

## **PART 1      GENERAL**

### **1.1          REFERENCES**

- .1 American Boiler Manufacturer's Association (ABMA)
- .2 American National Standards Institute (ANSI)
  - .1 ANSI Z21.13-2004/CSA 4.9-2004, Gas-Fired Low-Pressure Steam and Hot Water Boilers.
- .3 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)
  - .1 ANSI/ASME Boiler and Pressure Vessel Code, Section IV, 2004.
- .4 Canadian Gas Association (CGA)
  - .1 CAN1-3.1-77(R2001), Industrial and Commercial Gas-Fired Package Boilers.
  - .2 CAN/CSA-B149.1-05, Natural Gas and Propane Installation Code.
- .5 Canadian Standards Association (CSA International)
  - .1 CSA B51-03, Boiler, Pressure Vessel, and Pressure Piping Code.
  - .2 CSA B139-04, Installation Code for Oil Burning Equipment.
  - .3 CSA B140.7-05, Oil Burning Equipment: Steam and Hot-Water Boilers.
- .6 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

### **1.2          WORK DESCRIPTION**

- .1 This section of work has been postponed to an undefined datum.
- .2 This work will performed by a specialized contractor duly certified in manufacturing and maintenance of fire tube boilers, such as Groupe Simoneau, Roco Industries and others.
- .3 The scope of work is a thorough inspection of the two Cleaver Brooks boilers, Model 100-125 BC; provincial registration numbers are S-62843 and S-62844. They have 125-BHP capacity, powered with No. 2 oil, equipped with a combustion chamber of 1626 mm inches in diameter and 3200 mm in length. This inspection will cover the internal analysis of the two tube manifolds as well as all tubes and lids. The contractor will produce a comprehensive report on the remaining useful life of the two boilers and repairs needed in the short and medium term to ensure the sustainability of these boilers. The contractor will replace seals on the lids of both boilers and ensure their proper operation afterwards.

- .4 The chimneys of each boiler will be replaced by a Security Chimneys' Safety Series CIX Secure Stack prefabricated chimney with a 915mm diameter pipe with 50mm double wall insulation. The liner is made of 316 gauge stainless steel with a thickness of 0.89 mm. The shell is made of 304 gauge stainless steel with a thickness of 0.46mm inches. Insulation is high density mineral wool. All in accordance with UL 103, ULC S604, ULC/ORD C959, 540C, and 760C standards.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria, and limitations.
    - .1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .2 Shop Drawings:
  - .1 Submit shop drawings.
    - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Canadian province.
  - .2 Indicate the following:
    - .1 General layout showing terminal points, instrumentation test connections.
    - .2 Clearances for operation, maintenance, servicing, tube cleaning, tube replacement.
    - .3 Foundations with loadings, anchor bolt patterns.
    - .4 Piping hook-ups.
    - .5 Equipment electrical drawings.
    - .6 Burners and controls.
    - .7 All miscellaneous equipment.
    - .8 Flame safety control system.
    - .9 Breeching and stack configuration.
    - .10 Stack emission continuous monitoring system to measure CO, O, NOx, SO, stack temperature and smoke density of flue gases.
  - .3 Engineering data to include:
    - .1 Boiler efficiency at 25%, 50%, 75%, and 100% of design capacity.
    - .2 Radiant heat loss at 100% rated capacity.
- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .2 Instructions: submit manufacturer's installation instructions.
    - .1 The Departmental Representative will make available one (1) copy of systems supplier's installation instructions.

- .4 Closeout Submittals:
  - .1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

#### **1.4 QUALITY ASSURANCE**

- .1 Regulatory Requirements: work to be performed in compliance with applicable Provincial /Territorial regulations.

### **PART 2 PRODUCTS**

#### **2.1 GENERAL**

- .1 Performance:
  - .1 In accordance with American Boiler Manufacturers Association (ABMA), or ANSI Z21.13/CSA 4.9 (gas burning) testing procedures.
- .2 The master of works will provide the technical data of the equipment.
- .3 Controls: factory wired. Enclosed in Electrical and Electronic Manufacturers' Association of Canada (EEMAC) steel cabinet.
- .4 Thermal insulation:
  - .1 See Section 230713 – Duct Insulation.
- .5 Jackets: heavy gauge metal, finished with heat resisting paint.
- .6 Mounting:
  - .1 Structural steel base, lifting lugs.
- .7 Start-up, instruction, on-site performance tests: three (3) days per boiler.
- .8 Temporary use by contractor:
  - .1 Monitor and record performance continuously. Keep log of maintenance activities carried out.
  - .2 Refurbish to as-new condition before final inspection and acceptance.

#### **2.2 AUXILIARIES**

- .1 Provide auxiliaries for each boiler and to meet ANSI/ASME requirements.
- .2 Hot water boilers:
  - .1 Relief valves: ANSI/ASME rated to release entire boiler capacity.
  - .2 Pressure gauge: 90 mm diameter complete with shut-off cock.

- .3 Thermometer: 115 mm diameter range 10 to 150 degrees Celsius.
- .4 Low water cut-off: with visual and audible alarms.
- .5 Auxiliary low water cut-off: with separate cold water connection to boiler.
- .6 Isolating gate valves: on supply and return connections.
- .7 Drain valve: NPS 2.
- .8 Stack thermometer: range 65 to 400 degrees Celsius.
- .9 Outdoor controller: to reset operating temperature controller.
- .10 One (1) set of cleaning tools.

## **2.3 EMISSION CONTROL**

- .1 Rate of discharge of air contaminants from boiler not to exceed:
  - .1 For nitrogen oxides expressed as nitrogen dioxide:
    - .1 110 ng/J of heat input when fired with oil specified as type 4, 5, or 6, according to CGSB classification.
    - .2 43 ng/J of heat input when fired with oil specified as type1 or 2, according to CGSB classification.
    - .3 22 ng/J of heat input when fired with gaseous fuel.
  - .2 For sulphur dioxide:
    - .1 500 ng/J of heat input when fired with oil specified as type 4, 5, or 6, according to CGSB classification.
    - .2 25 ng/J of heat input when fired with oil specified as type1 or 2, according to CGSB classification.
  - .3 For particulate matter measured undiluted, 160 mg/m.
  - .4 For carbon monoxide, 125 ng/J of heat input.

## **PART 3 EXECUTION**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

### **3.2 INSTALLATION**

- .1 Install in accordance with ANSI/ASME Boiler and Pressure Vessels Code Section IV, regulations of the province having jurisdiction, except where specified otherwise, and manufacturers recommendations.
- .2 Make required piping connections to inlets and outlets recommended by boiler manufacturer.

- .3 Maintain clearances as indicated or if not indicated, as recommended by manufacturer for operation, servicing and maintenance without disruption of operation of any other equipment/system.
- .4 Mount unit level using specified vibration isolation in Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.
- .5 Pipe hot water relief valves full size to nearest drain.
- .6 Pipe steam relief valve through roof with drip pan elbow piped to nearest drain.
- .7 Pipe blowdown/drain to blowdown tank/floor drain.
- .8 LP gas installations: in accordance with CAN/CSA-B149.1.
- .9 Oil fired installations: in accordance with CSA-B139.

### **3.3 FIELD QUALITY CONTROL**

- .1 Commissioning:
  - .1 Contractor to:
    - .1 Certify installation.
    - .2 Start up and commission installation.
    - .3 Carry out on-site performance verification tests.
    - .4 Demonstrate operation and maintenance.

**END OF SECTION**