Date Distributed: December 19th, 2019

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD SUBGROUP INSPECTION

AGENDA

Meeting of January 14th, 2020
San Diego, CA

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 AM

2. **Introduction of Members and Visitors**

3. **Check for a Quorum**

4. **Awards/Special Recognition**

5. **Announcements**

   The National Board will be hosting a reception for all committee members and visitors on Wednesday evening at 5:30pm at The Smoking Gun. Additional information about the reception can be found on the Hotel Information webpage for the meeting: https://www.nationalboard.org/Index.aspx?pageID=456&ID=478

6. **Adoption of the Agenda**

7. **Approval of the Minutes of the July 16th, 2019 Meeting**

   The minutes are available for review on the National Board website, www.nationalboard.org.

8. **Review of Rosters (Attachment Page 1)**

   a. **Membership Nominations**
   Mr. Jeff Petersen and Mr. Vincent Scarcella are interested in becoming members of Subgroup Inspection. See Attachment Pages 2 and 4 for their resume.

   b. **Membership Reappointments**

   Mr. Thomas Vandini's membership to the subgroup is set to expire on 1/30/2020.

   c. **Officer Appointments**

9. **Open PRD Items Related to Inspection**
   - NB14-0602B – Improve index in Part 2 relating to pressure relief devices – D. Marek (PM)
     - Update: A proposal is expected to be presented at the January 2020 meeting,
   - NB15-0321 – Review testing requirements for inservice testing of pressure relief devices in Part 2, 2.5.7 a) – A. Renaldo (PM)
     - Update: Proposal has been approved by SC PRD and is awaiting Main Committee review.
   - NB15-0324 – guidelines for storage/shelf life in regard to inspection and testing frequencies – A. Renaldo (PM)
     - Update: Item has been approved by SG PRD and is awaiting approval from SC PRD
   - 17-132 – Paragraph 3.2.6 in Part 4 can be put into tabular format (Part 2, 2.5.8) – B. Nutter (PM), M. Brodeur, D. Marek, D. DeMichael, A. Cox, P. Dhobi, R. McCaffrey, T. Beirne
   - 19-9 – Inspect shipping plug removal for PRDs

10. **Interpretations**

    There are no Interpretations for the Subgroup Inspection.

11. Action Items

Item Number: 18-43	NBIC Location: Part 2, Section 5	No Attachment

General Description: Permanent nameplate removal from pressure vessel being removed from service

Subgroup: Inspection
Task Group: J. Roberts (PM), J. Burgess, J. Calvert, T. Shernisky, J. Clark, M. Sansone

July 2019 Meeting Action:
Mr. Roberts addressed the Subgroup stating Mr. Shernisky had the information for this item, and he was not present at the meeting. Mr. Roberts had nothing further to report.

Item Number: 18-62	NBIC Location: Part 2, S12.5	No Attachment

General Description: Remote Visual Inspection Requirements

Subgroup: Inspection
Task Group: V. Newton (PM), M. Horbaczewski, B. Wilson, J. Calvert, J. Castle, D. Graf, T. Shernisky

July 2019 Meeting Action:
Mr. Newton gave a progress report. He is working with ASME Section V to create a proposal. ASME Section V is also putting together Remote Visual Inspection requirements. They want to make sure they are both going down the same path with their requirements.

Item Number: 18-63	NBIC Location: Part 2	No Attachment

General Description: Review inspection requirements for pressure vessels designed for high pressures

Subgroup: Inspection
Task Group: T. Shernisky (PM), J. Mangas, J. Peterson, and J. Castle

July 2019 Meeting Action:
Mr. Peterson reported that there is no progress on this item.

Item Number: 19-6	NBIC Location: Part 2, 2.3.6.8	No Attachment

General Description: PVHO 2.3.6.8 Add other types of PVHO's

Subgroup: Inspection

Task Group: J. Byrum (PM), R. Smith, S. Reimers, J. Burgess, M. Mooney & D. Buechel

Explanation of Need: Currently part 2 only covers medical PVHO's.

July 2019 Meeting Action:
Mr. Welch reported that there is no progress on this item.

