaining item (PRI)

Proposal: Add a new paragraph 3.2.6 to address change of service for a PRI.

Scope:
This section provides requirements for PRIs that will be converted from one service to another. Changes in service can be successfully accomplished provided there is an understanding of the effect on the PRI.

Definition:
Change in Service: A change in the contents or the environment of a PRI that is different from the original design or previous service conditions.

Requirements:

1. Determine if the change in service is a repair or alteration per NBIC.
2. Evaluate the PRI for the new service requirements of pressure, temperature, flow rates, etc.
3. Review existing documentation for this PRI (i.e. vessel drawings, manufacturer's data reports, material test reports, pressure test, NDE, repairs, alterations, etc.).
4. Evaluate the PRI using NDE methods for establishing current thickness, corrosion rate, weld quality, etc.
5. A review shall be completed and documented by a competent individual with experience in pressure vessel design, alteration, repair, etc. This review shall be approved by the Owner/User or designated agent.
6. Verify the maximum allowable working pressure (MAWP), maximum allowable working external pressure (MAWEP), maximum allowable temperature (MAT), minimum design metal temperature (MDMT) for the new service.
7. Verify the PRI supports are adequate for the new service conditions. Verify all new PRI loads for the new service.
8. Compare specific gravity of new service medium with existing PRI design.
9. The PRI materials of construction shall be evaluated for compatibility of the new service.
10. Determine the corrosion effects of the new service conditions and establish remaining life of the PRI per NBIC.
11. Evaluate the PRI for fatigue service and thermal gradients.

12. Evaluate the new pressure and temperature relieving requirements for the new service conditions.
13. Verify that the proper nameplate(s) are attached per NBIC. Change in service could require additional information on the NBIC "R" nameplate.
14. Determine if jurisdictional rules have any effect on this change of service. Notify the jurisdiction as required.

Examples:
Put in example of repairs and alterations.

- If the PRI support is changed (i.e. from horizontal to vertical), the PRI should be evaluated for the new supports for new loadings such as hydrostatic loads, wind loads, seismic loading, nozzle loadings, etc.
- If the PRI was in hydrogen service, it shall be checked for hydrogen embrittlement prior to use in the new service.
- Addition of mechanical equipment such as agitators, instrumentation, spargers, etc shall be evaluated.

References:
B31.3 App F – Precautionary Considerations
API-510 8.2(c) Rerating
NFPA-58 para 5.2.8
OSHA Technical Manual, Sec 4, Ch 3. Pressure Vessel Guidelines
API RB 750 Process Safety Management
PCC-3 Risk Based Methods
API-579

NB08-2101

Part 1, Section 6
Supplement 3

Installation and Control of Solid Fuel (Wood/Biomass) Fired Boilers

(Draft for Review and Comment 1/17/12)

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 and combustion 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 inspect for signs of potential problems, including hot spots, warped areas, glassing in the furnace, discoloration, blistering, erosion, bad seals, water leaks, bearings running hot, slag buildup, missing or misaligned pieces or parts, condition of support systems, pitting, cracks, sludge buildup, provision of "Danger" or "Caution" signs, gasket condition, excess vibration, burning rubber or oil smells and 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 receive a close as possible inspection. Appropriate repairs shall be taken 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 may be 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/flyash reinjection 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.

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.

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Power Boilers

2.5.4 VENTILATION AND COMBUSTION AIR

a) The boiler room shall have an adequate air supply to permit clean, safe combustion, minimize soot formation,

and maintain a minimum of 19.5% oxygen in the air of the boiler room. The combustion and ventilation

air should be supplied by either an unobstructed air opening or by power ventilation or fans.1

b) Unobstructed air openings shall be sized on the basis of 1 sq. in. (650 sq. mm) free area per 2000 Btu/

hr (586 W) maximum fuel input of the combined burners located in the boiler room, or as specified in the

National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular

job conditions. The boiler room air supply openings shall be kept clear at all times.

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.5.4 VENTILATION AND COMBUSTION AIR

a) The boiler room shall have an adequate air supply to permit clean, safe combustion, minimize soot formation,

and maintain a minimum of 19.5% oxygen in the air of the boiler room. The combustion and ventilation

air may be supplied by either an unobstructed air opening or by power ventilation or fans.4

b) Unobstructed air openings shall be sized on the basis of 1 sq. in. (645 sq mm) free area per 2000 Btu/

hr (586 W) maximum fuel input of the combined burners located in the boiler room, or as specified in the

National Fire Protection Association (NFPA) standards for oil and gas burning installations for the particular

job conditions. The boiler room air supply openings shall be kept clear at all times.

