Date Distributed: June 20, 2012

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

SUBCOMMITTEE ON INSPECTION

AGENDA

Meeting of July 18, 2012
Columbus, OH

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.**

2. **Announcements**

3. **Adoption of the Agenda**

4. **Approval of Minutes of January 18, 2012**

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

   The following members of the SG on Inspection General are eligible for reappointment: Messrs. Domenic Canonico, Jim Getter, David Parrish and John Richardson. A vote will be taken.

   The following members of the SG on Inspection Specific are eligible for reappointment: Messrs. Don Cook, Jim Getter. Greg McRae, Jim Riley, Mike Schwartzwalder, Stan Staniszewski and Randy Wacker. A vote will be taken.

6. **Inquiries (Attachment 2)**

   IN12-0201 ***SC on Inspection Part 2, 5.2*** - Q:If a National Board Commissioned Inspector has verified the replacement of stamped data or nameplate by an "R" Certificate Holder on Corrugated rolls that are not stationary and subject to operation in multiple Jurisdictions, possibly by multiple owners, is the application of an NB-136"Replacement of Stamped Data" form required? A: No, if performed by an "R" Certificate holder and verified by an National Board Commissioned Inspector the responsibility of traceability and nameplate accuracy is on the Certificate Holder similar to nameplate replacement in the NBIC Part 3, 5.5.9.5.

   IN12-0202 ***SC on Inspection Part 2, 5.2*** – Q: Can an NB-136 "Replacement of Stamped Data Form" which is required to be signed by a National Board Commissioned Inspector, for Corrugated Rolls that are not stationary and subject to operation in multiple Jurisdictions, possibly by multiple owners, be filed with The National Board and copied to the applicable Jurisdiction in lieu of obtaining an approval signature from the Jurisdiction? A: Yes, the approval from one Jurisdiction should not be incumbent on any other Jurisdiction due to transient nature of Corrugated Roll Pressure Equipment. Similarly, if there was no Jurisdiction in the location of installation another Jurisdiction would be compelled to accept National Board filing if the equipment is moved.

7. **Action Items (Attachment 3)**

   NB07-0910 ***Part 2 S6 SG Inspection Specific-*** Review DOT supplement. A task group of S. Staniszewski (Chair), G. McRae and J. Riley has been assigned. This specific supplement should be reviewed by TG for completeness and accuracy. (No Attachment)

   July 2007

   A progress report was given. Changes to the DOT glossary were approved previously due to approved public review comments.

   January 2008

   A progress report was given. The task group has met twice to discuss the public review comments received from the 2007 edition and in the process 11 more issues were identified.

July 2008

A progress report was given.

January 2009

A progress report was given. An advanced notice of proposed rulemaking by the D.O.T. under Docket # PHMSA 2005-21351 is scheduled to be released by June 30, 2009.

July 2009

A progress report was given. Mr. Staniszewski reported that the docket did not make its release date.

January 2010

A progress report was given.

July 2010

Mr. Staniszewski gave a progress report. The document is currently under review from the legal department. At the end of the year there will be an advance notice of rulemaking.

January 2011

A progress report was given.

July 2011

Mr. Cook presented a progress report that was sent by Stan Staniszewski. The DOT has the rule making package in process right now of being approved and Stan is limited to what he can legally discuss. Stan will keep us abreast to any developments.

January 2012

A progress report was given by Mr. Staniszewski.

July 2012

Mr. Staniszewski is expected to report.

NB08-0321 ***Part 2 1.5 SG on Inspection Specific*** **-** In paragraph 1.5 Inspection Activities, add 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. A Task Group of all three parts of the NBIC has been formed under the leadership of Bob Wielgoszinski. Task group members from Inspection are G. McRae (Chair), R. Reetz, R. Wacker, D. Cook, and J. Getter. It was noted that some wording exists in Part 2 1.5.2 (a, 2.3.5.4 b)5 and 2.3.2 b) that deals with service conditions. (Attachment 3, p. 1)

July 2008

A task group was assigned.

January 2009

A progress report was given.

July 2009

A progress report was given.

January 2010
A progress report was given.

July 2010
A progress report was given.

January 2011
A progress report was given.

July 2011
A progress report was given by Mr. Cook. The Task Group met and is developing wording.

January 2012
A progress report was given by Mr. Wielgoszinski. The Task Group working on NB08-0321, NB08-0701 & NB08-0703 met. A letter ballot will be forthcoming.

July 2012
Mr. Wielgoszinski is expected to report.

NB08-0701 ***Part 2 S7 SG on Inspection Specific*** **-** Add a requirement for change of service from above ground to below ground installations of LPG tanks. We also need requirements for how to inspect these tanks. A task group of G. McRae (Chair), G. Galanes, J. Getter, M. Huffman, V. Mullins, J. Riley D. Cook, J. Richardson and V. Newton has been assigned. (Attachment 2 p. 2)

January 2008
A progress report was given and a task group was assigned.

July 2008
A progress report was given.

January 2009
A progress report was given. This action item will be worked on simultaneously with the task group assigned to NB08-0320, NB08-0321 and NB08-0322.

July 2009
A progress report was given.

January 2010
No progress at this time.

July 2010
A progress report was given.

January 2011
A progress report was given.

July 2011
A progress report was given by Mr. Cook. The Task Group met and is developing requirements.

January 2012
A progress report was given by Mr. Wielgoszinski. The Task Group working on NB08-0321, NB08-0701 & NB08-0703 met. A letter ballot will be forthcoming.

July 2012
Mr. Wielgoszinski is expected to report.

NB08-0703 ***Part 2 S7 SG on Inspection Specific*** **-** Investigate the feasibility of marking or stamping a re-rated name plate on a LPG tank that is being altered from an above ground tank to a below ground tank. A task group of G. McRae (Chair), G. Galanes, J. Getter, M. Huffman, V. Mullins, J. Riley, D. Cook, J. Richardson and V. Newton has been assigned. (No Attachment)

July 2008
A progress report was given and a task group was assigned.

January 2009
A progress report was given.

July 2009
A progress report was given.

January 2010
No progress at this time.

July 2010
A progress report was given.

January 2011
Mr. Cook gave a progress report.

July 2011
A progress report was given by Mr. Cook. The Task Group met and is working on the requirements.

January 2012
A progress report was given by Mr. Cook.

July 2012
Mr. Cook is expected to report.

NB10-0601 ***Part 2, SC S6, SG on Fiber Reinforced Plastic-*** Inspection of high pressure composite vessels. (No Attachment)

July 2011
A letter ballot was sent to the SC in May but it was taken back by the subgroup before its closure. There were a lot of comments by SC members that they were unfamiliar with these types of vessels.

January 2012
An informational presentation was presented by Mr. Doug Eisberg on high pressure composite vessels. Mr. Eisberg addressed some of the concerns raised during a letter ballot. Mr. Eisberg is a member of NBIC FRP Sub-Committee and ASME SC X.

July 2012
Mr. Cook is expected to report.

NB10-1301 ***Part 2 SG Inspection Specific*** **-** Address anhydrous ammonia nurse tank inspection. Attachment 3, pp. 3-4)

January 2010
A task group of Greg McRae, Stan Staniszewski, Jim Getter and Bob Reetz (Chair)was assigned.

July 2010
Mr. McRae gave a progress report.

January 2011
Mr. Reetz gave a progress report.

July 2011
A report was given by Mr. Reetz. No Progress while awaiting ANSI K61.1 "Storage & Handling of Anhydrous Ammonia".

January 2012
A progress report was given by Mr. Reetz.

July 2012
Mr. Reetz is expected to report.

NB11-0201 ***Part 2, S2 SG on Historical Boilers*** **-** Limits for bulged stayed firebox sheets. A task group of R. Bryce, D. Cook and F. Johnson has been assigned. (No attachment)

July 2010
A task group of R. Bryce (Chair), D. Cook and F. Johnson was assigned.

January 2011
A progress report was given.

July 2011
Mr. Cook gave a progress report. Finite Element Analysis (FEA) is being considered as a tool for establishing limits.

January 2012
A progress report was given by Mr. Reetz and Mr. Cook.

July 2012
Mr. Reetz is expected to report.

NB11-0203 ***Part 3 Supplement 2 S2.13.9.1 SG on Historical Boilers*** Revise text and Figure to incorporate the correct percentage of wasting allowed. A Task Group consisting of M. Wahl and T. Dillon was assigned. (No attachment)

July 2010
A task group of M. Wahl and T. Dillon was assigned.

January 2011
A progress report was given.

July 2011
No progress.

January 2012
A progress report was given by Mr. Reetz.

July 2012
Mr. Reetz is expected to report.

NB11-0204 ***Part 2 & 3, S2 SG on Historical Boilers-***Review NDE requirements of stayed areas. A task group of M. Wahl (Chair), J. Larson and F. Johnson has been assigned. (No attachment)

July 2010
A task group of M. Wahl (Chair), J. Larson and F. Johnson was assigned.