Item Number: 19-7	NBIC Location: Part 2	No Attachment

General Description: Pressure Gage Graduation

Subgroup: Inspection

Task Group: V. Newton (PM), D. Buechel, D. Rose, D. Graff, & J. Clark

Explanation of Need: This item was opened after discussion of the pressure gage for PVHO's. The SG Inspection decided they needed to look into the pressure gage graduation for other pressure retaining items beyond PVHO's.

July 2019 Meeting Action:
Mr. Newton and Mr. Buechel gave a progress report and hope to have a proposal in January 2020.

Item Number: 19-8	NBIC Location: Part 2, 2.3.6.8	No Attachment

General Description: Clarification of gage requirements for PVHO

Subgroup: Inspection
Task Group: J. Byrum (PM) & R. Smith

Explanation of Need: Existing PVHO gages do not conform to current NBIC and ASME Standards as written.

July 2019 Meeting Action:
No report. There was no one present to report on this item.

Item Number: 19-9	NBIC Location: Part 2	No Attachment

General Description: Inspect shipping plug removal for PRDs

Subgroup: Inspection
Task Group: V. Scarcella (PM), J. Peterson, T. Bolden, E. Brantley

Explanation of Need: Ensuring that shipping plugs have been removed because shipping plugs have been found that are still in place on PRD's.

July 2019 Meeting Action:
Mr. Getter and Mr. Peterson recommended closing this item in Part 2, and have Part 4 open an item to address this issue. After discussion, they decided to keep this item open. The task group created at the Subgroup Inspection meeting will work more on the wording and have something to propose in January 2020.

Item Number: 19-46	NBIC Location: Part 2, S5.1	No Attachment

General Description: Revisions to Yankee dryer supplement in Part 2 (Scope)

Subgroup: Inspection

Task Group: V. Newton (PM), T. Barker, D. Lesage, J. Jessick

Explanation of Need: Ensure that wording in Part 2, S5.1, is identical to that found in Part 1, S1.1.

July 2019 Meeting Action: A task group was assigned to the revised 19-46. This group will work with Part 1 to make sure the “SCOPE” paragraph in the supplements on Yankee Dryers in Part 1 and Part 2 both read the same.

Item Number: 19-63	NBIC Location: Part 2, S5.2	No Attachment

General Description: Changes to the Yankee Dryer Supplement (ASSESSMENT OF INSTALLATION)

Subgroup: Inspection

Task Group: V. Newton (PM), T. Barker, D. Lesage, J. Jessick

Explanation of Need: Ensure that wording in Part 2, S5.2, is identical to that found in Part 1, S1.2. Note that wording will be the same, but paragraph numberings will be different.

July 2019 Meeting Action:
A task group was assigned. This group will work with Part 1 to make sure the paragraph "ASSESSMENT OF INSTALLATION", in the supplements on Yankee Dryers in Part 1 and Part 2 both read the same.

Item Number: 19-64	NBIC Location: Part 2, S5.2.1	No Attachment

General Description: Changes to the Yankee Dryer Supplement (DETERMINATION OF ALLOWABLE OPERATING PARAMETERS)

Subgroup: Inspection

Task Group: None assigned
Explanation of Need: Ensure that wording in Part 2, S5.2.1, is identical to that found in Part 1, S1.3. Note that wording will be the same, but paragraph numberings will be different.

July 2019 Meeting Action:
A task group was assigned. This group will work with Part 1 to make sure the paragraph "DETERMINATION OF ALLOWABLE OPERATING PARAMETERS", in the supplements on Yankee Dryers in Part 1 and Part 2 both read the same.

New Items:

Item Number: 19-78	NBIC Location: Part 2, 2.2.12.1 a)	Attachment Pages 11-13

General Description: Detailed Requirements for Inservice Inspection of Cast Iron Boilers.

Subgroup: Inspection

Task Group: None assigned

Explanation of Need: The only reference to cast iron material in ASME Section I is PMB-5.4 that allows heads or parts of miniature boilers, when not exposed to direct action of the fire, may be made of cast iron or malleable iron provided it complies with a specification permitted by Section I. Heads and parts do not make up the complete boiler. ASME Section VIII Div. 1, UCI-2 states that cast iron boilers shall not be used in direct firing applications or in unfired steam boilers.

