General:
The Medical University of South Carolina (MUSC) operates industrial-level steam and hot water boiler systems. These systems provide steam at various pressures throughout the Engineering and Facilities Division (E&F) for the purpose of environmental heating, sterilization, and heating hot water. These systems are operated and maintained by the E&F Division's Boiler Shop. These systems require daily monitoring and adjustment, chemical treatment and testing as well as annual cleaning and inspection. The efficient operation of the boiler equipment is critical to the operation of the campus and represents a large cost in fuel and maintenance. The day-to-day maintenance of this equipment is identified in the E&F CMMS (Computerized Maintenance Management System). This procedure is to ensure compliance with regulations set forth by the South Carolina Department of Health and Environmental Control (SCDHEC).

Compliance:
To meet the requirements of SCDHEC Fuel Combustion Operations permit dated March 30, 2011 for Boilers on the MUSC campus, the following policy is provided regarding boiler start up, shutdown, tune-up and record keeping.

Purpose:
The purpose of this policy is to reference the procedure used for the maintenance and testing of boilers that are owned and/or operated by MUSC.

Procedure for Maintaining Boiler Efficiency (tune-up) and Records:
Boiler tune-ups should be undertaken only by qualified, competent, and experienced boiler operators or contractors working for MUSC. E&F boiler tune-ups are performed on a regularly scheduled Preventive Maintenance (PM) plan for each steam boiler at least every two years. A tune-up plan has been developed and is kept on file. The completed boiler tune-up PM records will be maintained by the E&F Operations PM and Planned Renewal group for a minimum of 5 years. The daily boiler logs are maintained online with our compliance data servicer (Zatesafe2)

Boiler Start-Up:
Boiler start up follows after all systems have been properly checked (visual inspection and electronic systems checks) for proper operation and assurance that safety devices are in proper working order.

Check water level in sight glass and assure water supply to boiler, fill to proper level(s) as required.
Steam boiler – water should be to center of sight glass.  
Water boiler – water should completely fill sight glass.

NOTE: On both steam and water boilers a vent or test valve is supplied to vent excess air when filling the boiler. Leave the valve open on a steam boiler until steam appears, then close, with a water boiler leave valve open until water begins to discharge, and then close the valve.  
Check all settings on operating controls.  
Check all reset and lock out mechanisms.  
Close supply valve to distribution header.  
On combination fuel units, set fuel selector switch to primary fuel to be used.  
Turn burner switch to “on” position  
Blower motor will energize to purge combustion chamber in the pre-purge period and continues to run, damper closes.  
Automatic igniter lights boiler in low fire. Boiler continues to run in low fire until properly warmed up before burner is allowed to go into high fire.

BOILER OPERATION:  
Normal operation will be with the manual-automatic switch set at “auto” and under control of the high-low fire control.  
With the switch set at “auto” the burner will operate on a high-low fire basis according to the local demands.  
The burner will continue to operate until the operating limit pressure or temperature setting is reached, unless:  
Burner is manually turned off.  
Low water condition is detected by low-water control.  
Electric current or fuel supply is interrupted.  
Pressure of combustion (or atomizing airdrops below minimum level).

NOTE: There are many causes or safety shutdown – motor overload, flame outages, tripped circuit breakers, blown fuses, or through other interlock (safety) devices in the circuitry.

BOILER SHUTDOWN:  
When the operating limit pressure or temperature control setting is reached to open the circuit, boiler shutdown occurs until the demand load for steam or hot water causes the pressure or temperature setting to restart the burner to again satisfy the demand. (Normal Operation and Cycling of Boiler)  
If the burner switch is turned “off” the following sequence occurs:  
Fuel valve(s) is de-energized extinguishing burner flame
Blower motor is de-energized
Refer to normal start-up procedure to return boiler to service.

**FUEL OIL REQUIREMENTS:**
Number 2 fuel oil.

**OPERATING BOILER ON FUEL OIL:**
With the above requirement for grade being used:
- Fuel oil re-circulating pump is activated after lining up on oil tank all suction and return valves open.
- Pump pressure should reach 75 psi on gauge.
- Oil burner pressure 42-45 psi
- Follow normal operating procedures with gas.

**Note:** operating on fuel oil applies to only the following boilers:
HCC #5 & #6, SEI #1 & #2, MRE #1 & #2

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Note: This Policy, like all other policies within Engineering and Facilities is not a contract and should not be relied upon as such. Questions concerning Interpretation of this document or suggestions for improvement should be directed to MUSC Facilities and Engineering.

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<th>Approved By:</th>
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