

COMBUSTION EQUIPMENT REFURBISHMENT AT EAST RIVER 70

SITUATION

Design and supply of retrofit gas and oil equipment to eliminate burner-operating problems and reduce emissions from Consolidated Edison Co. of N.Y.'s (Con Edison's) East River Boiler 70. East River 70 is a 185 MW wall-fired Foster Wheeler boiler, capable of firing natural gas and No. 6 oil. The boiler has 18 burners with a compartmented windbox. No controls for NOx emissions (i.e., OFA, FGR, etc.) were available.

Over the operating life of Unit 70, operation of the gas and oil burners deteriorated to unsatisfactory levels. Operation of the air registers was no longer possible and combustion problems such as poor ignition, flame stand-off and fuel spray impingement, lead to severe damage to many burner components.

OBJECTIVES

Achieve the following when burning gas and oil fuel:

- Reduce opacity during operating transients.
- Improve flame stability.
- Eliminate wall & throat impingement.
- Increase operating life of burner components.
- Reduce NOx emissions.

SOLUTION

COEN's scope included design, fabrication, installation supervision and equipment commissioning. Specific hardware furnished included: (1) rotatable gas canes, (2) flame stabilizers (swirlers), (3) oil guns, and (4) Low-NOx atomizers.



View of Burner Throat Showing COEN Flame Stabilizer, Gas Injectors and Oil Atomizer

The new hardware was installed during a maintenance outage and the air registers were fixed in the open position (i.e., burner airflow now controlled by the windbox compartment dampers). The boiler was subsequently brought to full-load on both fuels for a limited checkout prior to an additional outage for steam-send-out conversion.

RESULTS

All performance objectives were met. Flame stability was excellent and fuel impingement was eliminated. The unit was operated through the load range on both fuels without any opacity incidents and NOx emissions were maintained 25% below baseline levels. Additional NOx reductions were achieved during subsequent optimization testing.

This retrofit application achieved all the desired combustion improvement objectives at a fraction of the cost of a full-burner replacement.