B6000 BOILER MANAGEMENT SYSTEM
SAMPLE SPECIFICATION

Section I: General Requirements

1. Provide a Raypak B6000 Boiler Management System capable of controlling _____ Raypak Model _____ copper finned tube boiler(s).The boiler management system shall consist of a System Control Module, _____ Boiler Monitor Module(s), a water temperature sensor and an outdoor air temperature sensor. An internal power transformer shall be integral to each module.
2. The water temperature and outdoor air sensors shall be solid state and shall be capable of maintaining ±0.5°F sense accuracy when installed with a maximum of 4,000 feet of shielded cable as recommended by the manufacturer.
3. The System Control Module shall have a battery backup for maintaining program values in the event of a power failure. The battery shall have a minimum expected life span of five years.
4. All board mounted relays shall be socket mounted and shall be field replaceable.
5. All solid state components shall be fuse protected.
6. The boiler management system shall be listed by UL as an Energy Management System.
7. The boiler management system shall carry a one year limited warranty against failure caused by defective workmanship or material.
8. The control system and boiler equipment shall be manufactured by the same company and shall carry single source responsibility.

Section II: Equipment Enclosures

1. The System Control Module shall be boiler or remote mountable in a dustproof enclosure. The lockable control enclosure shall be constructed of 18 gauge steel and shall be vandal and tamper resistant.
2. The Boiler Monitor Module(s) shall be factory mounted on the boiler(s) and shall communicate with the System Control Module via a three wire shielded cable with single point grounding, as specified by the manufacturer. The maximum communication wire length between the System Control Module and the Boiler Monitor Module(s) shall be 4,000 feet.
3. The outdoor air temperature sensor shall be mounted in a protective steel housing.
4. All exterior enclosure surfaces shall be protected with a baked-on UV inhibited Polytuff powdercoat finish.

Section III: Control Functions

1. The boiler management system shall be microprocessor based and shall control the firing rate and sequencing of the boiler(s) to meet the system demand within the selectable limits of the Control Band, the Setpoint, the Reset Ratio, and the outdoor temperature. The system water temperature shall be capable of being maintained within ±3°F of Target Temperature under normal conditions.
2. The boiler management system operational algorithm shall have an advanced Proportional plus Integral plus Derivative (PID) logic structure. The control algorithm shall automatically optimize boiler response based on a history file of the last 96 firings.
3. The System Control Module microprocessor shall be self-checking and shall incorporate LED lamps to indicate proper system operation.
4. Boiler lead/lag selection will be performed automatically using a timed rotation protocol or manually via the System Control Module.
5. The boiler management system shall have a primary pump control output. An energy saving Pump Off Delay function shall be an integral part of the primary pump control.
6. The system shall incorporate an outdoor cutoff function that shuts down the boiler(s) and the primary system pump when the outdoor air temperature exceeds a user adjustable setpoint.
7. The boiler management system shall have a manual override function that allows independent operation of the boiler(s) for maintenance or in case of catastrophic boiler control failure.
8. *[Optional Alternate Setpoint Configuration - SelectSet Setback]* The boiler management system shall have an independent alternate setpoint capability. The alternate setpoint option shall incorporate a seven day clock and shall provide for up to six (6) setback or boost periods per day.

Section IV: Adjustable Parameters

1. The System Control Module shall incorporate an LCD alpha-numeric display and touch pad for adjusting the following parameters:
   (a) Reset Ratio shall be adjustable from None to 20:1;
   (b) Control Band shall be adjustable from 1° to 9°F;
   (c) Primary Pump Off Delay shall be adjustable from 0 to 20 minutes;
   (d) Outdoor Cutoff Temperature shall be adjustable from 35° to 99°F;
   (e) Outdoor Cutoff Deadband shall be adjustable from 1° to 9°F;
   (f) Maximum Water Temperature shall be adjustable from 70° to 235°F;
   (g) Ignition Lockout Time shall be adjustable from 15 to 100 seconds;

(h) Boiler Rotation Change Hours shall be adjustable from 0 to 225 hours;
(i) Firing Valve Step Increment shall be adjustable from 5 to 100% or one or two stages;
(j) System Design Degrees Rise shall be adjustable from 1 to 99°F;
(k) Setpoint shall be adjustable from 105° to 220°F. -or- Setpoint shall be adjustable from 40° to 220°F [Optional NoMin Setpoint Chip Set];
(l) The Proportional, Integral and Derivative Constants of the control algorithm shall also be adjustable.

Section V: Boiler Monitor Module Display Functions

1. The Boiler Monitor Module(s) shall incorporate the following LED operating and diagnostic lights:
    (a) A Power LED shall indicate that the boiler is powered;
    (b) Manual Override shall indicate that the boiler is in manual override mode and is operating independently of the System Control Module;
    (c) Call For Heat shall indicate that a signal is present at the thermostat inputs;
    (d) Pump shall indicate that the boiler pump circuit is energized;
    (e) Pilot shall indicate that the pilot is lit;
    (f) Main Gas shall indicate that the main gas valve is energized;
    (g) Aquastat shall indicate that the aquastat is satisfied;
    (h) Safety Fault shall indicate that a fault has occurred. In addition to Safety Fault one of the following LEDs shall be lit to indicate which fault has occurred:
    (i) High Limit;
    (j) Flow Switch;
    (k) Ignition Failure;
    (l) Low Water Cutoff *[optional]* ;
    (m) Low Gas Pressure *[optional]* ;
    (n) High Gas Pressure *[optional]* .

Section VI: System Control Module Display Functions

1. The System Control Module shall be equipped with two LEDs – System Normal and System Fault – that shall indicate system operating status.
2. The System Control Module shall be equipped with an electronic alarm buzzer for fault annunciation. A momentary switch located on top of the System Control Module shall silence the alarm buzzer.
3. In addition to displaying the Adjustable Parameters, the System Control Module LCD display shall have plain language indication of the following:
    (a) Initialization Status;
    (b) Current Outdoor Air Temperature;
    (c) Current System Water Temperature;
    (d) Current Target Temperature;
    (e) Boiler status including:
    (f) Operating Status;
    (g) Manual Override Mode;
    (h) Boiler fault indication including which component has faulted;
    (i) Boiler Firing Valve Position;
    (j) Boiler Firing Valve Up and Down Cycle Timing.

Section VII: Modem Remote Monitoring Option

1. The Boiler Management System shall be remotely monitored via an optional on-board modem. The modem and accompanying MS-DOS based software shall facilitate seamless remote communications using a RS485 protocol through a standard RJ11 telephone jack. The modem shall provide remote controllability of all parameters displayed or adjusted at the System Control Module.
2. The modem shall automatically dial up to three (3) pre-programmed locations in the event of a system malfunction or to supply hard copy status updates at programmed intervals.