Item Number: 19-80	NBIC Location: Part 2, 2.2.10.6 l) 1)	Attachment Page 14

General Description: Conflicting statements in Part 1 and Part 2 about boiler controls

Subgroup: Inspection
Task Group: None assigned

Explanation of Need: Requirements in this section need to be consistent with Part 1, 2.8.4 a) to avoid confusion.

Item Number: 19-88	NBIC Location: Part 2, 2.2.12.7 c) 2)	Attachment Page 15
General Description: At NBIC Part II propose the following be added to Thermal Fluid Heater **Subgroup:** Inspection **Task Group:** None assigned **Explanation of Need:** These items are essential to preventing catastrophic loss and are low cost items.		

Item Number: 19-90	NBIC Location: Part 2	No Attachment
General Description: Request NBIC Part II add guidance for inspection for high pressure vessels **Subgroup:** Inspection **Task Group:** None assigned **Explanation of Need:** No guidance currently exists and the vessels are becoming more prevalent. Guidance is needed on how to inspect and NDE. A general review of cyclical designs and required documentation and relief protection also needed.		

12. Future Meetings

- July 13th-16th, 2020 – Louisville, KY
- January 11th -14th, 2021 – TBD

13. Adjournment

Respectfully submitted,

Jonathan Ellis

Jonathan Ellis
NBIC Secretary

Contents

Subgroup Inspection

Last Name	First Name	Interest Category	Role	Exp. Date	More
Graf	Darrell	National Board Certificate Holders	Chair	08/30/2021	Details
Getter	Jim	Manufacturers	Vice Chair	08/30/2021	Details
Metzmaier	Jodi		Secretary	01/30/2099	Details
Barker	Timothy	Authorized Inspection Agencies	Member	01/30/2021	Details
Brantley	Ernest	Authorized Inspection Agencies	Member	07/30/2022	Details
Buechel	David	Authorized Inspection Agencies	Member	07/30/2022	Details
Calvert	James	National Board Certificate Holders	Member	08/30/2021	Details
Clark	James	Manufacturers	Member	10/30/2022	Details
Horbaczewski	Mark	Users	Member	08/30/2021	Details
LeSage	Donnie	Jurisdictional Authorities	Member	07/30/2020	Details
Mangas	John	General Interest	Member	08/30/2021	Details
Newton	Venus	Authorized Inspection Agencies	Member	01/30/2022	Details
Roberts	James	Manufacturers	Member	08/30/2020	Details
Rose	David	Users	Member	10/30/2022	Details
Safarz	Jason	General Interest	Member	07/30/2020	Details
Sansone	Matthew	Jurisdictional Authorities	Member	01/30/2021	Details
Shernisky	Thomas	Authorized Inspection Agencies	Member	08/30/2021	Details
Vandini	Thomas	National Board Certificate Holders	Member	01/30/2020	Details
Welch	Paul	Authorized Inspection Agencies	Member	01/30/2022	Details

JEFF C. PETERSEN

EDUCATION:
College of Eastern Idaho, Idaho Falls, Idaho. Graduated July 1987.
Received Associate of Applied Science in Quality Assurance and Nondestructive Examination. Course included: PT, MT, UT, RT, Visual Inspection, Leak Testing, Mechanical Inspection, Metrology, and Radiation Safety.

American Society of Mechanical Engineers (ASME) Continuing Education Training: ASME B31.3, ASME B31.1, ASME Section VIII, Division I, II and III. ASME Section I and IV. ASME Section IX. ASME Practical Welding Technology. ASME Section XI In-service Inspection of Nuclear Power Plant Components. API 579-1/ASME FFS-1 Fitness for Service. National Board Repair of Pressure Relief Valves. Davis NDE Advanced IGSCC Ultrasonic Weld Inspection and Sizing.
Hartford Steam Boiler Technical Training Preparation Course for the National Board Examination, November 1995.

CERTIFICATIONS:
--National Board In-Service Commission, OU-697 (R) Endorsement: 05/1996 to Present.
Certificate of Competency Industrial Commission of Utah 2/96.
--Certified Level II, SNT-TC-1A, in the following disciplines: UT, VT, ASME Section XI, VT-1, 2 and 3.

