



Capital Deferral at Northern States Power

S&C Featured Solution: Scada-Mate® Switches

Location: Grand Forks, North Dakota

Customer Challenge

Northern States Power (NSP) successfully utilized distribution automation to defer indefinitely a \$2-million substation expansion with a comparatively modest \$360,000 investment for 16 S&C Scada-Mate Switching Systems and three units of S&C Remote Supervisory PMH Pad-Mounted Gear—each featuring a Motorola MOSCAD RTU and DARCOM radio, plus 16 pad-mounted capacitor banks.

Load growth in the Grand Forks, North Dakota vicinity was such that the winter peak load threatened to outstrip the back-up capability of the three transformers in the two major substations that served the city. This was especially of concern in situations where one transformer is lost since, with the existing air-break switches, loads could only be transferred manually. And load-balancing switching between the two remaining sources could not be completed prior to reaching damaging temperatures in the transformer carrying the disproportionate share of the load... approximately 45 minutes.

To ensure reliable service, NSP was faced with expansion of the larger of the city's two substations by adding a third 43.4-MVA source or, alternatively, with automation of five feeders between the substations to allow for rapid transfer of loads during emergency situations. When the financial justifications were developed for each potential solution, the decision was clear: the lower cost of the distribution automation solution allowed NSP to postpone the larger expenditure for at least six years.

S&C Solution

With the Scada-Mate Switches and Remote Supervisory Pad-Mounted Gear deployed, NSP is now able to both monitor loading on the five critical feeders and shift load between sources for the convenience of operation and maintenance activities, as well as for alleviation of emergency overload conditions. During emergencies, the ability to transfer loads through SCADA allows dispatchers to off-load



the remaining transformers well within the 45-minute “window” prior to reaching the upper operating temperature limit of either transformer.

Other benefits obtained through the distribution automation solution include the ability to monitor power quality, to analyze and sectionalize faults, to perform routine switching remotely for maintenance purposes, and to improve voltage and var flow through the pad-mounted capacitor banks.

Results

Since installation in 1993, the distribution automation solution has been successfully performing as intended to monitor and move loads and regulate voltage. The emergency load-balancing scenario fortunately has not had to be enacted.

With the current rates of sporadic load growth in the Grand Forks area, NSP estimates that the expansion of capacity can continue to be deferred until at least 1999. If this holds true, the distribution automation solution will have paid for itself twice over, based solely on the annual carrying costs for the \$2 million debt expense over the six-year period, estimated to be \$760,000. In addition to the financial benefits, distribution automation has provided extra functionality over the six-year period that has allowed NSP to gain valuable data on their system and perform sectionalizing in a variety of situations.

Obviously, distribution automation has proven itself to be a clear winner at NSP, and has resulted in steady expansion of their system capabilities through the purchase of additional Scada-Mate Switches each year.