January 2011
A progress report was given.

July 2011
No progress.

January 2012
A progress report was given by Mr. Reetz and Mr. Cook.

July 2012
Mr. Reetz is expected to report.

NB11-0401 ***Part 4, SC PRD*** The development of a possible fourth part of the NBIC to cover pressure relief topics. (Attachment 3, pp. 5-53)

July 2012
The comments received from the letter ballot will be discussed.

NB11-0901 ***Part 2, S2, SG on Historical Boilers*** Add charts and formulas for calculating cylindrical components under external pressure. A TG of T. Dillon and S. Torkildson has been assigned. (Attachment 3, p. 54)

January 2011
A progress report was given and a task group was assigned.

July 2011
A progress report was given. No progress.

January 2012
A progress report was given by Mr. Reetz.

July 2012
Mr. Reetz is expected to report.

NB11-1101 ***Part 2, S2.6.2 b), SG on Historical Boilers -*** This section should be revised to provide more guidelines for evaluating local pitting corrosion versus general corrosion. (Attachment 3, pp. 55-56)

January 2011
A progress report was given.

July 2011
A progress report was given by Mr. Reetz. No progress.

January 2012
A progress report was given by Mr. Cook. Looking at Local Thin Areas described in Section VIII and Section I.

July 2012
Mr. Reetz is expected to report.

NB11-1601 ***Part 2, Table S2.10.4.1 SG Historical Boilers*** **-** This chart contains errors in formula and should be revised. (Attachment 3, pp. 57- 62)

July 2011
A progress report was given by Mr. Reetz. New charts prepared by Dr. Bryce are being reviewed.

January 2012
A progress report was given by Mr. Reetz.

July 2012
Mr. Reetz is expected to report.

NB11-1603 ***Part 2, S2.10.2 SG on Historical Boilers-*** Define deteriorated rivet heads. (Attachment 3, pp. 63-71)

July 2011
A task group of Dr. Bryce and Dennis Rupert was assigned.

January 2012
Mr. Reetz gave a progress report.

July 2012
Mr. Reetz is expected to report.

NB11-2101 ***Part 2, SG Inspection Specific*** **-** Address refurbished tanks. (Attachment 3, pp. 72-74)

July 2011
A progress report was given.

January 2012
A progress report was presented by Mr. Mullins. It appears that this subject may be addressed in the form of a Guide. The task group will continue to work.

July 2012
Mr. Mullins is expected to report.

NB12-0604 ***Part 2, Forms NB-6 and NB-7 SG Inspection General*** **-** Change these forms to become current with Jurisdictional requirements. (Attachment 3, pp. 75-77)

January 2012
A Task Group of on Don Cook (Chair), Ralph Pate, Mark Mooney, Tim Barker and Robert Dobbins was assigned.

July 2012
Mr. Cook is expected to report.

NB12-1501 Part 2, ***SG Inspection General*** Review inspection requirements so as to align with installation requirements in Part 1. (No Attachment)

July 2012
A Task group of V. Newton, M. Horbaczewski, J. Daiber and J. Safarz was assigned

NB12-1801 Part 2, 5.5.2 - 5.5.3 SC on Inspection Replacement of stamping during inservice inspection. (No Attachment)

July 2012
A report is expected.

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. Newton is expected to report.

8. New Business

9. Future Meetings

January 14-18, 2013, Mobile, AL
July 15-19, 2013, Columbus, OH

10. Adjournment

Respectfully Submitted,

Bill Smith
Secretary
:rh

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ATTACHMENT 1

SC on Inspection

Member	Title	ExpirDate	Interest Category
Barker, Timothy		1/31/2015	Auth Inpection Agencies
Canonico, Dr. Domenic A.		8/31/2012	General Interest
Cook, Don	Chair	8/31/2012	Jurisdictional Authorities
Getter, Jim		8/31/2012	Manufacturer
Horbaczewski, Mark		8/31/2012	Users
McRae, Greg		8/31/2012	Manufacturer
Mooney, Mark		8/31/2012	Auth Inpection Agencies
Newton, Venus		7/31/2013	Auth Inpection Agencies
Parrish, Dave		8/31/2012	Auth Inpection Agencies
Pate, Ralph		2/28/2014	Jurisdictional Authorities
Reetz, Robert		7/31/2013	Jurisdictional Authorities
Richardson, John		8/31/2012	Manufacturer
Riley, Jim		8/31/2012	Users
Safarz, Jason		7/21/2013	General Interest
Schwartzwalder, Mike		8/31/2012	NB Certificate Holders
Smith, Bill	Secretary		
Staniszewski, Jr., Stanley	Vice Chair	8/31/2012	Regulatory Authorities
Wacker, Randy A.		8/31/2012	Manufacturer

Total Members: 17

ATTACHMENT 2

PROPOSED INTERPRETATION

Inquiry No.	IN12-0201				
Source	Daren Daily & Mark Anderson				
Subject	Part 2, 5.5.2-5.2.3				
Edition	2011 Edition				
Question	If a National Board Commissioned Inspector has verified the replacement of stamped data or nameplate by an "R" Certificate Holder on Corrugated rolls that are not stationary and subject to operation in multiple Jurisdictions, possibly by multiple owners, is the application of an NB-136"Replacement of Stamped Data" form required?				
Reply	No, if performed by an "R" Certificate holder and verified by an National Board Commissioned Inspector the responsibility of traceability and nameplate accuracy is on the Certificate Holder similar to nameplate replacement in the NBIC Part 3, 5.5.9.5.				
Committee's Question					
Committee's Reply					
Rationale					
SC Vote	Unanimous	No. Affirmative	No. Negative	No. Abstain	No. Not Voting
NBIC Vote	Unanimous	No. Affirmative	No. Negative	No. Abstain	No. Not Voting
Negative Vote Comments					

PROPOSED INTERPRETATION

Inquiry No.	IN12-0202				
Source	Daren Daily & Mark Anderson				
Subject	Part 2, 5.5.2-5.2.3				
Edition	2011 Edition				
Question	Can an NB-136 "Replacement of Stamped Data Form" which is required to be signed by a National Board Commissioned Inspector, for Corrugated Rolls that are not stationary and subject to operation in multiple Jurisdictions, possibly by multiple owners, be filed with The National Board and copied to the applicable Jurisdiction in lieu of obtaining an approval signature from the Jurisdiction?				
Reply	Yes, the approval from one Jurisdiction should not be incumbent on any other Jurisdiction due to transient nature of Corrugated Roll Pressure Equipment. Similarly, if there was no Jurisdiction in the location of installation another Jurisdiction would be compelled to accept National Board filing if the equipment is moved.				
Committee's Question					
Committee's Reply					
Rationale					
SC Vote	Unanimous	No. Affirmative	No. Negative	No. Abstain	No. Not Voting
NBIC Vote	Unanimous	No. Affirmative	No. Negative	No. Abstain	No. Not Voting
Negative Vote Comments					

IN 12-0201

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

RE: NBIC PART 2, SECTION 5, 5.2 THROUGH 5.2.3

REPLACEMENT OF STAMPING DURING INSERVICE INSPECTION

& NB-136 REPLACEMENT OF STAMPED DATA FORM

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Statement of Need:

The verbiage of the NB-136 "REPLACEMENT OF STAMPED DATA FORM" appears to have originally been written around stationary equipment that has its In-Service Inspections performed at the Owners or Users site by an Inspector. Because it does not appear to address transient equipment that is serviced off-site, and moved between Jurisdictions, it has caused confusion with regards to who should file this form (owner/user or Certificate Holder) and if this form is applicable to all Pressure Equipment or just stationary equipment.

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Background Information:

- Corrugated Rolls are not stationary and are routinely transported to an "R" Certificate holder's facility for refurbishment, frequently requiring the replacement of lost or illegible nameplates.
- Corrugated Roll owners rely on a Certificate Holder to perform nameplate maintenance and the filing of any applicable documentation.
- Multi-Plant owners routinely exchange Corrugated Rolls from one Jurisdiction to another, including to and from areas that have no Jurisdiction.

Background Information (continued):

- Being the trusted eyes, ears, and hands of any Jurisdiction, a National Board Commissioned Inspector's signature could be sufficient evidence of compliance to I.D. traceability and verification of a Pressure Vessel in lieu of requiring authorization, as is the case in new construction and where no Jurisdiction exists.
- NBIC Part 3, Section 5, 5.9.5 [(a) & (b)] allows for the re-stamping or nameplate replacement on Safety Valves without the requirement for the creation or filing of an NB-136 "Replacement of Stamped Data Form", instead putting the responsibility on the Certificate Holder.
- In processing the NB-136 form, some Jurisdictions prefer the National Board Commissioned Inspector to verify everything before it is sent to them, which requires the replacement nameplate to already be attached, others prefer to follow the format of the form and sign for authorization first.
- Pressure Equipment that did not have its data report filed with The National Board, (EG: U-3 for UM stamped equipment), and no longer has a data report available (> 5 years), can only have its traceability verified matching historical stampings to historical documentation as available. Such historical stampings may be located on various surfaces of the Pressure Equipment and as such can only be assured by on on-site inspector prior to commencement of preparing a replacement nameplate.
- Verbiage is suggested to provide uniformity to the ASME Code [UG-119 (d) & (f)], see attached.

