

## **B.3 PERFORMANCE WORK STATEMENT**

### **New Boiler Plant Inspection, Testing, and Calibration VA Central Western Massachusetts, Leeds, MA**

#### **1. GENERAL**

The VA Central Western Mass owns and operates three high pressure steam boilers at the VA CWM CoGeneration Plant in Leeds, MA. The boilers supply the campus-wide high and low pressure underground steam distribution system serving the space heating, domestic hot water, kitchen equipment, and sterile processing needs. The plant includes a heat recovery steam generator (HRSG) and deaerator.

The boilers, HRSG, and deaerator must be inspected, tested, and calibrated periodically in accordance with VHA Directive 2008-062 and the VHA Boiler Plant Safety Device Testing Manual, Third Edition, 9/2008. This contract will provide a multi-year service agreement (base year plus 4 years) to meet these requirements. The bidders must be approved by the VHA Office of Construction and Facilities Management to provide these services.

#### **2. PROJECT SCOPE OF WORK**

Contractor shall provide all supervision, personnel, materials, parts, equipment, supplies, labor, travel and transportation needed to a multi-year service agreement for the inspection, testing and calibration of the boilers, burners, controls, instruments and data management system, HRSG, and deaerator. The inspections and service will be done annually, or semi-annually, in accordance with the VHA Directive 2008-062 and the VHA Boiler Plant Safety Device Testing Manual, Third Edition, 9/2008. The plant consists of the following major components and control systems, all of which are covered under this agreement.

- a. (3) 250 BHP Johnston Firetube Boilers, Model PFTA250-4LG200S, Built 2011, max capacity 8,368 LBS/HR, 4,000 sq. ft. heating surface, max gas firing rate 9,800 MBTU/HR, operating at 70 psig.
- b. (1) 19 BHP Cain Heat Recovery Steam Generator, max capacity 647 LBS/HR, 478 sq. ft. heating surface, safety valve setpoint 15 psig.
- c. (1) 840 Gallon Feedwater Deaerator.
- d. Preferred Utilities Boiler Control System.

##### **1. Introduction:**

A. This Performance Work Statement describes all requirements for the inspection, testing, calibration, and combustion tuning of the boiler plant burners, controls and instruments by qualified technicians

B. The contractor will also provide a National Board of Boiler and Pressure Vessels Commissioned Inspector to perform annual Internal and External inspection of three

High Pressure Boilers, the HRSG, and the Deaerator Tank in accordance with ASME, National Board and VA requirements.

C. Boiler plant safety, reliability, efficiency and equipment longevity are paramount concerns of VAMC management. Malfunctioning burners or controls can cause catastrophic events resulting in injuries and death and massive property damage. Inaccurate or inadequate data management and monitoring systems can fail to warn of unsafe or inefficient performance. Regular inspections, testing and calibration by expert technicians are an essential part of a program to address these concerns.

D. Period of Performance: Inspections to begin immediately upon award. Contractor shall then submit a schedule of inspections to comply with frequency requirements of VHA Directive 2008-062.

E. All work will be performed at the VA Central Western Massachusetts, 421 North Main Street, Leeds, MA 01053-9764.

## 2. Technician Qualifications:

A. Technicians shall have completed at least a one-year trade school and have five years successful experience in this field. The experience shall be largely with institutional and industrial boiler plants similar in design to the VAMC plant. The VAMC facility manager/engineer may define and accept equivalent qualifications.

B. Technicians shall demonstrate familiarity with and ready access to the current versions of the following references:

1. NFPA 85, Boiler and Combustion Systems Hazards Code.

2. VHA Boiler Plant Safety Device Testing Manual, 3rd Edition.

C. Technicians shall be equipped with portable electronic flue gas analyzers and other test instruments necessary for the required tests and calibrations, all calibrated within one month of the site visits. This facility has programmable digital controls; all technicians must be capable of programming the controls and have the appropriate hardware and software for this.

## 3. Inspection, Testing and Calibration Requirements:

A. Technicians shall perform inspection, tuning, testing, calibrating, and adjustments of burners and boiler and boiler plant controls as specified below. This shall be done every six months in accordance with the schedule provided by VAMC.

This service specifically covers (2) Semiannual services for each Boiler, and (2) Tune Up Services for each Boiler.

B. Instrumentation, monitoring and data management systems as listed below shall be calibrated every six months.

C. Provide at least two weeks' notice to the Contracting Officer's Representative (COR) prior to performing the work. Work cannot be scheduled during heavy steam load periods. Only one boiler at a time can be out of service for the inspection, testing and calibration procedures.

D. VAMC will have the boilers that are to be serviced prepared for the technicians upon their scheduled arrival. This includes having the boilers clean of soot and loose scale; fully warmed and at normal steam pressure.

E. All inspections, testing and calibrations shall comply with:

- 1) The recommendations and requirements of VHA Boiler Plant Safety Devices Testing Manual, 3rd Edition.
- 2) The written recommendations of the equipment manufacturers.
- 3) The requirements and recommendations of NFPA 85 Boiler and Combustion Systems Hazards Code including applicable appendices.
- 4) Burner performance requirements in this document.

F. A summary of the work is as follows:

1. Review boiler plant log sheets and alarm and trouble reports.
2. Review records that show combustion performance (flue gas oxygen and carbon monoxide).
3. Perform overall visual inspection of systems. Verify that systems comply with referenced codes and VAMC requirements stated in this contract.
4. Test and record the operation and set points of all burner/boiler safety interlock devices. Refer to list below. Verify that the set points and operating points are within allowable operating parameters. Make adjustments as necessary and record the new settings. The operation of a device must result in burner shutdown and/or proper alarm operation.
5. Operate burner(s) on each fuel from low fire to high fire and back to low fire in at least four increments and record combustion performance (flue gas oxygen, carbon monoxide, NOX where applicable), fuel train pressures, atomizing train pressures, burner pressures, stack temperatures, boiler steam output.

