ANNUAL PROJECT REPORT

AS OF DECEMBER 2001

1.PROJECT SPONSOR:
American Electric Power Service Corp,
Agent for Columbus Southern Power Company
1 Riverside Plaza
Columbus, Ohio 43215

2.PROJECT MANAGER:
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3.OCDO GRANT NO. CDO/D-00-21

4.PROJECT UPDATE X OR

FINAL REPORT

5.PROJECT TITLE: Conesville Unit 6 Thermalonox Demonstration Project

6.PROJECT TERM: FROM: April 1, 2001 TO: December 31, 2001

7.BUDGET:

CO-SPONSORS NAME	COST-SHARE
OCDO	$2,319,000.00
Columbus Southern Power	$7,301,839
	$
	$
	$
TOTAL PROJECT COST:	$9,620,839

I. ABSTRACT

8. OVERVIEW OF PROJECT & OBJECTIVES:

American Electric Power Service Corporation (AEPSC), in conjunction with its technology partners, Thermal Energy International and ASTARIS, performed phase I of a full-scale demonstration of THERMALONOx™ technology at Columbus Southern Power's Conesville Unit 6 between 8/14 and 8/23/2001. Conesville Unit 6 is a 375 MWe tangentially-fired, dry-bottom, pulverized coal-fired boiler which began service in 1978. Conesville Plant is located in Conesville, Ohio and operates six generating units with a total generating capacity of 1,945 MWe.

The THERMALONOx™ process consists of injecting elemental white phosphorus (P_4) into the ductwork upstream of the existing wet lime Flue Gas Desulfurization (FGD) system as illustrated in the figure below. The theory states that phosphorus reacts with oxygen in the flue gas to form oxygen free radicals and phosphorus pentoxide (P_2O_5). The oxygen free radicals then react with NO to create more soluble NO_2 that can then be removed in the wet FGD system.

Over the course of the six days the THERMALONOx™ technology was tested, system variables and conditions were changed systematically to cover the range of operating capabilities and conditions. During each test run and for at least one hour prior, the boiler conditions were held as constant as possible to minimize outside variables. Most of the data was collected at full-load conditions. Early test runs were performed at flow rates below ideal injecting parameters to ensure that the system operated as per design while minimizing the potential risks of human injury or equipment damage. Test runs were at least 30 minutes and most were an hour in length to gather enough data to study the statistical significance of the results.

This technology was intended to offer a competitive solution to SCR, a proven NOx reduction method capable of removing more than 75% of NOx emissions from the flue gas of a coal combustion boiler. Phase I of the test program was only designed to demonstrate the technology's ability to convert NO to NO_2, which is the first step in NOx removal using wet SO_2 scrubbed generating units. A minimum of 75% NOx reduction was the claim for THERMALONOx™, meaning that Phase I would necessarily be capable of achieving greater than 75% NO conversion.

9. WORK DONE AND CONCLUSIONS:

A full-scale test system was installed on Conesville 6, including all appropriate equipment necessary for safely handling and injection of elemental phosphorus. The 17 test runs performed on Conesville Unit 6 realized a maximum of 2.3% NO conversion. Variations in phosphorus distribution, duct coverage, residence time, and total phosphorus feed rate all showed negligible impact on NO conversion. The system has been laid-up and winterized, pending further advancements requiring additional testing.

10. PLANS FOR COMING YEAR:

All further involvement by AEP into the development of this technology has been suspended, pending further advancement by Thermal Energy Incorporated. The system is available for additional demonstration, providing compelling evidence is presented by TEI.

II. HIGHLIGHTS / ACCOMPLISHMENTS

11. Although the THERMALONOx™ technology demonstration has not yet successfully been proven an effedtive method for NOx reduction, there were positive accomplishments for the design, installation, and test teams. This installation required a marriage of industrial techniques never before attempted. Beyond demonstration of the technology, the design and test team set goals of successfully testing this technology without causing personal injury, equipment damage, power generation loss, or a reduction in the FGD's ability to remove SO_2. The four goals were realized.

III. ARTICLES / PRESENTATIONS

12. N/A