MISO Affected System Impact Study
For
SPP DISIS-2017-001 Projects
Restudy – Addendum Report

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Revision History

Date	Rev.	Description
September 2021	0	MISO AFS DISIS-2017-001 Phase III Report
March 2022	1	MISO AFS DISIS-2017-001 Restudy Addendum Report GEN-2017-013 Withdrawal

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1. Background

Midcontinent Independent System Operator ("MISO") performed Affected System studies ("AFS") for the interconnection requests in the Southwest Power Pool ("SPP") Definitive Interconnection System Impact Studies ("DISIS") DISIS-2017-001. The MISO provided Affected System Study results and report for DISIS-2017-001 Phase II and Phase III. DISIS-2017-001 Phase III report was provided in September 2021.

MISO AFS in Phase II was divided into two groups to identify impacts on the MISO-West and MISO-South regions. No adverse impacts were identified in MISO-South region; hence no network upgrades were identified in MISO-South region. Several adverse impacts were observed in MISO-West region in Phase II and network upgrades were identified.

In Phase III, Studies for MISO-West region for performed, incorporating withdrawals at the Decision Point 2 in SPP Interconnection process. Criteria violations were observed in Summer-Shoulder scenario and network upgrades were identified to mitigate the constraints. Phase III report was provided to SPP in September 2021. MISO-South region Phase III AFS study was not performed.

It was noted that one study project that was assigned network upgrades, GEN-2017-013 withdrew from SPP Interconnection queue. A restudy was performed to assess the impacts of GEN-2017-013's withdrawal.

This addendum report updates the findings of the Phase III report entitled as "Final Report MISO Affected System Studies for SPP DISIS-2017-001 Projects Phase III" and shall supersede the findings of previously provided MISO AFS DISIS-2017-001 reports.

2. Executive Summary

Results have been updated to reflect Network upgrade requirements after the withdrawal of study unit GEN-2017-013.

In Phase III study, criteria violations were observed only in Steady-state Shoulder Peak Scenario for West region projects. Only projects that were dispatched in West region models in Shoulder Peak Case were studied. Solar projects are not dispatched in Shoulder Peak Scenario as per MISO's fuel-type dispatch and were not studied.
No stability issues were identified in Phase III studies, Stability studies were not part of this restudy.

Summary of cost allocation (cost responsibility of each of the study projects) of network upgrades is provided in Table 2-1

Table 2-1 Cost Allocation Summary

Project	Total
GEN-2017-004	$3,234,674

Project	Total
GEN-2017-010	$6,898,970
GEN-2017-014	$9,716,496
GEN-2017-032	$3,563,382
GEN-2017-048	$10,511,458
GEN-2017-094	$7,075,020
Total	$41,000,000

2.1. Study Project(s)

SPP DISIS-2017-001 study projects as part of this restudy in MISO-West region are listed in Table 1-1 below.

Table 2-2 DISIS-2017-001 Study projects

Project	Fuel	Shoulder Pgen (MW)	Point of Interconnection	State
GEN-2017-004	Wind	201.6	Elm Creek - Summit 345 kV	KS
GEN-2017-010	Wind	200.1	Rhame 230 kV Sub	ND
GEN-2017-014	Wind	300	Underwood - Philip Tap 230 kV	SD
GEN-2017-032	Wind	200	Finney - Lamar 345 kV	CO
GEN-2017-048	Wind	300	Neset 230 kV Substation	ND
GEN-2017-094	Wind	200	Fort Thompson-Huron 230 kV	SD

Withdrawn study projects is mentioned in Table 2-3

Table 2-3 DISIS-2017-001 Withdrawn project(s)

Project	Fuel	Shoulder Pgen (MW)	Point of Interconnection	State
GEN-2017-013	Wind	200	Mingo 345kV	KS

Steady state thermal and steady state voltage analyses were performed to identify any reliability criteria violations caused by the study projects.

3. Model Updates

3.1. Model Development

MISO AFS DISIS-2017-001 Phase III Summer Shoulder models were used as base for this study. Study models were updated to reflect the withdrawal of study projects mentioned in Table 2-3.

DPP-2017-Feb Phase 3 study cases were used to develop models for DISIS-2017-001 study, these cases are based on the MISO Transmission Expansion Planning ("MTEP") cases from 2018, built for 2023.

4. Steady State Analysis

4.1. Thermal Results

No thermal violations were identified as impacted by the DISIS-2017-001 study projects in the shoulder case.

4.2. Voltage Results

Voltage criteria violations were observed in the shoulder case. Low Voltage violations were observed in OTP (620) and MEC (635). MISO shared the results with the affected Transmission Owners and received their inputs on potential mitigations and validity of results. A detailed list of violations that require mitigations is provided in Appendix A.

4.3. Network Upgrades

Three network upgrades were identified to address the voltage violations based on the feedback from the transmission owners.

Table 4-1 Network Upgrades

NU#	Description	Planning Level Cost Estimate ($M)	Area number	Area Name
1	Two 75MVAR Capacitors at Buffalo 345 kV	5.0	620	OTP
2	100 MVAR Capacitor Bank at Montezuma 345 kV	6.0	635	MEC
3	100 MVAR SVC/Statcom at Blackhawk 345 kV	30.0	635	MEC

5. Cost Allocation

Cost of the network upgrades mentioned in Table 4-1 is allocated to study projects in accordance with MISO Business Practices. Table 5-1 shows the cost responsibility for each of the study projects.

Table 5-1 Network Upgrade Cost Allocation

Project	Network Upgrade 1	Network upgrade 2	Network upgrade 3	Total
GEN-2017-004	$139,752	$589,831	$2,505,092	$3,234,674
GEN-2017-010	$1,156,832	$915,254	$4,826,884	$6,898,970
GEN-2017-014	$1,001,553	$1,444,068	$7,270,876	$9,716,496
GEN-2017-032	$163,043	$650,847	$2,749,491	$3,563,382
GEN-2017-048	$1,816,770	$1,362,712	$7,331,976	$10,511,458
GEN-2017-094	$722,050	$1,037,288	$5,315,682	$7,075,020
Total	$5,000,000	$6,000,000	$30,000,000	$41,000,000

6. Conclusion

Due to withdrawal of MISO AFS DISIS-2017-001 study project GEN-2017-013, MISO preformed restudy to see impacts of remaining projects in DISIS-2017-001 cycle on MISO footprint. The results of previously performed Phase III study were adjusted and updated cost allocation responsibilities are provided to DISIS-2017-001 study projects.

Appendix A - Voltage Results

Appendix B - Cost Allocation