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**THE  
NATIONAL  
BOARD**  
OF BOILER AND  
PRESSURE VESSEL  
INSPECTORS

**NATIONAL BOARD  
SUBCOMMITTEE  
PRESSURE RELIEF DEVICES**

**MINUTES**

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Meeting of July 15, 2015  
Columbus, OH

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The National Board of Boiler & Pressure Vessel Inspectors  
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## 1. Call to Order

The meeting was called to order at 8:00 AM on Wednesday July 15, 2015 by Chairman Sid Cammeresi.

The following members and visitors were in attendance:

### Members

Marrienne Brodeur  
Thakor Patel  
R.W. Donalson  
Kevin Simmons  
Brandon Nutter  
Sid Cammeresi (Chair)  
Adam Renaldo  
Kim Beise  
David McHugh  
Benjamin Anthony  
Raymond McCaffrey  
Thomas P. Beirne, P.E.

### Affiliation

International Valve & Instrument Corp.  
Farris Engineering  
Pentair Valves and Controls  
Pentair Valves and Controls  
DuPont  
Furmanite America  
Praxair  
Dowco Valve Co., Inc.  
Allied Valve, Inc.  
State of Rhode Island  
Quality Valve, Inc.  
National Board (Subcommittee Secretary)

### Members Not Present

Robert "Buddy" Dobbins  
Denis DeMichael  
J. Alton Cox

Zurich N.A.  
The Chemours Company  
JAC Consulting, Inc.

### Visitors

Dan Marek  
Tom Tarbay\*  
Joseph Ball

Mainthia Technologies  
TRT Consultants  
National Board

\*Alternate for J. Alton Cox

## 2. Announcements

Mr. Cammeresi announced the reception for Wednesday and meals provided.

## 3. Adoption of the Agenda

The agenda dated June 26, 2015 was presented. Two new action items were added to this agenda. It was moved and seconded to approve the agenda with the addition of the items placed under new business. The motion was unanimously approved.

#### 4. Approval of Minutes of January 21, 2015

It was moved and seconded to approve the minutes of the January 2015 meeting of the Subcommittee on Pressure Relief Devices with the correction of a typo. The motion was unanimously approved.

#### 5. Review of the Roster

##### a. Nominations

There are no nominations for new membership to SC PRD.

##### b. Reappointments

- Mr. Sid Cammeresi, Ms. Marianne Brodeur, Mr. Denis DeMichael, and Mr. Robert Donalson are eligible for reappointment to the Subcommittee on Pressure Relief Devices. All would like to continue their membership. The membership items are included on the main committee agenda for action.

##### c. Officer Selection

- Mr. Sid Cammeresi was the only nominee for Chairman for Subcommittee on Pressure Relief Devices. A motion was made, seconded, and unanimously approved to reappoint Mr. Cammeresi as Chairman of NBIC Sub-Committee on Pressure Relief Devices

#### 6. Interpretations

<b>Item Number:</b> IN15-0301	<b>NBIC Location:</b> Part 2, 2.5.8	<b>See Attachment A</b>
<b>General Description:</b> Three interpretation questions regarding pressure relief device storage.		
<b>Subgroup:</b> N/A		
<b>Task Group:</b> None Assigned		
<b>Meeting Action:</b> It was determined that there was no language in the NBIC that addresses the inquirer's request. The SC-PRD drafted a proposed response. A motion was made, seconded, and unanimously accepted to approve the response. Additionally a new action item was opened to give guidance for storage and shelf life. The action item number is NB15-0324.		

## 7. Action Items

<b>Item Number: NB11-0401</b>	<b>NBIC Location: TBD</b>	<b>No Attachment</b>
<p><b>General Description:</b> Investigate the development of a possible fourth part of the NBIC to cover pressure relief devices</p> <p><b>Task Group:</b> Entire Sub-committee</p> <p><b>Meeting Action:</b> Draft Part 4 is currently out for review and comment. The review and comment period will be left open until the end of July. Barring no comments a letter ballot will be issued to SC-PRD.</p>		

<b>Item Number: NB12-0901</b>	<b>NBIC Location: Part 3</b>	<b>No Attachment</b>
<p><b>General Description:</b> Prepare a guide for repair of tank vents</p> <p><b>Task Group:</b> D. DeMichael (PM), K. Simmons, B. Donalson, B. Dobbins, K. Beise, B. Nutter</p> <p><b>Meeting Action:</b> Mr. Nutter asked to be added to the task group. There are two manufacturers interested in helping with the guidelines. Task group members will try and recruit more. No further progress was made on this item.</p>		

<b>Item Number: NB13-1901</b>	<b>NBIC Location: TBD</b>	<b>No Attachment</b>
<p><b>General Description:</b> Add a provision to the NBIC to allow for the partial disassembly and cleaning of an ASME Section XII valve without changing the set pressure adjustments and without having to do a complete VR</p> <p><b>Task Group:</b> J. Ball (PM), R. McCaffrey, B. Nutter, T. Patel, D. McHugh</p> <p><b>Meeting Action:</b> One manufacturer's valves were tested. Other manufacturers were determined as not having this type of valve. Task group members to gage interest in this topic and determine whether or not it is worth keeping open for just one manufacturer or close item with no action.</p>		

<b>Item Number: NB14-0602A</b>	<b>NBIC Location: Part 1</b>	<b>No Attachment</b>
<p><b>General Description:</b> Improve index in Part 1 relating to pressure relief devices</p> <p><b>Task Group:</b> B. Anthony (PM), M. Broedeur, S. Cammeresi</p> <p><b>Meeting Action:</b> No additional progress was made on this item. This item will be continued to be worked in parallel with the development of the new Part 4.</p>		

<b>Item Number: NB14-0602B</b>	<b>NBIC Location: Part 2</b>	<b>No Attachment</b>
<p><b>General Description:</b> Improve index in Part 2 relating to pressure relief devices</p> <p><b>Task Group:</b> D. DeMichael, B. Dobbins, B. Donalson</p> <p><b>Meeting Action:</b> No additional progress was made on this item. This item will be continued to be worked in parallel with the development of the new Part 4.</p>		

<b>Item Number: NB14-0602C</b>	<b>NBIC Location: Part 3</b>	<b>No Attachment</b>
<b>General Description:</b> Improve index in Part 2 relating to pressure relief devices		
<b>Task Group:</b> B. Nutter (PM), R. McCaffrey, T. Patel, K. Simmons		
<b>Meeting Action:</b> No additional progress was made on this item. This item will be continued to be worked in parallel with the development of the new Part 4.		