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Power Boilers

- c) Power ventilators or fans shall be sized on the basis of 0.2 cfm (0.0057 cu meters per minute) for each
- 1000 Btu/hr (293 W) of maximum fuel input for the combined burners of all boilers located in the boiler
- room. Additional capacity may be required for any other fuel-burning equipment in the boiler room.
- d) When power ventilators or fans are used to supply combustion air, they shall be installed with interlock
- devices so that the burners will not operate without an adequate number of ventilators/fans in operation.
- e) The size of openings specified in NBIC Part 1, 2.5.4 b) may be reduced when special engineered air supply
- systems approved by the Jurisdiction are used.
- f) Care should be taken to ensure that steam and water lines are not routed across combustion air openings,
- where freezing may occur in cold climates.

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

c) Power ventilators or fans shall be sized on the basis of 0.2 cfm (.0057 cu meters per minute) for each
1,000 Btu/hr (293 W) of maximum fuel input for the combined burners of all boilers and/or water heaters
located in the boiler room. Additional capacity may be required for any other fuel burning equipment in the
boiler room.
d) When power ventilators or fans are used to supply combustion air, they shall be installed with interlock
devices so that the burners will not operate without an adequate number of ventilators/fans in operation.
e) When combustion air is supplied to the heating boiler by an independent duct, with or without the employment
of power ventilators or fans, the duct shall be sized and installed in accordance with the manufacturer's
recommendations. However, ventilation for the boiler room must still be considered.
f) The size of openings specified in NBIC Part 1, 3.5.4 b) may be reduced when special engineered air supply
systems approved by the Jurisdiction are used.
g) Care should be taken to ensure that steam and water lines are not routed across combustion air openings,
where freezing may occur in cold climates.

Power Boilers

2.5.5 LIGHTING

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

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.5.5 LIGHTING

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

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Power Boilers

2.5.6 EMERGENCY VALVES AND CONTROLS

All emergency shut-off valves and controls shall be accessible from a floor, platform, walkway, or runway. Accessibility

shall mean within a 6 ft. (1.8 m) elevation of the standing space and not more than 12 in. (305 mm)

horizontally from the standing space edge.

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.5.6 EMERGENCY VALVES AND CONTROLS

All emergency shut-off valves and controls shall be accessible from a floor, platform, walkway or runway. Accessibility

shall mean within a 6 ft. (1.8 m) elevation of the standing space and not more than 12 in. (305 mm)

horizontally from the standing space edge.

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Power Boilers

2.6 DISCHARGE REQUIREMENTS

2.6.1 CHIMNEY OR STACK

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

2.6.2 ASH REMOVAL

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

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.6 DISCHARGE REQUIREMENTS

3.6.1 CHIMNEY OR STACK

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

3.6.2 ASH REMOVAL

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

3.6.3

Power Boilers

2.4.3 DRAINS

At least one floor drain shall be installed in the boiler room.

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.6.3 DRAINS

Unobstructed floor drains, properly located in the boiler room, will facilitate proper cleaning of the boiler room.

Floor drains that are used infrequently should have water poured into them periodically to prevent the entrance

of sewer gasses and odors. If there is a possibility of freezing, an environmentally safe antifreeze mixture

should be used in the drain traps. Drains receiving blowdown water should be connected to the sanitary sewer

by way of an acceptable blowdown tank or separator or an air gap that will allow the blowdown water to cool

to at least 140°F (60°C) and reduce the pressure to 5 psig (34 kPa) or less.

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Power Boilers

Steam Heating Boilers,
Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.7 OPERATING SYSTEMS

3.7.1 OIL HEATERS

a) A heater for oil or other liquid harmful to boiler operation shall not be installed directly in the steam or water space within a boiler.

b) Where an external-type heater for such service is used, means shall be provided to prevent the introduction into the boiler of oil or other liquid harmful to boiler operation.

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Power Boilers

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

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.10 TESTING AND ACCEPTANCE

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Power Boilers

2.10.2 PRESSURE TEST

Prior to initial operation, the completed boiler, including pressure piping, water columns, superheaters,

economizers, stop valves, etc., shall be pressure tested in accordance with the original code of construction.

Any pressure piping and fittings such as water columns, blowoff valves, feedwater regulators, superheaters,

economizers, stop valves, etc., which are shipped connected to the boiler as a unit, shall be hydrostatically

tested with the boiler and witnessed by an Inspector.

