

## ATC Planning Zone 3 Generation Integration Screening Study

December, 2018

ATC voluntarily performed a high level, steady-state screening of transmission facilities in ATC Planning Zone 3, which encompasses the southwestern portion of Wisconsin using the 2028 summer peak model from the 2018 10-Year Assessment. This was done to assist generation developers with the preliminary identification of potential locations where existing transmission facilities may be able to accommodate the addition of new and/or additional generation capacity.

All potential locations were screened for single contingency<sup>1</sup>, steady-state limitations. The study assumes single/nearby combination locations and does not include any generation presently in the MISO queue. Locations that could not accommodate 100 MW of generation for a single contingency were removed from the tables that were produced through this effort. ATC has not performed any analysis to identify the scope or cost of work to eliminate the limit(s) that were identified for any of the contingencies that were noted. ATC may choose to perform similar screening studies of other portions of its footprint in the future, as system conditions and circumstances warrant.

Additional steady state, multiple contingency<sup>2</sup> analysis was performed for all 345 kV locations. Multiple contingency analysis was also performed for all 138 kV and 69 kV locations that appeared to be capable of hosting 100 MW or more of generation under steady-state single contingency conditions. Multiple contingency analyses resulted in reduced generation capacity as compared to single contingency screening results. ATC has not performed any analysis to identify the scope or cost of work to eliminate the limit(s) that were identified for any of the contingencies that were noted.

ATC's initial screening did not include stability analysis. Since different types of generating units have substantially different stability performance characteristics, a stability analysis would not be generally applicable for this type of screening study. Additionally, the stability analysis would result in different and likely less potential capability than what is depicted in this steady-state screening study. Finally, the study analyzed only one potential generation site at a time and, as such, the results are not necessarily additive.

Tables that follow below identify the location, screening results (rounded to the next lowest 10 MW) and the Zone 3 sub-zone where the existing transmission facility is located. Figure 1 depicts six sub-zones to aid in identification of applicable locations, as follows:

- Table 1 illustrates the results of the analysis for 345 kV sites.
- Table 2 and 3 provides the results of the analysis for 161 and 138 kV sites respectively where the generation capability appeared to be greater than 100 MW under single contingency conditions. The multiple contingency column is listed as “-” when there was zero generation capability under multiple contingency conditions. This could occur when there are only two outlets at the site.
- Table 4 provides the results of the analysis for 69 kV sites where the generation capability appeared to be greater than 100 MW under single contingency conditions. The multiple contingency column is listed as “-” when there was zero generation capability under multiple contingency conditions. This could occur when there are only two outlets at the site.

This was a high-level screening study using a single steady-state model and a particular set of assumptions, as described herein. The study results listed in the tables below may not be indicative of the results that

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<sup>1</sup> Single contingency refers to NERC Category P1s and No Load Loss Allowed P2s.

<sup>2</sup> Multiple contingency refers to NERC Category P2.1 + P1 and P6s (P1 + P1).

would be produced via the MISO Tariff Attachment X Generation Interconnection process. System stability, both angular and voltage, were not considered in this screening study. ATC makes no representations, either expressed or implied, that the scope of the interconnection facilities or transmission upgrades required to connect generation at these sites would be minimal, or even feasible. Single contingency screening results do not reflect any possible reductions required for multiple contingencies. The analysis considered 69 kV, 138 kV, 161 kV, and 345 kV nodes in the power flow model, but did not consider actual bus configuration or the existence of buses for constructability at the locations that were studied. Corresponding interconnection facilities and transmission upgrades will be determined by the MISO Tariff Attachment X process. For ATC TYA models, generally generation interconnections are only modeled if there is a signed GIA and generation retirements are only modeled if MISO has completed the associated Attachment Y-1 process. This non-binding, voluntary study is presented for informational purposes only and ATC makes no guarantee or warranty that the information presented herein is accurate or complete.

