



**2018 10-Year Assessment – [www.atc10yearplan.com](http://www.atc10yearplan.com)**

**Next Limiting Element Study**

The main objective for this study was to determine what thermal limitations, beyond those being addressed with the 2018 10-Year Assessment project list, ATC might see with high biases across the ATC transmission system.

The base model for the study was the 2028 all-project shoulder peak from the 2018 10-Year Assessment. Nine different biases were applied to the model and then selected no load loss allowed<sup>1</sup> contingencies were applied. SPS/RAS operation and voltage limitations were not considered in the study. The nine different biases were:

- Minnesota to ATC
- Minnesota to Illinois and Indiana
- Iowa to ATC
- Iowa to Illinois and Indiana
- Minnesota and Iowa to ATC
- Minnesota and Iowa to Illinois and Indiana
- Illinois and Indiana to ATC
- Illinois and Indiana to Minnesota
- Illinois and Indiana to Minnesota and Iowa

The study showed several facilities within the ATC system could be limitations under high bias scenarios. The first and second limitations for each bias scenario is shown in table 1.

**Table 1: ATC First and Second Limitations for Each Bias Scenario**

Bias Scenario	ATC First Limiting Element	ATC Planning Zone	ATC Second Limiting Element	ATC Planning Zone
Minnesota to ATC	Petenwell – Saratoga 138-kV Line X-43	1	Arpin – Sigel 138-kV Line X-33	1
Minnesota to Illinois and Indiana	Arpin – Sigel 138-kV Line X-33	1	None	N/A
Iowa to ATC	Petenwell – Saratoga 138-kV Line X-43	1	Eden – Spring Green 138-kV Line X-17	3

<sup>1</sup> No load loss allowed refers to NERC TPL-001-4, Table 1 requirements to not interrupt firm commitments or lose non-consequential load for specific categories of Planning contingencies. ATC also applied similar contingency categories to its non-BES facilities.



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Iowa to Illinois and Indiana	Petenwell – Saratoga 138-kV Line X-43	1	Eden – Spring Green 138-kV Line X-17	3
Minnesota and Iowa to ATC	Petenwell – Saratoga 138-kV Line X-43	1	Eden – Spring Green 138-kV Line X-17	3
Minnesota and Iowa to Illinois and Indiana	Petenwell – Saratoga 138-kV Line X-43	1	Arpin – Sigel 138-kV Line X-33	1
Illinois and Indiana to ATC	None	N/A	None	N/A
Illinois and Indiana to Minnesota	Fox River - North Appleton 345-kV Line NAPL121	4	Point Beach - Kewaunee 345-kV Line Q-303	4
Illinois and Indiana to Minnesota and Iowa	Fox River - North Appleton 345-kV Line NAPL121	4	Point Beach - Kewaunee 345-kV Line Q-303	4

The study was informational only and no projects to fix the thermal limitations above, or other thermal limitations found in the study, will be proposed in this Assessment. ATC will continue to monitor thermal limitations identified in this study in subsequent Assessments.