THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

SUBGROUP INSPECTION

MINUTES

Meeting of January 20, 2015
Orlando, FL

These minutes are subject to approval and are for the committee use only. They are not to be duplicated or quoted for other than committee use.

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

1. **Call to Order – 8:00 a.m.**

Chairman, Mr. Jim Getter called the meeting to order at 8:05 AM on January 20, 2015.

2. **Announcements**

- Continental breakfast & Lunch will be provided on Thursday morning
- Wednesday evening reception will be held at the hotel
- Room listings will be posted on the NBIC Website

3. **Adoption of the Agenda**

- NB15-0701
  - Add Public Review comments NB15-0601 & NB15-0401
  - Change attachments to pages 21-23

- NB15-0801
  - Change attachment to page 32 (missing on original agenda)

- NB15-0901
  - Change attachments to pages 24-30

- NB-13-1002 was added to the agenda

A motion was made to adopt the revised agenda. The motion was unanimously approved.

4. **Approval of Minutes of July 15, 2014.**

A motion was made to approve the Subgroup General on Inspection and Subgroup Specific on Inspection minutes from July 15, 2014. The motion was unanimously approved.

5. **Review of the Roster (ATTACHMENT PAGES 1-3)**

The attendees, members, alternates and guests are identified on **Attachment Pages 1-3**. With the attached attendance listing, a quorum was established.

6. **Action Items**

- **NB07-0910 - Part 2 S6 -** 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 task group for completeness and accuracy. (No attachment)

  January 2015
  A progress report was given by Mr. McRae. No progress to report.

- **NB12-1501 - Part 2 -** Review inspection requirements so as to align with installation requirements in Part 1. (No attachment)

  January 2015
  A progress report was given by Mr. Newton. No progress to report. Mr. Newton would like to discuss this action item with D. Cook to see how to move forward and to get more definition as to what is needed and what they need to expand on.

- **NB13-1201 – Part 2, 2.2.10.6 -** This action item is a result of PRC PR13-0209 from Francis Brown. His comment stated, " The NBIC is supposed to be a safety Code so why is a "good practice" only a "good practice" if required by a Jurisdiction. For example 2.2.10 6a) is or is not that paragraph a "good practice" mandatory, but without the Jurisdictional requirement a good practice is optional with the owner/user. This section should be revised to indicate "good practices" should be complied with but are mandatory when required by the Jurisdiction. (No attachment)

  January 2015
  A progress report was given by Mr. Mooney. No progress to report.

- **NB13-1301 - Part 2 -** Review methods of Finite Element Analysis as they pertain to inspection. A Task Group consisting of J. Riley (PM), S. Staniszewski, M. Schwartzwalder, M. Mooney and R. Pate was assigned.
  (ATTACHMENT PAGES 4-7)

  January 2015
  Mr. Riley presented a new document. The document was reviewed and the changes were explained. A motion was made to send the document out for letter ballot to SG for comment only. The motion was passed unanimously.

- **NB13-1302 - Part 2 -** Review Cryogenic vessel inspection requirements. A Task Group consisting of J. Riley (PM), A. Renaldo, R. Dobbins, R. Bartley and R. Pate was assigned.
  (ATTACHMENT PAGES 8-9)

  January 2015
  Mr. Riley presented a new document. The document was reviewed as a progress report. There will hopefully be a final version of the document to send out for letter ballot (comment only) to SG soon. Add Mr. T. Barker and Mr. J. Getter to the Task Group.

- **NB13-1303 - Part 2 -** Review Inspection requirements for Biomass Fueled Boilers. A Ta sk Group consisting of M. Mooney (PM), M. Horbaczewski, D. Canonico, and J. Safarz were assigned.
  (ATTACHMENT PAGES 10-12)

  January 2015
  A progress report was given by Mr. Mooney. No progress to report.

- **NB13-1701 – Part 2, 2.3.6.6 –** Inspection requirements for wire wound pressure vessels.
  (ATTACHMENT PAGES 13-16)

  January 2015
  A revised document was presented by Mr. Dobbins. A motion was made to move the document to SC for approval. The motion was unanimously approved.

- **NB14-0501 - Part 2 Update Part 2 Index -** A Task Group consisting of D. Canonico and M. Mooney was assigned. (No attachment)

  January 2015
  A motion was made to close this action item. Motion was unanimously approved.

- **NB14-0901 – Part 2** – Inspection of High Pressure Vessels
  (ATTACHMENT PAGES 17-18)

  January 2015
  A progress report was given by Mr. Mooney. He needs to go back and talk with F. Brown. No progress to report.

- **NB14-1001 – Part 2, 5.2.1 -** The NBIC does not address replacement of duplicate nameplates where the original nameplate is intact and attached to an inner vessel and may or may not be visible. TG of M. Mooney (PM) and J. Getter has been assigned.
  (ATTACHMENT PAGE 19)

  January 2015
  A progress report was given by Mr. Mooney. No progress to report.

- **NB14-1701 - Part 2 -** Add diagrams for Local Thin Areas (LTA) for LP Gas and propane tanks. TG of G. McRae (PM), T. Vandini and J. Getter has been assigned. (No attachment)

  January 2015
  A progress report was given by Mr. McRae. No progress to report. He should have something for the next meeting.

- **NB14-1906 - Part 2 -** Paragraph 6.1 is a scope for the supplement section. This is the only part that has this section; it is not consistent with our formatting and is a repeat of what is covered in the Introduction under Supplements in all three parts. TG of D. Canonico, M. Mooney and D. Graf has been assigned. (No attachment)

  January 2015
  A motion was made to remove 6.1 SCOPE. The motion was unanimously approved.

- **NB15-0201 – Part 2 –** This item opened as a result of the closure of NB13-0701.Provide consistent language in all affected areas of the NBIC. TG of J. Riley (PM), R. Reetz, M. Mooney, T. Vandini, M. Clark, G. McRae has been assigned. (No attachment)

  January 2015
  A progress report was given by Mr. Riley. He needs to get more information regarding this action item, No progress to report.
  Remove B. Reetz from the task group.

- **NB15-0501 – Part 2, S7.10 h) -** This action item is a result of PR15-0142. Since a nameplate is required with an "R" stamp for the underground service change, was the requirement for an R-1/R-2 to be completed intentionally left off? Would it not be prudent for an Inspector to verify that the seal welding or flush patch welds comply at least visually comply with code? An "R" Certificate Holder is already required. Why not include an Inspector to verify the weld is acceptable and require a signed R-1/R-2 form, which is to be filed with the NB. There is a risk to life/property if a seal weld or flush patch on a LPG storage vessel is not completed in accordance with code requirements. Paragraph e) also introduces additional welding, which should be verified. Also, please consider a new item for Part 3, which would refer the reader to this Supplement for a Change.
  (ATTACHMENT PAGE 20)

  January 2015
  A task group of T. Vandini (PM), G. McRae, J. Getter and D. Graf has been assigned.

- **NB15-0502 – Part 2, S7.10 k) -** This item is a result of PR15-0143. Part k) is silent concerning qualified welders. I don't believe the intent is for unqualified welders to be seal welding or welding flush patches to close off unused connections (d)) as well as welding the nameplate, especially since a qualified WPS is required. Consider requiring that the welder be qualified as specified in NBIC Part 3 2.2.3. Also, Consider providing more guidance to "stamp holder using a qualified welding procedure" by pointing the reader to Part 3. Consider changing this to "stamp holder using a qualified WPS or SWPS as specified in NBIC Part 3 2.2.1 and 2.2.2 respectfully."
  (ATTACHMENT PAGE 21)

January 2015
A task group of T. Vandini (PM), G. McRae, J. Getter and D. Graf has been assigned.

- **NB15-0503 – Part 2, S10.6 -** This item is a result of PR15-0704. The Term "Examination" is used throughout S11.6, S11.7, and S11.9. Was this intended to read "Inspection" instead, which is a duty of the Inspector?
(ATTACHMENT PAGE 22)

  January 2015
  A task group of R. Dobbins (PM), R. Pate and P. Welch has been assigned.
  Supplement 11, referenced in the Public Review Comments, is now Supplement 10 in the 2015 NBIC.

- **NB15-0504 –Part 2, S10.10** – This item is a result of public review comments PR15-0701, PR15-0702 and PR15-0703. These comments deal with inspector's duties in performing inspections of high pressure composite vessels.
(ATTACHMENT PAGES 23-25)

  January 2015
  A task group of M. Mooney (PM), M. Horbaczewski and E. Brantley has been assigned.