Requested Interpretations:

Q:, If a National Board Commissioned Inspector has verified the replacement of stamped data or nameplate by an "R" Certificate holder on Corrugated Rolls that are not stationary and subject to operation in multiple Jurisdictions, possibly by multiple owners, is the application of an NB-136 "Replacement of Stamped Data Form" required?

PROPOSED REPLY: No, if performed by an "R" Certificate holder and verified by a National Board Commissioned Inspector the responsibility of traceability and nameplate accuracy is on the Certificate Holder similar to nameplate replacement in the NBIC, Part 3, SECTION 5, 5.9.5.

++

Q: Can an NB-136 "Replacement of Stamped Data Form", which is required to be signed by a National Board Commissioned Inspector, for Corrugated Rolls that are not stationary and subject to operation in multiple Jurisdictions, possibly by multiple owners, be filed with The National Board and copied to the applicable Jurisdiction in lieu of obtaining an approval signature from the Jurisdiction?

PROPOSED REPLY: Yes, the approval from one Jurisdiction should not be incumbent on any other Jurisdiction due to the transient nature of Corrugated Roll Pressure Equipment. Similarly, if there was no Jurisdiction in the location of installation another Jurisdiction would be compelled to accept National Board filing if the equipment is moved.

++

Respectfully submitted:
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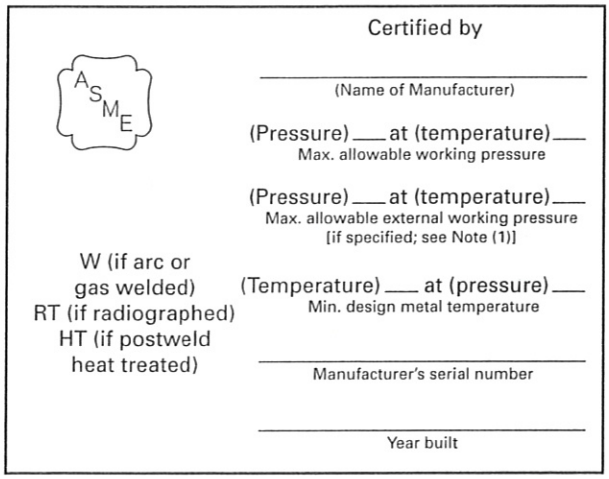
(10) (a)

FIG. UG-118 FORM OF STAMPING



GENERAL NOTE: Information within parentheses is not part of the required marking. Phrases identifying data may be abbreviated; minimum abbreviations shall be MAWP, MAEWP, MDMT, S/N, and year, respectively.

NOTE:
(1) The maximum allowable external working pressure is required only when specified as a design condition.

(1) The required markings on a nameplate shall be in characters not less than $\frac{5}{32}$ in. (4 mm) high, except that characters for pressure relief device markings may be smaller.

(2) Characters shall be either indented or raised at least 0.004 in. (0.10 mm) and shall be legible and readable.

(d) The nameplate may be marked before it is affixed to the vessel, in which case the Manufacturer shall ensure that the nameplate with the correct marking has been applied to the proper vessel, and the Inspector shall satisfy himself that this has been done.

(e) The nameplate shall be attached to the vessel or to a pad, bracket, or structure that is welded, brazed, soldered, or attached with mechanical fasteners directly to the vessel. Mechanical fasteners shall be of a material and design that is compatible with the vessel, bracket materials, and the vessel service. After installation of the pad, bracket, or structure, the heads of the fasteners shall be welded, brazed, or soldered to the pad, bracket, or structure that supports the nameplate. The nameplate shall be located within 30 in. (760 mm) of the vessel. Removal shall require the willful destruction of the nameplate, or its attachment system. (See M-3.)

(1) Nameplates may be attached either by welding, brazing, or soldering.

(2) Nameplates may be attached by tamper-resistant mechanical fasteners of suitable metal construction.

(3) Nameplates may be attached with pressure-sensitive acrylic adhesive systems provided that, in addition to the requirements of this paragraph, those of Appendix 18 are met.

(f) An additional nameplate in accordance with (a) through (d) may be installed on the skirt, supports, jacket, or other permanent attachment to a vessel. All data on the additional plate, including the Certification Mark with the Designator, shall be as required for the mandatory nameplate. The marking need not be witnessed by the Inspector. The additional nameplate shall be marked: "DUPLICATE."

(g) When a nameplate is employed, the Manufacturer's name or identifying trademark, and vessel serial number (or National Board Number, if applicable,) may also be marked directly on the vessel in close proximity to the nameplate attachment. The marking shall be of a visible permanent type that is not detrimental to the vessel, and its location shall be indicated on the Data Report.

(1) If the thickness limitations of UG-118 preclude marking directly on the vessel shell or heads, it may be applied to the skirt, supports, jacket, or other permanent attachment to the vessel.

UG-120 DATA REPORTS (10) (a)

(a) A Data Report shall be filled out on Form U-1 or Form U-1A by the Manufacturer and shall be signed by the Manufacturer and the Inspector for each pressure vessel marked with the Certification Mark with the U Designator.

(1) Same day production of vessels may be reported on a single Form provided all of the following requirements are met:

(a) vessels must be identical;

(b) vessels must be manufactured for stock or for the same user or his designated agent;

(c) serial numbers must be in uninterrupted sequence; and

(d) the Manufacturer's written Quality Control System includes procedures to control the development, distribution, and retention of the Data Reports.

(2) The number of lines on the Data Report used to describe multiple components (e.g., nozzles, shell courses) may be increased or decreased as necessary to provide space to describe each component. If addition of lines used to describe multiple components results in the Data Report exceeding one page, space must be provided for the Manufacturer and Authorized Inspector to initial and date each of the additional pages. Horizontal spacing for information on each line may be altered as necessary. All information must be addressed; however, footnotes described in the remarks block are acceptable, e.g., for multiple cases of "none" or "not applicable."

(3) The Manufacturer shall:

(a) furnish a copy of the Manufacturer's Data Report to the user and, upon request, to the Inspector:

c) The existing repair nameplates, if applicable, shall not be removed during such testing.

5.9.5 REPLACEMENT OF ILLEGIBLE OR MISSING NAMEPLATES

a) Illegible Nameplates
When the information on the original manufacturer's or assembler's nameplate or stamping is illegible, but traceability can be confirmed, the nameplate or stamping will be augmented by a nameplate furnished by the "VR" stamp holder stamped "Duplicate." It shall contain all information that originally appeared on the nameplate or valve, as required by the applicable section of the ASME Code, except the "V," "HV," or "UV" symbol and the National Board mark. The repair organization's nameplate, with the "VR" stamp and other required data specified in 5.9.2, will make the repairer responsible to the owner and the Jurisdiction that the information on the duplicate nameplate is correct.

b) Missing Nameplates
When the original valve nameplate is missing, the repair organization is not authorized to perform repairs to the valve under the "VR" program, unless positive identification can be made to that specific valve and verification that the valve was originally stamped with an ASME "V" or "UV" symbol or marked with an ASME "HV" symbol. Valves that can be positively identified will be equipped with a duplicate nameplate, as described in this section, in addition to the repairer's "VR"-stamped nameplate. The repairer's responsibilities for accurate data, as defined in 5.9.5(a) (Illegible Nameplates), shall apply.

c) Marking of Original Code Stamp
When a duplicate nameplate is affixed to a valve, as required by this section, it shall be marked "Sec. I," "Sec. IV," or "Sec. VIII," as applicable, to indicate the original ASME Code stamping.

5.10 ALTERNATIVE MARKING AND STAMPING FOR GRAPHITE PRESSURE EQUIPMENT

a) General Requirements

1) This procedure may be used in lieu of the stamping and nameplate requirements defined in this section.

2) The required data as defined in this section shall be 5/32 in. (4 mm) high, minimum.

3) The National Board code symbol ("R") shall be used to make the impression in the cement.

b) Application of the "R" Code Symbol

1) The graphite surface shall be clean and smooth.

2) Apply a thin coating of cement onto the Code part. The cement should have the consistency of toothpaste.

3) Apply sufficient heat to the cement so that it begins to form a skin.

4) Apply a coating of a thinned release agent, such as "ANTISEIZE," to the tip of the "R" stamp with a brush.

5) Press the coated stamp all the way to the bottom of the cement and remove by pulling straight out before the cement hardens.

6) Cure or heat the impression as required.