6. Compare the combustion performance data with VAMC requirements (see below) and previous readings. If necessary, make adjustments to the fuel flow and combustion air controllers, control valves and dampers to obtain the required performance. Record the new performance data.

7. Verify accuracy of instrumentation listed below. Verify that all devices are properly selected for the application in terms of type, size, set point range, performance, code approval. Calibrate all instruments that are not within manufacturer's specifications for accuracy.

8. Immediately inform COR of any recommended repairs or modifications.

G. List of interlocks, safety devices, and gauges to be inspected, tested, or calibrated (including but not limited to).

Semi Annually on each boiler/burner:

1. Low-water cutoff (slow drain)
2. Fire each boiler and the pilot on the alternate fuel for 1 hour
3. Low-water cutoff shunt switch
4. Auxiliary low-water cut-off (slow drain)
5. Auxiliary low-water cut-off shunt switch
6. High-water alarm
7. Low-water alarm
8. High-steam pressure cut-out (recycle)
9. High-steam pressure cut-out (non-recycle)
10. Steam safety valves (raise boiler pressure until valve pops).
11. Flame scanner
12. Check gas vent for leaks
13. High-gas fuel pressure cut-off
14. Low-gas fuel pressure cut-off
15. Gas fuel safety shut off valves proof of closure
16. Leak test gas fuel safety shut off valves

17. High-fuel oil temperature cut-off (heated fuel)
18. Low-fuel oil temperature cut-off (heated fuel)
19. Low-atomizing pressure for fuel oil
20. High-fuel oil pressure cut-off Low-fuel oil pressure cut-off
21. Leak test fuel oil safety shut off valves
22. Check operation of Liquid Petroleum Gas pilot
23. Low-pilot gas pressure cut-out
24. Forced draft fan motor interlock
25. Forced draft fan damper wide open for purge
26. Boiler outlet damper wide open for purge
27. Purge air flow interlock
28. Timing for pre-purge
29. Timing for post-purge
30. Igniter timing
31. Low fire position interlock
32. Combustion air interlock
33. Main flame out; i.e., time to close valves
34. Ignition flame out; i.e., it is time to close valves
35. Minimum igniter flame test
36. Scanner not sensing ignition spark
37. Low-oxygen alarm and/or cut-out
38. Pre-purge setting of flue gas recirculation damper
39. Fuel oil safety shut off valves proof of closure

H. The following items will be completed on an annual basis:

1. Steam safety valves (accumulation test at high fire)

I. Required burner performance (natural gas and fuel oil):

- 1) Turndown (ratio of maximum and minimum firing rates): 10/1 8/1 5/1 4/1 (Refer to original burner specification).
- 2) Achieve, but do not exceed, boiler maximum steam flow output rating. Measure fuel input at minimum and maximum firing rates.
- 3) Maximum carbon monoxide: 200 parts per million (ppm)
- 4) Flue gas oxygen: 2.5 – 4.2% (Up to 5.2% at loads below 40% of maximum steam output; no upper limit at minimum firing rate; oxygen can be one percentage point higher on oil firing on single-point positioning systems).
- 5) Flue gas oxygen (low excess air burners): 1.0 – 2.0% (Up to 2.5% at loads below 40% of maximum steam output; no upper limit at minimum firing rate; oxygen can be one percentage point higher on oil firing on single point positioning systems).
- 6) Flames shall be stable with no pulsations, shall be retained near burner, no blowoff or flashbacks, no constant flame impingement on refractory or waterwalls.

J. List of instrumentation and controls to be inspected and calibrated semi-annually (including but not limited to):

- 1) Steam flow transmitters (all).
- 2) Steam flow recorders/computer readout.
- 3) Flue gas oxygen sampling, analyzing and recorder/computer readout.
- 4) Boiler and economizer stack temperature transmitters and recorder/computer readout.
- 5) Master steam pressure and combustion controllers.
- 6) Boiler outlet draft controllers.
- 7) Boiler water level controllers.
- 8) Feedwater deaerator and condensate storage tank water level controllers including overflow.
- 9) All pressure and temperature sensors and transmitters.
- 10) All signal processing and readout devices.

4. Emergency Response:

Contractor to provide an estimated 24 hours labor and \$2,000 in parts, including emergency 4hr call back with 24 hour response time. If additional parts and labor are required an increase to the contract may be done if within the scope of work, otherwise a new order will need to be issued. Please provide your hourly emergency labor rate.

5. Report Requirements:

A. Provide complete written report of the inspection fully describing all tests performed, all findings, and recommendations.

B. Furnish report within one week of each facility inspection in "Microsoft Word" format by email to the COR and to the VA Headquarters office designated. Provide hard copies of data sheets and flue gas analyzer "strip" printouts to the COR within one week of visit.

C. All safety-related deficiencies shall be immediately reported to the COR during the inspection visit.

6. All work shall be performed in accordance with VA Construction Safety Code, OSHA codes, and VACWM confined space entry procedures. Contact COR before performing any work. Successful bidder shall submit detailed procedures describing compliance with all OSHA, EPA, and all other applicable regulatory requirements pertaining to safe and proper inspection and maintenance of equipment, i.e., proper use of PPE, safe work practices, etc.