- **NB15-0701 – Part 2, 2.3.6.8 -** This item is a result of public review comment PR15-0204, PR15-0601, PR15-0401. Do not incorporate the proposed change – Establishing a mandatory (shall) inspection requirement based on another inspection code is beyond the scope of the NBIC. To my knowledge, no other inspection code has ever been made mandatory under the NBIC. If inspection requirements are needed then one of two things should be done: 1) let individual jurisdictions set the requirements, or 2) within the NBIC include specific inspection requirements consistent with pressure vessels constructed to ASME Section VIII and ASME PVHO-1. An alternative to including specific requirements within the NBIC would be to change the text to: "Inspections may be conducted using ASME PVHO-2 for reference." It must be clear that the requirements of PVHO-2 are not a mandatory part of an NBIC inspection. See for example, PVHO-2 Section 4.0. None of the responsibilities listed include a commissioned boiler inspector. Even Section 7 states that there are various types of inspections. "Operational Inspections" are definitely beyond the scope and capabilities of a commissioned inspector.
(ATTACHMENT PAGES 26-28)

  January 2015
  A task group of M. Mooney (PM) and D. Buechel has been assigned.

- **NB15-0801 – Part 2, S10 -** This action item is a result of PR15-0602. AIA believes that several aspects of the proposed requirements are either undefined or otherwise beyond the normal scope and training of National Board Commissioned Inspectors. Imposing these requirements on Special Inspectors may also place them in the untenable position of assuming liability beyond the limits of the insurance policies under which they perform inspections. Items of concern include the failure to define the terms "sufficient clearance" (S10.2b), "safely supported" (S10.2d), "guarded (S10.2f); and "permanent" (S10.3a). We recommend either defining or deleting these terms. Furthermore, Commissioned Inspectors are not qualified to (i) determine whether a CO2 detector is set to alarm at any particular concentration (S10.5); (ii) verify the posting of warning signs and determine the setpoint of any alarms (S10.6); or (iii) determine the length of safety relief/vent lines or verify that the materials selected for valves, piping, tubing, hoses and fittings used in the LCDSV system meet certain requirements. We recommend deleting these sections.
(ATTACHMENT PAGE 29)

  January 2015
  A task group of M. Mooney (PM), P. Welch, E. Brantley and T. Barker has been assigned.

- **NB15-0901 – Part 2 S10 - NB15-0901 – Part 2 S10 -** This action item is a result of PR15-0205, PR15-0206, PR15-0207, PR15-0208, PR15-0209, PR15-0210, PR15-0211 and PR15-0402. Much of Supplement 10 contains requirements for inspection of equipment or systems that are outside the scope of the insurance policies that insurance company's issue. If these inspections are mandated by the Jurisdiction, then the inspectors employed by these insurance companies will be forced to make inspections in where they have no business interest. Further, this puts indefensible liability on the Inspector and his/her employer. I recommend either deleting this Supplement from the 2015 edition and rework it to be more guidance related then requirement based, or add a suitable disclaimer in the Scope paragraph, S10.1, that would exempt Inspector conformance to this supplement if carbon dioxide systems or parts thereof, are not within the employer's scope of activity.
  (ATTACHMENT PAGE 30-37)

  January 2015
  A task group of M. Mooney (PM), P. Welch, E. Brantley and T. Barker has been assigned.

- **NB15-0901 – Part 2 S10 -** This action item is a result of PR15-0402. Much of Supplement 10 contains requirements for inspection of equipment or systems that are outside the scope of the insurance policies that insurance companies issue. If these inspections are mandated by the Jurisdiction, then the inspectors employed by these insurance companies will be forced to make inspections in where they have no business interest. Further, this puts indefensible liability on the Inspector and his/her employer. I recommend either deleting this Supplement from the 2015 edition and rework it to be more guidance related then requirement based, or add a suitable disclaimer in the Scope paragraph, S10.1, that would exempt Inspector conformance to this supplement if carbon dioxide systems or parts thereof, are not within the employer's scope of activity.

  January 2015
  PR15-0402 is included in the above action item. This one was created in error. No action needs to be taken.

- **NB15-1002 – Part 2** – Address wording of "ASME Code Symbol Stamp" vs. "Symbol" vs. "Code Symbol" vs. "Stamp" vs. "Certification

  January 2015
  A motion was made to consider this item editorial. The motion was unanimously approved.

7. New Business

- **NB13-1002:** M. Schwartzwalder presented a revised document incorporating the letter ballot comments. The document was revised again in SG and a motion was made to accept the document as revised. The motion was unanimously approved.
  (ATTACHMENT PAGE 38-40)

8. Future Meetings

July 2015 – Columbus, Ohio
January 2016 – Tucson, Arizona

9. Adjournment

The meeting was adjourned around 11:15 AM on January 20, 2015.

Respectfully Submitted,

Jodi Metzmaier
Secretary
:jm

Attendance List SG on Inspection

Meeting Date: **January 20, 2015**

Attachment pages 1-3

Paul Welch Arise, Inc. 2530 Trotters Lane Social Circle, GA 30025 Ph: 678-446-5290 Fax: Email:paul.welch@ariseinc.com	Attended: Yes ☑ No ☐ *Initial*	**Domenic A. Canonico** Canonico & Assoc. 1423 East Brow Road Signal Mountain, TN 37377 Ph: 423-886-1008 Fax: E-mail: canonicod@epbfi.com.	Attended: Yes ☐ No ☒ *Initial*
Stanley Staniszewski, Jr. US Dept. of Transportation, Pipelines & Administration Hazardous Materials Safety East Building PHH -20 1200 New Jersey Ave. SE Washington, DC 20590 Ph: 202-366-4545 x 0453 Fax: 202-366-3753 E-mail: stanley.staniszewski@ dot.gov	Attended: Yes ☐ No ☒ *Initial*	**Ernest Brantley** XL Insurance America, Inc. 5018 Bristol Industrial Way, Suite 203 Buford, GA 30518 Phone: (337)842-7044 Fax: Email:ernest.brantley@bpcllcga.com	Attended: Yes ☑ No ☐ *Initial*
Tim Barker FM Global 601 108th NE Suite 1400 Bellevue, WA 98004 Ph: 360-801-3790 Fax: E-mail: **Timothy.Barker@FMGlobal.com**	Attended: Yes ☑ No ☐ *Initial*	**Jason Safarz** Sales Director CEC Combustion Services Group 1699 Brookpark Road Cleveland, OH 44130 Ph: 216-749-2992 Fax: 216-398-8403 Email: jsafarz@combustionsafety.com	Attended: Yes ☐ No ☐ *Initial*
Mark Mooney Liberty Mutual Insurance<br~~Chief Engineer~~ Technical Director 20 Riverside Road MS:03BN Weston, MA Ph: 781-891-890 x 27329 Fax: 781-642-6512 E-mail: Mark.Mooney@Libertulmual.com	Attended: Yes ☑ No ☐ *Initial*	**Jim Getter** Worthington Cylinders 200 Old Wilson Bridge Road Columbus, OH 43085 P: 614-840-3087 F: 614-438-3083 E-mail: jim.getter@worthingtonindustries.com	Attended: Yes ☑ No ☐ *Initial*
Mike Schwartzwalder Stress Engineer Services, Inc. 5380 Courseview Drive Mason, OH 45045 614-581-6456 Ph: ~~513-336-6701~~ Fax ~~614-716-1744~~ 614-794-1469 E-mail: mschwartzwalder@stress.com	Attended: Yes ☑ No ☐ *Initial*	**Jodi Metzmaier** National Board 1055 Crupper Ave. Columbus, OH 43229 P: 614-888-8320 F: 614-847-1828 E: jmetzmaier@nationalboard.org	Attended: Yes ☒ No ☐ *Initial*

