FY97-XXV-71
COAL SAMPLING SYSTEM

CONTRACTOR: BNI Coal, Ltd.
Microbeam Technologies Incorporated

PRINCIPAL INVESTIGATOR:

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PARTICIPANTS

Sponsor	Cost Share
BNI Coal, Ltd.	$ 27,831
Minnkota Power Cooperative	$ 26,720
ND Industrial Commission	$ 49,720
Total Project Cost	$104,271

Project Schedule – 7 Months
Contract Date – 12/3/96
Start Date – 11/1/96
Completion Date – 9/1/97

Project Deliverables
Status Report - 7/1/97 ✓
Status Report - 8/1/97 ✓
Draft Final Report - 8/15/97 ✓
Final Report – 9/1/97 ✓

OBJECTIVE / STATEMENT OF WORK

The objective of this project is to purchase, install, and test a coal sampling system that will collect coal samples from the feed system of an individual cyclone-fired boiler at the Milton R. Young Station. The purpose of the sampling system is to provide "as-fired" coal samples that are essential in determining coal quality effects on cyclone performance. A goal of this work is to evaluate and demonstrate the Coal Quality Management System (CQMS) as a tool for fuel quality planning. This project is being proposed as an addition to Project FY95-XIX-60 providing field-testing and validation.

STATUS

The sampling system was installed on the Unit II feeder system for cyclone #6 at the Milton R. Young Station. Minnkota Power Cooperative and Stock Equipment Company did installation, and shakedown testing of the feeder system. After minor modifications the system operated flawlessly.

Five samples of coal and corresponding slags were collected for analysis and CQMS validation testing. One sample represented poor slag flow, while the other four represented good slag flow conditions.

The following conclusions were reached:

- Analytical results indicated no identifiable bias in the sampling. However, there was a wide range of clay minerals present and some of the clay minerals had an extremely variable composition.
- The CQMS results indicate very subtle difference between the coal and slag when "poor slag flow" was observed, and the coal and slag when "good slag flow" was observed.
- All of the slags were depleted in sodium and magnesium and enriched in aluminum and silicon with respect to the coal mineral analysis.
- The reason for the "poor slag flow" is not evident on bulk analysis of the coal ash and slag composition.
- CQMS calculations and indices indicated the potential for the "poor slag flow". However, CQMS calculations and indices indicated the potential for poor slag flow when "good slag flow" was observed.