<b>Item Number: NB14-0603</b>	<b>NBIC Location: Part 3, 1.7.5.4 i), 4.5</b>	<b>No Attachment</b>
<b>General Description:</b> Review record retention requirements for pressure relief devices		
<b>Task Group:</b> B. Dobbins (PM), K. Beise, A. Renaldo		
<b>Meeting Action:</b> No progress was made on this item.		

<b>Item Number: NB15-0103</b>	<b>NBIC Location: Part 1, 2.9.6 c)</b>	<b>No Attachment</b>
<b>General Description:</b> Update requirements for power boiler pressure relief valve mounting and discharge		
<b>Task Group:</b> R. McCaffrey, (PM), J. Ball, D. Marek		
<b>Meeting Action:</b> This item was transferred from SC-Installation. A task group was formed.		

<b>Item Number: NB15-0301</b>	<b>NBIC Location: Part 3, 4.5.2</b>	<b>No Attachment</b>
<b>General Description:</b> Evaluate backpressure testing requirement for owner/users		
<b>Task Group:</b> A. Cox (PM), T. Tarbay, D. DeMichael, B. Dobbins, B. Nutter		
<b>Meeting Action:</b> A draft proposal was made as a progress report. Mr. Nutter asked to be added to task group.		

<b>Item Number: NB15-0302</b>	<b>NBIC Location: Part 3, 5.12.3 d)</b>	<b>See Attachment B</b>
<b>General Description:</b> Review blowdown requirements		
<b>Task Group:</b> B. Donalson (PM), T. Patel		
<b>Meeting Action:</b> A proposal was presented by Mr. Patel. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0303</b>	<b>NBIC Location: Part 1, 4.5.1 and 5.3.1</b>	<b>See Attachment C</b>
<b>General Description:</b> Evaluate wording for capacity certification for resistance to flow		
<b>Task Group:</b> B. Nutter (PM), K. Simmons		
<b>Meeting Action:</b> A proposal was presented by Mr. Nutter. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0304</b>	<b>NBIC Location: Part 3, 5.12.3</b>	<b>No Attachment</b>
<b>General Description:</b> Review verification of manufacturer's nameplate information		
<b>Task Group:</b> B. Nutter (PM), S. Irvin, D. McHugh		
<b>Meeting Action:</b> A proposal was presented by Mr. Nutter. A motion was made and seconded to accept the proposal. After discussion the motion was withdrawn and the proposal will be revised.		

<b>Item Number: NB15-0305</b>	<b>NBIC Location: Part 1</b>	<b>No Attachment</b>
<b>General Description:</b> Create Guidelines for Installation of Overpressure Protection by System Design.		
<b>Task Group:</b> B. Dobbins (PM), B. Nutter, A. Renaldo, D. Marek		
<b>Meeting Action:</b> No progress was made on this item.		

<b>Item Number: NB15-0306</b>	<b>NBIC Location: Part 1, 2.9.2</b>	<b>See Attachment D</b>
<b>General Description:</b> Use of Pilot Operated Valves with Forced Flow Steam Generators.		
<b>Task Group:</b> K. Simmons (PM), T. Patel		
<b>Meeting Action:</b> A proposal was presented by Mr. Patel. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0307</b>	<b>NBIC Location: Part 3</b>	<b>No Attachment</b>
<b>General Description:</b> Create Guidelines for Repair of Pin Devices.		
<b>Task Group:</b> D. McHugh (PM), J. Satterthwaite		
<b>Meeting Action:</b> Mr. McHugh received some repair guidelines from one pin device manufacturer and is trying to get input from a few more manufacturers. Mr. Beirne to give Mr. McHugh a list of manufacturers of pin devices along with contacts. Should have some guidelines written out for next meeting.		

<b>Item Number: NB15-0308</b>	<b>NBIC Location: Part 1</b>	<b>No Attachment</b>
<b>General Description:</b> - Create Guidelines for Installation of Pressure Relief Devices for Organic Fluid Vaporizers.		
<b>Task Group:</b> T. Patel (PM), K. Beise, B. Dobbins, B. Nutter		
<b>Meeting Action:</b> Mr. Nutter asked to be added to the task group. Work continues on this item.		

<b>Item Number: NB15-0310</b>	<b>NBIC Location: Part 3, 1.7.5.4</b>	<b>No Attachment</b>
<b>General Description:</b> Give Guidance as to Which Spring Chart Should be used in Repairs.		
<b>Task Group:</b> A. Cox (PM), B. Nutter, M. Brodeur, T. Patel, K. Simmons, R. McCaffrey		
<b>Meeting Action:</b> No progress was made on this item.		

<b>Item Number: NB15-0311</b>	<b>NBIC Location: Part 1, 4.5.4 b)</b>	<b>See Attachment E</b>
<b>General Description:</b> - Clarify Text for Fire Condition PRV Installation Requirements.		
<b>Task Group:</b> B. Nutter (PM), K. Beise, D. Marek		
<b>Meeting Action:</b> A proposal was presented by Mr. Nutter. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0312</b>	<b>NBIC Location: Part 2, 2.57 and 2.5.8</b>	<b>No Attachment</b>
<b>General Description:</b> Re-evaluate T&P Valve Inspection Requirements Based on Robert Boiko Presentation.		
<b>Task Group:</b> B. Dobbins, R. Boiko, B. Anthony, J. Ball (PM), A. Cox, A. Renaldo		
<b>Meeting Action:</b> No progress was made on this item. PM was changed to J. Ball.		