7) When cured, the part may be washed to remove any excess release agent.

c) Application of characters directly to graphite

1) Use a very thin template of a flexible material (stainless steel; flexible and easily cleaned).

Attachment 3

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.

1/1

(1)

ACTION ITEM NB08-0701

LPG storage containers may be changed from aboveground service to underground service subject to the following conditions:

1. Any connections located on the bottom of the container shall be welded shut using a forged plug or removed and replaced with a flush patch.

2. All connections on the top of the tank shall be relocated to one area that can be enclosed by a domed sleeve that reaches the top of the grade.

3. The check lock/liquid withdrawal connection on top of the container shall have a tube that reaches the bottom of the container.

4. The dip tube shall be of the correct length for the container size.

5. The support legs may remain in place. All welds shall encircle the legs to prevent a potential area of corrosion.

6. There shall be connections for attachment of anodes for cathodic protection.

7. The protective coating shall be in good condition. Any coating touch up needed at the time of installation shall be compatible with the original coating.

8. Lifting lugs may remain in place and their attachment welds shall encircle the lug.

9. The thickness of the pressure boundary parts shall have a NDE examination to confirm compliance with the original code of construction.

10. Any flush patches shall be of the same thickness as the original material.

11. Any welding shall be performed by a qualified "R" stamp holder.

12. Verify that there is no internal corrosion due to valves having been removed while the container is in storage.

13. Verify that the container has never been previously in anhydrous ammonia service. Any blue coloring of the brass valves indicates that the vessel has been in anhydrous ammonia service.

14. The nameplate shall transfer the information from the original nameplate. This shall include the manufacturers name, vessel serial number, National Board number, MAWP, year built, head and shell thicknesses, but not necessarily the original code stamping. Additional information should include an indication of underground service, new dip tube length, a National Board R stamp.

NB11-0901

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October 4, 2010

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

Subject: Historical Boiler internals under external pressure.

Dear Committee Members,

I am writing to request an addition to the NBIC Part 2, Section 6. The current NBIC contains charts and formulas to determine the maximum allowable working pressure for cylindrical components and stayed surfaces under internal pressure.

I believe the NBIC committee should also add chart(s) and formula(s) for calculating the maximum allowable working pressure for cylindrical components under external pressure. We have many return flue and vertical boilers in which inspectors need to calculate the maximum allowable working pressures for these components.

Thank you for your consideration.

Respectfully,

Joel T. Amato
Chief Boiler Inspector
Minnesota Department of Labor and Industry

New Item

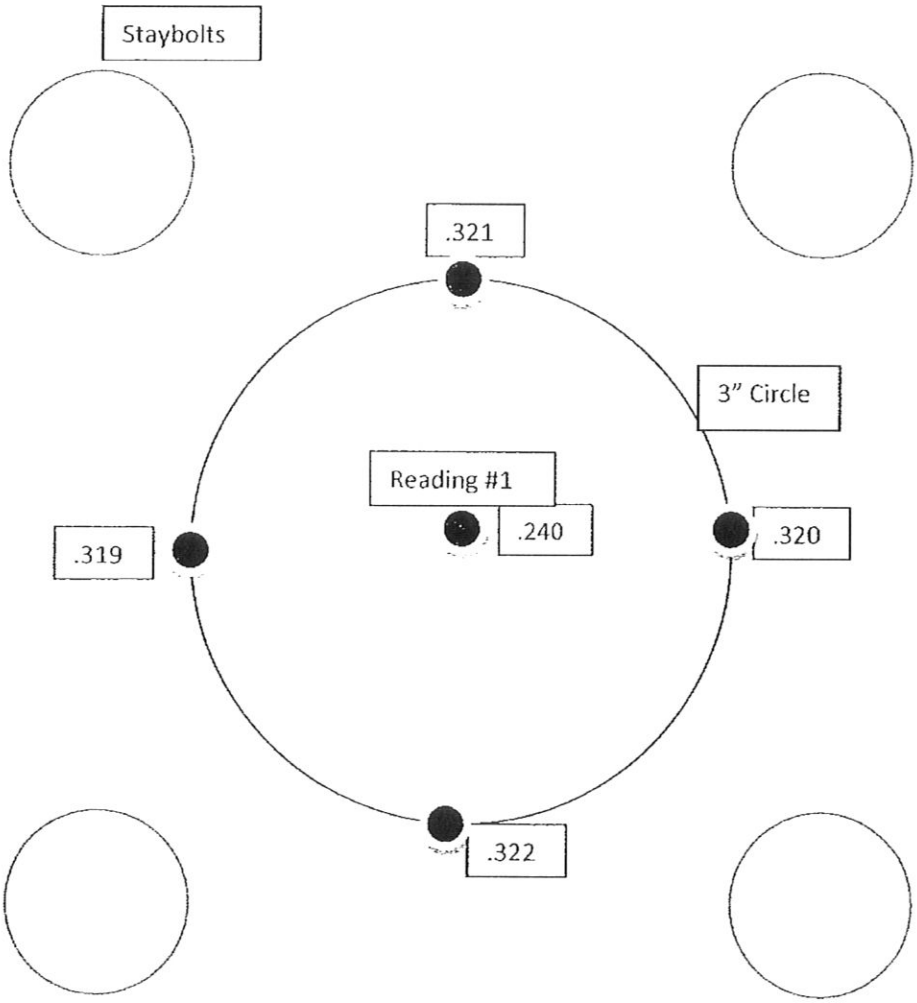
Request for Code Change below to address thickness readings for adjusting MAWP if general or localized pitting is observed.

Part II, Section 6, Paragraph S2.6.2 b) should be revised to provide more guidance for evaluating local pitting corrosion versus general corrosion. See example below;

Once region of corrosion pitting is detected by UT (.240" in the attached illustration), a three-inch circle should be drawn around the pitted region. After four readings around the perimeter of the circle are determined by UT and show significant difference with the original lowest reading, the lowest of the four readings should be used as the actual thickness for that particular subsection of the boiler (e.g., the staybolt quadrant as shown, or the grid section of the barrel).
The lowest center reading is assumed to be a localized pit, and can be disregarded in the MAWP calculation because of surrounding material that provides some level of reinforcement.

Sample Readings

Exhibit 1



Ballot Comments NB11-0401 INSP

Name	Document	Comment	Date Created	Is Active
Bob Reetz		I agree with Venus Newton and others. I do not believe that separating all references to PRD's from Parts I and 2 and 3 and creating a new Part 4 will enhance anything. I recommend leaving the references just where they are at present. As an inspector, it just complicates matters to have to jump back and forth between NBIC sections to understand an issue. For these reasons, this action to remove PRD references from each Part of the NBIC does not have my approval.	05/23/2012	☑ True
Jim Riley		Speaking for owner-users we support PRD related items moving to a new Part 4. Our owner-user agencies keep all current NBIC parts in electronic form with all other industry and regulatory codes. Easy access search using PDF format. Inspectors are fluent with electronic access and rely on it for most recent information. Good summary by Joe Ball.	05/23/2012	☑ True
Mark Horbaczewski		However, I agreed with Dave Parish more work has to be done so we are consistent with the other sections. I believe that a new item for business may have to be opened and get committee members to go over these changes thoroughly.	05/23/2012	☑ True
Venus Newton		I don't agree with the whole idea of removing the PRD's	05/23/2012	☑ True

		from Part 2, because now in order to perform a complete inspection of a pressure retaining item a field inspector has yet one more Code book to go to. It's just adding to the confusion of performing an inservice inspection.		
Joseph Ball	56c03783-d093-4c71-858e-b17acdbf5a7c.docx	See attached document	05/23/2012	☑ True
Joseph Ball		Thanks to David Parrish for the detailed review. Material in Supplements was kept in those documents considering the users want the information for these particular types of equipment in one place, and those supplements were written in that fashion. See the attachment for more detailed responses.	05/23/2012	☑ True
Joseph Ball		Please see response to Mr. Parrish. Thank you.	05/23/2012	☐ False
Timothy Barker		I agree with Mr. Parrish's comments. I like the idea but there are many areas that were missed with the changeover and a lot of areas referencing Safety Valves where it should be PRD's.	05/04/2012	☑ True
Dave Parrish	NBIC PART 2 with Part 4 removed dkpComments.docx	There is general agreement within FM Global with the objective to consolidate OPD guidance into a specific part. There is, however, concern about redundancy in each PART and across all four PARTS. Currently, there are some inconsistencies resulting from duplications of text. The proposed PART 4 does reduce some of	05/04/2012	☑ True

	the redundancy and inconsistency, but further effort is needed. Attached is a quick review of proposed PART 2 INSPECTION to demonstrate how improvement can be accomplished.		
John Richardson	The changes appear to be in order.	04/27/2012	☑ True

NBIC PART 2 with Part 4 removed.docx

(NOTE: All general pressure relief device information that will be moved to part 4 is shown as strike through text. Detail PRD information in supplements has *not* been moved, examples: DOT, historic boilers)
4-25-12

Organization
The NBIC is organized into three ***four*** Parts to coincide with specific post-construction activities involving pressure-retaining items. Each Part provides general and specific rules, information, and guidance within each applicable post-construction activity. Other NBIC Parts or other published standards may contain additional information or requirements needed to meet the rules of the NBIC. Specific references are provided in each Part to direct the user where to find this additional information. NBIC Parts are identified as:
• Part 1, Installation – This Part provides requirements and guidance to ensure all types of pressure-retaining items are installed and function properly. Installation includes meeting specific safety criteria for construction, materials, design, supports, safety devices, operation, testing, and maintenance.
• Part 2, Inspection – This Part provides information and guidance needed to perform and document inspections for all types of pressure-retaining items. This Part includes information on personnel safety, non-destructive examination, tests, failure mechanisms, types of pressure equipment, fitness for service, risk-based assessments, and performance-based standards.