Attendance List SG on Inspection

Attachment pages 1-3

Meeting Date: January 20, 2015

Jim Riley Conoco Phillips 1380 San Pablo Ave. Rodeo, CA 94572-1354 P: 510-245-5895 F: E-mail: jim.riley@~~conocophillips.com~~ P66.com	Attended: Yes ☑ No ☐ JRR *Initial*	**Ralph Pate** Chief Elevator/Boiler Inspector Alabama Department of Labor ~~100 North Union St., Suite 630~~ ~~PO Box 303500~~ 649 Monroe St. Montgomery AL 36131 Ph: 334-242-3066 Fax: 334-353-4528 Email: ralph.pate@labor.alabama.gov	Attended: Yes ☒ No ☐ RPP *Initial*
Venus Newton Manager of Jurisdictional Inspection Services One CIS Insurance Company 3380 Chastain Meadows Pkwy Kennesaw, GA 30144 Ph: 770-590-6726 Cell: 678-457-1310 Fax: E-mail: venus.newton@us.bureauveritas.com	Attended: Yes ☒ No ☐ VN *Initial*	**Greg McRae** Engineering and Technical Director Trinity Containers, LLC 2525 Stemmons Freeway Dallas, TX 75207 Ph: 214-589-8559 Fax: 214-589-8553 E-mail: greg.mcrae@trin.net	Attended: Yes ☑ No ☐ *Initial*
Tom Vandini Director of Quality and Continuous Improvement Quality Steel Corporation 721 Graham Drive Fremont, OH 43420 PH. : (419) 333-5205 Mobile: (419) 455-3933 Email: tvandini@propanetank.com	Attended: Yes ☑ No ☐ *Initial*	**Mark Horbaczewski** Diamond Technical Services 3333 Warrensville Road Lisle, IL 60532 Ph.: 773-447-5667 Fax: Email: MHorbaczewski@diamondtechnicalservices.com	Attended: Yes ☑ No ☐ MHH *Initial*
Darrell Graff Air Products and Chemicals, Inc. Principal Mechanical Integrity Tech GO Pressure Systems Group 7201 Hamilton Boulevard Allentown, PA 18195 Phone: (610)799-2889 Fax: Email: GRAFDR@airproducts.com	Attended: Yes ☒ No ☐ DG *Initial*	**David Ford** US DOT FMSCA 300 New Bern Street Suite 418 Raleigh, NC 27601 Phone: (919)886-1297 Fax: Email: David.Ford@dot.gov	Attended: Yes ☒ No ☐ *Initial*

Attachment pages 1-3

Attendance List SG on Inspection

Meeting Date: **January 20, 2015**

Marshal Clark, Ph.D., P.E. Senior Associate Structural Integrity Associates, Inc. 3 Glenview Drive Littleton, CO 80123 Phone: (303)795-3050 Fax: Email: mclark@structint.com	Attended: Yes ☐ No ☐ *Initial*	**Robert Dobbins** Technical Director Zurich North America 565 Dennis Reinhardt Road Lincolnton, NC 28092 Phone: (704)748-1641 Fax: Email: robert.dobbins@zurichna.com	Attended: Yes ☑ No ☐ RwD *Initial*
Name: ADAM RENALDO Company: PRAXAIR, INC Address: Phone: 716 879 2928 Fax: Email: Adam_Renaldo@Praxair.com		Name: Joe Frey Company: Stress Engineering Svs. Address: 13800 Westfair East Drive Houston, TX 77041-1101 Phone: 713 201 7861 cell Fax: 281 955 2638 Email: joe.frey@stress.com	
Name: DAVID BUECHEL Company: Hartford Steam Boiler Ilc Address: 4300 SETON ST, 7TH, PA 15227 Phone: 412-885-8120 Fax: Email: DAVID_BUECHEL@HSB.COM		Name: Bonnie Petersen Company: MarquipWardUnited Address: 13001 O. Airport Rd Phillips, WI 54555 Phone: 715-339-2191 Fax: Email: Bonnie.petersen@marquipwardunited.com	
Name: MATTHEW VAZQUEZ Company: ASME Address: 2 PARK AVE NEW YORK, NY 10016 Phone: (212) 591-8572 Fax: Email: VazquezM@asme.org		Name: Company: Address: Phone: Fax: Email:	

Supplement SX
Inspector Review Guidelines for Finite Element Analysis (FEA)

PART 2, SECTION 4
INSPECTION – EXAMINATIONS, TEST METHODS, AND EVALUATIONS

4.6 CALCULATIONS

This Section describes review by the Inspector of calculations prior to acceptance of quantitative engineering assessments per industry standards (such as Fitness-For-Service) for in-service equipment, and repairs and alterations.

4.6.1 ENGINEER EXPERIENCE

For quantitative engineering assessments, repairs and alterations, all calculations shall be completed prior to the start of any physical work or fitness-for-service acceptance. All design calculations shall be completed by an engineer (as designated by the manufacturer, R-stamp organization, owner or user) experienced in the design portion of the ~~standard~~code used for construction of the item. Refer to NBIC Part 3, Sections 3.2.4, 3.2.5, and 3.2.6 for design and calculations requirements for repairs and alterations.

4.6.1.2 FINITE ELEMENT ANALYSIS (FEA) ENGINEER EXPERIENCE

Finite Element Analysis (FEA) may be used to support quantitative engineering assessments or design for repairs and alterations as follows.

a) When quantitative engineering analysis is used to demonstrate the structural integrity of an in-service component containing a flaw or damage.
b) Where the configuration is not covered by the available rules in the ~~standard~~code used for construction.
c) When there are complicated loading conditions or when a thermal analysis is required.

Because the FEA method requires more extensive knowledge of, and experience with, pressure equipment design and the FEA software package involved, the analysis and report submitted to the Inspector for review shall be completed and certified by a Professional Engineer (PE) licensed and registered as required by the manufacturer, R-stamp organization, owner or user and the jurisdiction if applicable.

The Inspector may require an initial explanation of why the FEA is applicable before the analysis is performed. The inspector shall verify ~~that~~ the validity of the FEA report, that it has been certified by a licensed and registered Professional Engineer, and that it is available for review by the manufacturer, R-stamp organization, owner or user and the jurisdiction. Owing to the specialized nature of FEA, the report must be clear and concise. Further guidelines are found in NBIC Part 2 Sx. INSPECTOR REVIEW GUIDELINES FOR FINETE ELEMENT ANALYSIS (FEA).

Supplement SX
Inspector Review Guidelines for Finite Element Analysis (FEA)

SX.1 SCOPE

This Supplement provides guidelines to be followed when a finite element analysis (FEA) is submitted as part of a quantitative engineering assessment for in-service equipment, or a repair or alteration package for a pressure retaining item for review by the Inspector, and the local jurisdiction if required. Refer to NBIC Part 2 Section 4.6.

SX.2 TERMINOLOGY

a) Finite element analysis (FEA) as applied in engineering is a computational tool for performing engineering analysis. It includes the use of mesh generation techniques for dividing a complex problem into small elements for simulation, as well as the use of software program coded with finite element method algorithm.

b) Quantitative engineering assessment refers to methodologies whereby flaws contained within a pressure retaining item are assessed in order to determine the adequacy of the structure for continued service without failure. The result of the assessment provides guidance on structural integrity, inspection methods and intervals, and shapes decisions to operate, repair, monitor or replace the structure.

SX.3 CHECKLIST

The following presents a thought-provoking checklist of areas to consider and discuss with the FEA practitioner engineer performing the analysis and may be used to familiarize the Inspector with the FEA approach and method- as part of validating the FEA report.~~and aid in preparing an analysis specification~~.

SX.3.1 PRESSURE RETAINING ITEM INFORMATION

a) Vessel type, size, region/section and component(s) under FEA consideration
b) Materials of construction and materials properties (including those as a function of temperature)
c) Original code of construction
d) Repair and alteration history
e) Known extent of degradation and associated damage mechanisms (if available/any)
f) Operating conditions (temperature and heat flux, pressure including vacuum, cyclical service, etc.)
g) Other loads (seismic, earthquake, etc.)

SX.3.2 SCOPE OF THE FEA

a) The objective of the FEA analysis (to be used to support quantitative engineering analysis, repair, alteration, etc.)
b) The justification for use of FEA rather than rules in the code of construction. Refer to NBIC PART 2 4.6.1.2

SX.3.3 FEA SOFTWARE AND MODELLING

a) The software version to be used for the analysis
b) The type of analysis (i.e. stress, static, dynamic, elastic, plastic, small or large deformations, heat transfer, etc.)
c) The modelling approach that will be used (solids, shells, simplification of geometry, mesh generation, solver technique, division into elements and element size, boundary restraints, etc.)
d) The geometries to be modeled (non-corroded, corroded and future corrosion allowance, bulge, dent, groove, crack, etc.)

SX.4 REPORT REQUIREMENTS

The following checklist of areas to consider and discuss with the FEA practitioner engineer completing the certified report may be used to define what should be included in the report. An alternate useful reference is the following presentation: Proceedings of the ASME 2014 Pressure Vessels & Piping Conference, PVP2014-28958, Writing and Reviewing FEA Reports Supporting ASME Section VIII, Division 1 and 2 Designs – Practical Considerations and Recommended Good Practice.