### **2028 Steady-State Analysis Power Flow Assumptions**

- Bay Lake projects in service
- Kittyhawk substation
  - Interconnection of J390 units
- Cardinal-Hickory Creek in service
  - Addition of Hill Valley substation
- Bain-Spring Valley-North Lake Geneva project in service
- Several rebuilds/uprates in the surrounding area
- T-D Projects in service
  - Northern Lights
  - Edgerton
  - Mt. Pleasant
  - State Line
  - Juneautown
  - Schofield
- Retirement of the following facilities
  - Nelson Dewey T32 transformer
- Bus/Line/Transformer reconfigurations
  - Lincoln
  - Racine
  - Arcadian
  - Williams Bay
  - Paddock
  - Columbia 345/138 transformers
  - Saukville

**Table 1: Generation Capability at 345 kV Sites – ATC Planning Zone 3**

<b>345 kV Site</b>	<b>Single contingency results (MW Capability)</b>	<b>Multiple contingency results (MW Capability)</b>	<b>Sub-Zone</b>
Hill Valley	470	140	B
Cardinal	450	70	C
North Madison	290	290	C
Columbia	230	0	D
Rockdale	550	80	E
Kittyhawk/J390	780	10	F
Paddock	760	10	F

**Table 2: Generation Capability at 161 kV Sites – ATC Planning Zone 3**

<b>161 kV Site</b>	<b>Single contingency results (MW Capability)</b>	<b>Multiple contingency results (MW Capability)</b>	<b>Sub-Zone</b>
Nelson Dewey	390	190	B

Table 3: Generation Capability at 138 kV Sites – ATC Planning Zone 3

138 kV Site	Single contingency results (MW Capability)	Multiple contingency results (MW Capability)	Sub-Zone
Spring Green	110	50	A
Troy	130	-	A
Wyoming Valley	120	-	A
Albany	120	-	B
Bass Creek	180	100	B
Darlington	300	100	B
Edgerton	410	-	B
Eden	270	80	B
Falcon / Quiltblock	270	-	B
Hillman	220	0	B
Lancaster	260	-	B
Nelson Dewey	440	220	B
North Monroe	190	100	B
Potosi	210	-	B
Verona	120	-	B
American	260	-	C
Blount	180	-	C
Cardinal	240	10	C
Cross Country	420	170	C
Christiana	430	60	C
Colloday Point	260	-	C
Fitchburg	630	80	C
Femrite	320	130	C
Huiskamp	210	-	C
Kegonsa	530	70	C
McFarland	410	-	C
North Madison	390	320	C
Northern Lights	300	-	C
Oak Ridge	360	130	C
Pleasant View	330	-	C
Reiner	340	110	C
Sprecher	290	-	C
Sycamore	220	80	C
Vienna	300	-	C
Yahara River	310	-	C

**Table 3: Generation Capability at 138 kV Sites – ATC Planning Zone 3 (continued)**

<b>138 kV Site</b>	<b>Single contingency results (MW Capability)</b>	<b>Multiple contingency results (MW Capability)</b>	<b>Sub-Zone</b>
ACEC Lewiston	170	-	D
Artesian	160	0	D
Birchwood	120	-	D
Columbia	340	0	D
Dell Creek	130	-	D
Hamilton	380	-	D
Kilbourn	110	0	D
Kirkwood	220	10	D
Loch Mirror	120	-	D
Lake Delton Tap	230	-	D
Nishan	150	-	D
Portage	340	80	D
Rock Springs Tap / Rock Springs	180	-	D
Staff	320	-	D
Trienda	270	10	D
Zobel	150	-	D
Academy	130	50	E
Boxelder/Lakehead Waterloo	270	30	E
Butler Ridge Wind	120	-	E
Cambridge Tap/ Cambridge	230	-	E
Crawfish River	110	-	E
Fox Lake	130	-	E
Friesland	280	-	E
Fountain Prairie	130	-	E
Hubbard	140	-	E
Hustisford	140	-	E
Jefferson	130	20	E
London	310	-	E
Lakehead Cambridge Tap	180	-	E
North Beaver Dam / East Beaver Dam	160	-	E
North Randolph	350	10	E
Rockdale	430	60	E
Rubicon	120	50	E
Stony Brook	230	-	E
Tyrannena	160	-	E

**Table 3: Generation Capability at 138 kV Sites – ATC Planning Zone 3 (continued)**

<b>138 kV Site</b>	<b>Single contingency results (MW Capability)</b>	<b>Multiple contingency results (MW Capability)</b>	<b>Sub-Zone</b>
Balsam	340	140	F
Brick Church	210	120	F
Blackhawk	260	70	F
Beloit Gateway	340	-	F
BOC Gas Tap	220	-	F
Bristol/Delevan	100	-	F
Colley Road	300	0	F
Dickinson	340	-	F
Elkhorn	210	130	F
Janesville	390	90	F
Lakehead Delevan Tap / Lakehead Delevan	100	-	F
McCue / Kennedy	350	60	F
Marine	250	-	F
North Lake Geneva	310	130	F
Northwest Beloit	310	-	F
Paddock	550	370	F
RC2 Bradford	170	-	F
RC2 LaPrairie	270	-	F
Rock River	350	90	F
Russell	460	70	F
Sunrise	260	40	F
Southwest Delevan	120	-	F
Townline	280	60	F
Tripp	220	-	F
Viking	190	-	F
Venture Tap / Venture	300	-	F
West Darien	140	-	F
Williams Bay	160	-	F
Wilcox	300	-	F