• Part 3, Repairs and Alterations – This Part provides information and guidance to perform, verify, and document acceptable repairs or alterations to pressure-retaining items regardless of code of construction. Alternative methods for examination, testing, heat treatment, etc., are provided when the original code of construction requirements cannot be met. Specific acceptable and proven repair methods are also provided.

• Part 4, Pressure Relief Devices – This part provides information and guidance on the installation, inservice inspection and repair of pressure relief devices.

Each NBIC Part is divided into major Sections as outlined in the Table of Contents. Tables, charts, and figures provide relevant illustrations or supporting information for text passages, and are designated with numbers corresponding to the paragraph they illustrate or support within each Section. Multiple tables, charts, or figures referenced by the same paragraph will have additional letters reflecting the order of reference. Tables, charts, and figures are located in or after each major Section within each NBIC Part.
Text Identification and Numbering
Each page in the text will be designated in the top header with the publication's name, part number, and part title. The numbering sequence for each section begins with the section number followed by a dot to further designate major sections (e.g., 1.1, 1.2, 1.3). Major sections are further subdivided using dots to designate subsections within that major section (e.g., 1.1.1, 1.2.1, 1.3.1). Subsections can further be divided as necessary.
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INSPECTION – GENERAL REQUIREMENTS FOR INSERVICE INSPECTION OF PRESSURE-RETAINING ITEMS

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outside the vessel at the point of entry while the Inspector is inside and shall monitor activity inside and outside and communicate with the Inspector as necessary. The attendant shall have a means of summoning rescue assistance, if needed, and to facilitate rescue procedures for all entrants without personally entering the vessel.
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Note: If a vessel has not been properly prepared for an internal inspection, the Inspector shall decline to make the inspection.

1.5.4 POST-INSPECTION ACTIVITIES

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

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INSPECTION — DETAILED REQUIREMENTS FOR INSERVICE INSPECTION OF PRESSURE-RETAINING ITEMS

(FOLLOWING par. F. IS ALSO INCLUDED IN PART 4, but not deleted here for continuity of this section)

f. Pressure Relief Devices — pressure relief valves shall be a closed bonnet design with no manual lift lever. The pressure relief discharge should be connected to a closed, vented storage tank or blowdown tank with solid piping (no drip pan elbow or other air gap). When outdoor discharge is used, the following should be considered for discharge piping at the point of discharge:
1. Both thermal and chemical reactions (personnel hazard);
2. Combustible materials (fire hazard);
3. Surface drains (pollution and fire hazard);
4. Loop seal or rain cap on the discharge (keep both air and water out of the system);
5. Drip leg near device (prevent liquid collection); and
6. Heat tracing for systems using high freeze point fluids (prevent blockage).
[dkp5]

2.5 PRESSURE RELIEF DEVICES: SEE NBIC PART 4 for the Inspection of Pressure Relief Devices[dkp6]

~~2.5.1 SCOPE~~

~~a) The most important appurtenances on any pressurized system are the pressure relief devices provided for overpressure protection of that system. These are devices such as safety valves, safety relief valves, pilot valves, and rupture disks or other non-reclosing devices that are called upon to operate and reduce an overpressure condition.~~
~~b) These devices are not designed or intended to control the pressure in the system during normal operation. Instead, they are intended to function when normal operating controls fail or abnormal system conditions are encountered.~~
~~c) Periodic inspection and maintenance of these important safety devices is critical to ensure their continued functioning and availability when called upon to operate. See NBIC Part 2, 2.5.8 for recommended testing frequency for PRDs.~~
~~d) Inspection areas of concern include:~~
~~1) correct set pressure;~~
~~2) safety considerations;~~
~~3) device data;~~
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~~4) condition of the device;~~
~~5) condition of the installation; and~~
~~6) testing and operational inspection.~~

~~2.5.2 PRESSURE RELIEF DEVICE DATA~~

~~a) Nameplate marking or stamping of the device should be compared to stamping on the protected pressureretaining item. For a single device, the set pressure shall be no higher than the Maximum Allowable Working Pressure (MAWP) marked on the protected pressure-retaining item or system.~~
~~b) If multiple devices are provided, the difference between set pressures shall not exceed that permitted by the original code of construction. The set pressure of additional devices may exceed the MAWP, as permitted by the original Code of Construction.~~
~~c) Verify nameplate capacity and, if possible, compare to system capacity requirements.~~
~~d) Check identification on seals and ensure they match nameplates or other identification (repair or reset nameplate) on the valve or device.~~

~~2.5.3 INSERVICE INSPECTION REQUIREMENTS FOR PRESSURE RELIEF DEVICE CONDITIONS~~

~~a) Check for evidence that the valve or device is leaking or not sealing properly. Evidence of leakage through pressure-relief valves may indicate that the system is being operated at a pressure that is too close to the valve's set pressure. See NBIC Part 2, Supplement 8.~~
~~b) Seals for adjustments should be intact and show no evidence of tampering.~~

c) Connecting bolting should be tight and all bolts intact.
d) The valve or device should be examined for deposits or material buildup.
e) Evidence of rust or corrosion should be checked.
f) Check for damaged or misapplied parts.
g) If a drain hole is visible, ensure it is not clogged with debris or deposits.
h) Check for test gages left in place after pressure testing of the unit.
i) Bellows valves shall be checked to ensure the bonnet vent is open or piped to a safe location. The vent shall not be plugged since this will cause the valve set pressure to be high if the bellows develops a leak. Leakage noted from the vent indicates the bellows is damaged and will no longer protect the valve from the effects of back pressure.
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2.5.4 INSERVICE INSPECTION REQUIREMENTS FOR PRESSURE RELIEF DEVICES INSTALLATION CONDITION

a) Inspect inlet piping and ensure it meets the requirements of the original Code of Construction. For pressure relief valves, check that the inlet pipe size is not smaller than the device inlet size.
b) Inspect discharge piping and ensure it meets the original Code of Construction. Check that the discharge pipe size is not smaller than the device outlet size.
c) Check that the valve drain piping is open.
d) Check drainage of discharge piping.
e) Check that inlet and discharge piping are not binding or placing excessive stress on the valve body, which can lead to distortion of the valve body and leakage or malfunction.
f) Check the condition and adequacy of piping supports. Discharge piping should be supported independent of the device itself.
g) Check for possible hazards to personnel from the valve discharge or discharge pipe.
h) Check that there are no intervening isolation valves between the pressure source and the valve inlet or between the valve outlet and its point of discharge. (Isolation valves may be permitted in some pressure vessel service. [(See NBIC Part 1, 5.3.6 e), and jurisdictional requirements. Isolation valves are not permitted for power boilers, heating boilers, or water heaters.]
i) A change-over valve, which is used to install two pressure relief devices on a single vessel location for the purpose of switching from one device to a spare device, is not considered a block valve if it is arranged such that there is no intermediate position that will isolate both pressure relief devices from the protected system. Change-over valves should be carefully evaluated to ensure they do not have excessive pressure drop that could affect the pressure relief device operation or capacity. These devices are commonly used in pressure vessel service. They may also be used in some boiler applications. It is recommended that the Jurisdiction be contacted to determine their acceptability on boiler applications.

2.5.5 ADDITIONAL INSPECTION REQUIREMENTS

Additional items should be considered for the specified services.

2.5.5.1 BOILERS

a) If boilers are piped together with maximum allowable working pressures differing by more than 6%, additional protective devices may be required on the lower pressure units to protect them from overpressure from the higher pressure unit.
b) Hot-Water Heating Boilers and Water Heaters
1) These units generally do not use any water treatment and therefore may be more prone to problems with deposits forming that may impair a safety device's operation. Particular attention should be paid to signs of leakage through valves or buildups of deposits.
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2) Hot-water boilers tend to have buildups of corrosion products since the system is closed with little makeup. These products can foul or block the valve inlet.

3) Water heaters will have cleaner water due to continuous makeup. However, these valves usually have a thermal element that will cause the valve to open slightly when the water is heated and not removed from the system. When this hot water evaporates in the discharge piping, calcium deposits may tend to form in the valve inlet and outlet.