--Past Certifications Level II, SNT-TC-1A, in the following disciplines: PT, MT, RT, and Leak testing.

--AWS Certified Welding Inspector # 92090071: Expires 09/2022.

JOB EXPERIENCE:
July 1996 – Present. Battelle Energy Alliance, LLC: Idaho National Laboratory (INL).
--Applied Engineering / In-service Commissioned Inspector/Quality Engineer.
Responsible for managing and performing in-service inspections of boilers and pressure vessels located at the INL per the requirements of the National Board Inspection Code (NBIC).
--Responsibilities include: Implementing the (BEA) Owner-User pressure vessel inspection program, in accordance with established company procedures, required safety codes, DOE orders and national codes and bylaws.
--Verify all repairs to boilers and pressure vessels meet the requirements of the NBIC and ASME codes as applicable. Interface with the Department of Energy pertaining to the NBIC.
--Perform reviews of engineering designs for new construction, repairs, and alterations.
--Provide and approve inspection instructions for work control documents which perform maintenance, repair, and alterations of unfired pressure vessels and boilers for

compliance with established quality assurance requirements.
--Provide ASME Section XI in-service inspections for the Advanced Test Reactor. Duties included review and approval of technical documents such as design packages, work orders, drawings, new purchase order requisitions, In-Service inspection plans and procedures for appropriate quality and technical requirements for the Advanced Test Reactor.
-- Perform independent assessments verifying implementation and effectiveness of the ASME NQA-1, INL Quality Assurance Program. Assessments include: Quality Improvement, Inspection and Acceptance Testing, Software Quality Assurance, Design Control, Material Control, M&TE, Nonconformance, NDE.

August 1990 - July 1996. Lockheed Martin Idaho: Idaho National Laboratory (INL).
--Master Support Technician, Nuclear Operations QA, (INL) Test Reactor Area. Performed quality inspections, testing, and surveillance services to ensure adherence to quality standards. Performed routine, complex and unusual mechanical inspections of supplier/furnished material. Initiated reports and complied data as required for inspection planning and record keeping. Coordinated with buyers, vendors, quality engineers, and requesters to resolve any noncompliance issues.

July 1987-August 1990. General Dynamics Electric Boat Division:
--Performed NDE/Mechanical inspections in support of the refueling of the AIW, MARF and S8G Naval Reactors prototypes located at the West Milton, New York and Naval Reactors Facility, Idaho Falls Idaho.

Career Profile

Current Position

Risk Control Director

Prior (CNA) Positions

Resume

Employer: CNA
Job Title: Director
Start Date: June, 2002 , **End Date:**
Description:
As Director of Risk Control of the Northeast Region I am responsible for risk control services for over 10,000 clients that very from large government entities to power generating facilities. The zone staff routinely complete 15,000 inspections a year. My responsibilities include the following:

- Working with various government agencies to assist clients with compliance

- Working with staff counsel on contracts, compliance and litigation

-Coordination of claims services for CAT response

-Review of large claims

-Management of large accounts

-Presentations to industry organizations, large client leadership teams and future leaders

-Manage broker relationships

-Lead auditor of countrywide quality control

City: New York , **State:** New York
Country: United States

Employer: Enron Energy Services
Job Title: Senior Field Service Engineer
Start Date: September, 1999 , **End Date:** September, 2002
Description:
Managed field services for contracts exceeding $1B in combined service and energy contracts. Piloted Field Service reporting and procedures for the Quality Control of contractor services at client locations. Conduct Due Diligence Surveys, Energy Managment Surveys, Safety Surveys and Incident Investigations for energy assets at client locations. Participated in the Planned Maintenance Committee and Communication Committee

City: , **State:** New York
Country: United States

Employer: HSB/IRI
Job Title: Industrial Group Consultant
Start Date: September, 1991 , **End Date:** September, 2000
Description:
Risk control activities at a wide range of accounts, including fully integrated pulp and paper facilities, fully integrated steel, chemical, co-generation, technologies, and pharmaceuticals. Extensive use and evaluation of non-destructive testing including mag flux particle testing, ultrasonic testing and infrared testing. Evaluated construction of non-code pressure vessels. Consult with Account Teams on renewals and new business. Conducted training on ASME Section I and Confined Space Entry. Authorized Inspector with supervisor endorsement for quality control programs for ASME and NBIC code repairs.