SX.4.1 SECTIONS TO BE INCLUDED IN THE REPORT

a) An introduction and/or executive summary
b) A description of the model
c) A presentation of the results
d) An analysis of the results and conclusions

SX.4.2 LISTING OF INFORMATION THAT MAY BE INCLUDED IN THE FEA REPORT

SX.4.2.1 ANALYSIS METHOD

a) State the scope of the FEA and the justification for using it; give the program and version
b) Note whether or not the problem is linear.
c) Give an overview of how the analysis is conducted, for example:
    1) Calculations are done to simplify radiation boundary conditions so that the problem is linear.
    2) Thermal loads are applied to the FEA model and temperatures generated
    3) Temperatures at select locations are compared to the radiation simplification calculations
    4) Mechanical loads are added
    5) Stresses are generated
    6) Stress classification results are generated
    7) Results are verified by comparison to something (for example BPVVC Section VIII Division 2 Part 5 Design by Analysis)
    8) Results are compared to the construction code
d) Note if any of the geometry is not included in the stress model

SX.4.2.2 STRUCTURAL DESCRIPTION / MESH / STRESS CLASSIFICATION LINE LOCATIONS

a) Reference the geometry source or show a drawing or sketch with dimensions that relate the model geometry to the actual structure in the FEA analysis
b) Name all the parts, usually best done with a sketch
c) Note any symmetry
d) Give the type of element used for each component
e) Describe the mesh type (h, p , 2D, 3D), shape, and order (2^{nd} order or above) and show plots of the mesh
f) Show the top and bottom of shells or beam orientations and indicate if they are thick or thin elements
g) Show the cross sections with stress recovery points for beams
h) Describe any boundary conditions such as supports, restraints, loads, and forces as well as the method of restraining the model to prevent rigid body motion.
i) Describe parts that are connected by node sharing or contact and tell whether the connections are thermal, mechanical, or both

j) Give the stress classification line locations (usually best done with a sketch)

SX-4.2.3 Material Properties

a) List properties used for every component, references to other sources are not sufficient. They must be explicitly listed. Show the values of any properties modified for the sake of the model. For example, the model density is often modeled.
b) Show calculations for properties that are modified for the sake of the model.
c) Discuss any given artificial properties for the analysis (for example the modulus was set to 1000 psi so that the component would not influence the mechanical model. Or, above 1200F the properties are assumed to be constant).
d) Reference the source for all material properties.

SX-4.2.4 Restraints and loads

a) Show all restraints and loads
b) Discuss the justification for all restraints and loads, and give calculations if they were done to determine the restraints or loads (for example, end pressure).
c) Discuss any contact regions.
d) Give initial or default temperatures.

SX-4.2.5 Validation

a) Describe how the model was validated.
b) Describe the accuracy of the model digitization either by use of convergence or to the accur acy of previous successful models.

SX-4,2,6 Results

For each model the following should be presented

a) Give temperature plots.
b) Give deformed geometry plots
c) Give stress classification line results and comparison to Code allowable.
d) Relate the results of the model to the defined allowable stresses of the original Code of construction.
e) Refer to ASME Section VIII, Division 2, Part 2, Section 2.3.3.1(c)(2) Documentation requirements of design-by-analysis calculations in Part 5.

SX-4.2.7 Reference Documents Used:

Typical reference documents could include:

a) ASME BPVC II-D
b) ASME BPVC Section VIII Division 1
c) ASME BPVC Section VIII Division 2
d) ASME/API-579
e) Drawings
f) UDS
g) ASCE ~~7-05~~

Inspection of Static Vacuum Insulated Cryogenic Vessels

This section covers the periodic inspection and testing of static vacuum insulated cryogenic pressure vessels used in the storage of refrigerated liquefied gases. Owner-users should inspect static cryogenic vacuum-insulated storage tanks to ensure that the equipment is in safe serviceable condition.

Definition: A static vacuum insulated cryogenic vessel is a vessel that is thermally insulated for use with one or more cryogenic fluids, consisting of: 1) an inner vessel holding the cryogenic fluid, 2) an outer jacket that serves as an air tight enclosure which supports the inner vessel, holds the insulation and enables the vacuum to be established, and 3) the associated piping system.

Outdoor installation general observation:

Check that the following conditions or safe guards are adequate prior to doing a periodic external inspection of the vessel:

- Surface water drainage is directed away from the location of installation. Proximity of storage tank to sewer inlets shall comply with local fire code.
- Installations are in place, such as a wall, to prevent gases from spreading across the location if there is a slope between vessels (and lower rooms if any) Comment: NFPA 55 already establishes requirements for the tank to be a set distance from openings and air intakes. These distances ensure ample time for spilled product to evaporate and dilute in the air. Containment walls are rarely used.
- Protective measures are in place for the vessels and components from mechanical impact damage (such as barricades, safe set-back distances, ~~polls~~ poles and bars.
- Protection is in place for the external vessel supports from leaking cryogenic fluid Comment: Proper drainage is the only protection afforded against leaking cryogenic fluid. No other protections are in place for most systems.
- Any gas from pressure relief devices or vents is discharged to a safe place.
- There is sufficient ventilation to avoid the formation of explosive gas-air mixtures or an oxygen deficient/enriched atmosphere.

Periodic Visual Inspection:

A periodic external visual inspection of the vessel and equipment should be made to ensure that the vacuum between the inner vessel and outer jacket has not been compromised. If the vessel has lost vacuum, the owner-user of the cryogenic storage vessel shall immediately investigate the cause. Any loss of vacuum should be investigated as this could affect the integrity of the vessel and support system. If the cause is due to an internal pipe failure as evidenced by vapor escaping from the vacuum relief device, the pressure should be immediately reduced to atmospheric pressure followed by emptying of all of the cryogenic liquid in a safe manner.

External visual inspections are possible at all accessible parts of the vessel and piping. The following inspections should be included as part of the periodic external visual inspection.

- A functional check of essential and critical valves and their operability.
- Leak tests under operating conditions of the vessel and piping.
- Assessing if there have been any significant changes in the operational conditions of the installation and its surroundings.
- Check that there is no excessive out-of-roundness or deformation of the outer vessel
- Check all nozzle attachments
- Check the vessel supports to make sure there is no structural damage.
- Check that any attachments to the outer jacket are not damaged or affecting the vessel condition.
- Verification of periodic testing and repair (or replacement) of the pressure relief device(s)

- Check that the pressure relief device(s) are not continually venting. PRD's may vent periodically under normal circumstances but should be reported for maintenance testing and repair if venting continually.
- Checking the condition of the outer vessel, piping and accessories
- Check for abnormal frosting on outer vessel surface. Under normal usage, frost and ice will develop around pipes, valves, controls and vaporizers. Inspect the outer skin of the outer vessel for any new or abnormal signs of excessive frosting.

Extended Interval Pressure Testing

The Owner-User should consider conducting a pressure test of the vessel at extended intervals, such as every 8 to 15 years. An example is a pneumatic pressure test at 110% of design pressure. At the same time, a vacuum test, such as for 3 hours, may also be conducted. Comment: It is the position of the Compressed Gas Association that periodic pressure tests are not required for vacuum-jacketed cryogenic vessels. This is due to non-corrosive service, the performance history of existing tanks, and the excellent fracture toughness of the inner vessel material at cryogenic temperature. Please refer to CGA Position Statement PS-4. As for periodic vacuum tests; it is unwise to ever test vacuum once a tank is in service. Loss of vacuum is easily detected by observing frost forming on the outer vessel, or by the relief actuating. Testing vacuum is the most frequent cause of vacuum problems. So, vacuum tests are only performed when loss of vacuum is suspected, or when a vessel is being refurbished.

1.2 Administration

Add to end of Part 2, Section 1.2

Unless otherwise specifically required by the Jurisdiction, the duties of the Inspector do not include inspection to other standards and requirements (environmental, construction, electrical, operational, undefined industry standards, etc.) for which other regulatory agencies have authority and responsibility to oversee.

Proposed New Supplement for Part 2

Inspection of Biomass Fired Boiler Installations (Section 6, Supplement 9)

S9.1 - Scope

a) This supplement provides rules for continued inspection of biomass fired boilers and the additional equipment utilized in these installations. In this context Biomass is intended to mean various types of wood wastes, or wood byproducts.

b) Many of the requirements of the earlier Sections of Part 2 are common to all boiler installations irrespective of the fuel being fired; therefore this supplement will address the differences that occur when solid fuels, such as Biomass, are being used. Thus the primary thrust of this section will be directed toward the inspection of the fuel handling and distribution systems, and the impact these systems may have on the pressure vessel itself.