<b>Item Number: NB15-0313</b>	<b>NBIC Location: Part 1, 3.9.4.7</b>	<b>See Attachment F</b>
<b>General Description:</b> Clarify Text to Better Define Valve Outlet Area.		
<b>Task Group:</b> T. Patel (PM), D. Marek		
<b>Meeting Action:</b> A proposal was presented by Mr. Patel. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0314</b>	<b>NBIC Location: Part 1, 3.9.4.2</b>	<b>No Attachment</b>
<b>General Description:</b> Review of Y-Base or Valve less Headers for Use in T&P Valve Installations.		
<b>Task Group:</b> B. Dobbins (PM), D. McHugh		
<b>Meeting Action:</b> No progress was made on this item.		

<b>Item Number: NB15-0315</b>	<b>NBIC Location: Part 1, 4.5.6 and 5.3.6</b>	<b>No Attachment</b>
<b>General Description:</b> Review isolation Valve Requirements.		
<b>Task Group:</b> D. DeMichael (PM), B. Nutter, A. Renaldo		
<b>Meeting Action:</b> A draft proposal was presented by Mr. Renaldo as a progress report.		

<b>Item Number: NB15-0317</b>	<b>NBIC Location: Part 1, 5.3.1 a)</b>	<b>See Attachment G</b>
<b>General Description:</b> Capacity certification for pressure relief devices in piping systems – currently in conflict with B31.3.		
<b>Task Group:</b> K. Beise (PM), D. Marek, D. Gonzales		
<b>Meeting Action:</b> At the request of the PM a proposal was presented by Mr. Nutter. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0320</b>	<b>NBIC Location: Part 2, 2.5.5.3 g) 9)</b>	<b>See Attachment H</b>
<b>General Description:</b> Review torqued flanged disk requirements		
<b>Task Group:</b> B. Nutter (PM)		
<b>Meeting Action:</b> A proposal was presented by Mr. Nutter. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0321</b>	<b>NBIC Location: Part 2, 2.5.7 a)</b>	<b>No Attachment</b>
<b>General Description:</b> Review testing requirements for inservice testing of pressure relief devices		
<b>Task Group:</b> A. Cox (PM), A. Renaldo, J. Satterthwaite		
<b>Meeting Action:</b> A draft proposal was presented by Mr. Renaldo as a progress report.		

<b>Item Number: NB15-1004</b>	<b>NBIC Location: All</b>	<b>No Attachment</b>
<b>General Description:</b> Update “stamp” vs. “certification” language to maintain consistency with ASME code		
<b>Task Group:</b> B. Nutter (PM), T. Beirne		
<b>Meeting Action:</b> A task group was formed to work on this item.		

<b>Item Number: NB15-2401</b>	<b>NBIC Location: Part 3, 4.5.2</b>	<b>No Attachment</b>
<b>General Description:</b> Steam set on air by non-owner-user.		
<b>Task Group:</b> R. Donalson (PM), T. Patel		
<b>Meeting Action:</b> A task group was formed to work on this item.		

## 8. New Business

<b>Item Number: NB15-0322</b>	<b>NBIC Location: Part 3, S7.5c)</b>	<b>See Attachment J</b>
<b>General Description:</b> Incorrect Paragraph Reference		
<b>Task Group:</b> None		
<b>Meeting Action:</b> SC-PRD drafted a proposal. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		

<b>Item Number: NB15-0323</b>	<b>NBIC Location: Part 3, S7.5c)3)</b>	<b>See Attachment K</b>
<b>General Description:</b> Define “Certificate of Compliance”		
<b>Task Group:</b> None		
<b>Meeting Action:</b> SC-PRD drafted a proposal. A motion was made and seconded to accept the proposal. After discussion the motion was voted on and passed unanimously.		



<b>Item Number: NB15-0324</b>	<b>NBIC Location: None</b>	<b>See Attachment L</b>
<b>General Description:</b> Create Guidelines for Inspection and Testing Frequencies with respect to shelf life and storage of pressure relief valves.		
<b>Task Group:</b> A. Rendaldo (PM), B. Nutter, K. Simmons, D. Marek		
<b>Meeting Action:</b> A task group was formed to work on this item resulting from IN15-0301.		

## 9. Future Meetings

January 13, 2016 – Corpus Christi, Texas

July 20, 2016 – Columbus, Ohio

## 10. Adjournment

A motion was made, seconded, voted on, and unanimously passed to adjourn the meeting at approximately 4:45 PM

Respectfully Submitted,

Thomas P. Beirne, P.E.

Secretary, NBIC Subcommittee Pressure Relief Devices

pc: D. Douin

D. Cook

B. Besserman

There is no language in the NBIC that addresses storage or shelf life of pressure relief devices. Consult the manufacturer for recommendations on duration and proper conditions for pressure relief device storage. The NBIC Sub-Committee on Pressure Relief Devices recognizes a need to give some recommendations on this topic. An action item has been opened to address this topic.

