



Zone 5 – 2024 study results

Refer to [Table ZS-4](#) and [Figure ZS-20](#)

Summary of key findings

- Heavy load growth in Waukesha, Washington, Dodge and Jefferson counties will require voltage and load support. A new 345-kV line from Rockdale to Mill Road (formerly Lannon Junction) is one option being considered but not yet proposed to solve these problems.
- Voltage and thermal issues remain in Zone 5 under contingency conditions.

Ten 138-kV buses in Waukesha and Washington County experience low or marginal bus voltage under NERC Category A or TPL-001-0 conditions (intact system) in 2024. The buses are Bark River (94.8 percent), Chinook (95.2 percent), Cooney (94.9 percent), Cottonwood (94.1 percent), Edgewood (95.2 percent), Glacier (95.9 percent), Hartford (95.5 percent), Merrill Hills (95.1 percent), Mukwonago (95.0 percent), St. Lawrence (95.9 percent), Arthur Road (95.8 percent), and Summit (94.6 percent). Installing capacitor banks at Summit and Mukwonago will help alleviate these voltage issues.

Following are the results of the 2024 contingency analysis (NERC Category B or TPL-002-0 conditions) performed on Zone 5.

The Oak Creek–Pennsylvania 138-kV line will load to 99.0 percent of its summer normal rating under intact system conditions. Under a number of contingencies, the line will approach or exceed its summer emergency rating.

Contingencies in eastern Jefferson and western Waukesha Counties create voltage issues at numerous locations in northern Waukesha and southern Washington Counties. Running generation at Concord and Germantown as well as capacitor additions at Summit, Concord, Mukwonago, and Bluemound should improve voltage profiles.

An outage of the Saukville–Fredonia 138-kV line will cause the bus voltage at Fredonia to drop to 91.9 percent.

Low probability bus outages at Pleasant Prairie, Oak Creek, and Burlington continue to create thermal and voltage problems as described in 2010 and 2014.

An outage of the Bain–Kenosha 138-kV line will cause the Albers–Kenosha 138-kV line to exceed its summer emergency rating by 1.3 percent.

Contingencies on 138-kV lines terminating at Oak Creek create thermal and voltage issues in southern Milwaukee County. Possible solutions are being developed.

Thermal issues in the Arcadian – Waukesha area continue. Solutions have been described above.



10-Year Assessment

An annual report summarizing proposed additions and expansions to the transmission system to ensure electric system reliability.

2009

October 2009 10-Year Assessment
www.atc10yearplan.com

An outage of the Edgewood – St. Martins 138-kV line will result in low voltages at Edgewood (90.1 percent), Chinook (90.1 percent, and Mukwonago (91.6 percent).

An outage of the Pleasant Valley-Saukville 138-kV line will result in marginal voltages (91.5 percent) at the Pleasant Valley 138-kV bus.

In the previous 2019 results section, a potential Rockdale–Mill Road 345-kV line was discussed as a way improving bus voltages in Waukesha, Washington, and Jefferson Counties. Through 2019, the ATC planning models indicated there is generation available at Concord and Germantown that could provide support to the three county region. At some point between 2019 and 2024, all of the generation at Concord and Germantown will be dispatched. Dispatching generation at Concord and Germantown has been able to provide voltage and thermal relief. When all the generation has been dispatched, no additional relief will be available and it will be time to consider other system improvements to provide relief.

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

None

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None

Summary of Compliance with NERC Standards

The mitigation plans, planned, proposed and provisional projects identified for Zone 5 in this Assessment will allow the ATC system in Zone 5 to meet NERC standards TPL-001, TPL-002, TPL-003 and TPL-004 in each of the four years 2010-2014, and for the 2015-2019 planning horizon.