

## **BOILER SAFETY – Combustion Controls**

### **Understanding the Hazard:**

Heating and process boilers can be one of the most critical pieces of machinery at your facility, and they require properly maintained safety controls to ensure safe operation. Because boilers are fuel-fired and heated by combustion, there is a risk of explosion and fire that can destroy your equipment, and facility.



The majority of explosions in fuel-fired boilers originate during startup or shutdown, as shown in the chart on the left. Automatic combustion safety devices will reduce the likelihood of a fire and/or explosion in your boiler, and can minimize damage if a problem occurs. It is vital that your equipment is properly maintained and tested by qualified technicians, and that all operators are well-trained.

### **What You Can Do at Your Facility:**

- Verify that your current installation meets or exceeds combustion control guidelines consistent with the type of equipment present and in accordance with National Fire Protection Association (NFPA) and ASME CSD-1 (Controls and Safety Devices for Automatically Fired Boilers) standards.
- Implement a documented program for inspection, testing and maintenance of combustion control equipment. Test safety controls at least annually, using qualified instrumentation technicians.
- Maintain properly trained boiler operators, and verify that written operating procedures are followed.
- Practice good housekeeping standards in boiler room areas and do not store combustible material near boilers.

## **Safety Checklist**

### **Annually – Start of Heating Season:**

- Fuel Safety Shutoff Valves (SSOV) should be tested for leakage.
- Air flow or pressure switches, and damper high/low fire interlocks should be tested.
- Flame scanners and all safety controls that interlock with the SSOV through the combustion safeguard controller should be checked.
- Piping, hoses, wiring, and electrical connections of all interlocks and shutoff valves should be checked for leaks, corrosion, and loose connections.

### During Startup:

- Check all automatic and manual controls regulating feed water, draft, dampers, and interlocks. Ensure that all stack dampers are open.
- Verify boiler water level.
- Check the furnace and flue passes for fuel accumulation. Any unburned fuel should be thoroughly removed.
- Check flame detection devices.
- Purge furnace for at least 3-5 minutes to fully clear gas passages.
- If burner fails to ignite within five seconds, shut off fuel supply and re-purge furnace.
- Do not leave an auto fired boiler unattended after starting until it has completed several firing cycles and all controls are functioning properly.

### Monthly Checks/Tests:

- Flame failure detection system
- Fan and airflow interlocks
- Low fire start interlock
- High steam pressure or temperature interlock
- Fuel pressure and temperature interlocks (Oil)
- Gas cleaner and drip leg (Gas)
- High and low fuel pressure interlocks (Gas)

### As Required:

- Clean flame scanners
- Disassemble and clean atomizers (Oil)
- Clean Strainers

### **Don't Let This Happen to You....**



*Safe startup procedures and assurance of no fuel leakage into the furnace would have prevented this loss.*