



Department of Consumer
and Business Services

Boiler Inspections: An Evolving Responsibility

NBBI General Meeting

05/12/2025
Rodger Adams
Tom Clark



Introduction

NBIC Part 2, Section 1, 1.1 Scope



“The safety of the public and the Inspector is the most important aspect of any inspection activity.”

Introduction



Rodger Adams
South Region Manager
Zurich Resilience Solutions



Tom Clark
Chief Boiler Inspector
Oregon Building Codes Division | DCBS

Please stand-up if you represent a member jurisdiction, AIA, manufacturer, or repair/service organization.

Please sit-down if you *CAN* retire within the next 10 years.

Please stand-up if you're actively working as a boiler operator.

Please stand-up if you have a Boiler Operator or Stationary Engineer license.

Thermal Fluid Heater Incident



Images courtesy of Tom Clark

How many low-water fuel cutoff devices does it take to make a boiler safe?

Incident Statistics

The National Board BULLETIN, Summer 2002



Department of Consumer
and Business Services

2001 INCIDENT REPORT

This report was compiled from data submitted by National Board jurisdictional authorities and authorized inspection (insurance) agencies as of December 31, 2001. It also includes materials submitted from several insurance companies that insure boilers but do not provide inspection services.

Please note: deaths and injuries are industry-related. They include, but are not limited to, owners and operators of boilers and pressure vessels.

This survey notes a 75 percent response rate from National Board jurisdictional authorities and a 41 percent response rate from authorized inspection agencies. The total number of surveys mailed was 89, with a 64 percent response rate overall. ♦

2001 INCIDENT REPORT

| OBJECT EXPERIENCING INCIDENT | ACCIDENTS | INJURIES | DEATHS |
|---|--------------|-----------|-----------|
| POWER BOILERS | | | |
| Safety Valve | 4 | 0 | 0 |
| Low-Water Condition | 161 | 3 | 0 |
| Limit Controls | 8 | 0 | 0 |
| Improper Installation | 2 | 0 | 0 |
| Improper Repair | 1 | 0 | 0 |
| Faulty Design or Fabrication | 2 | 0 | 0 |
| Operator Error or Poor Maintenance | 82 | 50 | 7 |
| Burner Failure | 29 | 2 | 0 |
| Unknown / Under Investigation | 7 | 1 | 0 |
| SUBTOTALS | 296 | 56 | 7 |
| HEATING BOILERS: STEAM | | | |
| Safety Valve | 2 | 0 | 0 |
| Low-Water Condition | 519 | 0 | 0 |
| Limit Controls | 17 | 0 | 0 |
| Improper Installation | 10 | 0 | 0 |
| Improper Repair | 11 | 0 | 0 |
| Faulty Design or Fabrication | 31 | 0 | 0 |
| Operator Error or Poor Maintenance | 406 | 0 | 0 |
| Burner Failure | 29 | 0 | 0 |
| Unknown / Under Investigation | 66 | 0 | 1 |
| SUBTOTALS | 1091 | 0 | 1 |
| HEATING BOILERS: WATER (includes hot-water supply) | | | |
| Safety Relief Valve | 6 | 0 | 0 |
| Low-Water Condition | 195 | 1 | 0 |
| Limit Controls | 19 | 0 | 0 |
| Improper Installation | 13 | 2 | 0 |
| Improper Repair | 10 | 3 | 0 |
| Faulty Design or Fabrication | 30 | 0 | 0 |
| Operator Error or Poor Maintenance | 260 | 1 | 0 |
| Burner Failure | 26 | 3 | 0 |
| Unknown / Under Investigation | 72 | 0 | 0 |
| SUBTOTALS | 631 | 10 | 0 |
| UNFIRED PRESSURE VESSELS | | | |
| Safety Valve | 6 | 2 | 0 |
| Limit Controls | 4 | 0 | 0 |
| Improper Installation | 8 | 2 | 0 |
| Improper Repair | 8 | 0 | 0 |
| Faulty Design or Fabrication | 16 | 0 | 0 |
| Operator Error or Poor Maintenance | 142 | 14 | 4 |
| Unknown / Under Investigation | 17 | 0 | 0 |
| SUBTOTALS | 201 | 18 | 4 |
| TOTALS | 2,219 | 84 | 12 |

Incident Statistics (1992-2002)

The National Board BULLETIN, Summer 2002



| Equipment Category | Deaths | Number of Accidents |
|--------------------------|------------|---------------------|
| Unfired Pressure Vessels | 64 | 2,511 |
| Power Boilers | 44 | 4,311 |
| Water-Heating Boilers | 14 | 6,928 |
| Steam-Heating Boilers | 5 | 9,588 |
| | 127 | 23,338 |

Incident Statistics

The National Board BULLETIN, Summer 2002



“And we must do more to inform the general public – to insist that everyone who works on and around boilers has the essential knowledge to protect themselves as well as those around them.”

*“According to Market Research 365, the commercial boiler market will grow from its current estimated value of **\$11.8 billion** to **\$29.3 billion** by 2035.”*

“Operators state the need for help, yet there is no standard for where to get training or who to go to for help.”

What *ARE* We Doing?

