September 2011 10-Year Assessment
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Zone 4 – 2012 study results

Refer to Table ZS-1 and Figure ZS-13

Summary of key findings

- The Oshkosh area 69-kV facilities continue to overload under single contingency conditions.
- Low voltages and heavily loaded 138/69-kV transformers exist in the northern portion of Door County.

As discussed in previous Assessments, the rebuild of the Sunset Point – Pearl Avenue 69-kV line will address the overload of the circuit under single-contingency conditions. To see the impact of this overload and to verify the overload is getting progressively worse over time, the rebuild project planned to reinforce this circuit was not included in the base case models analyzed for this assessment. Hence, the reason the overload appears in models past its anticipated in-service date. The current in-service date for this reinforcement project is April 2012. Once complete, the limitation will be addressed.

The completion of the Kewaunee switchyard reconfiguration along with the addition of a second 345/138-kV transformer in 2011 provides increased offsite power reliability for the nuclear power plant, helps facilitate switchyard maintenance on transmission facilities, provides the ability to deliver generation into our transmission network under transmission outages and brings more economical base load generation to the marketplace.

Similar to previous Assessments, the potential for low voltages under normal and single contingency conditions and the potential for overloads under single contingency conditions in northern Door County necessitates a combination of reinforcement projects be implemented. This area is unique because of the local area's peak load usually does not occur during ATC's typical system peak. The Sister Bay capacitor bank and the Canal – Dunn Road projects described below were included in all models evaluated for this assessment, thus the overloads and voltage issues noted in the summary of key findings above will not appear in any of the results.

To address the immediate needs of this area, two additional 1.2 MVAR distribution capacitor banks were installed at the Sister Bay Substation in 2008. The addition of these capacitor banks on the distribution system supports the voltages in the area under normal and single-contingency conditions until the longer term reinforcements noted below are in place.

The proposed long-term solutions for northern Door County include implementing reinforcements in two phases. The in-service dates for both phases were able to be

deferred to their current in-service dates as a result of installing the distribution capacitor banks at Sister Bay. The two phases consist of:

- Rebuild the existing Canal – Dunn Road 69-kV line as a new Canal – Dunn Road 138/69-kV double-circuit line and install a new 138/69-kV transformer at the Dunn Road Substation by June 2012, and
- Constructing a second Dunn Road – Egg Harbor 69-kV line by June 2021.

The proposed Canal – Dunn Road 138/69-kV double-circuit line and Dunn Road transformer will not only address the low voltages in the area under normal and single-contingency conditions, but also addresses the overloads of the 138/69-kV transformers at Canal and various 69-kV lines in the area under single-contingency conditions. The installation of the 138/69-kV transformer at the Dunn Road Substation introduces a third such transformer to this area and will provide geographic diversity from the existing transformation at the Canal Substation. ATC received approval in August 2010 for its CPCN application from the Public Service Commission of Wisconsin to construct the first phase of this project.

The second 69-kV line between Dunn Road and Egg Harbor Substations will provide a second source to the northern Door County area and facilitate maintenance outages of the existing Dunn Road – Egg Harbor 69-kV line. See Zone 4 – 2021 study results section for additional details.

No performance limits were exceeded for Category A conditions for all 2012 analysis.