2.5.5.2 PRESSURE VESSELS AND PIPING

Standard practice for overpressure protection devices is to not permit any type of isolation valve either before or after the device. However, some pressure vessel standards permit isolation valves under certain controlled conditions when shutting down the vessel to repair a damaged or leaking valve. If isolation block valves are employed, their use should be carefully controlled by written procedures. Block valves should have provisions to be either cap-sealed or locked in an open position when not being used. For ASME Section VIII, Div. 1 pressure vessels, see UG-135, Appendix M, and jurisdictional rules for more information.

2.5.5.3 RUPTURE DISKS

a) Rupture disks or other non-reclosing devices may be used as sole relieving devices or in combination with safety relief valves to protect pressure vessels.

b) The selection of the correct rupture disk device for the intended service is critical to obtaining acceptable disk performance. Different disk designs are intended for constant pressure, varying pressure, or pulsating pressure. Some designs include features that make them suitable for back pressure and/or internal vacuum in the pressure vessel.

c) The margin between the operating pressure and the burst pressure is an important factor in obtaining acceptable performance and service life of the disk. Flat and pre-bulged solid metal disks are typically used with an operating pressure that is no more than 60% to 70% of the burst pressure. Other designs are available that increase the operating pressure to as much as 90% of the burst pressure. Disks that have been exposed to pressures above the normal operating pressure for which they are designed are subject to fatigue or creep and may fail at unexpectedly low pressures. Disks used in cyclic service are also subject to fatigue and may require a greater operating margin or selection of a device suitable for such service.

d) The disk material is also critical to obtaining acceptable service life from the disk. Disks are available in a variety of materials and coatings, and materials that are unaffected by the process fluid should be used. Disks that experience corrosion may fail and open at an unexpectedly low pressure.

e) Disk designs must also be properly selected for the fluid state. Some disk types are not suitable for use in liquid service. Some disks may have a different flow resistance when used in liquid service, which may affect the sizing of the disk.

f) Information from the rupture disk manufacturer, including catalog data and installation instructions, should be consulted when selecting a disk for a particular service.

g) For rupture disks and other non-reclosing devices, the following additional items should be considered during inspections.

1) The rupture disk nameplate information, including stamped burst pressure and coincident temperature, should be checked to ensure it is compatible with the intended service. The coincident temperature on the rupture disk shall be the expected temperature of the disk when the disk is expected to burst and will usually be related to the process temperature, not the temperature on the pressure vessel nameplate.

2) Markings indicating direction of flow should be checked carefully to ensure they are correct. Some rupture disks when installed in the incorrect position may burst well above the stamped pressure.

3) The marked burst pressure for a rupture disk installed at the inlet of a safety relief valve shall be equal to or less than the safety relief valve set pressure. A marked burst pressure of 90% to 100% of the safety relief valve set pressure is recommended. A disk with a non-fragmenting design that cannot affect the safety relief valve shall be used.

Note: If the safety relief valve set pressure is less than the vessel MAWP, the marked burst pressure may be higher than the valve set pressure, but no higher than the MAWP.

4) Check that the space between a rupture disk and a safety relief valve is supplied with a pressure gage, try cock, or telltale indicator to indicate signs of leakage through the rupture disk. The safety relief valve

shall be inspected and the leaking disk shall be replaced if leakage through the disk is observed.
5) If a rupture disk is used on a valve outlet, the valve design must be of a type not influenced by back pressure due to leakage through the valve. Otherwise, for nontoxic and non-hazardous fluids, the space between the valve and the ruptured disk shall be vented or drained to prevent the accumulation of pressure.
6) For rupture disks installed on the valve inlet, the installation should be reviewed to ensure that the combination rules of the original Code of Construction have been applied. A reduction in the valve capacity up to 10% is expected when used in combination with a non-reclosing device.
7) The frequency of inspection for rupture disks and other non-reclosing devices is greatly dependent on the nature of the contents and operation of the system and only general recommendations can be given. Inspection frequency should be based on previous inspection history. If devices have been found to be leaking, defective, or damaged by system contents during inspection, intervals should be shortened until acceptable inspection results are obtained. With this in mind, the inspection frequency guidelines specified in NBIC Part 2, 2.5.8 are suggested for similar services.
8) Rupture disks are often used to isolate pressure relief valves from services where fouling or plugging of the valve inlet occurs. This tendency should be considered in establishing the inspection frequency.
9) Since these devices are for one time use, a visual inspection is the only inspection that can be performed. Rupture disks that are installed using a specified bolting torque procedure cannot be reused after inspection and must be replaced.
10) It is recommended that all rupture disks be replaced periodically to prevent unintended failure while in service due to deterioration of the device.
Rupture disks should be checked carefully for damage prior to installation and handled by the disk edges, if possible. Any damage to the surface of the ruptured disk can affect the burst pressure.
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2.5.6 PACKAGING, SHIPPING AND TRANSPORTATION

a) The improper packaging, shipment, and transport of pressure relief devices can have detrimental effects on device operation. Pressure relief devices should be treated with the same precautions as instrumentation, with care taken to avoid rough handling or contamination prior to installation.
b) The following practices are recommended:
1) Valves should be securely fastened to pallets in the vertical position to avoid side loads on guiding surfaces except threaded and socket-weld valves up to 2 in. (50mm) may be securely packaged and cushioned during transport;
2) Valve inlet and outlet connection, drain connections, and bonnet vents should be protected during shipment and storage to avoid internal contamination of the valve. Ensure all covers and/or plugs are removed prior to installation;
3) The valve should not be picked up or carried using the lifting lever. Lifting levers should be wired or secured so they cannot be moved while the valve is being shipped or stored. These wires shall be removed before the valve is placed in service;
4) Pilot valve tubing should be protected during shipment and storage to avoid damage and/or breakage.

2.5.7 TESTING AND OPERATIONAL INSPECTION OF PRESSURE RELIEF DEVICES

a) Pressure relief valves must be tested periodically to ensure that they are free to operate and will operate in accordance with the requirements of the original Code of Construction. Testing should include device set or opening pressure, reclosing pressure, where applicable, and seat leakage evaluation. Tolerances specified for these operating requirements in the original Code of Construction shall be used to determine the acceptability of test results.
b) Testing may be accomplished by the owner on the unit where the valve is installed or at a qualified test facility. In many cases, testing on the unit may be impractical, especially if the service fluid is hazardous or toxic. Testing on the unit may involve the bypassing of operating controls and should only be performed by qualified individuals under carefully controlled conditions. It is recommended that a written procedure be available to conduct this testing.
1) The Inspector should ensure that calibrated equipment has been used to perform this test and the results should be documented by the owner.
2) If the testing was performed at a test facility, the record of this test should be reviewed to ensure the

valve meets the requirements of the original Code of Construction. Valves which have been in toxic, flammable, or other hazardous services shall be carefully decontaminated before being tested. In particular, the closed bonnet of valves in these services may contain fluids that are not easily removed or neutralized. If a test cannot be performed safely, the valve shall be disassembled, cleaned, and decontaminated, repaired, and reset.
3) If a valve has been removed for testing, the inlet and outlet connections should be checked for blockage by product buildup or corrosion.
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c) Valves may be tested using lift assist devices when testing at full pressure may cause damage to the valve being tested, or it is impractical to test at full pressure due to system design considerations. Lift assist devices apply an auxiliary load to the valve spindle or stem, and using the measured inlet pressure, applied load and other valve data allow the set pressure to be calculated. If a lift assist device is used to determine valve set pressure, the conditions of NBIC Part 3, 4.5.3 shall be met. It should be noted that false set pressure readings may be obtained for valves which are leaking excessively or otherwise damaged.
d) If valves are not tested on the system using the system fluid, the following test mediums shall be used:
1) High pressure boiler safety valves, high temperature hot-water boiler safety relief valves, low pressure steam heating boilers: steam;
2) Hot-water heating boiler safety relief valves: steam, air, or water;
3) Hot water heater temperature and pressure relief valves: air or water;
4) Air and gas service process safety relief valves: air, nitrogen, or other suitable gas;
5) Liquid service process pressure relief valves: water or other suitable fluid;
6) Process steam service safety relief valves: steam or air with manufacturer's steam to air correction factor.
Note: Valves being tested after a repair must be tested on steam except as permitted by NBIC Part 3, 4.5.2.
e) As an alternative to a pressure test, the valve may be checked by the owner for freedom of operation by activating the test or "try" lever (manual check). For high pressure boiler and process valves, this test should be performed only at a pressure greater than 75% of the stamped set pressure of the valve or the lifting device may be damaged. This test will only indicate that the valve is free to operate and does not provide any information on the actual set pressure. All manual checks should be performed with some pressure under the valve in order to flush out debris from the seat that could cause leakage.
Note: The manual check at 75% or higher is based on lift lever design requirements for ASME Section I and VIII valves. Code design requirements for lifting levers for ASME Section IV valves require that the valve be capable of being lifted without pressure.
f) If a valve is found to be stuck closed, the system should immediately be taken out of service until the condition can be corrected, unless special provisions have been made to operate on a temporary basis (such as additional relief capacity provided by another valve).
g) If a pressure test indicates the valve does not open within the requirements of the original Code of Construction, but otherwise is in acceptable condition, minor adjustments (defined as no more than twice the permitted set pressure tolerance) shall be made by an organization accredited by the National Board to reset the valve to the correct opening pressure. All adjustments shall be resealed with a seal identifying the responsible organization and a tag shall be installed identifying the organization and the date of the adjustment.
h) If a major adjustment is needed, this may indicate the valve is in need of repair or has damaged or misapplied parts. Its condition should be investigated accordingly.
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i) Systems with multiple valves will require the lower set valves to be held closed to permit the higher set valves to be tested. A test clamp or "gag" should be used for this purpose. The spring compression screw shall not be tightened. It is recommended that the test clamps be applied in accordance with the valve

