


# EXHIBITION (HISTORICAL) BOILERS BSB 0600-05

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BOILER SAFETY BUREAU  
STANDARD OPERATING PROCEDURE MANUAL

## EXHIBITION (HISTORICAL) BOILERS – BSB 0600-05 **R8**

### 1.0 PURPOSE AND SCOPE

To provide uniform, comprehensive inspection requirements for the inspection of steam locomotive and historical boilers to ensure that they are safe for continued operation.

This ***procedure*** covers the periodic inspection of steam locomotive and historical boilers. A historical boiler is as a boiler of riveted and/or welded construction, forming part of a steam tractor, traction engine, portable steam boiler, calliope and other such boilers that are being preserved, restored and maintained for demonstration, viewing, or educational purposes.

This procedure applies to inspections of all steam locomotive and historical boilers that are required to be inspected by Boiler Safety Bureau (BSB or Bureau) Deputy and Special Inspectors. This procedure does not apply to steam locomotives falling under the requirements of the Federal Railroad Administration (FRA) that are published in 49 CFR 230, or Model Hobby boilers (see SOP 0600-06).

### 2.0 PERSONNEL RESPONSIBILITIES

- 2.1 The Bureau Chief has the overall responsibility for implementation of this ***procedure***.
- 2.2 The Assistant Bureau Chief has the oversight responsibility for this procedure as it applies to the inspection staff.
- 2.3 The Inspector Supervisors are responsible for ensuring the inspectors use this ***procedure***, as a minimum, in their inspections.
- 2.4 BSB Inspectors are responsible for cognizance, understanding and use of this ***procedure***.

### 3.0 HEALTH AND SAFETY ISSUES

- 3.1 The purpose of this procedure is to guide inspectors through the process of inspecting these particular objects. This will aid the inspector in performing thorough and effective inspections which will promote the safe operation of the object(s).
- 3.2 Should the inspector be required to clean, grind or otherwise prepare boiler surfaces for inspection, personal protective equipment shall be utilized per the BSB 0200-04 procedure.

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### 4.0 PROCEDURE

#### 4.1 Certificate of Inspection:

A steam locomotive boiler or a historical boiler shall not be operated in the State of North Carolina unless it has a valid Certificate of Inspection issued by the Boiler Safety Bureau of the Department of Labor.

#### 4.2 Steam locomotive boilers shall be inspected in accordance with the requirements in the National Board Inspection Code (NBIC) Part 2, Section 6, Supplement 1 – Steam Locomotive Fire Tube Boiler Inspection and Storage. Steam locomotive boilers shall undergo annual visual and in-service inspections.

4.2.1 The internal and external visual inspections shall be documented with the Steam Locomotive Visual Inspection Checklist – Attachment 1 of this procedure.

4.2.2 The in-service inspection shall be documented with the Steam Locomotive Inservice Inspection Checklist – Attachment 2 of this procedure.

4.2.3 Ultrasonic Thickness Testing that is done shall be documented on the Steam Locomotive and Historical Boiler Ultrasonic Thickness Testing Checklist – Attachment 6 of this procedure.

#### 4.3 Historical Boilers shall be inspected in accordance with the requirements in the National Board Inspection Code (NBIC) Part 2, Section 6, Supplement 2 – Historical Boilers. The inspection cycle as described in NBIC Part 2, Section 6, Supplement 2 is summarized below; the Inspector shall document the appropriate *interval* of the inspection cycle when reporting the inspection.

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4.3.1 Initial Inspection- The initial inspection shall be documented on the Initial Historical Boiler Certification Report - Attachment 3 of this procedure.

- a) Initial inspections shall be performed to determine baseline criteria needed for the operating life of the boiler. The owner-user shall maintain documentation and inspection results, as required by this Section.
- b) The heating surface shall be calculated and documented with Attachment 8 to this procedure.
- c) A visual internal and external inspection per NBIC Part 2, S2.5.2.2 that is documented on the Historical Boiler Visual Inspection Checklist – Attachment 4 to this procedure;
- d) An in-service inspection per NBIC Part 2, S2.7.1 that is documented on the Historical Boiler Inservice Inspection Checklist – Attachment 5 to this procedure.
- e) Initial ultra-sonic thickness (UT) testing per NBIC Part 2, S2.6.2 that is documented on the Steam Locomotive and Historical Boiler Ultrasonic Thickness Testing Checklist – Attachment 6 to this procedure;
- f) MAWP calculation per NBIC Part 2, S2.10;
- g) Hydrostatic Pressure Testing per NBIC Part 2, S2.6.1 that is documented on the Steam locomotive and Historical Boiler Hydrostatic Pressure Test Checklist – Attachment 7 to this procedure; and
- h) Other examinations (UT, PT, MT) as required by the Jurisdiction or Inspector to determine boiler integrity.
- i) Threaded connections should be removed to inspect the threads.

***NOTE: For ASME constructed and stamped exhibition boilers, less than 20 years old at time of initial inspection, with a Manufacturer's Data Report, the initial inspection per 4.3.1 may be waived with the acceptance of the Boiler Safety Bureau.***

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### 4.3.2 Interval #1- In-service Inspection

- a) Check feed water supply;
- b) Check trycocks and sight glass;
- c) Visual inspection for leaks.
- d) Safety valve popping and blow down tests.

