Report on

GEN-2016-071
Modification Request Impact Study

Revision R1 **May 2, 2022**

Submitted to
Southwest Power Pool

anedenconsulting.com

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Revision History

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
05/2/2022	Aneden Consulting	Initial Report Issued

Executive Summary

Aneden Consulting (Aneden) was retained by the Southwest Power Pool (SPP) to perform a Modification Request Impact Study (Study) for GEN-2016-071, an active Generation Interconnection Request (GIR) with a point of interconnection (POI) at the Middleton Tap 138 kV Substation.

The GEN-2016-071 project interconnects in the Oklahoma Gas & Electric (OKGE) control area with a capacity of 200.1 MW as shown in Table ES-1 below. This Study has been requested to evaluate the modification of GEN-2016-071 to change the turbine configuration to 60 x GE 2.82 MW for a total capacity of 169.2 MW.

In addition, the modification request included changes to the collection system and generator step-up transformers. The existing and modified configurations for GEN-2016-071 are shown in Table ES-2.

Table ES-1: GEN-2016-071 Existing Configuration

Request	Point of Interconnection	Existing Generator Configuration	GIA Capacity (MW)
GEN-2016-071	Middleton Tap 138 kV (514804)	87 x GE 2.3 MW	200.1

Table ES-2: GEN-2016-071 Modification Request

Facility	Existing Configuration	Modification Configuration
Point of Interconnection	Middleton Tap 138 kV (514804)	Middleton Tap 138 kV (514804)
Configuration/Capacity	87 x GE 2.3 MW = 200.1 MW	60 x GE 2.82 MW = 169.2 MW
Generation Interconnection Line	Length = 3.25 miles R = 0.002379 pu X = 0.011948 pu B = 0.003768 pu Rating MVA = 0 MVA	Length = 3.25 miles R = 0.002379 pu X = 0.011948 pu B = 0.003768 pu Rating [A/B] MVA = 255/323 MVA
Main Substation Transformer[1]	X = 7.996%, R = 0.249%, Winding MVA = 135 MVA, Rating MVA = 225 MVA	X = 7.996%, R = 0.249%, Winding MVA = 135 MVA, Rating [A/B] MVA = 135/225 MVA
Equivalent GSU Transformer[1]	Gen 1 Equivalent Qty: 87 (GEWTG2) X = 5.706%, R = 0.713%, Winding MVA = 217.5 MVA, Rating MVA = 217.5 MVA	Gen 1 Equivalent Qty: 60: (GEWTG2) X = 5.722%, R = 0.572%, Winding MVA = 195 MVA, Rating MVA = 195 MVA
Equivalent Collector Line[2]	R = 0.005252 pu X = 0.006821 pu B = 0.080550 pu	R = 0.005660 pu X = 0.007541 pu B = 0.059337 pu
Generator Power Factor	±0.95	±0.95

1) X/R based on Winding MVA, 2) all pu are on 100 MVA Base

As the existing and modification configurations both utilized GE turbines with the GEWTG2 stability model, a turbine parameters comparison and equivalent impedance comparison were performed in order to determine the potential impact of the requested change. SPP determined that because the turbine parameters of the dynamic stability models did not change significantly and the equivalent impedance change of 3.57%

was below the 10% threshold, the modification request did not require dynamic stability and short circuit analyses. However, SPP determined that power flow would need to be performed based on the POI MW injection decrease of 14.36% compared to the DISIS-2017-001 power flow models.

The scope of this modification request study included charging current compensation analysis and power flow analysis. Aneden also updated the dynamic stability models to reflect the new modification configuration.

Aneden performed the charging current compensation analysis using the modification request data based on the DISIS 2017-001 stability models, and the power flow analysis using the most recently studied DISIS-2017-001 Group 8 Energy Resource Interconnection Service (ERIS) power flow models. A summary of the models used in each analysis is shown in Table ES-3 below.

Table ES-3: Models Evaluated in Each Analysis

Charging Current Compensation Analysis (Stability Models)	Power Flow Analysis (ERIS Power Flow Models)
2019 Winter Peak (2019WP) 2021 Light Load (2021LL) 2021 Summer Peak (2021SP) 2028 Summer Peak (2028SP)	2019 Winter Peak (2019WP) 2020 Summer Peak (2020SP) 2020 Spring Peak (2020G) 2024 Light Load (2024LL) 2024 Summer Peak (2024SP) 2024 Winter Peak (2024WP) 2029 Summer Peak (2029SP)

The analyses were performed using the PTI PSS/E version 33 and PowerGEM TARA software and the results are summarized below.

The results of the power flow analysis showed that there were no new constraints identified in the modified study models based on the SPP Transfer Distribution Factor (TDF) requirements[1]. In addition, the previously identified thermal constraints in the DISIS-2017-001-1 report[2] were reduced by the GEN-2016-071 capacity reduction as shown in Table ES-4.

