

Northern States Power Company  
Electric Utility – State of North Dakota  
Case No. PU-12-813

## **Expansion Planning for Intelliteam Switches in North Dakota**

### Overview

In the fourth quarter of 2012 the Company installed 25 Intelliruptor automated switches on its Fargo, North Dakota electric distribution system. The investment was part of a comprehensive reliability improvement commitment included in the Settlement Agreement of the Company's most recent electric rate application (Case No. PU-10-657).

The switches were strategically located on eight distribution feeder lines serving most of the critical loads in the Fargo and West Fargo service areas. The Fargo Intelliteam network was the Company's largest single roll-out of automated switches in its eight state footprint, and included newer technology and upgraded software than what the Company currently had in place elsewhere on its system. Cost recovery of the 25 Intelliruptors and the related communications infrastructure was approved by the Commission and included in electric rates effective May 1, 2012.

The switches have operated in 2013 to reduce the overall time that customers served by the protected feeders are out of power during an outage. This is accomplished by isolating faults and segmenting the system to quickly restore power to parts of the system while repairs are made to damaged or affected equipment. Switches are operated either automatically via communications between the switches, or remotely by operators using information provided by the Intelliteam network.

### Expansion Options

Our ND engineer has analyzed the potential for additional switch installations on our ND system. Our assessment of cost-effectiveness takes into account the differences in our respective Fargo, Grand Forks, and Minot area infrastructure, load profiles, and reliability performance.

*Fargo, ND* – A possible expansion plan in Fargo would include the automation of three additional feeders coming out of our Cass County Substation through the installation of ten new Intelliruptor switches. Feeder CAS081 is already partially protected, but two additional Intelliruptors would expand the switching capabilities

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and protect some of our larger customers located in the Industrial Park. Feeder CAS082 serves a commercially “dense” area along the 13<sup>th</sup> Avenue corridor. Approximately four Intelliruptors would be needed to offer material reliability enhancements in an area that includes large retailers such as WalMart and Menard’s. Finally, CAS093 serves the other half of the Industrial Park where commercial customers, such as Integrity Windows and Cargill, are located. Four Intelliruptors would be installed on this feeder. Our preliminary estimate of the cost for this Fargo expansion plan, including ten additional Intelliruptors, would be approximately \$750,000.

*Grand Forks, ND* - Since many of our higher usage customers in the Grand Forks area (e.g. University of ND, Altru Hospital, Simplot, City Water Treatment Plant) are served through an underground electric distribution system, Intelliteam automation is not feasible at this time. Underground feeders create a very different set of design considerations when it comes to automation and we believe it would be beneficial to let distribution automation technology mature before investing in the kind of equipment needed. Presently, we have not identified a cost-effective approach to underground system automation.

*Minot, ND* – We have historically seen very good reliability performance in our Minot service area, which might normally lessen the justification for this type of automation. However, a surge of construction activity and load growth in and around Minot in recent years is driving the need for system upgrades. In the future, the city may potentially be a good application for an Intelliteam network. We have assessed our Minot system and have developed a preliminary plan that would automate five feeders emanating from our Souris Substation. These feeders (SOR061, SOR062, SOR063, SOR070, and SOR081) serve the downtown commercial loads (including Trinity Hospital), Minot International Airport, Minot State University, and the city water treatment plant. This automation plan would require the installation of about 25 switches as well as the necessary software and communications equipment, at a cost of approximately \$2.0 million.

Recommendation

From our evaluation of the potential automation configurations in our three North Dakota service areas, we have concluded that if future additional automation was to be installed in North Dakota, we would recommend that the Fargo expansion plan described above be implemented first. It would positively impact the most customers and further strengthen the grid in the state’s largest city. Because we already have the

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required software and communication system installed in Fargo, it would generate these sizeable benefits at a lower incremental cost.

Furthermore, the robust nature of our Minot system is expected to continue to yield good reliability performance, thereby enabling us to defer a significant Intelliteam investment in that city further into the future.

Regardless of the expansion option considered, North Dakota Commission approval of appropriate cost recovery would be an important factor in the scope of any additional Intelliteam network investment.