Item NB-15-0302 Proposal 7-15-15

Part 3

**5.12.3 CHANGES TO ORIGINAL PRESSURE RELIEF VALVE NAMEPLATE INFORMATION**

- a) If the set pressure is changed, the set pressure, capacity, and blowdown, if applicable, on the original nameplate or stamping shall be marked out, but left legible. The new capacity shall be based on that for which the valve was originally certified.
- b) If service fluid is changed, the capacity, including units, on the original nameplate or stamping shall be marked out, but left legible. The new capacity shall be based on that for which the valve was originally certified, or if a conversion has been made, as described in NBIC Part 3, S7.2 on the capacity certification for the valve as converted.
- c) If the Type/Model number is changed, the Type/Model number on the original nameplate shall be marked out, but left legible.
- d) If the blowdown is changed, the blowdown, if shown on the original nameplate or stamping, shall be marked out, but left legible. The new blowdown may be based on the current ASME Code requirements.
- e) Incorrect information on the original manufacturer's nameplate shall be marked out, but left legible. Corrected information shall be indicated on the repair nameplate and noted on the document as required by the quality system.

#### 4.4.2 PRESSURE INDICATING DEVICES

The need for pressure indicating devices should be considered in the design of the pressure vessel, and when required, the scale on the dial of the pressure gage shall be at least 25% above the highest set pressure of the pressure relief device.

#### 4.5 PRESSURE RELIEF DEVICES

All pressure vessels shall be protected by pressure relief devices in accordance with the following requirements.

##### 4.5.1 DEVICE REQUIREMENTS

~~a) Pressure relief devices are to be manufactured in accordance with a national or international standard and be certified for capacity (or resistance to flow for rupture disk devices) by the National Board.~~

**a) Pressure relief devices shall be manufactured in accordance with a national or international standard and be certified for capacity or flow resistance by the National Board.**

9.

d) Pressure relief devices shall be selected (e.g., material, pressure, etc.) and installed such that their proper functioning will not be hindered by the nature of the vessel's contents.

##### 4.5.2 NUMBER OF DEVICES

At least one device shall be provided for protection of a pressure vessel. Pressure vessels with multiple chambers with different maximum allowable working pressures shall have a pressure relief device to protect each chamber under the most severe coincident conditions.

##### 4.5.3 LOCATION

- a) The pressure relief device shall be installed directly on the pressure vessel, unless the source of pressure is external to the vessel and is under such positive control that the pressure cannot exceed the maximum overpressure permitted by the original code of construction and the pressure relief device cannot be isolated from the vessel, except as permitted by NBIC Part 1, 4.5.6 e) 2).
- b) Pressure relief devices intended for use in compressible fluid service shall be connected to the vessel in the vapor space above any contained liquid or in the piping system connected to the vapor space.
- c) Pressure relief devices intended for use in liquid service shall be connected below the normal liquid line.

##### 4.5.4 CAPACITY

- a) The pressure relief device(s) shall have sufficient capacity to ensure that the pressure vessel is not exposed to pressure greater than that specified in the original code of construction.
- b) If an additional hazard can be created by exposure of a pressure vessel to fire or other unexpected source of external heat, supplemental pressure relief devices shall be installed to provide any additional capacity that should be required.
- c) Vessels connected together by a system of piping not containing valves that can isolate any pressure vessel should be considered as one unit when determining capacity requirements.
- d) Heat exchangers and similar vessels shall be protected with a pressure relief device of sufficient capacity to avoid overpressure in case of internal failure.

## 5.2.6 HANGERS AND SUPPORTS

Support of piping shall consider loads (including wind and seismic loads) imposed on equipment or existing piping to which it is attached. Non-piping attachments such as ladders and walkways, equipment supports, temporary supports, structural supports, etc., shall not be connected to the piping unless such loads have been considered in the design of the piping and its supports. Design of hangers and supports for piping shall consider loads imposed by hydrostatic pressure testing. The installer shall remove pins from non-rigid hangers and seal plugs from hydraulic snubbers and temporary supports used for installation prior to placing the piping in service.

## 5.2.7 PROTECTION AND CLEANING

The installer shall exercise care during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the piping. The installer shall inspect and, where necessary, clean the interior of the piping and its appurtenances where possible, prior to making the final closures for the presence of foreign debris.

## 5.2.8 WELDING AND BRAZING

The installer should consider the impact of performing any preheating, welding, brazing, or postweld heat treatment on valves, instrumentation, or other heat sensitive equipment and, where appropriate, review the equipment manufacturer's recommended installation procedures prior to performing the work.

## 5.2.9 BOLTING

**a) Pressure relief devices shall be manufactured in accordance with a national or international standard and be certified for capacity or flow resistance by the National Board.**

## 5.3 PRESSURE RELIEF DEVICES

When required by the original code of construction, piping shall be protected by pressure relief devices in accordance with the following requirements.

### 5.3.1 DEVICE REQUIREMENTS

~~a) Pressure relief devices are to be manufactured in accordance with a national or international standard and be certified for capacity (or resistance to flow for rupture disc devices) by the National Board.~~

- 1) In certain cases piping standards permit the use of regulators, which may include integral pressure relief valves to limit the pressure in a piping system. In this case, capacity certification of the pressure relief valve is not required.
- b) Dead weight or weighted lever pressure relief devices shall not be used.
- c) Pressure relief devices shall be selected (i.e., material, pressure, etc.) and installed such that their proper functioning will not be hindered by the nature of the piping system's contents.

### 5.3.2 NUMBER OF DEVICES

At least one pressure relief device shall be provided for protection of a piping system. A pressure relief device installed on a pressure vessel or other component connected to the piping system should be used to meet this requirement. Portions of piping systems with different maximum allowable working pressures shall have a pressure relief device to protect each portion separately.