S9.2 – Assessment of Installation

a) A general assessment of the complete installation shall be undertaken, in terms of observable results of operating and maintenance practices. Indicators include the general boiler room cleanliness, for example significant quantities of fuel particles (dust) should not be apparent in the boiler room.

b) The combustion air inlet shall be free of any debris or dust particle build up, and where moveable louvered intakes exist, the actuating mechanisms shall be clean and operate freely. Corrective action is required when non-compliance is noted.

c) The flue gas venting system shall be checked for tightness, with no observable signs of leakage. Corrective action is required if leakage is noted.

d) The intakes of the various fans or blowers shall be free of fuel particle build up or signs of other debris. Corrective action in terms of cleaning is required when discrepancies are noted.

e) fuel metering equipment and the fuel transportation system shall be free from signs of particulate or dust leakage. Corrective action in terms of cleaning and repair work is required as necessary.

f) Electrical equipment and controls shall be properly protected from the ingress of dust, by ensuring that all cover plates are properly installed and all panel doors are intact, operable and closed.

g) Verify that all guards for rotating equipment (shafts, bearings, drives) are correctly installed and fan inlet screens are in place.

h) On the boiler, generally check for signs of potential problems, including;

- Water leaks
- Ash Leaks
- Condition of insulation and lagging.
- Casing leaks or cracks
- Check all safety valves for bypass and ensure the inspection plugs are capped and the drain lines are piped away from traffic areas.
- Missing or misaligned pieces or parts ie twisted, misaligned or bound up buck stays, missing linkage bolting.
- Condition of support systems
- Provision of “Danger” or “Caution” signs
- Excess vibration
- Excess noise.

i) Verify that the Owner/User has established function test, inspection, requirements, maintenance and testing of all controls and safety devices in accordance with the manufacturer’s recommendations. Verify that these activities are conducted at assigned intervals in accordance with written procedures, non-conformances which impact continued safe operation of the boiler are corrected and the results are properly documented. These activities shall be at a frequency recommended by the manufacturer, or frequency required by the jurisdiction. Where no frequencies are recommended, or prescribed, the activity should be conducted at least annually

S9.3 – Boiler Room Cleanliness

a) While boiler room cleanliness is of primary importance in all boiler rooms it is of particular importance in biomass fired boiler rooms. Biomass can contain fine particulate, which if allowed to leak from the transportation system into the

surrounding boiler room, will eventually be drawn into fans, resulting in the possibility of combustion air systems becoming plugged.

b) Boiler rooms containing quantities of fine dusts are susceptible to fire or explosion, again emphasizing the need for high standards of cleanliness.

S9.4 – Emission Control Requirements

a) Emission control is dependent upon the fuel being fired and the emission requirements prevailing at the location of the boiler installation. As such they are a part of the initial design and installation process, and apart from ensuring that they are kept in top working condition, so that emission requirements are not violated; there is little that can be done from the inspector's point of view.

b) When Continuous Emissions Monitors (CEM's) are in use, they should be demonstrated to be functioning properly and have a current calibration sticker.

c) Delta-P pressure gauges which measure the pressure drop across the various elements of the emission control system should all be functioning correctly.

d) There should be no sign of erosion caused by entrained particulate matter, in any part of the breaching, ductwork, stack or the individual emission control elements.

e) On systems in which the emissions control system incorporates a baghouse, appropriate fire detection and suppression systems shall be incorporated and functioning properly.

2.3.6.6 INSPECTION OF WIRE WOUND PRESSURE VESSELS

(a) This section provides guidelines for inspection of wire wound pressure vessels typically designed for 10,000 psi or greater service. The scope of inspection of these vessels should include components affected by repeated opening and closing, such as the frame, yolk and cylinder inner diameter surface, or alignment of the yolk with the cylinder, lack of maintenance and a check for inoperable or bypassed safety and warning devices.

(b) These vessels consist of four parts, a wire wound cylinder, two end closures and a frame to retain the closures in the cylinder. The wire is one continuous piece and is wound in tension. On the cylinder, the wire can only carry circumferential or radial loading. The cylinder is typically not of sufficient thickness to carry axial load which requires the end closures have no threads or retaining grooves and requires a frame to retain the pressure vessel axial load imposed on the closures. The purpose for this design is to minimize weight of the containment cylinder using thinner wall materials and using external wound wire to induce a compressive preload. This design also provides increased resistance to damage from fatigue loading.

Note that some vessels may be monoblock cylinders (no winding) with wire wound frame and some vessels may be wire wound cylinder with a forged or welded plate frame (not wire wound). Use of a frame to retain the end closures removes the sharp transitions in shape (threads or grooves) associated with monoblock cylinder failures. The design of high pressure vessels is typically based on fatigue life criteria. The majority of operating wire wound vessels in North America today were fabricated under the rules of ASME BPVC Section VIII Division 3, Alternative Rules for Construction of High Pressure Vessels. Some inservice vessels may have been constructed the ASME BPVC Section VIII Division 1 or Division 2 rules, and others installed as “State Specials” that still require fatigue life analysis to determine a safe operating life. The primary failure mode is fatigue cracking. Early detection of any damage to the cylinder, closures or frame is essential to avoid catastrophic failure

High pressure design requires use of high strength materials, which have relatively low ductility. The material thickness required for reasonable fatigue life is greatly reduced by the pre-tensioned wire wound design. Typical winding design provides compression sufficient that at vessel design conditions there is no circumferential stress in the cylinder. These vessels have been used in various industrial applications, including foods and drinks processing, ceramic or refractory processing and powdered metal processing utilizing a liquid compressing fluid at ambient or slightly elevated temperature. The most frequent of these are isostatic pressing and hydrostatic extrusion. Isostatic pressing can be performed at either cold temperatures, at room temperature, with liquid as the pressure medium, or hot, at temperatures of 2000 to 3300°F with gas as the pressure medium. In hot isostatic presses, the vessel wall is separated from the hot space by insulation, which keeps the vessel wall operating at a low temperature of approximately 120 to 180°F.
Cold pressing is used for regular production at pressures up to 87,000 psi. Ceramic, refractory and metal processing is also performed at elevated temperature, up to 3632°F (2000°C). The “hot” processes utilize an inert gas fluid pressure up to 45,000 psi (310

MPa). Continuous cooling is necessary for the hot process and may contribute to corrosion damage of the cylinder of closures.
Hydrostatic extrusion is generally performed either cold, at room temperature, or warm, at temperatures up to 1110°F, in both cases with liquid as the pressure medium. Hydrostatic extrusion is used for regular production at pressures up to 200,000 psi. Both cold and hot processes are commonly found in research facilities and in universities.

(c) Record keeping

(1) Since these vessels have a finite fatigue life, it is essential a record be maintained of each operating cycle, recording both temperature and pressure. Deviation beyond design limits is cause for suspending operation and reevaluation of remaining fatigue life. Vessels having no operating record should be inspected and a fracture mechanics evaluation with a fatigue analysis test be performed to establish remaining life before resuming operation.

(2) Operating data should be recorded and include the following whenever the vessel is operating:

a. Number of cycles
b. Maximum pressure
c. Maximum temperature

(d) Any unusual conditions (d) Any damage to the cylinder or closures can lead to premature failure. Frequent visual inspection should be made of internal and external surfaces of the cylinder, frame and closures. A thorough examination should be completed if any visually apparent damage is identified or if any excursion beyond design temperature or pressure occurs.

In addition, surfaces of the cylinder and closures should be examined by dye penetrant or magnetic particle method at intervals based on vessel remaining life. Closures may require ultrasonic examination of passageways.

Following is an example of what the results of such a study might reveal as allowable cycles for a particular wire wound vessel:

Columns	> 10^6 Cycles	“Columns” are beams on either side of frame, between the yokes.
Yokes	> 10^6 Cycles	“Yokes” are the circular ends of the frame.
Wires of frames	> 10^6Cycles	“Wires” place frame in compression
Cylinder	100 X 10^3 cycles	
Wires of Cylinder	60 X 10^3 cycles	“Wires” place cylinder in compression.
Closures	30 X 10^3 cycles	All connections to the vessel are through the closures. These passageways create stress raisers, as do grooves for sealing system.

The vessel design life in this example is thus limited by the closure. The calculated design life is 30,000 cycles at design pressure and temperature.