### 4.3.3 Interval #2– Visual Inspection (Internal/External) requires internal and external surfaces to be clean.

- a) Remove and inspect fusible plugs;
- b) Visually inspect internal and external surfaces.

### 4.3.4 Interval #3– Pressure Test

- a) The pressure test is conducted between MAWP and 1.25 times the MAWP and shall not be more than 1.25 times the MAWP.

### 4.3.5 After interval #3 is completed, the subsequent inspection cycle continues to interval #1.

### 4.3.6 UT thickness testing per NBIC Part 2, S2.6.2, shall be performed at 5-year intervals, or at a shorter interval if deemed necessary. Recurring UT thickness testing may be extended by up to 1 cycle (5 years) where the owner can demonstrate the following:

- a) Two prior consecutive NDE reports following this cycle, spanning a minimum of 5 years, showing the current practice permits a longer NDE cycle;
- b) Storage and care of the boiler are in adherence with the applicable sections S2.13.1.
- c) Operating records shall be reviewed annually during the extension period indicating no change to boiler condition.

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### 4.4 Owner/User Responsibility:

- 4.4.1 The owner/user shall prepare the boiler for visual inspection (internal/external) in the following manner:
    - a) Remove lagging insulation and casing from the boiler proper.
    - b) Remove covers on all inspection openings and fusible plugs.
    - c) Clean scale around all inspection openings.
    - d) Remove ash and soot from tubes, firebox and smoke box.
    - e) Remove grates from firebox.
    - f) Remove built up grease and paint.
    - g) Have necessary apparatus for conducting hydrostatic test.
  - 4.4.2 All records of tests, inspection certificates and other information are to be retained on file by the owner to demonstrate that all of these requirements have been met.
  - 4.4.3 When non-destructive examinations (NDE) are required, they shall be done as specified in NBIC Part 3 Section 4.2 a) and b). The owner/user is responsible for ensuring that all required NDE is performed by qualified personnel, for maintaining such records of personnel qualifications and for presenting them to the Inspector for review. Failure to do so may require the testing to be repeated.
  - 4.4.4 Equipment, operator, and calibration standards used for UT thickness testing shall be documented by the owner and be acceptable to the Jurisdiction.
  - 4.4.5 The owner is required to demonstrate the knowledge and ability to safely operate the boiler.
- ### 4.5 Additional instructions for the Inspector:
- 4.5.1 The Inspector shall determine from the owner(s) the history of the operation and repair of the boiler.
  - 4.5.2 The Inspector shall issue a violation, as appropriate, if repairs or alterations are required.
  - 4.5.3 The Inspector is to verify that the owner/user is maintaining all records related to the boiler. These records will assist the Inspector during required periodic inspections.

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- 4.5.4 Whenever the Inspector deems it necessary to perform UT thickness testing, the results shall be documented with the Steam Locomotive and Historical Boiler Ultrasonic Thickness Testing Checklist – Attachment 6 to this procedure.
- 4.5.5 When UT thickness testing is performed by *personnel other than BSB*, the Inspector shall verify documented results by performing spot check UT.

### 5.0 REPAIRS

- 5.1 Repairs shall be done in accordance with NBIC Part 3, Section 6, Supplement 1 for steam locomotive fire tube boilers and Part 3 Section 6, Supplement 2 for historical boilers.
- 5.2 Repairs of steam locomotive or historical boilers shall be made only by:
  - a) “R” stamp holders familiar with antique equipment or;
  - b) Alternate repair organization approved by the Bureau and with procedures and welders qualified to ASME Section IX.
- 5.3 The Boiler Safety Bureau shall be notified prior to commencement of repairs by alternate repair organizations. The Boiler Safety Bureau shall review repairs plans, set hold points and inspect the in-process and final repair.
- 5.4 Materials used for repairs must be listed in NBIC Part 3, Section 6, Supplement 1 for locomotive boilers and Part 3 Section 6, Supplement 2 for historical boilers.
- 5.5 Repairs of lap seam cracks will not be authorized.

### 6.0 CUSTOMER SERVICE REQUIREMENTS

The purpose of following this procedure is to provide the customer, be it the public, employees of the Bureau, or other state agencies, with the most efficient service, information, training and assistance possible.

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### 7.0 DATA AND RECORD MANAGEMENT

- 7.1 All certificate inspections shall be entered as an Internal Certificate inspection in *the Bureau's inspection database*. All inspections entered shall include inspection comments of the interval completed at that time, findings, and results from the inspection.
- 7.2 An Exhibition Boiler certificate inspection fee of fifty dollars (\$50) shall be entered for the inspection.
- 7.3 The report and attachments required by this procedure shall be completed, signed, and distributed as follows:
- a) Deputy Inspector shall complete an inspection report per 7.1 and 7.2 of this section and the appropriate attachment for the interval.
  - b) Deputy Inspector will forward the interval attachment to their Supervisor for their review.
  - c) After the Supervisor reviews the report, it will be sent to the assigned Administrative Specialist, who will upload electronically in OnBase for electronic storage and a paper copy shall be placed in a file maintained by the BSB office.
  - d) Copies of the reports and attachments shall be given to the owner/user upon request.
- 7.4 ***Records shall be maintained in accordance with the Functional Schedule for North Carolina State Agencies as adopted by State Archives, a Division of the North Carolina Department of Natural and Cultural Resources.***