

FY01-XXXVII-104
LIGNITE VISION 21 PHASE II TRANSMISSION STUDIES

CONTRACTOR: Lignite Energy Council w/ ABB as subcontractor

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PARTICIPANTS

<u>Sponsor</u>	<u>Cost Share</u>
Great River Energy	\$20,000
Xcel Energy	\$20,000
Basin Electric	\$20,000
Montana Dakota Utilities/Knife River Coal	\$20,000
BNI Coal / Minnesota Power	\$20,000
LUSCAR	\$20,000
Great Northern Properties	\$20,000
NACCO/Falkirk & Coteau	\$20,000
ND Industrial Commission	<u>\$140,000</u>
Total	\$300,000

Project Schedule – 6 Months

Contract Date - 10/17/2000
Start Date – 10/17/2000
Completion Date – 3/14/2001

Project Deliverables

Status Report – 11/30/2000 ✓
Status Report – 2/15/2001 ✓
Final Report – 3/14/2001 ✓

OBJECTIVE / STATEMENT OF WORK

The primary goal of this project is to analyze the dynamic response of the transmission network for each of seven proposed generating sites, the loss of certain transmission lines and a large generating unit in North Dakota, the effect on the stability of the network in the region, the N.D. export capability and AC transmission losses. An additional secondary goal to be achieved by this study is its budget estimates of the transmission construction costs, both site specific and costs common to all seven proposed generating sites.

STATUS

This project's final report summarizes the results, facility modifications, and costs specific for each of the sites plus those for common facilities. For each of the seven sites in North Dakota, alternatives were developed for exporting power from North Dakota to the Minneapolis/St. Paul area. A common set of system upgrades and additions were identified for the sites for increasing the North Dakota Export (NDEX) and transferring the power to the Minneapolis/St. Paul area. The seven sites are described below by the nearest power system feature.

- Site #1 – Beulah Mine / Coyote Station
- Site #2 – Center Mine / Milton Young Station
- Site #3 – Falkirk Mine / Coal Creek Station
- Site #4 – Freedom Mine / Antelope Valley
- Site #5 – Great Northern Properties / Belfield Substation
- Site #6 – Gascoyne Mine / Hettinger Substation
- Site #7 – LUSCAR / Tioga Substation

Initially studies were made for identifying the common facilities required to export 2450 MW from North Dakota, which includes export from the new Lignite Vision 21 500-MW power plant. Studies were also made for identifying the facilities required to export 2800 MW from North Dakota, which include the new Lignite Vision 21 500-MW power plant, plus an additional 350 MW from other sources.

Upgrading the transmission line that runs from Antelope Valley station (Beulah, ND) to the Broadland station (Huron, SD) from 345 kV to 500 kV and extending it to the Split Rock station (Sioux Falls, SD) is required to increase the transmission capacity for higher exports and to increase the system stability. Adding a line from the Split Rock station to the Lakefield station (Lakefield, MN) is required to provide a second 345 kV line to carry power out of the Split Rock (Sioux Falls) area.

The cost estimates for the common facilities to increase the NDEX to 2450 MW and to 2800 MW are listed as follows:

Costs for NDEX Upgrade to 2450 MW	\$130,529,000
Costs for NDEX Upgrade to 2800 MW With Generator Tripping	\$153,039,000
Costs for NDEX Upgrade to 2800 MW Without Generator Tripping	\$162,039,000

In conclusion, facilities were identified for each site which result in all sites having the capability to export 2450 MW and the common facilities for increasing the export level to 2450 MW and to 2800 MW have been identified for transfers to the Minneapolis/St. Paul area.