An acceptable factor of safety for vessel fatigue inspection interval varies between 0.25 and 0.5 of the remaining design life. The inspection interval for the above example is therefore 10,000 to 20,000 cycles, but should not exceed five years.

In addition to scope of frequent inspection, the fatigue inspection should include measurement of the cylinder inside diameter and frame inside length to detect reduced tension in the wire windings. Note that monoblock cylinders and plate frames require additional inspection due to differing construction.

If a crack or flaw is detected during any inspection, an immediate evaluation, repair and study of impact on remaining fatigue life should be completed by a National Board authorized repair agency. Using the results of this study, and application of safety factor 0.25 (due to known damage), the number of cycles of operation to the next fatigue inspection is established.

As part of the frequent inspection, the following items should be reviewed:

(1) Verify no change in the process, such as the processing fluid, that might adversely impact vessel integrity.

(2) Review the vessel manufacturer's inspection recommendations for vessel, closures and frame. If manufacturer's recommendations are not available, obtain recommendations from a recognized wire wound vessel service provider.

(3) Verify any repair to pressure retaining items has been completed by National Board authorized service provider having wire wound vessel expertise.

(4) Verify overpressure protection with appropriate set pressure and capacity is provided. Rupture discs are commonly used for pressures exceeding 14,500 psi (100 MPa) to avoid valve seat leakage. Overpressure protection devices are frequently replaced to avoid premature operation.

(e) Additional Inspection Criteria

(1) If there are no manufacturer's recommendations available for the vessel, the following are additional recommended inspections that should be conducted to ensure vessel integrity and safety

a. Conduct annual visual and dimensional vessel inspections with liquid penetrant examination of maximum stressed areas to ensure that the surfaces are free of defects. Conduct ultrasonic examination of the vessel after every 25% of the design cycle life or every five years, whichever comes first, to detect subsurface cracks. Special attention Should be given to the roots of threads and closures using threaded head retention construction. Other geometric discontinuities that are inherent in the design or irregularities resulting from localized corrosion, erosion, or mechanical damage should be carefully examined. This is particularly important for units of monoblock construction.

b. The closure mechanism of the vessel end-closure is opened and closed frequently during operation. It should be closely inspected for freedom of movement and proper contact with its locking elements. Wire wound vessels must have yoke-type closures so the yoke frame will need to be closely inspected on a regular basis

c. Should pitting, cracks, corrosion, or other defects are found during scheduled inspection, verify that an evaluation using fracture mechanics techniques is performed. This is to determine MAWP, cyclic life and extent of NDE frequency based on crack growth rate.

(2) Gages, Safety Devices, and Controls

a. Verify that the vessel is provided control and monitoring of the pressure, temperature, electrical system, fluid flow, liquid levels, and all variables that are essential for the safe operation of the system. If the vessel is automatically controlled, manual override should be available. Also, safety interlocks should be provided on the vessel closure to prevent vessel pressurization if the vessel closure is not complete and locked.

b. Verify that all safety device isolation valves are locked open if used.

c. Verify appropriate pressure relief device is installed with relief setpoint at low a pressure as possible, consistent with the normal operating pressure but in no case higher than the design operating pressure of the vessel. Rupture discs are normally considered more suitable for these types of applications since pressure relief devices operating at pressures above 14500 psi may tend to leak by their seat.

d. Verify that pressure and temperature of the vessel coolant and vessel wall is controlled and monitored. Interlock devices associated with these monitoring devices that will deenergize or depressurize the vessel are strongly recommended due to the potential significant damage that can be caused by release of energy in the event of overpressurization due to excess pressure or temperature in the vessel.

e. Verify audible and visual alarms are installed to indicate unsafe conditions.

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:

There is no existing text.

b) Statement of Need

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

Mr. Francis Brown received a telephone call regarding a Chief Boiler Inspector granting an operating permit for a 13,000 psi vessel with apparently little more than a cursory inspection. In granting the permit there was no consideration of the fatigue life of the vessel, and fatigue should always be a consideration. Also, the vessel is 20 years old with no operating log. Perhaps the extra inspections and precautions needed when dealing with high pressure vessels should be brought to the attention of the Chief Inspectors. Mr. Brown requested that an action item be opened.

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.

The corrosion barrier of a high pressure vessel failed leading to stress corrosion cracking and eventual failure of the vessel. Apparently stress corrosion cracking initiated at scratches on the inside surface of the vessel. The scratches were from insertion/removal of product, and cleaning of the vessel interior after each cycle.

Action Item Request Form

EXISTING LANGUAGE in 2013 NBIC Part 2

5.2 REPLACEMENT OF STAMPED DATA DURING INSERVICE INSPECTION

5.2.1 AUTHORIZATION

a) When the stamping on a pressure-retaining item becomes indistinct or the nameplate is lost, illegible, or detached, but traceability to the original pressure-retaining item is still possible, the Inspector shall instruct the owner or user to have the stamped data replaced. All re-stamping shall be done in accordance with the original code of construction, except as modified herein. Requests for permission to re-stamp or replace nameplates shall be made to the Jurisdiction in which the pressure-retaining item is installed. Application must be made on the ***Replacement of Stamped Data Form***, NB-136 (see NBIC Part 2, 5.3.2). Proof of the original stamping and other such data, as is available, shall be furnished with the request. Permission from the Jurisdiction is not required for the reattachment of nameplates that are partially attached. When traceability cannot be established, the Jurisdiction shall be contacted.

b) When there is no Jurisdiction, the replacement of stamped data shall be authorized and witnessed by a National Board Commissioned Inspector and the completed Form NB-136 shall be submitted to the National Board.

I propose the following revisions **to NBIC Part 2 paragraphs 5.2.1 (a) and 5.2.2 a)**

Stamped Data Form, NB-136 (see NBIC Part 2, 5.3.2). Proof of the original stamping and other such data, as is available, shall be furnished with the request. Permission from the Jurisdiction is not required for the reattachment of duplicate nameplates or nameplates that are partially attached. When traceability cannot be established, the Jurisdiction shall be contacted.

5.2.2 REPLACEMENT OF STAMPED DATA

a) The re-stamping or replacement of data shall be witnessed by a National Board Commissioned Inspector and shall be identical to the original stamping. The requirement to witness replacement of a duplicate nameplate may be waived if acceptable to the Jurisdiction.

JUSTIFICATION FOR CODE REVISION:

The NBIC does not seem to address replacement of "Duplicate" nameplates where the original nameplate is intact and attached to an inner vessel and may or may not be visible such as on a cryogenic vessel that has an inner and outer shell, the inner vessel being the actual pressure retaining item. It seems reasonable that since the AI is not required to witness a duplicate nameplate as addressed in ASME Section VIII Div 1 UG 119 (f), the AI should not be required to witness the replacement of a "Duplicate" nameplate or request permission from the Jurisdiction.

James P. Larson

OneCIS Insurance Co.

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Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: October 7, 2014

Commenter Name: Nathan Carter

Commenter Address: HSB Global Standards, One State Street, PO Box 299
Hartford, CT 06141-0299

Commenter Phone: 860-722-5750

Commenter Fax:

Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 2, S7.10 h)

Comment/Recommendation: *Proposed Solution:* □ New Text ☒ Revise Text □ Delete Text

Since a nameplate is required with a "R" stamp for the underground service change, was the requirement for an R-1/R-2 to be completed intentionally left off? Would it not be prudent for an Inspector to verify that the seal welding or flush patch welds comply at least visually comply with code? A "R" Certificate Holder is already required. Why not include an Inspector to verify the weld is acceptable and require a signed R-1/R-2 form, which is to be filed with the NB. There is a risk to life/property if a seal weld or flush patch on a LPG storage vessel is not completed in accordance with code requirements. Paragraph e) also introduces additional welding, which should be verified.

Also please consider a new item for Part 3, which would refer the reader to this Supplement for a Change of Service.

Source: ☒ Own Experience/Idea □ Other Source/Article/Code/Standard

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Commenter No. Issued: PR15-01

Comment No. Issued: 42

Project Committee Referred To: SC Inspection

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Section/Subsection Referenced: Part 2, S7.10 k)

Comment/Recommendation: *Proposed Solution:* □ New Text ☒ Revise Text □ Delete Text

Part k) is silent concerning qualified welders. I don't believe the intent is for unqualified welders to be seal welding or welding flush patches to close off unused connections (d)) as well as welding the nameplate, especially since a qualified WPS is required. Consider requiring that the welder be qualified as specified in NBIC Part 3 2.2.3. Also, Consider providing more guidance to "stamp holder using a qualified welding procedure" by pointing the reader to Part 3. Consider changing this to "stamp holder using a qualified WPS or SWPS as specified in NBIC Part 3 2.2.1 and 2.2.2 respectfully."

