

FY95-XIX-59
EQUIPMENT, ENGINEERING & ECONOMIC EVALUATION
FOR A LIGNITE FUEL PRODUCTION FACILITY

CONTRACTOR: Grand Forks Activation Technologies

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PARTICIPANTS

<u>Sponsor</u>	<u>Cost Share</u>
Knife River to Barr Engineering	\$37,000
Knife River Corporation	\$13,000
Grand Forks Activation Technologies	\$1,500
ND Industrial Commission	<u>\$51,149</u>
 Total Project Cost	 \$102,649

Project Schedule - 2 Years

Contract Date - 5/31/95
Start Date - 6/1/95
Completion Date - 6/24/96

Project Deliverables

Status Report - 08/01/95 ✓
Final Report - 09/08/97 ✓

OBJECTIVE / STATEMENT OF WORK

The objective of this project is to obtain engineering and equipment information for three specific unit operations. Commercial vendors will do testing of the unit operations. Preliminary economic cost for a conceptual lignite upgrading process will be estimated. The unit operations of the conceptual lignite upgrading process include coal crushing, screening, wet physical cleaning (hydro-classification), drying, and briquetting. This process has evolved, in part, as a result of the following Lignite Research Council projects: FY94-XV-53, LMFS-94-12, LMFS-94-15 and FY95-XVIII-57.

STATUS

McLanahan Corp. of Hollidaysburg, Pennsylvania, did crushing tests. Carpco, Inc. of Jacksonville, Florida, did physical cleaning. Wyssmont Company, Inc. of Fort Lee, New Jersey, did drying. Hazen Research, Inc. of Golden, Colorado, provided Jig cleaning test data. The engineering data was collected and analyzed by Grand Forks Activation Technologies. Barr Engineering provided the preliminary plant design and cost estimate.

Plant design and operating assumptions are:

- Feed material, minus 3-inch ROM lignite
- Feed quality, approximately 11.5% ash, 1.9% sulfur, and 40% moisture
- Feed rate; 336 tons/hour; 516,216 tons/year
- Coal crushing, minus 1/4-inch
- Physical cleaning, Carpco Density Separator, pyrite and ash rejection
- Refuse discarded to tailings
- Recovery and use of 20-mesh by zero fraction in an adjacent facility
- Recovery and dewatering of the 1/4-inch by 20-mesh fraction
- Drying of the 1/4-inch by 20-mesh fraction to 25% moisture
- Product recovery; 250,000 tons per year
- Product quality, approximately 9% ash, 1% sulfur, and 25% moisture

The plant was assumed to operate 8 hours per day, 5 days per week, and 48 weeks per year with an 80% availability factor. Capital costs were estimated at \$6 to \$7 million excluding taxes and field erection costs. Operating costs were estimated at \$225,000 per year excluding maintenance labor.

Briquetting was evaluated as an option but was rejected because of costs. In order to make the upgrading scheme economically viable and environmentally acceptable, it is necessary to reduce drying costs and to find uses for the high-sulfur refuse. Additional work in crushing and processing of alternate sizes could reduce costs and improve recovery.