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**Southwest Power Pool, Inc. (SPP)**

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**Definitive Interconnection System Impact Study – DISIS-2017-001 Group 08 Sensitivity**

**Technical Report**

**REP-1587**

**Revision #01**

**May 2023**

Submitted By:

Mitsubishi Electric Power Products, Inc. (MEPPI)

Power Systems Engineering Division

Warrendale, PA

**Report Revision History**

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| --- | --- | --- |
| **Revision** | **Report Revision Table** | **Date** |
| 1 | Issue Draft Report for Review | 05/05/2023 |
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|  |  |  |

# Introduction

SPP requested that MEPPI perform a sensitivity analysis on the DISIS-2017-001-3 Group 08 study cluster to examine the impact on Generation Interconnection Request GEN-2017-068 and GEN-2017-086 due to the withdrawal of GEN-2016-162 and GEN-2016-163, the removal of the GEN-2016-119 Tap – Arcadia 345 kV Line identified in the Arcadia Substation Expansion, and the impact of an alternate generation dispatch for Group 08. GEN-2017-068 is a 103.5 MW solar facility with interconnection to the Gordan Evans 138 kV substation in Sumner County, Kansas and GEN-2017-086 is a 150 MW wind facility with interconnection to the Viola 345 kV substation in Harper County, Kansas. The analysis aimed to identify potential impacts to GEN-2017-068 and GEN-2017-086 related to the non-converged, thermal, and voltage constraints and associated Network Upgrades and any additional material impact to the Group 08 study cluster. This request is part of the 2017-001 Definitive Interconnection System Impact Study (DISIS).

# DISIS Sensitivity Analysis Results

# Executive Summary Results

MEPPI performed a power flow analysis using the following 2019 ITP model set and the following seven (7) ERIS DISIS-2017-001-3 Group 08 power flow cases for this analysis:

* **2019 ITP Series Models**
  + 2019ITPP5E-19W.sav (Year 1 Winter)
  + 2019ITPP5E-20G.sav (Year 2 Spring)
  + 2019ITPP5E-20S.sav (Year 2 Summer)
  + 2019ITPP5E-24L.sav (Year 5 Light)
  + 2019ITPP5E-24S.sav (Year 5 Summer)
  + 2019ITPP5E-24W.sav (Year 5 Winter)
  + 2019ITPP5E-29S.sav (Year 10 Summer)
* **DISIS-2017-001-3 Group 08 Study Models** 
  + Year 1 (2019) Winter Peak (19WP)
  + Year 2 (2020) Spring (20G)
  + Year 2 (2020) Summer Peak (20SP)
  + Year 5 (2024) Light (24L)
  + Year 5 (2024) Summer Peak (24SP)
  + Year 5 (2024) Winter Peak (24WP)
  + Year 10 (2029) Summer Peak (29SP)

The Siemens Power Technologies International PSS/E power system simulation program Version 33.12.2 and PowerGEM TARA v2301 were used for this study. MEPPI performed a generation dispatch update to the DISIS-2017-001-3 Group 08 Energy Resource Interconnection Service (ERIS) power flow models based on the 2019 ITP Series dispatch levels for legacy generation units. The legacy generation units in Area 536 (WERE) were initially set to the dispatch levels of the 2019 ITP series models and generation scaled in the same area to maintain generation and load balance. The legacy units in Area 536 were used as the subsystem to offset the generation change. MEPPI then performed a power flow and cost allocation sensitivity analysis to determine the impacts associated with the removal of GEN-2016-162 and GEN-2016-163, the removal of the Viola 345/138 kV transformer #3, removal of the GEN-2016-119 Tap – Arcadia 345 kV Line, and the updated generation dispatch of Group 08.

After performing the power flow analysis and Transfer Distribution Factor (“TDF”) analysis, MEPPI observed no negative impacts for Group 8. For Group 8 (Area 536 – WERE), the new flows and counter-flows do not have any material impact on the DISIS-2017-001 study cluster requests.

In the future, if additional withdrawals occur in Groups 8 (DISIS-2017-001), and re-studies are triggered, the current cost allocation can be impacted, changing the upgrade costs assigned to projects in this Group.

The models used for the sensitivity analysis are available upon request.

# Summary of Results

The results of the analysis identified that after the implementation of the new generation dispatch, removal of GEN-2016-162 and GEN-2016-163 projects, removal of the third Viola 345/138 kV transformer, and removal of the GEN-2016-119 Tap – Arcadia 345 kV Line, there was no need for the rebuilding of the existing JEC - Hoyt 345 kV and Beaver to Eureka transmission lines. The following conclusions were drawn from this analysis:

* Removal of the JEC to Hoyt 345 kV Rebuild due to system intact flows being less than 100% of Rate A. Previously cost allocated to GEN-2017-068 and GEN-2017-086
  + Conclusion: Remove cost allocation and requirement of Network Upgrade for GEN-2017-068 and GEN-2017-086.
* Removal of the Beaver to Eureka 161 kV rebuild due to system intact flows being less than 100% of Rate A. Note a facility study determined this Network Upgrade to be a update of relay line settings. Previously cost allocated to GEN-2017-074.
  + Conclusion: Remove cost allocation and requirement of Network Upgrade for GEN-2017-074.

Refer to the Appendix A attached in this report for a summary of the updated generation dispatch for Area 536 and Appendix B for the study results comparing the previous results posted in the DISIS-2017-001-3 study report (dated 9/20/2022) and the results from this sensitivity analysis.

# Appendix A: Generation Dispatch Summary



# Appendix B: DISIS-2017-001 Group 08 Results