**Table 4: Generation Capability at 69 kV Sites – ATC Planning Zone 3**

<b>69 kV Site</b>	<b>Single contingency results (MW Capability)</b>	<b>Multiple contingency results (MW Capability)</b>	<b>Sub-Zone</b>
Boscobel Muni / Boscobel	100	-	A
Bris Bois / Hillside	100	70	A
Gran Grae	100	50	A
Muscoda	100	-	A
Muscoda Industrial Park	100	-	A
Spring Green	150	50	A
Stagecoach	110	60	A
Timberlane Tap	130	-	A
Bass Creek	120	60	B
Brodhead Switching Station	130	60	B
Darlington	110	60	B
East Lincoln Street / Mount Horeb	110	80	B
Eden	120	60	B
Harmony Tap / Harmony	100	-	B
Hillman / Pioneer / Platteville / Pioneer Tap / McGregor	110	80	B
Idle Hour	110	-	B
La Mar	110	-	B
Monroe Central Tap / Monroe Central	100	-	B
North Monroe	110	50	B
North Stoughton / North Stoughton Tap 1 & 2	120	-	B
Oregon	110	-	B
Red Hawk Tap / Red Hawk	100	-	B



**Table 4: Generation Capability at 69 kV Sites – ATC Planning Zone 3 (continued)**

<b>69 kV Site</b>	<b>Single contingency results (MW Capability)</b>	<b>Multiple contingency results (MW Capability)</b>	<b>Sub-Zone</b>
Rock Branch	120	90	B
Sheepskin	100	40	B
South Monroe	150	100	B
Spring Grove	100	-	B
Stoughton	120	80	B
Stoughton Muni East Tap / Stoughton Muni East	120	-	B
Sun Valley Tap / Sun Valley	100	-	B
Verona	240	170	B
Air Gas Tap / Air Gas	100	-	C
Burke Tap / Burke	100	-	C
Dane	160	90	C
De Forest	160	20	C
Femrite	120	-	C
Fitchburg	290	90	C
Kegonsa	100	0	C
North Madison	110	40	C
Pheasant Branch	110	-	C
Royster	160	90	C
Sun Prairie	160	60	C
Sycamore	130	40	C
Syene	100	-	C
Tokay	130	-	C
Waunakee	160	90	C
Waunakee Centennial Park	100	-	C
Waunakee Easy Street Tap	150	-	C
West Middleton	210	60	C
West Towne	200	130	C
Artesian / Reedsburg	120	-	D
Baraboo	100	-	D
Columbia	130	80	D

**Table 4: Generation Capability at 69 kV Sites – ATC Planning Zone 3 (continued)**

<b>69 kV Site</b>	<b>Single contingency results (MW Capability)</b>	<b>Multiple contingency results (MW Capability)</b>	<b>Sub-Zone</b>
Dam Heights North & South Tap / Dam Heights / Prairie du Sac Plant	110	90	D
Kilbourn	180	80	D
Kirkwood	180	100	D
Lodi Tap	100	-	D
Merrimac Tap / Merrimac	100	-	D
Okee Tap	100	-	D
Portage Industrial Park / Portage	190	160	D
Poynette Tap / Poynette	100	-	D
Wyocena	110	-	D
Hubbard	120	50	E
North Beaver Dam	120	50	E
North Randolph	190	130	E
Rio	100	0	E
South Beaver Dam	100	60	E
Balsam	130	-	F
Brick Church	140	40	F
Colley Road	190	100	F
East Rockton	100	-	F
Enzyme Bio Systems	220	-	F
Katzenberg	120	80	F
McCue	230	130	F
North Lake Geneva	130	50	F
Park Avenue Tap / Park Avenue	100	-	F
RCEC Clinton	200	-	F
Richmond Road	140	-	F
Sharon Tap	160	-	F
Shaw	110	-	F
Tiger	180	-	F
Town Hall Road Tap	200	-	F
Twin Lakes	140	-	F

**KEY**

- 345 kV Substation
- 138 kV Substation
- 69 kV Substation
- Generation
- 345 kV Transmission
- 161 kV Transmission
- 138 kV Transmission
- 69 kV Transmission

