

**ANNUAL PROJECT REPORT
AS OF DECEMBER 1992**

1. PROJECT SPONSOR:

Contract Research Division
The Babcock & Wilcox Company
1562 Beeson Street
Alliance, Ohio 44601-2196

2. PROJECT MANAGER:

Paul S. Nolan
Project Manager,
Clean Coal Projects

TELEPHONE: (216) 860-1074

3. OCDO GRANT NO#: 6-85-90

4. PROJECT: Final Report

5. PROJECT TITLE: Limestone Injection Multistage Burner (LIMB) Demonstration Program and LIMB Humidification Process.

6. PROJECT TERM: FROM November 16, 1984 **TO** December 31, 1991

7. PROJECT	<u>NAME</u>	<u>COST-SHARE</u>
CO-SPONSORS:	OCDO	\$ 7,941,811
	The Babcock & Wilcox Company	7,481,130
	U.S. EPA	8,025,870
	Stone & Webster Engr.. Corp.	149,920
	Radian Corporation	35,567
	Ohio Edison Company	1,734,990
	Consolidation Coal Company	<u>1,275,000</u>
TOTAL PROJECT COST:		\$26,644,288

I. ABSTRACT

8. OBJECTIVES

Develop Limestone Injection Multistage Burner (LIMB) and low nitrogen oxides burner technologies for both retrofit and new applications leading to commercialization for wall-fired boilers. Variations of the LIMB concept will be evaluated as part of formulating a demonstration plan. Implementation of this plan will follow, first with baseline definition, then with actual demonstration of the technology at the host utility. Appropriate parameters on boiler performance and emission characteristics will be monitored and analyzed. Humidification of the flue gas will improve sulfur dioxide removal efficiency and electrostatic precipitator performance. Enhancement of sulfur dioxide capture performance is emphasized since the ultimate objective of the LIMB technology is reduction of acid gas emissions.

9. WORK DONE AND CONCLUSIONS:

The EPA comments to the draft of the final report were reviewed and the final report was submitted to the EPA.

Site demobilization and restoration activities began following the conclusion of DOE LIMB Extension testing and were completed.

10. PLANS FOR COMING YEAR:

None - Project complete.

II. HIGHLIGHTS/ACCOMPLISHMENTS

11. Major accomplishments included:

1. Final report submitted to the EPA.
2. Completed site demobilization and restoration.

III. ARTICLES/PRESENTATIONS

12. "LIMB: Detailed Results of Testing at Ohio Edison's Edgewater Station," G.A. Kudlac, T.R. Goots, and P.S. Nolan, Paper presented at the 17th International Conference on Coal Utilization and Slurry Technologies, Clearwater, Florida, April 1992.

"Demonstration of Sorbent Injection Technology on a Wall-Fired Utility Boiler (Edgewater LIMB Demonstration)," P.S. Nolan, T.W. Becker, P.O. Rodemeyer, and E.J. Prodesky, Final report to the U.S. Environmental Protection Agency, EPA-600/R-92-115 (NTIS PB92-2001136) June 1992

"Final Results of the DOE LIMB and Coolside Demonstration Projects," M.J. DePero, T.R. Goots, and P.S. Nolan, Paper presented at First Annual Clean Coal Technology Conference, Cleveland, Ohio, September 1992

"Economic Evaluation of the LIMB and Coolside Processes," T.R. Goots, P.S. Nolan and M.J. DePero, Paper presented at the Ninth Annual Pittsburgh Coal Conference, Pittsburgh, Pennsylvania, October 1992

"LIMB Ash Mixed with Sewage Sludge to Produce a Soil Amendment," J.H. Beeghly, K. Grathwol and J. Demuth, Paper presented at the Ninth Annual Pittsburgh Coal Conference, Pittsburgh, Pennsylvania, October 1992

"Technological and Economic Evaluations of the LIMB and Coolside Processes," P.S. Nolan, T.R. Goots and M.J. DePero, Paper presented at the 1992 International Joint Power Generation Conference, Atlanta, Georgia, October 1992

“LIMB Demonstration Project Extension and Coolside Demonstration,” T.R. Goots, M.J. Goots and P.S. Nolan, Final report on Cooperative Agreement DE-FC22-87PC79798 with the U.S. Department of Energy (DOE to submit NTIS) October 1992