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.10.1 PRESSURE TEST

Prior to initial operation, the completed boiler, individual module, or assembled module, shall be subjected to

a pressure test in accordance with the requirements of the original code of construction.

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Power Boilers

2.10.3 NONDESTRUCTIVE EXAMINATION

Boiler components and subcomponents shall be nondestructively examined as required by the governing

Code of Construction.

2.10.4 SYSTEM TESTING

Prior to final acceptance, an operational test shall be performed on the complete installation. The test data

shall be recorded and the data made available to the jurisdictional authorities as evidence that the installation

complies with the provisions of the governing code(s) of construction. This operational test may be used as

the final acceptance of the unit.

Power Boilers

2.10.5 FINAL ACCEPTANCE

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

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.10.2 FINAL ACCEPTANCE

a) In addition to determining that all equipment called for is furnished and installed in accordance with the plans and specifications, all controls shall be tested by a person familiar with the control system.

b) Before any new heating plant (or boiler) is accepted for operation, a final (or acceptance) inspection by a person familiar with the system shall be completed and all items of exception corrected.

11/12 (92)

Power Boilers

2.10.6 BOILER INSTALLATION REPORT

a) Upon completion, inspection, and acceptance of the installation, the installer shall complete and certify

the *Boiler Installation Report I-1. See NBIC Part 1, 1.4.5.1.*

b) The *Boiler Installation Report I-1 shall be submitted as follows:*

1) One copy to the Owner; and

2) One copy to the Jurisdiction, if required.

Steam Heating Boilers, Hot-Water Heating Boilers, Hot-Water Supply Boilers, and Potable Water Heaters

3.10.3 BOILER INSTALLATION REPORT

a) Upon completion, inspection, and acceptance of the installation, the installer shall complete and certify

the *Boiler Installation Report I-1. See NBIC Part 1, 1.4.5.1.*

b) The *Boiler Installation Report I-1 shall be submitted as follows:*

1) One copy to the Owner; and

2) One copy to the Jurisdiction, if required.

18/13

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

Ballot Comments

Name	Document	Comment	Date Created
Donald Patten	NB11-2001	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	NB11-2001	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	NB11-2001	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

Name	Document	Comment	Date Created
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 ie. 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 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.	03/07/2012
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

Name	Document	Comment	Date Created
Robin Hough		This commnet comes from Donald Patten: I was unaware of any conflicts with ASME. When we as the subcommitte 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
Robin Hough		I was unaware of any conflicts with ASME. When we as the subcommitte 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
Donald Patten		I was unaware of any conflicts with ASME. When we as the subcommitte 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 ballotors. 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	NB11-2001	I looked at ASME 2007 edition Addenda 2009 and foiund nothing stipulating the location of a releif valve for isolable economizers. Please see acopy of the attached from said edition. If anyone can point me in the direction of wher I can find this information I would greatly appreciate it.	03/27/2012
Donald Patten	NB11-2001	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	NB11-2001	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

Copy from ASME Section 1 – 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 locationed recommended by the manufacturer, when no recommendation exists the location shall be as close as practical possibleto 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.

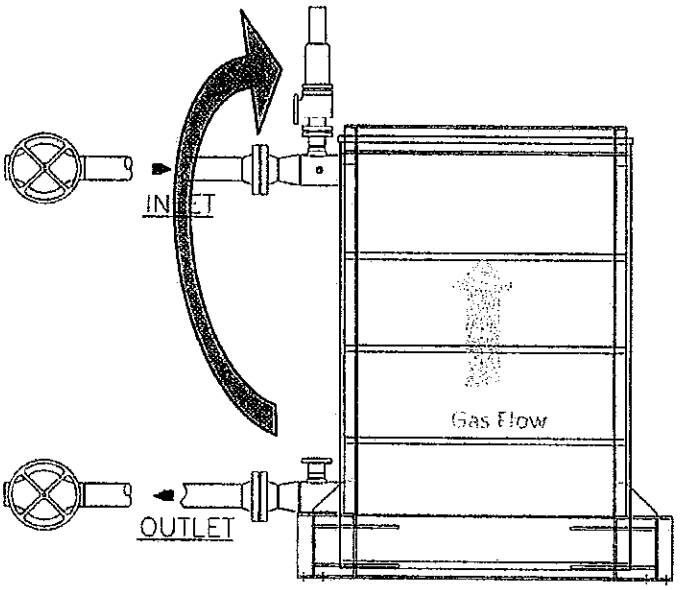

Figure 1

David Olson

QCM

Victory Energy Operations, LLC

918-340-9942

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

Attachment Page 1 of 2

	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.	