"FOR COMMITTEE USE ONLY"

SECTION 5

**PART 1**

**2.9.2 FORCED-FLOW STEAM GENERATOR**

For a forced-flow steam generator with no fixed steamline and waterline, equipped with automatic controls and protective interlocks responsive to steam pressure, safety valves may be provided in accordance with the above paragraphs identified in NBIC Part 1, 2.9.1 or the following protection against overpressure shall be provided:

a) One or more power-actuated pressure-relieving valves shall be provided in direct communication with the boiler when the boiler is under pressure and shall receive a control impulse to open when the maximum allowable working pressure at the superheater outlet is exceeded. The total combined relieving capacity of the power-actuated pressure-relieving valves shall be not less than 10% of the maximum design steaming capacity of the boiler under any operating condition as determined by the manufacturer. The valves shall be located in the pressure part system where they will relieve the overpressure. An isolating stop valve of the outside-screw-and-yoke type should be installed between the power-actuating pressure-relieving valve and the boiler to permit repairs provided an alternate power-actuated pressure-relieving valve of the same capacity is so installed as to be in direct communication with the boiler;

b) ~~Spring-loaded safety~~**Pressure relief** valves shall be provided having a total combined relieving capacity, including that of the power-actuated pressure-relieving valve, of not less than 100% of the maximum designed steaming capacity of the boiler, as determined by the manufacturer. In this total, credit in excess of 30% of the total relieving capacity shall not be allowed for the power-actuated pressure-relieving valves actually installed. Any or all of the ~~spring-loaded safety~~**pressure relief** valves may be set above the maximum allowable working pressure of the parts to which they are connected, but the set pressures shall be such that when all these valves (together with the power-actuated pressure-relieving valves) are in operation the pressure will not rise more than 20% above the maximum allowable working pressure of any part of the boiler, except for the steam piping between the boiler and the prime mover;

c) When stop valves are installed in the water-steam flow path between any two sections of a forced-flow steam generator with no fixed steamline and waterline:

1) The power-actuated pressure-relieving valve shall also receive a control impulse to open when the maximum allowable working pressure of the component, having the lowest pressure level upstream to the stop valve, is exceeded;

2) The ~~spring-loaded safety~~**pressure relief** valve shall be located to provide overpressure protection for the component having the lowest working pressure; and

3) A reliable pressure-recording device shall always be in service and records kept to provide evidence of conformity to the above requirements.

#### 4.4.2 PRESSURE INDICATING DEVICES

The need for pressure indicating devices should be considered in the design of the pressure vessel, and when required, the scale on the dial of the pressure gage shall be at least 25% above the highest set pressure of the pressure relief device.

#### 4.5 PRESSURE RELIEF DEVICES

All pressure vessels shall be protected by pressure relief devices in accordance with the following requirements.

##### 4.5.1 DEVICE REQUIREMENTS

- a) Pressure relief devices are to be manufactured in accordance with a national or international standard and be certified for capacity (or resistance to flow for rupture disk devices) by the National Board.
- b) Dead weight or weighted lever pressure relief valves shall not be used.
- c) An unfired steam boiler shall be equipped with pressure relief valves as required in NBIC Part 1, 2.9.
- d) Pressure relief devices shall be selected (e.g., material, pressure, etc.) and installed such that their proper functioning will not be hindered by the nature of the vessel's contents.

##### 4.5.2 NUMBER OF DEVICES

At least one device shall be provided for protection of a pressure vessel. Pressure vessels with multiple chambers with different maximum allowable working pressures shall have a pressure relief device to protect each chamber under the most severe coincident conditions.

##### 4.5.3 LOCATION

b) Pressure vessels that can be exposed to fire or other sources of unexpected external heat may require supplemental pressure relief devices to provide additional relieving capacity.

1) The combined capacity of all installed pressure relief devices shall be adequate to prevent the pressure from rising more than 21% above maximum allowable working pressure.

2) The set point of any supplemental pressure relief device(s) shall not exceed 110% of the maximum allowable working pressure. If a single pressure relief device is utilized to protect the vessel during both operational and fire or other unexpected external heating conditions, the set point shall not exceed maximum allowable working pressure.

- a) The pressure relief device(s) shall have sufficient capacity to ensure that the pressure vessel is not exposed to pressure greater than that specified in the original code of construction.
- ~~b) If an additional hazard can be created by exposure of a pressure vessel to fire or other unexpected source of external heat, supplemental pressure relief devices shall be installed to provide any additional capacity that should be required.~~
- c) Vessels connected together by a system of piping not containing valves that can isolate any pressure vessel should be considered as one unit when determining capacity requirements.
- d) Heat exchangers and similar vessels shall be protected with a pressure relief device of sufficient capacity to avoid overpressure in case of internal failure.

"FOR COMMITTEE USE ONLY"

**PART 1**

**3.9.4.7 SAFETY RELIEF VALVE DISCHARGE PIPING**

ba) The discharge from safety relief valves shall be so arranged that there will be no danger of scalding attendants. When the safety relief valve discharge is piped away from the water heater to the point of discharge, there shall be provisions for properly draining the piping and valve body. The size and arrangement of discharge piping shall be such that any pressure that may exist or develop will not reduce the relieving capacity of the relieving devices below that required to protect the water heater.

ba) When a discharge pipe is used, it ~~s internal cross-sectional area~~ shall be not less than the ~~full-area nominal size~~ of the valve outlet ~~or of the total of the valve outlets discharging thereinto~~, and shall be as short and straight as possible and so arranged as to avoid undue stress on the valve ~~or valves~~. When an elbow is placed on a safety relief discharge pipe, it shall be located close to the valve outlet.

c) Where multiple valves relieve into a common discharge pipe, the cross-sectional flow area of the common discharge pipe shall be equal to or greater than the sum of the individual valve discharge pipe areas.



## 5.2.6 HANGERS AND SUPPORTS

Support of piping shall consider loads (including wind and seismic loads) imposed on equipment or existing piping to which it is attached. Non-piping attachments such as ladders and walkways, equipment supports, temporary supports, structural supports, etc., shall not be connected to the piping unless such loads have been considered in the design of the piping and its supports. Design of hangers and supports for piping shall consider loads imposed by hydrostatic pressure testing. The installer shall remove pins from non-rigid hangers and seal plugs from hydraulic snubbers and temporary supports used for installation prior to placing the piping in service.