manufacturer's instructions when the valve is at or near the test temperature, and be applied hand tight only to avoid damage to the valve stem or spindle.
j) Upon completion of set pressure testing, all pressure relief valve gags shall be removed.

2.5.8 RECOMMENDED INSPECTION AND TEST FREQUENCIES FOR PRESSURE RELIEF DEVICES

a) Power Boilers
1) Pressure less than 400 psig (2.76 MPa): Manual check every 6 months; pressure test annually to verify nameplate set pressure or as determined by operating experience as verified by testing history.
2) Pressure greater than 400 psig (2.76 MPa): Pressure test to verify nameplate set pressure every three years or as determined by operating experience as verified by testing history.
3) Pressure tests should be performed prior to bringing the boiler down for planned internal inspection so needed repairs or adjustments can be made while the boiler is down.
b) High-Temperature Hot-Water Boilers
Pressure test annually to verify nameplate set pressure or as determined by operating experience as verified by testing history. For safety reasons, removal and testing on a steam test bench is recommended. Such testing will avoid damaging the safety valve by discharge of a steam-water mixture, which could occur if the valve is tested in place.
c) Low-Pressure Steam Heating Boilers
Manual check quarterly; pressure test annually prior to steam heating season to verify nameplate set pressure.
d) Hot-Water Heating Boilers
Manual check quarterly; pressure test annually prior to heating season to verify nameplate set pressure.
Note: The frequencies specified for the testing of pressure relief valves on boilers is primarily based on differences between high pressure boilers that are continuously manned, and lower pressure automatically controlled boilers that are not monitored by a boiler operator at all times. When any boiler experiences an overpressure condition such that the safety or safety relief valves actuate, the valves should be inspected for seat leakage and other damage as soon as possible and any deficiencies corrected.
e) Water Heaters
Manual check every two months. Due to the relatively low cost of safety valves for this service, it is recommended that a defective valve be replaced with a new valve if a repair or resetting is indicated.
f) Pressure Vessels and Piping
Frequency of test and inspection of pressure relief devices for pressure vessel and piping service is greatly dependent on the nature of the contents and operation of the system and only general recommendations can be given. Inspection frequency should be based on previous inspection history. If valves are found to be defective or damaged by system contents during inspection, intervals should be shortened until acceptable inspection results are obtained. Where test records and/or inspection history are not available, the following inspection and test frequencies are suggested:
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Service Inspection Frequency
Steam Annual
Air and Clean Dry Gases Every three years
Pressure relief valves in
combination with rupture
disks
Every five years
Propane, Refrigerant Every five years
All Others Per inspection history
g) Establishment of Inspection and Test Intervals
Where a recommended test frequency is not listed, the valve user and Inspector must determine and agree on a suitable interval for inspection and test. Some items to be considered in making this determination are:
1) Jurisdictional requirements;
2) Records of test data and inspections from similar processes and similar devices in operation at that

facility;
3) Recommendations from the device manufacturer. In particular, when the valve includes a non-metallic part such as a diaphragm, periodic replacement of those parts may be specified;
4) Operating history of the system. Systems with frequent upsets where a valve has actuated require more frequent inspection;
5) Results of visual inspection of the device and installation conditions. Signs of valve leakage, corrosion or damaged parts all indicate more frequent operational inspections;
6) Installation of a valve in a system with a common discharge header. Valves discharging into a common collection pipe may be affected by the discharge of other valves by the corrosion of parts in the outlet portion of the valve or the buildup of products discharged from those valves;
7) Ability to coordinate with planned system shutdowns. The shutdown of a system for other maintenance or inspection activities is an ideal time for the operational inspection and test of a pressure relief valve;
8) Critical nature of the system. Systems that are critical to plant operation or where the effects of the discharge of fluids from the system are particularly detrimental due to fire hazard, environmental damage, or toxicity concerns all call for more frequent inspection intervals to ensure devices are operating properly;
9) Where the effects of corrosion, blockage by system fluid, or ability of the valve to operate under given service conditions are unknown (such as in a new process or installation), a relatively short inspection interval, not to exceed one year or the first planned shutdown, whichever is shorter, shall be established. At that time the device shall be visually inspected and tested. If unacceptable test results are obtained, the inspection interval shall be reduced by 50% until suitable results are obtained.
h) Establishment of Service Intervals
1) The above intervals are guidelines for periodic inspection and testing. Typically if there are no adverse findings, a pressure relief valve would be placed back in service until the next inspection. Any unacceptable conditions that are found by the inspection shall be corrected immediately by repair or
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replacement of the device. Many users will maintain spare pressure relief devices so the process or system is not affected by excessive downtime.
2) Pressure relief valves are mechanical devices that require periodic preventive maintenance even though external inspection and test results indicate acceptable performance. There may be wear on internal parts, galling between sliding surfaces or internal corrosion, and fouling which will not be evident from an external inspection or test. Periodic re-establishment of seating surfaces and the replacement of soft goods such as o-rings and diaphragms are also well advised preventive maintenance activities that can prevent future problems. If the valve is serviced, a complete disassembly, internal inspection, and repair as necessary, such that the valve's condition and performance are restored to a like-new condition, should be done by an organization accredited by the National Board.
3) Service records with test results and findings should be maintained for all overpressure protection devices. A service interval of no more than three inspection intervals or ten years, whichever is less, is recommended to maintain device condition. Results of the internal inspection and maintenance findings can then be used to establish future service intervals.

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recommendations are followed. Extreme caution should be employed to ensure only enough force is applied to contain pressure. Excessive mechanical force applied to the spindle restraint may result in damage to the seat and/or spindle and may interfere with proper operation of the valve. The spindle restraint shall be removed following the test.
The organization that performs the liquid pressure test and applies a spindle restraint shall attach a metal tag that identifies the organization with the date the work was performed to the pressure relieving device. If the seal was broken, the organization shall reseal the adjustment housing with a seal that identifies the responsible

organization. The process shall be acceptable to the Jurisdiction where pressure-retaining items are installed. [dkp7]

Metal temperature shall not be more than 120°F (49°C) unless the owner-user specifies the requirement for a higher test temperature. If the owner-user specifies a test temperature higher than 120°F (49°C), then precautions shall be taken to afford the Inspector close examination without risk of injury.

Hold-time for liquid pressure tests shall be for a minimum of 10 minutes prior to examination by the Inspector. Test pressure shall be maintained for the time necessary for the Inspector to conduct inspection.

4.3.1.3 PNEUMATIC PRESSURE TESTING

A pressure test using a compressible gas should not be considered due to potential hazard unless a liquid pressure test cannot be performed without damaging the pressure-retaining item or causing contamination of internal surfaces of the pressure-retaining item.

Concurrence of the owner and Inspector shall be obtained and the Jurisdiction, where required, prior to conducting a pneumatic test. The test pressure shall be the minimum required to verify leak tightness integrity but shall not exceed maximum pneumatic test pressure of the original code of construction. Precautionary requirements of the original code of construction shall be followed.

WARNING: Adequate safety precautions shall be taken to ensure personnel safety when a compressible gas is used due to volumetric expansion potential upon release of pressure test gas. Consideration shall be given to possible asphyxiation hazards.

Properly calibrated instrumentation shall be used to detect leakage of testing medium. Instrumentation selected shall be appropriate for the test medium. Instrumentation may detect changes in pressure or chemical concentrations and shall be sensitive enough to detect leakage.

