Zone 1 - 2021 study results

Refer to Table ZS-3 and Figure ZS-3

Summary of key findings

- Two transformers serving the 69-kV system are overloaded under single contingency and/or under an intact system,
- Additional reinforcement on the 69-kV line system in central Juneau County is needed due to overloads under contingency, and
- Potential voltage issues in the Ripon-Berlin and Omro –Winneconne areas begin to appear under contingency.

The Metomen 138/69-kV transformer loading is approaching its summer emergency rating under contingency conditions. The Metomen transformer 69-kV breaker was replaced in 2009 and the existing 47 MVA Metomen 138/69-kV transformer will be replaced with a 100 MVA transformer in 2017.

As discussed in the 2016 study results, the Petenwell 138/69-kV transformer loading exceeds its summer normal rating under system intact conditions and exceeds its summer emergency rating under single contingency conditions. The transformer needs to be replaced in 2015. Dispatching generation and distribution load bridging will be utilized as an interim mitigation measure to alleviate potential thermal problems.

Maintenance and voltage issues exist in the greater Berlin and Ripon areas that need to be addressed. To address these issues in the greater Berlin/Ripon area, a reconfiguration of the North Randolph - Ripon 69-kV line is proposed. A new 69-kV line will connect the Fairwater and Mackford Prairie substations forming a new 69-kV line from North Randolph to Metomen Substation. The northern portion of the existing Mackford Prairie Tap - Ripon 69-kV line will then be extended into a vacant terminal position at Metomen Substation, creating a second Ripon-Metomen 69-kV line. This will allow for the retirement of a portion of the North Randolph-Ripon circuit between Metomen and Mackford Prairie substations which is where a significant portion of the maintenance issues are located.

No performance limits were exceeded for Category A conditions for all 2021 analysis except the high voltage at Council Creek 138-kV bus in the 2021 minimum load model and overload of the Petenwell 138/69-kV transformer in the 2021 summer peak model. The Council Creek high voltage issue can be addressed by adjusting the Council Creek 138/69-kV transformer LTC settings. The Petenwell transformer overloading issue is addressed by replacing the transformer in 2015.

The lead times necessary to implement the corrective plans that are scheduled for 2017 through 2021 were considered and taken into account prior to assigning an in-service date for each associated project. All of the projects scheduled for the longer 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"

- None