## 5.2.7 PROTECTION AND CLEANING

The installer shall exercise care during installation to prevent loose weld material, welding rods, small tools, and miscellaneous scrap metal from getting into the piping. The installer shall inspect and, where necessary, clean the interior of the piping and its appurtenances where possible, prior to making the final closures for the presence of foreign debris.

## 5.2.8 WELDING AND BRAZING

The installer should consider the impact of performing any preheating, welding, brazing, or postweld heat treatment on valves, instrumentation, or other heat sensitive equipment and, where appropriate, review the equipment manufacturer's recommended installation procedures prior to performing the work.

## 5.2.9 BOLTING

All mechanical joints and connections shall conform to manufacturers' installation instructions and recognized standards acceptable to the Jurisdiction having authority.

## 5.3 PRESSURE RELIEF DEVICES

When required by the original code of construction, piping shall be protected by pressure relief devices in accordance with the following requirements.

### 5.3.1 DEVICE REQUIREMENTS

codes of construction

a) Pressure relief devices are to be manufactured in accordance with a national or international standard and be certified for capacity (or resistance to flow for rupture disc devices) by the National Board.

- 1) In certain cases piping ~~standards~~ permit the use of regulators, which may include integral pressure relief valves to limit the pressure in a piping system. In this case, capacity certification of the pressure relief valve is not required.

**2) Some piping codes of construction permit the use of pressure relief devices without capacity certification. In this case, capacity certification of the pressure relief device by the National Board is not required.**

### 5.3.2 NUMBER OF DEVICES

At least one pressure relief device shall be provided for protection of a piping system. A pressure relief device installed on a pressure vessel or other component connected to the piping system should be used to meet this requirement. Portions of piping systems with different maximum allowable working pressures shall have a pressure relief device to protect each portion separately.

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- 2) Hot-water boilers tend to have buildups of corrosion products since the system is closed 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

**9) Since rupture disks are non-reclosing devices, a visual inspection is the only inspection that can be performed. A rupture disk that is removed from its holder shall not be reinstalled unless recommended by the manufacturer to do so. A rupture disk contained in an assembly that can be removed from a system without releasing the force maintaining the contact between the disk and holder, such as pre-torqued, welded, soldered, and some threaded assemblies, may be suitable for reinstallation after visual inspection. The manufacturer should be consulted for specific recommendations.**

- 7) The

- 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.

### 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. (50 mm) may be securely packaged and cushioned during transport;

- 1) PRV part weld repairs shall be performed under the "R" Certificate Holder's quality system; however, the requirements for in-process involvement of the Inspector (see NBIC Part 3, 1.3.2) may be waived. The requirement for stamping is waived.
- 2) The process of identifying and controlling repairs shall be documented in the "R" Certificate Holder's quality system.
- 3) PRV part repairs shall be documented on a Form R-1 with a statement under Remarks "PRV Part Repair." The owner's name and location of installation shall be that of the "VR" Certificate Holder. The information received from the "VR" Certificate Holder as required in NBIC Part 3, S7.3 a) shall be noted under "Description of Work."
- 4) Upon completion of the repair, the repaired part and completed Form R-1 shall be returned to the "VR" Certificate Holder responsible for completing the PRV repair.

#### S7.4 MATERIALS FOR PRESSURE RELIEF DEVICES

The materials used in making repairs shall conform to the requirements of the original code of construction. The "VR" Certificate Holder is responsible for verifying identification of existing materials from original data, drawings, or unit records and identification of the materials to be installed.

#### S7.5 REPLACEMENT PARTS FOR PRESSURE RELIEF DEVICES

- a) Critical parts shall be fabricated by the valve manufacturer or to the manufacturer's specifications. Critical parts are those that may affect the valve flow passage, capacity, function, or pressure-retaining integrity.
- b) Critical parts not fabricated by the valve manufacturer shall be supplied with material test certification for the material used to fabricate the part.
- c) Replacement critical parts receiving records shall be attached or be traceable to the valve repair document (see NBIC Part 3, ~~S7.3 a)~~). These records shall conform to at least one of the following:
  - 1.7.5.4 i) Receiving records documenting the shipping origin of the part fabricated by the valve manufacturer (includes packing list) from the valve manufacturer or assembler of the valve type;
  - 2) A document prepared by the "VR" Certificate Holder certifying that the replacement part used in the repair has the manufacturer's identification on the part or is otherwise labeled or tagged by the manufacturer and meets the manufacturer's acceptance criteria (e.g., critical dimensions found in maintenance manual);
  - 3) Receiving records for replacement critical parts obtained from a source other than the valve manufacturer or assembler of the valve type shall include a *Certificate of Compliance* that provides as a minimum:
    - a. The part manufacturer and part designation;
    - b. A certifying statement that either:
      1. The part was fabricated by the valve manufacturer and meets the manufacturer's acceptance criteria (e.g., critical dimensions found in maintenance manual), or
      2. The part meets the manufacturer's specifications and was fabricated from material as identified by the attached material test report.
    - c. The signature of an authorized individual of the part source;

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SUPPL. 7

## SUPPLEMENT 7

### REQUIREMENTS FOR REPAIRS TO PRESSURE RELIEF DEVICES

#### S7.1 SCOPE

This supplement provides general requirements that apply to repairs to pressure relief valves. Repairs may be required because of defects found during periodic inspections because testing has identified that valve performance does not meet the original code of construction requirements, failure during operation, or for routine preventative maintenance.