City: , **State:** New York
Country: United States

Employer: CU
Job Title: Underwriter/Loss Control Engineer
Start Date: September, 1989 , **End Date:** September, 1991
Description:
Marketed, quoted and underwrote middle market and small business accounts. Conducted broker visitis and training. Responsable for all NYS & NJ claims. Conducted jurisdictional inspections on boilers and risk evaluations of small to medium size retail, institutional, commercial, co-generation and industrial facilities. Extensive use of New York Building Code Sections that pertain to boilers and New York State Boiler Codes.

City: , **State:** New York
Country: United States

Employer: HSB
Job Title: Loss Investigator
Start Date: March, 1987 , **End Date:** March, 1989
Description:
Conducted claims investigations in the New York City Metropolitan area. Piloted electronic claims system. Interfaced with claims and contractors to subjugate losses. Trained new field inspectors.

City: , **State:** New York
Country: United States

Employer: USN
Job Title: First Class Petty Officer
Start Date: September, 1980 , **End Date:** January, 1987
Description:
Work center supervisor in boiler engineering spaces, fuel/water testing lab, fire department and automatic control repair shop. Conducted training on propulsion system basics. Responsible for Quality Control of system and component repairs and replacements while assigned to the Philadelphia Shipyard. Extensive experience in the operation, maintenance and repair of steam propulsion equipment.

City: , **State:** Pennsylvania
Country: United States

Education

Degree: Bachelor of Science
Major: Business
School: SUNY Empire State College
School (if not in the above list):
Has this degree been completed?: Yes
Date Acquired: May, 2012

Languages

Licenses, Designations and Certifications

License /Designation/Certification: Nat Brd Boiler Press Vess Inst
Issue Date: June, 1987
Expiration Date: December, 2017
License Number: 8965
Issued by: NBB&PVI
Active: Yes
State: New York , **Country:** United States

Professional Memberships

Organization: Nat Board Boilr/Press Vess Ins
Position / Role: Committee Member NB 269
Start Date: June, 2015 , **End Date:**
Current Role:

Organization: Amer Soc Mechanical Engineers
Position / Role: MEMBER
Start Date: February, 2011 , **End Date:**
Current Role:

Other Activities

Other Activity Type: Board
Organization: NBBPVI
Internal/External: External
From Date: May, 2017 , **To Date:** May, 2017
Other Activity: Presented to the general assembly on changes to RCI-1
Comments:

Other Activity Type: Classes Taught
Organization: National Board of BPV Inspectors
Internal/External: External
From Date: May, 2017 , **To Date:** May, 2017
Other Activity: Adressed the General Assembly on cahnges to Rules for Commisioned Inspectors
Comments:
On going series:

4/2104: Most critical leadership functions

9/2014: Situational leadership

4/2015: Rumsfeld's Rules Chapter 1-7

9/2015: Rumsfeld's Rules Chapter 7-14

4/2016 Strength Based Leadership Review survey results

1/2017 "Bringing Out the Best in People"

Other Activity Type: Classes Taught
Organization: Tyson Foods
Internal/External: External
From Date: October, 2016 , **To Date:** October, 2016
Other Activity: Protection for Thermal Fluid Heaters
Comments:
Presented to operators, risk management and managers on NFPA 87 and ASME CSD-1 protection devices for thermal fluid heaters, their function, maintenance calibration and testing. Included an overview of construction codes and risk control activities for leakage prevention and CO prevention.

Other Activity Type: Committee
Organization: National Board Qualifications Committee
Internal/External: External
From Date: May, 2015 , **To Date:** December, 2016
Other Activity: Member
Comments:
Appointed member to the committee in May 2015. The committee sets the qualifications for certification internationally.

