

# Innovative NO<sub>x</sub> Control Technologies can Eliminate an SCR

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***Over 65% NO<sub>x</sub> Reduction achieved on a coal-fired unit using two layers of the RJM-LT™ system***

## Introduction

On First Energy's Bay Shore Generating Station, Unit #3, RJM achieved a 65% NO<sub>x</sub> reduction using two layers of RJM-LT™ system. RJM-LT™ is a layered approach to NO<sub>x</sub> reduction that can achieve up to a 90% NO<sub>x</sub> reduction without an SCR or a catalyst. Unit #3 is a B&W 150 MWg Radiant coal fired boiler. Boiler Data is attached below.

### Boiler Configuration

Manufacturer	Babcock & Wilcox
Type	Radiant
Design Main Steam Flow	952,000 lb/hr
Design Steam Conditions at Boiler Outlet	2500 PSIG 1060°F SH, 1010F RH,
Fuels	PRB and Eastern Bituminous
Burners	12 B&W register
Firing Arrangement	3 wide x 4 high
Combustion Air Temperature	560 F
Furnace Plan	22' 0" Deep 27' 0" Wide
Overfire Air	3 Wide 20" dia
Baseline NO <sub>x</sub> (PRB)	0.7 lb/mmBtu

## The RJM-LT Approach to NO<sub>x</sub> Reduction

RJM engineered and supplied low NO<sub>x</sub> burner modifications and over fire air to achieve a low NO<sub>x</sub> level. Other objectives included limiting LOI to 1.5 x baseline and maintaining a CO level below 200 ppm at the economizer outlet.

Prior to starting the engineering, RJM carried out a CFD model of the existing and proposed burners. Following the successful CFD modeling, RJM supplied a coal pipe extension, coal distributor, coal spreader, flame stabilizer and register shroud for each burner. The air to each burner was then balanced using RJM's proprietary ADA method. As part of the NO<sub>x</sub> reduction project, three pressure part openings were made for over fire air in the burner front wall in the same vertical column as the burners. The overfire air ports were connected to the top of the windbox via ducts, each with its own automatic actuator control damper.

## Final Performance

Firing PRB coal the NO<sub>x</sub> was reduced to an average of 0.248 lb/mmBtu at the 67 MW, 100 MW, and the 130MW runs. LOI decreased from an average of 0.739% to an average of 0.5% for the three load runs. CO was typically maintained below 46 ppm. The over fire air ports were 11% open. **Overall NO<sub>x</sub> reduction was 64.6% from the baseline.**