#### S7.2 GENERAL REQUIREMENTS

- a) Repair of a pressure relief valve is considered to include the disassembly, replacement, re-machining, or cleaning of any critical part, lapping of a seat and disc, reassembly, adjustment, testing, or any other operation that may affect the flow passage, capacity, function, or pressure-retaining integrity.
- b) Conversions, changes, or adjustments affecting critical parts are also considered repairs. The scope of conversions may include changes in service fluid and changes such as bellows, soft seats, and other changes that may affect Type/Model number provided such changes are recorded on the document as required for a quality system and the repair nameplate. (See NBIC Part 3, 5.12.1).
- c) The scope of repair activities shall not include changes in ASME Code status.
- d) When a repair is being performed under the administrative requirements for National Board Accreditation, a repair shall consist of the following operations as a minimum:
  - 1) Complete disassembly, cleaning, and inspection of parts, repair or replacement of parts found to be defective, reassembly, testing as required by NBIC Part 3, 4.5, sealing and application of a repair nameplate. When completed, the valve's condition and performance shall be equivalent to the standards for new valves.
  - 2) The administrative requirements for National Board Accreditation apply only to valves that are stamped with an ASME "V," "UV," or "NV" Code symbol or marked with an ASME "HV" symbol and have been capacity certified on the applicable fluid by the National Board.

#### S7.3 WELD REPAIRS TO PRESSURE RELIEF VALVE PARTS

- a) The Quality System Manual may include controls for the "VR" Certificate Holder to have the pressure relief valve part repaired by a National Board "R" Certificate Holder, per this supplement provided the following documentation is provided to the "R" Certificate Holder:
  - 1) Code of construction, year built;
  - 2) Part identification;
  - 3) Part material specified; and
  - 4) "VR" Certificate Holder's unique identifier for traceability as required by the Repair Inspection Program.
- b) Prior to performing weld repairs to pressure relief valve (PRV) parts, the "R" Certificate Holder shall receive repair information required by NBIC Part 3, S7.3 a) from the "VR" Certificate Holder responsible for the pressure relief valve repair.

- 1) State the title of the individual responsible for the purchasing of all material.
- 2) State the title of the individual responsible for certification and other records as required.
- 3) All incoming materials and parts shall be checked for conformance with the purchase order and, where applicable, the material specifications or drawings. Indicate how material or part is identified and how identity is maintained by the quality system.

**i) Repair and Inspection Program**

The repair and inspection program section shall include reference to a document (such as a report, traveler, or checklist) that outlines the specific repair and inspection procedures used in the repair of pressure relief valves. Repair procedures shall require verification that the critical parts meet the valve manufacturer's specification. NBIC Part 3, S7.14 outlines recommended procedures covering some specific items. Provisions shall be made to retain this document for a period of at least five years.

- 1) Each valve or group of valves shall be accompanied by the document referred to above for processing through the plant. Each valve shall have a unique identifier (e.g., repair serial number, shop order number, etc.) appearing on the repair documentation and repair nameplate such that traceability is established.
- 2) The document referred to above shall describe the original nameplate information, including the ASME Code symbol stamping and the repair nameplate information, if applicable. In addition, it shall include material checks, replacement parts, conversion parts (or both), reference to items such as the welding procedure specifications (WPS), fit-up, NDE technique, heat treatment, and pressure test methods to be used. Application of the "VR" stamp to the repair nameplate shall be recorded in this document. Specific conversions performed with the new Type/Model Number shall be recorded on the document. There shall be a space for "signoffs" at each operation to verify that each step has been properly performed.
- 3) The system shall include a method of controlling the repair or replacement of critical valve parts. The method of identifying each spring shall be indicated.
- 4) The system shall also describe the controls used to ensure that any personnel engaged in the repair of pressure relief valves are trained and qualified in accordance with NBIC Part 3, Supplement 7.

**j) Welding, NDE, and Heat Treatment (when applicable)**

The quality system manual shall indicate the title of the person(s) responsible for and describe the system used in the selection, development, approval, and qualification of welding procedure specifications, and the qualification of welders and welding operators in accordance with the provisions of NBIC Part 3, S7.12 and S7.13.

- 1) The quality system manual may include controls for the "VR" Certificate Holder to have the pressure relief valve part repaired by a National Board "R" Certificate Holder, per NBIC Part 3, S7.3.
- 2) The completed Form R-1 shall be noted on and attached to the "VR" Certificate Holder's document required in NBIC Part 3, 1.7.5.4. i). Similarly, NDE and heat treatment techniques must be covered in the quality system manual. When outside services are used for NDE and heat treatment, the quality system manual shall describe the system whereby the use of such services meet the requirements of the applicable section of the ASME Code.

**k) Valve Testing, Setting, and Sealing**

The system shall include provisions that each valve shall be tested, set, and all external adjustments sealed according to the requirements of the applicable ASME Code Section and the National Board. The


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- 1) PRV part weld repairs shall be performed under the "R" Certificate Holder's quality system; however, the requirements for in-process involvement of the Inspector (see NBIC Part 3, 1.3.2) may be waived. The requirement for stamping is waived.
- 2) The process of identifying and controlling repairs shall be documented in the "R" Certificate Holder's quality system.
- 3) PRV part repairs shall be documented on a Form R-1 with a statement under Remarks "PRV Part Repair." The owner's name and location of installation shall be that of the "VR" Certificate Holder. The information received from the "VR" Certificate Holder as required in NBIC Part 3, S7.3 a) shall be noted under "Description of Work."
- 4) Upon completion of the repair, the repaired part and completed Form R-1 shall be returned to the "VR" Certificate Holder responsible for completing the PRV repair.

#### S7.4 MATERIALS FOR PRESSURE RELIEF DEVICES

The materials used in making repairs shall conform to the requirements of the original code of construction. The "VR" Certificate Holder is responsible for verifying identification of existing materials from original data, drawings, or unit records and identification of the materials to be installed.