Other Activity Type: Task Force
Organization: NBBPV
Internal/External: External
From Date: June, 2013 , **To Date:** January, 2014
Other Activity: Task Group memeber for NBIC Part II
Comments:
Wire wound pressure vessels

Other Activity Type: Committee
Organization: NYC Department of Buildings
Internal/External: External
From Date: November, 2011 , **To Date:** June, 2013
Other Activity: NYC Code Com. MCC
Comments:
Panel and Com memeber

Other Activity Type: Committee
Organization: NJ State DOL
Internal/External: External
From Date: May, 2010 , **To Date:** September, 2011
Other Activity: NJ DOL Contractor License Com

Comments:
Com participation to develop Rules and Regs for contractors

Other Activity Type: Classes Taught
Organization: SORCE School Risk Control for Electrical Exposures
Internal/External: External
From Date: July, 2007 , **To Date:** July, 2014
Other Activity: NFPA 70B, NFPA 70, IEEE 242
Comments:
Internal and external classes for all lines risk control for electrical exposures.

Other Activity Type: Classes Taught
Organization: CNA
Internal/External: Internal
From Date: July, 2006 , **To Date:** August, 2007
Other Activity: Electrical Exposures Basic Risk Control
Comments:
Taught electrical safety and exposure classes to trainees

Other Activity Type: Major Project work
Organization: WWP
Internal/External: External
From Date: June, 2005 , **To Date:** September, 2008
Other Activity: Wounded Warrior Project
Comments:

Other Activity Type: Major Project work
Organization: Enron
Internal/External: External
From Date: April, 2000 , **To Date:** June, 2002
Other Activity: Fire Safety Audit Project
Comments:
Conducted safety audits at cleint locations

Other Activity Type: Classes Taught
Organization: Various
Internal/External: External
From Date: June, 1991 , **To Date:** June, 2014
Other Activity: ASME & NBIC Classes
Comments:
Certified trainer for various ASME, NFPA and jurisdictional code classes.

Other Activity Type: Major Project work
Organization: NJ DOL
Internal/External: External
From Date: November, 1987 , **To Date:** September, 2008
Other Activity: Second Class Engineer License Blue Seal
Comments:

Other Activity Type: Classes Taught
Organization: USN

Internal/External: External
From Date: January, 1986 , **To Date:** December, 1986
Other Activity: Propulsion Plant Operator Training
Comments:
Propulsion Plant Therory and operation

Other Activity Type: Major Project work
Organization: USN
Internal/External: Internal
From Date: June, 1985 , **To Date:** July, 1985
Other Activity: Command Assessment Team & Leadership Management Training
Comments:
Leadership and Command Assesment Team Training completed in 1981 and 1985

Other Activity Type: Major Project work
Organization: US DOL
Internal/External: Internal
From Date: March, 1984 , **To Date:** September, 2008
Other Activity: DOL Propulsion Plant Engineer
Comments:
Complete apprentiship program for certification

Other Activity Type: Major Project work
Organization: USN
Internal/External: Internal
From Date: June, 1981 , **To Date:** December, 1983
Other Activity: BWFW Lab Tech
Comments:
Certified BWFW Lab Tech and Fuel & lube oil test lab tech

CNA Honors and Awards

Award : CNA Focus - Silver
Date Received: October, 2009

Award : CNA Focus - Silver
Date Received: October, 2009

Award : CNA Focus - Gold
Date Received: July, 2009

Award : CNA Focus - Platinum
Date Received: April, 2008

Award : CNA Focus - Gold
Date Received: March, 2006

Award : CNA Focus - Gold
Date Received: November, 2005

Award : CNA Focus - Bronze
Date Received: June, 2004

Award : CNA Focus - Silver
Date Received: January, 2004

Career Mobility

Mobility: Qualified Mobility
Description:
Mobile for the right opportunity

Current Date: May, 2017

Item 19-78

Subject: Detailed Requirements for Inservice Inspection of Cast Iron Boilers.

NBIC Location: Part 2, 2.2.12.1 a)

Explanation of Need: The only reference to cast iron material in ASME Section I is PMB-5.4 that allows heads or parts of miniature boilers, when not exposed to direct action of the fire, may be made of cast iron or malleable iron provided it complies with a specification permitted by Section I. Heads and parts do not make up the complete boiler. ASME Section VIII Div. 1, UCI-2 states that cast iron boilers shall not be used in direct firing applications or in unfired steam boilers.

