Zone 1 - 2016 study results

Refer to Table ZS-2 and Figure ZS-2

Summary of key findings

- The 69-kV transmission corridor in the central part of Monroe County and the 138-kV facilities in central Juneau County and southeast Wood County are sensitive to west-to-east system biases,
- Petenwell 138/69-kV transformer overloads under system intact and single contingency conditions, and
- Maintenance and voltage issues exist in the greater Berlin and Ripon areas that need to be addressed.

Low voltages and overloads on the transmission facilities can occur around the Tomah area. The 69-kV transmission corridor in the central part of Monroe County is particularly sensitive to a west-to-east system bias. Thus, this area will require reinforcements to be implemented to reliably serve load in the future. Several potential reinforcements have been evaluated to address the low voltage and thermal overload issues in the Tomah area. Furthermore, there is a need for periodic separation of the ATC and Dairyland Power Cooperative facilities at the Council Creek Substation to prevent overloads. ATC worked in cooperation with Dairyland Power Cooperative and Xcel Energy to develop a more comprehensive long term solution to address reliability issues in the Tomah area as well as the limitations along the Monroe County to Council Creek transmission corridor. The proposed solution is to replace the existing 69-kV circuit between the Monroe County and Council Creek Substations with a new 161/69-kV double circuit line in 2014. This solution addresses Planning Criteria driven needs, reduces system losses and provides economic benefits to customers.

The loading on the Petenwell 138/69-kV transformer exceeds its summer normal rating under system intact conditions and exceeds its summer emergency rating under single contingency conditions. A proposed project to upgrade this transformer is currently scheduled for 2015. To improve operating flexibility, this project also includes the reconfiguration of the Petenwell 138-kV bus. Dispatching generation and distribution load bridging will be utilized as an interim mitigation measure to alleviate potential loading issues. This issue does not occur in the off-peak sensitivity models.

Low voltages around the greater Berlin area will necessitate additional capacitors to be installed at Ripon Substation. This issue does not occur in the off-peak sensitivity models.

No performance limits were exceeded for Category A conditions for all 2016 analysis except the high voltage at Council Creek 138-kV bus in the 2016 minimum load model. The

Council Creek high voltage issue can be addressed by adjusting the Council Creek 138/69-kV transformer LTC settings.

The lead times necessary to implement the corrective plans that are scheduled for 2012 through 2016 were considered and taken into account prior to assigning an in-service date for each associated project. All of the projects scheduled for the near term planning horizon have an “In-service date” that matches the “Need date”, except the following projects:

Projects whose “Need date” precedes the “In-service date”

- None

Projects whose “In-service date” precedes the “Need date”

- Upgrade and install capacitor banks at Ripon 69-kV substation