#### S7.5 REPLACEMENT PARTS FOR PRESSURE RELIEF DEVICES

- a) Critical parts shall be fabricated by the valve manufacturer or to the manufacturer's specifications. Critical parts are those that may affect the valve flow passage, capacity, function, or pressure-retaining integrity.
- b) Critical parts not fabricated by the valve manufacturer shall be supplied with material test certification for the material used to fabricate the part.
- c) Replacement critical parts receiving records shall be attached or be traceable to the valve repair document (see NBIC Part 3, S7.3 a). These records shall conform to at least one of the following:
  - 1) Receiving records documenting the shipping origin of the part fabricated by the valve manufacturer (such as packing list) from the valve manufacturer or assembler of the valve type;
  - 2) A document prepared by the "VR" Certificate Holder certifying that the replacement part used in the repair has the manufacturer's identification on the part or is otherwise labeled or tagged by the manufacturer and meets the manufacturer's acceptance criteria (e.g., critical dimensions found in maintenance manual);
  - 3) Receiving records for replacement critical parts obtained from a source other than the valve manufacturer or assembler of the valve type shall include a ~~Certificate of Compliance~~  that provides as a minimum:
    - a. The part manufacturer and part designation;
    - b. A certifying statement that either:
      1. The part was fabricated by the valve manufacturer and meets the manufacturer's acceptance criteria (e.g., critical dimensions found in maintenance manual), or
      2. The part meets the manufacturer's specifications and was fabricated from material as identified by the attached material test report.
    - c. The signature of an authorized individual of the part source;

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SUPPL. 7

**Action Item Request Form**

**8.3 CODE REVISIONS OR ADDITIONS**

Request for Code revisions or additions shall provide the following:

a) Proposed Revisions or Additions

For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

Existing Text:

None
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b) Statement of Need

Provide a brief explanation of the need for the revision or addition.

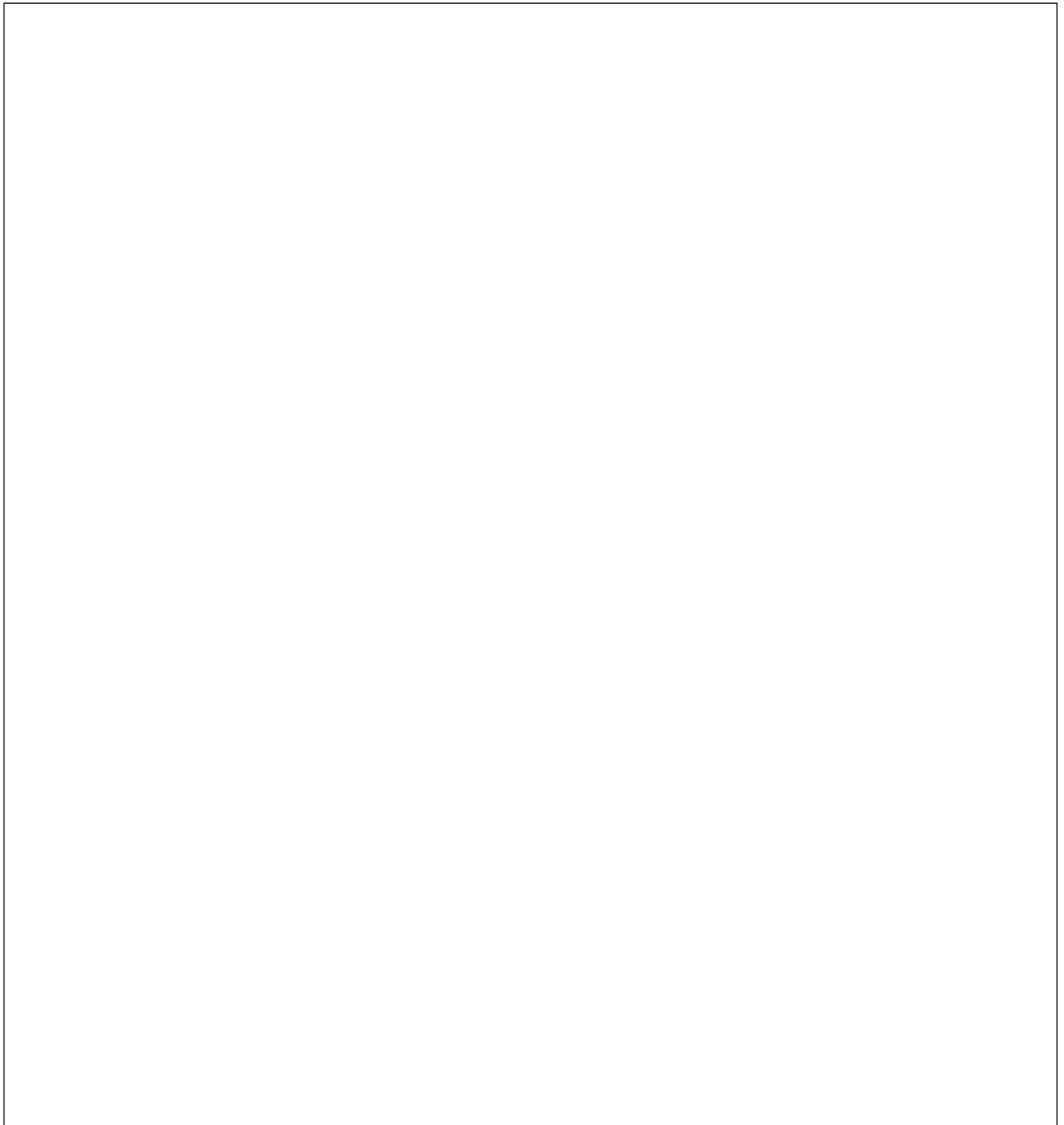
Based on IN15-0301 the Sub-Committee on Pressure Relief Devices recognizes a need to create guidelines for storage and shelf life with respect to inspection and testing frequencies.
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c) Background Information

Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the Committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate.

When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

A large, empty rectangular box with a thin black border, occupying the lower two-thirds of the page. It is intended for the user to provide background information, sketches, tables, figures, and graphs as requested in the text above.