Background Information: The language to include "or high" pressure steam was added in the 2007Ed/2007Add of the NBIC Part 2. Unfortunately, there are no historical records or interpretations supporting the need for the revision in 2007. Both the 2004/2006 and 2007/2007 NBIC paragraphs have been provided for reference.

Proposed Revision:

2.2.12.1 CAST-IRON BOILERS

a) Cast-iron boilers are used in a variety of applications to produce low pressure steam and hot-water heat.~~low or high pressure steam and hot-water heat.~~ Cast-iron boilers should only be used in applications that allow for nearly 100% return of condensate or water and are not typically used in process-type service. These boilers are designed to operate with minimum scale, mud, or sludge, which could occur if makeup water is added to this system.

- *Pressure relief devices* – all pressure relief devices should be connected to a closed, vented storage tank or blowdown tank and must be the type with a closed-bonnet, no manual lift lever and solid piped discharge to an appropriately vented receiver. If outdoor discharge is used, the following should be considered for discharge piping at the point of discharge.
  - Both thermal and chemical reactions (personnel hazard)
  - Combustible materials (fire hazard)
  - Surface drains (pollution and fire hazard)
  - Loop seal or rain cap on the discharge (keep both air and water out of the system)
  - Drip leg near device (prevent liquid collection)
  - Heat tracing for systems using high freeze point fluids (prevent blockage)

RB-5604 WASTE HEAT BOILERS

Waste heat boilers are usually of firetube or watertube type and obtain their heat from an external source or process in which a portion of the BTU's have been utilized. Generation of electrical energy is usually the primary application of waste heat boilers. The biggest disadvantage of this type of boiler is that it is not fired on the basis of load demand. Since the boiler does not have effective control over the amount of heat entering the boiler, there may be wide variations or fluctuations of metal temperatures. Waste process gasses are usually in a temperature range of 400°F (205°C) to 800°F (425°C), where combustion gasses of conventional fired boilers are at about 2000°F (1095°C). Special design considerations are made to compensate for lower combustion gas temperatures such as the use of finned high-efficiency heat absorbing tubes, and by slowing the velocity of gasses through the boiler.

Due to the unique design and material considerations of waste heat boilers, the following are common areas of inspection.

- *Corrosion* – chemicals in waste heat gasses may create corrosive conditions and react adversely when combined with normal gasses of combustion. Water or steam leakage can create localized corrosion. Extreme thermal cycling can cause cracks and leakage at joints.

- *Erosion* – typically waste heat flow is very low and erosion is not a problem, however, when waste heat is supplied from an internal combustion engine, exhaust gasses can be high enough to cause erosion.

- *Vibration* – in some process applications and all engine waste heat applications, the boiler may be subjected to high vibration stresses.

- *Acid attack* – in sulfuric acid processes refractory supports and steel casings are subject to acid attack. Piping, filters, heat exchangers, valves, fittings, and appurtenances are subject to corrosive attacks because these parts are not normally made of corrosion resistant materials.

- *Dry operation* – in certain applications waste heat boilers are operated without water. Care must be taken not to expose carbon steel material to temperatures in excess of 800°F (425°C) for prolonged periods. Carbides in the steel may precipitate to graphite at elevated temperatures.

RB-5605 CAST-IRON BOILERS

Cast-iron boilers are widely used in a variety of applications to produce low pressure steam and hot water heat. Cast-iron boilers should only be used in applications that allow for nearly 100% return of condensate or water, and are not typically used in process-type service. These boilers are designed to operate with minimum scale, mud, or sludge, which could occur if makeup water is added to this system.

b) Due to the unique design and material considerations of waste heat boilers, the following are common areas of inspection:

1) Corrosion — chemicals in waste heat gasses may create corrosive conditions and react adversely when combined with normal gasses of combustion. Water or steam leakage can create localized corrosion. Extreme thermal cycling can cause cracks and leakage at joints.

2) Erosion — typically waste heat flow is very low and erosion is not a problem. However, when waste heat is supplied from an internal combustion engine, exhaust gasses can be high enough to cause erosion.

3) Vibration — in some process applications and all engine waste heat applications, the boiler may be subjected to high vibration stresses.

