

**FY94-XVII-56
AIR TOXICS REMOVAL USING THE IFGT
FOR AN UPGRADED LIGNITE COAL BLEND**

CONTRACTOR: Babcock & Wilcox

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PARTICIPANTS

<u>Sponsor</u>	<u>Cost Share</u>
Babcock & Wilcox	\$54,534
ND Industrial Commission	<u>\$54,534</u>
Total	\$109,068

Project Schedule - 2 Years

Contract Date -10/10/94
Start Date - 10/10/94
Completion Date -3/31/95

Project Deliverables

Status Report - 12/19/94 ✓
Status Report - 1/31/95 ✓
Final Report - 3/31/95 ✓

OBJECTIVE / STATEMENT OF WORK

The objective of this study is to assess the ability of a condensing heat exchanger to clean the flue gas resulting from the combustion of a coal blend using an upgraded lignite fuel. Specific objectives are:

- Flue gas characterization (particulates, mercury concentration and SO₂);
- Particulate removal efficiency by size range;
- Total mercury and form of mercury removal;
- SO₂ removal efficiency; and
- Thermal performance of the condensing heat exchanger.

STATUS

The Industrial Commission of North Dakota awarded B & W a contract to evaluate combustion characteristics of three upgraded lignite fuel blends (LMFS-94-12). This contract, SFY94-XVII-56, was awarded for the purpose of evaluating the condensing heat exchanger design, called the Integrated Flue Gas Treatment (IFGT) concept as a part of the combustion characterization study. The IFGT tests were performed during the week of November 8-11, 1994. Measurements were made during two of the coal blend combustion tests to determine particulate removal and mercury removal efficiency. One test was done under the base condensing mode (no reagent spray). One set of particulate measurement tests was done using alkali spray conditions. Measurements were made during each of the three coal blend combustion tests to determine SO₂ removal efficiency.

Results include:

Heat Recovery. Heat recovery of condensing heat exchanger was 6.6% of furnace heat release.

SO₂ Removal. Alkalinity of the UNDL blend flyash provided 15% SO₂ removal in condensing mode without a reagent spray. SO₂ removal efficiencies were over 95% using soda ash reagent.

Particulate Removal. Removal efficiencies were 89% for the condensing mode and 81% for the IFGT mode. The data showed that the condensing heat exchanger can provide substantial particulate removal.

Mercury Removal. In condensing mode of operation, 53% of the gas phase was removed. In the IFGT mode, 58% was removed.