The National Board of Boiler and Pressure Vessel Inspectors (NBBI)



- **Inspector Guides**

- Air Receivers, Cast-Iron Boilers, Firetube Boilers, Operating Controls, Pressure Relief Devices, Storage Water Heaters, Water-Level Controls and Devices

- **Topics of Interest**

- Inspector Diary, Inspection of Materials, Out-of-Print ASME Editions

- **BPV Fundamentals Seminar**

- **Installer's Series**

- **NB-380 Inservice Inspector Training Program**

What *ARE* We Doing?

Authorized Inspection Agencies (AIA's)

- Mentor
- Recommendations for operator training
- Low-and high-pressure boiler training
- Instruction and guidance on-site
- On-demand operator training
- Classroom training
- Boiler log tags



What ARE We Doing?

High pressure boiler log

Inspector

Boiler number

Year

Phone

Low water cutoff quick drain test - daily

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| January | February | March | April | May | June | July | August | September | October | November | December | | | | | | | | | | | | | | | | | | | |

Low water cutoff slow drain test - quarterly

| | | | | | | | | | | | |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|
| January | February | March | April | May | June | July | August | September | October | November | December |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|

Safety valve test - every six months or per manufacturer recommendation

| | | | | | | | | | | | |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|
| January | February | March | April | May | June | July | August | September | October | November | December |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|

Burner and controls annual servicing by qualified service technician

| | | | | | | | | | | | |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|
| January | February | March | April | May | June | July | August | September | October | November | December |
|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|

Date:

High pressure boiler log

Inspector

Boiler number

Year

Phone

Important: Follow manufacturer's recommendations related to operation and testing.

WARNING: DO NOT LEAVE THE BOILER UNATTENDED DURING TESTING OF LOW WATER CUTOFFS

Low water cutoffs:

| | |
|------------------------------|---|
| Quick drain test: (daily) | With the burner in operation, open the low water cutoff blow down drain and flush the chamber. The boiler burner should shut down quickly. If the burner does not shut down, secure the chamber and have a qualified firm make repairs to this important safety device. |
| Slow drain test: (quarterly) | With the boiler in operation, lower the water level in the boiler slowly to simulate an actual low water condition. The burner should shut down before the water level leaves the sight glass. |

Pressure relief devices (safety valves)

Manual test: (semi-annually)

Water treatment

Burner controls & safety devices

CAUTION: Do not let the water level leave the sight glass. If the burner continues to operate after the water level leaves the sight glass, the boiler should be immediately secured and the low water cutoff repaired or replaced immediately.

With the boiler in operation and at operating pressure, test the safety valve by pulling the test lever to a fully open position for a few seconds. Release the test lever allowing the valve to snap closed.

CAUTION: If the valve is seized in the shut position or will not reseal correctly, it should be repaired or replaced immediately.

Maintain your water softening system and regularly test and maintain your feed water treatment. Effective water longevity. Ask your inspector if your treatment is effective when the boiler is internally inspected.

Annually have a qualified boiler burner/control technician test, adjust and maintain all the safety devices and controls on the boiler. If you are located in a jurisdiction that has adopted the CSD-1 standard, there are specific requirements that must be completed. Contact your local inspector if you have any questions.

What *ARE* We Doing?

Jurisdictions

- **Meetings and Collaboration**

- AIA's
- Boiler, burner and controls manufacturers
- Water treatment representatives
- Boiler repair and service organization
- Independent training companies

- **Wisconsin Boiler Inspectors Associations (WBIA)**

- Boiler Inspectors (State of Wisconsin, City of Milwaukee, and Insurance Company)
- Boiler and pressure vessel manufacturers
- Boiler repair companies
- Safety valve manufacturers and manufacturers representatives
- Boiler operators/owners



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What CAN We Do?

NBIC Part 2, 1.5.4 POST-INSPECTION ACTIVITIES



“During any inspections or tests of pressure-retaining items, the actual operating and maintenance practices should be noted by the Inspector and a determination made as to their acceptability.”

What CAN We Do?

ASME VI and VII



ASME Section VI

Recommended Rules for the Care and Operation of Heating Boilers

- **Article 9:** Operation and Maintenance of Steam Boilers
- **Article 10:** Operation and Maintenance – Hot Water Boilers and Hot Water Heating Boilers

ASME Section VII

Recommended Guidelines for the Care of Power Boilers

- **Article 101:** Boiler Operation
- **Article 102:** Boiler Auxiliaries
- **Article 103:** Appurtenances
- **Article 104:** Instrumentation, Controls, and Interlocks

What CAN We Do?



Ferrari 812 GTS

Conclusion



On-Demand Operator Training

How-To

BPV Fundamentals Seminar

NB-380 Inservice Inspector Training Program

Recommendations

Boiler Logs

Guidance

Installer's Series

Training

Inspector Guides

Topics of Interest

Meetings

Mentoring

Classroom Training

Collaboration

Site Specific Training

*“When all is said and done, none of us want to be measured in terms of numbers.
Or statistics. Or even Incident Reports.*

*It is up to **YOU** to determine what will be.”*

*Are **WE** doing enough?*

*Are **YOU** doing enough?*



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Questions



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