4) Acid Attack — in sulfuric acid processes refractory supports and steel casings are subject to acid attack. Piping, filters, heat exchangers, valves, fittings, and appurtenances are subject to corrosive attacks because these parts are not normally made of corrosion resistant materials.

5) Dry Operation — in certain applications waste heat boilers are operated without water. Care must be taken not to expose carbon steel material to temperatures in excess of 800°F (427°C) for prolonged periods. Carbides in the steel may precipitate to graphite at elevated temperatures.

2.2.12.5 CAST-IRON BOILERS

a) Cast-iron boilers are used in a variety of applications to produce low or high pressure steam and hot water heat. Cast-iron boilers should only be used in applications that allow for nearly 100% return of condensate or water, and are not typically used in process-type service. These boilers are designed to operate with minimum scale, mud, or sludge, which could occur if makeup water is added to this system.

b) Due to the unique design and material considerations of cast-iron boilers, the following are common areas of inspection:

1) Scale and Sludge — since combustion occurs at or near the bottom, accumulation of scale or sludge close to the intense heat can cause overheating and lead to cracking.

2) Feedwater — makeup feedwater should not come in contact with hot surfaces. Supply should be connected to a return pipe for tempering.

3) Section Alignment — misalignment of sections can cause leakage. Leakage or corrosion between sections will not allow normal expansion and contraction that may cause cracking.

4) Tie Rods or Draw Rods — used to assemble the boiler and pull the sections together. These rods must not carry any stress and need to be loose, allowing for section growth during heat up. Expansion washers may be used and nuts should be just snugged allowing for expansion.

5) Push Nipple or Seal Area — corrosion or leakage is likely at the push nipple opening, usually caused by the push nipple being pushed into the seat crooked, warping due to overheating, tie rods too tight, and push nipple corrosion/erosion.

6) Corrosion — firesides of sections can corrode due to ambient moisture coupled with acidic flue gas deposits.

Item 19-80

Subject: Conflicting statements in Part 1 and Part 2 about boiler controls

NBIC Location: Part 2, 2.2.10.6 l) 1)

Explanation of Need: Requirements in this section need to be consistent with Part 1, 2.8.4 a) to avoid confusion.

Background Information:
2.8.4 PRESSURE CONTROL (From NBIC Part 1)
Each automatically fired steam boiler shall be protected from overpressure by two pressure operated controls.
a) Each individual steam boiler or each system of commonly connected steam boilers shall have a control that will cut off the fuel supply when the steam pressure reaches an operating limit, which shall be less than the maximum allowable working pressure.

2.2.10.6 CONTROLS (From NBIC Part 2)
l) Check that the following controls/devices are provided:
1) Each automatically fired steam boiler is protected from overpressure by not less than two pressure operated controls, one of which may be an operating control.

Proposed Revision:
l) Check that the following controls/devices are provided:

1) Each automatically fired steam boiler is protected from overpressure by not less than two pressure operated controls~~, one of which may be an operating control.~~.

When required by the code of construction or the jurisdiction, the high pressure limit control shall be of the manual reset type.

2) Each automatically fired hot-water boiler or hot-water boiler system is protected from over-temperature by not less than two temperature operating controls, one of which may be an operating control.

When required by the code of construction or the jurisdiction, the high temperature limit control shall be of the manual reset type.

3) Each hot-water boiler is fitted with a thermometer that will at all times, indicate the water temperature at or near the boiler outlet.

Item 19-88

Subject: At NBIC Part II propose the following be added to Thermal Fluid Heater

NBIC Location: Part 2, 2.2.12.7 c) 2)

Explanation of Need: These items are essential to preventing catastrophic loss and are low cost items.

Background Information: Reviews of incidents involving thermal fluid heaters find these items lacking.

Proposed Revision:

2.2.12.7 THERMAL FLUID HEATERS

c) Inspection

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2) Due to the unique design and material considerations of thermal fluid heaters and vaporizers, common areas of inspection are:

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g. Verify stack gas temperature is monitored and recorded;

h. Thermal fluids should be tested in accordance with manufacturer's specifications, at least annually and whenever degradation is suspected;

i. Stack gas temperature alarms and safety shut down devices should be considered.