

Ford Finds Solution in Cofire Retrofit

Cofiring natural gas and coal adds flexibility and increases efficiency

"Why did we decide to retrofit to cofiring natural gas?" Dave Knapp, Ford's Cleveland Site Power House Chief Engineer, explains that they wanted to increase their efficiency, add some flexibility to their operations, and recover

percent cofiring. At this level of cofiring, efficiency also increases by two percent due to lower excess air levels and improved carbon burnout in fly ash. During the summer months when load requirements are low, Ford now has the flexibility to fire 100 percent natural gas and shut down all the coal operations for maintenance. During spring and fall, Ford can quickly take the boiler on and off line as temperatures and loads vary. Additionally, and in keeping with Ford's "good neighbor" policy, overall emissions are reduced.

All-around solution

In 1997, Doug Rider and Cliff Andrews of Dominion East Ohio, met with the engineers at Ford and explained the benefits of cofiring natural gas and coal. Additional funding and performance testing for the Ford retrofit was provided by the Chicago-based Gas Technology Institute (GTI)—formerly Gas Research Institute—through its agent, Arthur D. Little. GTI has been conducting extensive cofiring demonstration projects for the past several years.

"Boiler No. 5 had been derated 30 percent because of excessive opacity and particulate emissions at high load," says Rider. "We knew cofiring could recover this lost derate, as well as increasing operating flexibility and efficiency, and reducing overall emissions. We explained all the operational and environmental benefits and the engineering to the people at Ford. They realized the

retrofit was a good all-around solution and gave the project a green light."

Boiler No. 5 is a 100,000 pound-per-hour Riley spreader stoker boiler manufactured by Union Iron Works. It was retrofitted with two

"... it has produced exactly the results we wanted"

high-pressure, high-velocity, natural gas Co-Fyr burner packages from Coen Company, Inc. headquartered in Burlingame, California. Additional assistance was provided by the local Coen manufacturer representative, George Joniec of Process Alternatives and Combustion in Lambertville, Michigan. He worked closely with Dominion, Ford and Coen's California R & D department to provide modeling to ensure proper burner size, location and firing velocity as well as application engineering. Charlie Schmidt of Schmidt Associates, Inc., in Bedford, OH, was Ford's consulting engineer on the project and saw it through from inception to final completion.

Optimizing performance

"Once the burners were installed," remembers Rider, "GTI came out to do some performance testing—which is an important part of their cofire program. We did some pretest work, and then GTI did their testing. Although everything worked well, we saw some areas we thought we could improve on to create optimum performance."



Pleased with results of their first boiler cofire retrofit, Ford hopes to retrofit a second soon.

lost boiler derate. They saw the retrofit as a refinement to their plant operations with a unique mix of new and proven technologies. The cofire retrofit has successfully demonstrated the results they desired.

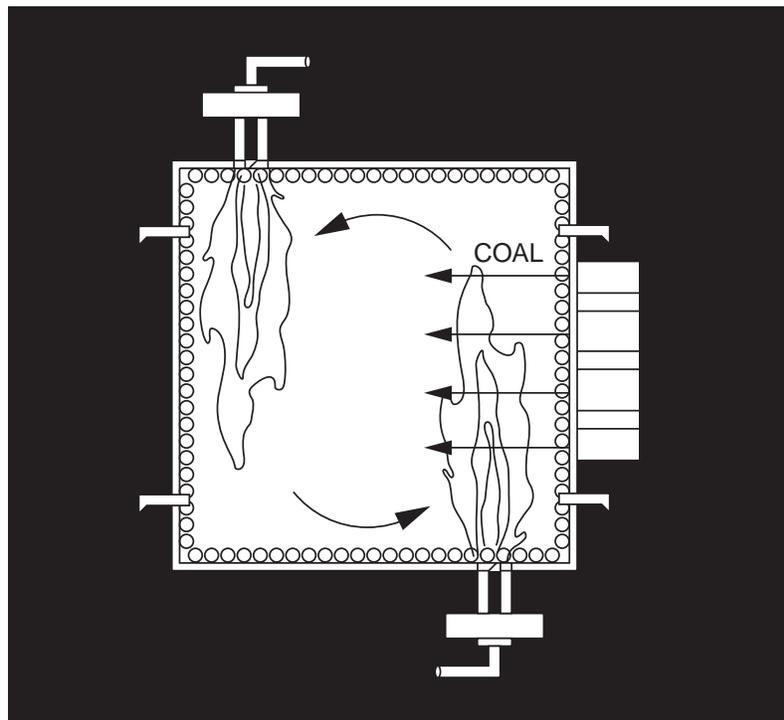
The Ford Motor Company's Brookpark facility near Cleveland, OH, is a 365-acre complex which is comprised of four manufacturing plants: two engine plants, a gray-iron foundry, and an aluminum casting plant. The facility is served by five boilers which, until 1997, were strictly coal-fired. The boilers generate steam primarily for facility heating, although they also provide process steam for various manufacturing processes.

The natural gas cofire retrofit has met all the goals established by Ford. Derate is completely recovered at approximately 21

Ford Finds Solution in Cofire Retrofit

After the first phase of performance testing, Coen made some adjustments to the burners to optimize performance in both the winter and summer modes. In winter, smaller gas nozzles produce higher velocity, allowing for better penetration across the bed and better mixing. In summer, so that the boiler can be run on gas alone, larger nozzles are used.

"The retrofit went very smoothly," concludes Dave Knapp at Ford. "The system is working well and I would highly recommend it. We're actually hoping to retrofit a second boiler to cofiring very soon."



Cofire Burners Configuration