LMFS-99-33
NORTH DAKOTA ELECTRIC TRANSMISSION STUDY

CONTRACTOR: ABB Power T&D Company, Inc.

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CONTRACT AMOUNT: $75,000

Project Schedule – 6 Months
Contract Date – 8/13/99
Start Date – 9/15/99
Completion Date – 3/15/00

Project Deliverables
Draft Final Report – 3/01/00✓
Final Report – 5/15/00✓

OBJECTIVE / STATEMENT OF WORK

The purpose of this project is to evaluate the transmission capability for North Dakota considering future load growth and potential generation additions. The present and near term electrical transmission system, export of generation and capacity for additional export from North Dakota are evaluated. Specific objectives are:

- Determine the limitations of the existing bulk electric transmission network to provide transmission service to existing electrical load and generating facilities in North Dakota.
- Identify future electric load serving requirements and the possible enhanced capabilities (through increased efficiencies and minor improvements) of existing generating facilities in North Dakota.
- Identify and evaluate possible bulk transmission enhancements necessary to serve future electric load and the enhanced capabilities (through increased efficiencies and minor improvements) of existing generating facilities in North Dakota.
- Identify and evaluate possible bulk transmission enhancements necessary to provide additional transmission outlet capability for new coal-fired generating units that might be constructed in North Dakota.

STATUS

The existing ac transmission system has the capability to export over 2000 MW from North Dakota. The transmission limits for power exported from North Dakota are not due to thermal limits of the lines or equipment but are due to stability and voltage collapse limitations on the power system. Transfer capability from North Dakota on the ac system is also dependent on simultaneous transfer from Manitoba Hydro.

ABB completed an initial Industrial Commission funded study in 1993, “Technical and Economic Assessment of Options for Increasing Transmission Capacity from the State of North Dakota” (LMFS-7). ABB concluded that although there appeared to be spare capacity on the North Dakota transmission system, once all outages, transmission fluctuation and other factors were considered the level of spare capacity is sparse.

Local utilities emphasize that no existing firm capacity is available for North Dakota Export (NDEX) and non-firm capacity is available only part of the time.

As a part of project LMFS-99-33, ABB evaluated options to enhance NDEX. Series capacitor compensation to enhance existing transmission was one option investigated to increase export from North Dakota. The analysis indicates series capacitors provide potential for increasing NDEX, but additional study is needed to evaluate system performance and stability.

Export from an additional 500 MW of North Dakota generation appears feasible by upgrading the existing lines. Upgrading the existing lines from Antelope Valley, North Dakota to Huron, South Dakota to 500kV and the Huron, South Dakota to Split Rock, South Dakota and Split Rock, South Dakota, to Lakefield, Minnesota line to 345kV, would provide a path for power to the Twin Cities area of Minnesota.

Additional options are new high voltage direct current (HVDC) lines, upgrading existing HVDC lines and a new 230 kV line to Fort Thompson, South Dakota.

As a result of project LMFS-99-33, site-specific transmission analyses are recommended.