4.4 METHODS TO ASSESS DAMAGE MECHANISMS AND INSPECTION FREQUENCY FOR PRESSURE-RETAINING ITEMS [dkp8]

1) The anticipated length of time the locomotive will be stored;
2) Whether storage will be indoors or outdoors;
3) Anticipated weather conditions during the storage period;
4) The availability of climate-controlled storage;
5) Type of fuel used; and
6) Equipment available at the storage site.

b) Indoor storage can be categorized into two types: indoor with climate control, and indoor without climate control.

c) Outdoor storage can also be categorized into two types: outdoors during a warm time of year or in a geographic location where it can reasonably be expected to be above freezing during storage, and outdoors during a time period or in a geographic location where it can be expected that freezing temperatures will occur during storage.

d) Locomotive boilers may be stored using the "wet method" or the "dry method."

e) Before any method of storage, the boiler must be thoroughly washed out with mud and scale removed from the mudring, crownsheet, bottom of the barrel, and the top of the firing door.

S1.5.2 WET STORAGE METHOD

a) When utilizing the "wet storage method" the boiler is completely filled with treated water to exclude air.

Note: This method cannot be used if the locomotive is exposed to freezing weather during storage.

b) Chemicals may be added to the storage water to further inhibit corrosion. However, depending on the chemical used, the treated water may have to be disposed of as a hazardous waste to prevent chemical contamination of the surrounding property.

c) The procedure applies only to the sections of the boiler that contain water. The firebox interior, cylinders, piping, and auxiliary equipment of the locomotive still require draining, preservation, and dry storage.

S1.5.3 DRY STORAGE METHOD

a) When utilizing the "dry storage method" the boiler is completely emptied of water, dried out, and allowed to stand empty. Several variations of the "dry method" may be used. These include but are not limited to:

1) airtight storage with a moisture absorbent placed in trays in the boiler;

2) airtight storage with the boiler filled with inert gas to exclude oxygen; and
3) open air storage with the mudring washout plugs removed to enable air circulation for evaporation of formed moisture.
b) Each variation has positive and negative points that must be taken into account before use. If the boiler is filled with inert gas such as nitrogen, care must be taken because this method can result in asphyxiation of personnel if the gas escapes the boiler through a leaking valve or washout plug and enters a pit, sump, or enclosed room. In addition, the boiler must be completely vented to remove gas, then tested and declared gas-free before personnel may enter.
c) Although the use of dry storage with several washout plugs removed for air circulation is the most common method, there are some potential drawbacks. The boiler interior may be subject to moisture forming from condensation created from humidity changes in the ambient air. Small animals may take up residence inside if screens are not used to cover handholes and washouts.
d) Before storage, the boiler must be thoroughly washed out with mud and scale removed from the mudring, crownsheet, bottom of the barrel, and top of the firing door. Any mud or loose scale left in the boiler will retain moisture, leading to corrosion. After washing, water must be removed and the boiler dried before storage. A portable gas or electric heater placed in the firebox to aid evaporation and drying, along with a vacuum used to siphon water out via the lower washout plugs, is recommended.
Note: Use of the common railroad drying out procedure of building a small wood fire in the firebox is not recommended because of the danger of overheating the firebox sheets.
e) The typical railroad dry storage method required blow down of the boiler until empty while steam pressure registered on the gage and removal of the washout plugs while the shell plates were hot and there was no steam pressure. This allowed the heat remaining in the boiler plates to evaporate remaining water in the boiler. However, this method may result in staybolt damage from temperature change and requires extreme care, if used.
f) Oil should not be applied to the interior surfaces of the boiler because it is difficult to remove. Further, the oil must be removed before steaming or it will form scale and contribute to foaming.

S1.5.4 RECOMMENDED GENERAL PRESERVATION PROCEDURES

a) When the locomotive is under steam, inspect piping, fittings, and appliances for steam and water leaks that may introduce moisture into the lagging. Repair leaks as necessary and remove wet lagging. Wet lagging can accelerate corrosion of the boiler external surfaces, especially staybolt sleeves and caps.

b) Thoroughly wash the boiler and firebox and remove mud and scale from the mudring, crownsheet, bottom of the barrel, and top of the firing door. Any mud or loose scale left in the boiler will retain moisture, leading to corrosion. Wash out thermic siphons, arch tubes, and circulators.
c) To protect the boiler interior during storage, dry the boiler by using compressed air to blow out as much water as possible. A portable heater placed in the firebox to warm the boiler to 200°F (93°C), along with a vacuum used to siphon water out via the lower washout plugs, can aid evaporation and drying of any moisture that collects in low or impossible-to-drain locations without harming the sheets.
Caution: To prevent a buildup of steam pressure during the drying process, the steam dome cover or top washout plugs should be removed to enable the moisture to escape. In addition, the driving wheels should be blocked and the throttle and cylinder cocks should be opened to permit any steam that forms in the superheater units to escape.
d) Superheater units, by nature of design, can be difficult to drain and dry out. Typical methods include:
1) Pressurize the boiler with compressed air with the locomotive stationary and blocked in place. Using the throttle to regulate the airflow, allow the air to blow through the entire bank of superheater units and dry pipe and discharge into the cylinders. The cylinder cocks must be open.
2) Pressurize the boiler with compressed air and then operate the locomotive under air pressure over a short distance of track. The cylinder cocks should be opened during the initial operation to prevent damaging the cylinders by hydraulic lock.
3) If the air pressure draining procedure is not practical or cannot be accomplished correctly, the superheater units can be protected against trapped moisture by filling the entire superheater bundle with a standard antifreeze/water mixture or with diesel fuel.

Notes: The air pressure dry-out methods "1" or "2" may have to be performed several times to discharge all of the moisture. Refer to NBIC Part 2, S1.5.5, *Use of Compressed Air to Drain Locomotive Components*, for additional information on compressed air drying.
If the locomotive is operated under air pressure, the air brake system should be made operational to provide safe stopping or other steps taken to control and stop the locomotive.
e) After drying, it will be necessary to either vent the boiler or to place containers of desiccant inside the boiler through the dome cap to absorb any condensation that may occur during storage. Venting the boiler to allow air circulation is accomplished by leaving two or more of the lower washout plugs out and opening the vent valve on the top of the boiler. A vent line consisting of two 90° elbows and pipe nipples should be installed in the vent valve to locate the opening to the downward direction in order to keep rain or snow from entering the open valve.
f) If the locomotive will be stored outdoors, the following should be completed:
1) Inspect the boiler jacket and confirm it is tight with no gaps leading into the lagging or shell. Pay close attention to areas at shell openings such as for studs, safety valves, etc. Repair all gaps or damaged jacket sections as necessary. Consideration should be given to covering the entire locomotive and tender with a tarp. Otherwise, all jacket openings should be covered to prevent the entrance of rain or snow. Where necessary, apply a waterproof covering over the exposed or open sections;
2) The smokestack should be sealed by applying a wood and sheet rubber cover held in place by clamps or a through bolt;

3) The safety valves should either be covered or removed, with plugs or caps installed in the holes if the valves are removed;
4) The dynamo, air pump, and feedwater heater exhausts should also be covered;
5) Empty and clean the smokebox, front tubesheet, superheater units, steam pipes, and front end plates of all coal, ash, or burnt oil. This work is especially critical at the bottom section of the smokebox and front tubesheet rivet flange. The smokebox door should be sealed by applying a gasket or sealant and any other air openings in the smokebox sealed. The exhaust nozzle should be sealed by applying a wood and sheet rubber cover held in place by clamps;
6) The potential for corrosion of the smokebox interior can be further minimized by applying a coating of outdoor paint or primer. All inspection of the smokebox and front tubesheet must be accomplished before painting since it will cover up many types of defects. The coating will burn off quickly when the locomotive is returned to service;
7) Thoroughly clean the firebox sheets, flues, and superheater return bends of all ash and clinker.
8) On coal burners, empty and clean the grates and ash pan of all coal and ash completely. This work is especially critical at the sections between the grate bearers, the mudring rivets, and firebox sheets; and from the grate segment air openings. On oil burners, care should be taken to remove ash from between the flash wall refractory and the firebox sheets;
9) If the locomotive will be out of service for longer than 12 months, removal of the brick arch or flash wall refractory that extends above the mudring should be considered to prevent condensation and corrosion from occurring between the brick and the steel. Temporary removal of the brick arch or flash wall to permit application of a preservative to firebox sides, arch tubes, or siphons should be considered for shorter storage periods;
10) All appliances and piping that might contain water or condensation should be drained and blown dry using dry compressed air. This includes the air and equalizing reservoirs, dirt collectors, injectors, cylinders, stoker engine cylinders, dynamos, the steam and water sides of feedwater heaters and pumps, the steam side of air pumps, the steam side of lubricators, atomizers, oil tank heaters, gage siphons, tank hoses, and cab heater piping. A small quantity of valve oil should be sprayed into the valve chambers, cylinders and the steam side of all appliances to protect against corrosion. Refer to S1.5.5, *Use of Compressed Air To Drain Locomotive Components*, for details;
11) The cylinder castings, exhaust cavities, and steam lines must be drained of all moisture and blown dry. Typical methods include:
a. Pressurizing the boiler with compressed air, with the locomotive stationary and blocked in place.