

## **CHEMICAL MANUFACTURER IMPROVES THERMAL FLUID HEATER OPERATION**

A manufacturer of specialty chemicals operates a 10 million BTU per hour thermal fluid heater that heats four (4) reactors. The heater was 22 years old at the time of the project. The burner operated on natural gas (interruptible) and heavy (No. 6) fuel oil. The heater utilized a combustion air preheater that recovered 1.5 MM BTUH at full fire.

Two problems were addressed by this project:

1. The old burner and combustion controls no longer provided the degree of control required by current standards and community expectations. Notably, temperature swings in the thermal fluid temperature were traced to a lack of adequate turn-down capability by the burner. Also, when firing on oil, the system had developed a propensity to smoke, which resulted in complaints from neighbors.
2. The owner had begun to notice “hot spots” on the side of the heater, indicating possible deterioration of the internal insulation.

A project was undertaken that accomplished the following objectives:

1. The burner was replaced with a new hot air, dual fuel burner. The new burner offered improved turndown on both natural gas and fuel oil and allowed more stable temperature in the thermal fluid circulating loop. An improved fuel oil “gun” design provided much better atomization of the heavy fuel oil, allowing for more complete combustion and reduced smoking.
2. The old, mechanical linkage-based combustion control system was replaced with a state-of-the-art electronic ratio controller, eliminating all mechanical linkages and allowing for improved fuel/air mixtures across the burner’s throttling range.
3. The heater’s front end was removed, and failed insulation was replaced. As the manufacturer’s design drawings had been lost to history, Hudson & Associates contacted individuals known to us to have worked at the manufacturer when the heater was built. Interviews with those individuals allowed the internal insulation to be replaced in keeping with the original construction techniques used in 1984.

The heater was restarted without incident and is currently operating in its improved state. A conservative estimate is that the life of this equipment has been extended by approximately 10 years.

These techniques can be applied to steam boilers with similar results.