Source: ☒ Own Experience/Idea □ Other Source/Article/Code/Standard

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Commenter No. Issued: PR15-01

Comment No. Issued: 43

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Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 2, S11.6, S11.7, S11.9

Comment/Recommendation: *Proposed Solution:* □ New Text ☒ Revise Text □ Delete Text

The Term "Examination" is used throughout S11.6, S11.7, and S11.9. Was this intended to read "Inspection" instead, which is a duty of the Inspector?

S11.7. Should there be a Visual Acuity requirement?

Source: ☒ Own Experience/Idea □ Other Source/Article/Code/Standard

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Commenter No. Issued: PR15-07 Project Committee Referred To:

Comment No. Issued: 04 SC Inspection

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Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 2, S11.10.2 another

Comment/Recommendation: *Proposed Solution:* □ New Text ☒ Revise Text □ Delete Text

S11.10 specifies very complex, details throughout. Would it not be prudent for the ~~Examiner to prepare a written procedure capturing all of the requirements in S11.~~10 as well as addressing all of the requirements in ASME Section V, Article 11? Would it also be prudent to require this procedure to be demonstrated to the Inspector also or at a ~~minimum require that the procedure be available for review by the Inspector during~~ his/her inspection cycle?

Source: ☒ Own Experience/Idea □ Other Source/Article/Code/Standard

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Commenter No. Issued: PR15-07

Comment No. Issued: 01

Project Committee Referred To: SC Inspection

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Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 2, S11.10.2 and S11.10.6

Comment/Recommendation: *Proposed Solution:* □ New Text ☒ Revise Text □ Delete Text

The Title "Test Procedure" is used in both Sections S11.10.2 and S11.10.6 under S11.10 Acoustic Emission Examination. Was it the intent to have "Test Procedure" listed twice for Acoustic Emission. If not, suggest that these two paragraphs be consolidated. The latter is more detailed than the former.

Source: ☒ Own Experience/Idea □ Other Source/Article/Code/Standard

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Commenter No. Issued: PR15-07

Comment No. Issued: 02

Project Committee Referred To: SC Inspection

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Commenter Email: nathan_carter@hsbct.com

Section/Subsection Referenced: Part 2, S11.10.3

Comment/Recommendation: *Proposed Solution:* □ New Text ☒ Revise Text □ Delete Text

Which Edition of SNT-TC-1A and CP-189? Is any acceptable that addresses Acoustic ~~Emission Examination?~~

Last Sentence. How is the training and experience quantified? To whose satisfaction? How is this training and experience documented? I assume that the intent is that considerable training and experience be performed and not a 5 minute training session and ~~one examination interval be performed. Without quantifying this, what is there to~~ prevent this from occurring?

Source: ☒ Own Experience/Idea □ Other Source/Article/Code/Standard

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Commenter No. Issued: PR15-07

Comment No. Issued: 03

Project Committee Referred To: SC Inspection

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Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: **10/04/2014**

Commenter Name: **Brian W. Moore, P.E.**

Commenter Address: **Hartford Steam Boiler**
One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **Part 2 Section 2.3.6.8**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

Do not incorporate the proposed change – Establishing a mandatory (shall) inspection requirement based on another inspection code is beyond the scope of the NBIC. To my knowledge, no other inspection code has ever been made mandatory under the NBIC. If inspection requirements are needed then one of two things should be done: 1) let individual jurisdictions set the requirements, or 2) within the NBIC include specific inspection requirements consistent with pressure vessels constructed to ASME Section VIII and ASME PVHO-1. An alternative to including specific requirements within the NBIC would be to change the text to: "Inspections may be conducted using ASME PVHO-2 for reference." It must be clear that the requirements of PVHO-2 are not a mandatory part of an NBIC inspection. See for example, PVHO-2 Section 4.0. None of the responsibilities listed include a commissioned boiler inspector. Even Section 7 states that there are various types of inspections. "Operational Inspections" are definitely beyond the scope and capabilities of a commissioned inspector.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-02

Project Committee Referred To: SC on Inspection

Comment No. Issued: **04**

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Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: **October 13, 2014**

Commenter Name: **Kenneth A. Stoller - American Insurance Association (AIA)**

Commenter Address: **2101 L Street NW, Suite 400**

Washington, DC 20037

Commenter Phone: **202-828-7167**

Commenter Fax: **202-495-7866**

Commenter Email: **kstoller@aiadc.org**

Section/Subsection Referenced: **Part 2, Section 2.3.6.8**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

While AIA supports the concepts underlying PVHO-2, we oppose its adoption as an in-service inspection standard. The requirements of PVHO-2 are addressed to owner/operators, not inspectors, and go well beyond the normal scope and training of National Board Commissioned Inspectors. Imposing these requirements on special inspectors may also place them in the untenable position of assuming liability beyond the limits of the insurance policies under which they perform inspections. Accordingly, we recommend leaving this section unamended.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-06

Comment No. Issued: 01

Project Committee Referred To: SC Inspection

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Comments Must be Received No Later Than: October 13, 2014

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: **October 13, 2014**

Commenter Name: **Robert Wielgoszinski**

Commenter Address: **HSB Global Standards**
One State Street, Hartford, CT 06060

Commenter Phone: **860-722-5064**

Commenter Fax: **860-722-5505**

Commenter Email: **Robert_wielgoszinski@hsbct.com**

Section/Subsection Referenced: **Part 2, paragraph 2.3.6.8**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

Inspections that are specified by the NBIC should be performed in accordance with the NBIC, and not be performed to other Codes or Standards. The specific details for inspection should be extracted from the standard and written into the NBIC. This places the NBIC in control of which inspections they need performed. This paragraph should be withheld from publication in the NBIC until revised to specify the inspections needed.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued:PR15-04 _____ Project Committee Referred To:

Comment No. Issued: **01** **SC Inspection**

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Washington, DC 20037

Commenter Phone: **202-828-7167**

Commenter Fax: **202-495-7866**

Commenter Email: **kstoller@aiadc.org**

Section/Subsection Referenced: **Supplement 10, Inspection of Liquid Carbon Dioxide Storage Vessels**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☒ Delete Text

AIA believes that several aspects of the proposed requirements are either undefined or otherwise beyond the normal scope and training of National Board Commissioned Inspectors. Imposing these requirements on Special Inspectors may also place them in the untenable position of assuming liability beyond the limits of the insurance policies under which they perform inspections. Items of concern include the failure to define the terms "sufficient clearance" (S10.2b), "safely supported" (S10.2d), "guarded (S10.2f); and "permanent" (S10.3a). We recommend either defining or deleting these terms. Furthermore, Commissioned Inspectors are not qualified to (i) determine whether a CO2 detector is set to alarm at any particular concentration (S10.5); (ii) verify the posting of warning signs and determine the setpoint of any alarms (S10.6); or (iii) determine the length of safety relief/vent lines or verify that the materials selected for valves, piping, tubing, hoses and fittings used in the LCDSV system meet certain requirements. We recommend deleting these sections.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-06 Project Committee Referred To:

Comment No. Issued: 02 SC Inspection

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Date: **10/04/2014**

Commenter Name: **Brian W. Moore, P.E.**

Commenter Address: **Hartford Steam Boiler**
One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **Part 2 Supplemnt 10 S10.3 a)**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

Delete S10.2 a) This is unenforceable language and beyond the scope of knowledge of a National Board Commissioned inspector. The word "permanent" is undefined and beyond the knowledge of a commissioned inspector to determine. There can be no uniform and consistant interpretation of "permanent."

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-02 Project Committee Referred To:

Comment No. Issued: **05** SC Inspection

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Commenter Address: **Hartford Steam Boiler**
One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **Part 2 Supplemnt 10 S10.2 d)**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

Delete S10.2 d) This is unenforceable language and beyond the scope of knowledge of a National Board Commissioned inspector. The expression "safely supported" is undefined and beyond the knowledge of a commissioned inspector to determine. If "safely supported" means chained to the wall with a lock, then this subparagraph should so state, otherwise there can be no uniform and consistant interpretation of "safety supported".

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-02 Project Committee Referred To:

Comment No. Issued: **06** **SC Inspection**

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Commenter Address: **Hartford Steam Boiler**

One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **Part 2 Supplemnt 10 S10.2 f)**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

Delete S10.2 f) This is unenforceable language and beyond the scope of knowledge of a National Board Commissioned inspector. The word "guarded" is undefined and beyond the knowledge of a commissioned inspector to determine. If "guarded" means a 6" diameter steel pipe, filled with concrete, and buried 3' onto the ground, then this subparagraph should so state, otherwise there can be no uniform and consistant interpretation of "guarded".

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-02 Project Committee Referred To:

Comment No. Issued: **07** **SC Inspection**

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Commenter Address: **Hartford Steam Boiler**
One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **Part 2 Supplemnt 10 S10.3 a)**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

Delete S10.2 a) This is unenforceable language and beyond the scope of knowledge of a National Board Commissioned inspector. The word "permanent" is undefined and beyond the knowledge of a commissioned inspector to determine. There can be no uniform and consistant interpretation of "permanent."

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard

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Comment No. Issued: 08 SC Inspection

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One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **S10.5 Gas Detection Systems**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

National Board Commissioned inspectors do not inspect to NIOSH or ACGIH documents. It is not appropriate to cite these as mandatory, which is how this subparagraph will be interpreted. Commissioned inspectors are not qualified to determine whether a detector is set to alarm at any particular concentration.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-02 Project Committee Referred To:

Comment No. Issued: **09** **SC Inspecction**

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Commenter Address: **Hartford Steam Boiler**
One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **Part 2 Supplemnt 10 S10.6**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

Delete S10.6. Verifying signage is beyond what in-service commissioned inspectors are chartered to do. Such signage is within the purview of OSHA for a safe work environment for employees. Commissioned in-service inspectors do inspect to any requirements of OSHA. In addition, the in-service inspectors are not qualified to determine the setpoint of any alarms. This entire section should be deleted.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Comment No. Issued: **10** SC Inspection

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One State St, P.O. Box 5024, Hartford, CT 06102

Commenter Phone: **860-722-5657**

Commenter Fax: **860-722-5530**

Commenter Email: **brian_moore@hsb.com**

Section/Subsection Referenced: **Part 2 Supplemnt 10 S10.7**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☐ Revise Text ☒ Delete Text

Delete S10.7. The materials specifications are beyond what a commissioned in-service can verify. Valves, piping, tubing, and fittings may not be visibly marked for such verification. Further, the inspector cannot verify S10.7 a)3) "…the working pressure of the applicable circuit in the system…" The caution is not enforceable language for an inspector: "Caution: Company's and or individuals filling or refilling LCDSV's shall be responsible for utilizing fill equipment that is acceptable to the manufacturer to prevent over pressurization of the vessel." In S10.7 d) the length of a vent line cannot be reasonable determined by an in-service inspect. Tracing a line with a tape measure to determine its length is not practical or reasonable. Finally, the tables reference a "Fire Flow Rate" which is a manufacturer/user determined rating under Section VIII. This entire section, including the tables, should be deleted.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: ____PR15-02_____ Project Committee Referred To:

Comment No. Issued: **11** **SC Inspection**

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Date: **October 13, 2014**

Commenter Name: **Robert Wielgoszinski**

Commenter Address: **HSB Global Standards**
One State Street, Hartford, CT 06060

Commenter Phone: **860-722-5064**

Commenter Fax: **860-722-5505**

Commenter Email: **Robert_wielgoszinski@hsbct.com**

Section/Subsection Referenced: **Part 2, Supplement 10**

Comment/Recommendation: *Proposed Solution:* ☐ New Text ☒ Revise Text ☐ Delete Text

Much of Supplement 10 contains requirements for inspection of equipment or systems that are outside the scope of the insurance policies that insurance companies issue. If these inspections are mandated by the Jurisdiction, then the inspectors employed by these insurance companies will be forced to make inspections in where they have no business interest. Further, this puts indefensible liability on the Inspector and his/her employer. I recommend either deleting this Supplement from the 2015 edition and rework it to be more guidance related then requirement based, or add a suitable disclaimer in the Scope paragraph, S10.1, that would exempt Inspector conformance to this supplement if carbon dioxside systems or parts thereof, are not within the employer's scope of activity.

Source: ☒ Own Experience/Idea ☐ Other Source/Article/Code/Standard _____

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Commenter No. Issued: PR15-04 Project Committee Referred To:

Comment No. Issued: 02 Inspection

National Board Inspection Code Action item NB13-1002- Revision Dated 1/20/15

NB13-1002 - Part 2, SG Insp. Spec. – Review inspection requirements for B31.1 Power Piping. A Task Group consisting of Mike Schwartzwalder (Lead), Joe Frey, Venus Newton, Mark Mooney, Marshall Clark, Domenic Canonico, Mark Horbaczewski and Robbie Dobbins were assigned.

For Discussion, I propose the following additions to the Part 2- Inspection, 2013 edition Section 1.3 add paragraph 1.3(v) ASME B31.1, Power Piping, Chapter VII, Operation and Maintenance.

Add to Part 2- Section 9 Inspection, Glossary of Terms Definitions; 9.1 Definitions**; Covered piping systems (CPS):** These are piping systems on which condition assessments ~~are to~~ should be conducted. As a minimum for piping designed to B31.1, the CPS are to include NPS 4 and larger of the main steam, hot reheat, cold reheat steam and boiler feedwater systems. In addition to the above, CPS also includes NPS 4 and larger piping in other systems that operate above 750° F (400° C) or above 1025 psi (7100 kPa). The owner-user may include other piping systems.

Insert new Section 2.4.8 –Covered Piping Systems (CPS)

Covered piping systems are piping systems, designed to B31.1, on which conditions assessments ~~are to~~ should be conducted. It is recognized that all of the documentation, data and records listed in the following may not be available for a specific plant, particularly older plants. In these cases, the owner or user should ensure to the extent possible that Covered Piping Systems do not represent unnecessary safety risks.

a) In addition to boiler external piping, which is addressed under the original construction codes, the owner or user should consider establishing operation and maintenance procedures for ~~Covered Piping Systems (CPS~~CPS~~)~~ which could fail as a result of creep, fatigue, wall thinning, corrosion fatigue and graphitization. The consequences of failure of CPS could pose a safety risk to personnel and equipment ~~result in death, injury and loss of property~~. The following guidance is provided as examples of written operation and maintenance procedures that owners or users prepare to ensure safe operation of these components;

1) Operation of piping systems within design limits,

2) Documentation of actual operating temperatures,

3) Documentation of significant system transients or excursions including thermal hydraulic events,

4) Documentation of alterations and repairs,

5) Documentation of maintenance of pipe supports for piping operating within the creep regime,

6) Documentation of maintenance of piping system elements such as vents, drains, relief valves, desuperheaters, and instrumentation necessary for safe operation,

7) Assessment of degradation mechanisms, including but not limited to creep, fatigue, graphitization, corrosion, erosion, and flow accelerated corrosion,

8) Quality of flow medium,

9) Documentation of the condition assessment, and

10) Other required maintenance

b) A condition assessment program should be established to provide assessment and documentation of the condition of all CPS. This program should contain (but not limited to) as many of the following elements as appropriate;

1) System name,

2) Listing of original material specifications and their editions,

3) Design diameters and wall thicknesses,

4) Design temperature and pressure,

5) Normal operating temperatures and pressures,

6) Operating hours, both cumulative and since last assessment,

7) Actual modes of operation since last condition assessment (such as number of hot, warm, and cold starts),

8) Pipe support hot and cold walkdown readings and conditions since last conditions assessment for piping systems that are operated within the creep regime,

9) Alterations and repairs since last condition assessment,

10) Description and list of any dynamic events, since last condition assessment,

11) Actual pipe wall thickness and outside diameter measurements since last condition assessment,

12) Summary of pipe system inspection findings including areas of concern, and

13) Recommendations for re-inspection interval.

c) Record of CPS should be maintained for the life of the piping system and should include those items listed in items a and b, applicable to the component, in addition to original as-built drawings, and repaired piping drawings.

d) It is also recommended that the owner or user should have a program, which documents pipe support readings, piping system displacements and modifications, which are taken during hot and cold walk downs. The owner or user should evaluate the effects of unexpected piping position changes, significant vibrations, and malfunctioning supports on the piping system's integrity and safety and record results and or corrective action taken in accordance with c).

e) Records of repairs or alterations to ~~Covered Piping Systems (CPS)~~ CPS shall be ~~recorded~~ documented on the applicable R form, if required, or another suitable document.