Table ES-4: GEN-2016-071 MRIS Impact on Existing Thermal Constraints (DISIS-2017-001-1)

Monitored Element	Limiting Rate (MVA)	Contingency	DISIS-2017-001-1 Worst TC[3] %Loading	Modification Worst %Loading
505480 BEAVER 5 161 506932 EUREKA 5 161 1	247	System Intact	100.7	100.53
532765 HOYT 7 345 532766 JEC N 7 345 1	1036	System Intact	107.38	106.73
532937 NEOSHO 5 161 547469 RIV4525 161 1	205	System Intact	121.31	121.15
532793 NEOSHO 7 345 588544 G17-009-TAP 345 1	956	P12:345:WERE:WAVS-LACY_345::	123.22	122.36
532799 WAVERLY7 345 542981 LACYGNE7 345 1	1141	System Intact	109.9	109.41

[1] Definitive Interconnection System Impact Study Manual, December 2021
[2] DISIS-2017-001-1 Restudy of Power Flow, November 3, 2021
[3] Transfer Case (TC): in-group renewable projects are dispatched to 100% max capacity

The results of the charging current compensation analysis performed using the 2019 Winter Peak, 2021 Light Load, 2021 Summer Peak, and 2028 Summer Peak models showed that the GEN-2016-071 project needed a 6.35 MVAr shunt reactor on the 34.5 kV bus of the project substation with the modifications in place, a decrease from the 8.4 MVAr found for the existing GEN-2016-071 configuration calculated using the DISIS-2017-001 models. This is necessary to offset the capacitive effect on the transmission network caused by the project's transmission line and collector system during low-wind or no-wind conditions. The information gathered from the charging current compensation analysis is provided as information to the Interconnection Customer and Transmission Owner (TO) and/or Transmission Operator. The applicable reactive power requirements will be further reviewed by the Transmission Owner and/or Transmission Operator.

The requested modification has been determined by SPP to not be a Material Modification. The requested modification does not have a material adverse impact on the cost or timing of any other Interconnection Request with a later Queue priority date.

In accordance with FERC Order No. 827, the generating facility will be required to provide dynamic reactive power within the range of 0.95 leading to 0.95 lagging at the high-side of the generator substation.

It is likely that the customer may be required to reduce its generation output to 0 MW in real-time, also known as curtailment, under certain system conditions to allow system operators to maintain the reliability of the transmission network.

Nothing in this study should be construed as a guarantee of transmission service or delivery rights. If the customer wishes to obtain deliverability to final customers, a separate request for transmission service must be requested on Southwest Power Pool's OASIS by the customer.

1.0 Scope of Study

Aneden Consulting (Aneden) was retained by the Southwest Power Pool (SPP) to perform a Modification Request Impact Study (Study) for GEN-2016-071. A Modification Request Impact Study is a generation interconnection study performed to evaluate the impacts of modifying the DISIS study assumptions. The determination of the required scope of the study is dependent upon the specific modification requested and how it may impact the results of the DISIS study. Impacting the DISIS results could potentially affect the cost or timing of any Interconnection Request with a later Queue priority date, deeming the requested modification a Material Modification. The criteria sections below include reasoning as to why an analysis was either included or excluded from the scope of study.

The analyses were performed using the PTI PSS/E version 33 and PowerGEM TARA software. The results of each analysis are presented in the following sections.

1.1 Power Flow Analysis

To determine whether power flow analysis is required, SPP evaluates the difference in the real power output at the POI between the DISIS-2017-001 power flow configuration and the requested modification. Power flow analysis is performed if the difference in the real power may result in a significant impact on the results of the DISIS power flow analysis.

1.2 Dynamic Stability Analysis, Short Circuit Analysis

To determine whether stability and short circuit analyses are required, SPP evaluates the difference between the turbine parameters and, if needed, the collector system impedance between the existing configuration and the requested modification. Dynamic stability analysis and short circuit analysis would be required if the differences listed above may result in a significant impact on the most recently performed DISIS stability analysis.

1.3 Charging Current Compensation Analysis

SPP requires that a charging current compensation analysis be performed on the requested modification configuration as it is a non-synchronous resource. The charging current compensation analysis determines the capacitive effect at the POI caused by the project's collector system and transmission line's capacitance. A shunt reactor size is determined in order to offset the capacitive effect and maintain zero (0) MVAr flow at the POI while the project's generators and capacitors are offline.

1.4 Study Limitations

The assessments and conclusions provided in this report are based on assumptions and information provided to Aneden by others. While the assumptions and information provided may be appropriate for the purposes of this report, Aneden does not guarantee that those conditions assumed will occur. In addition, Aneden did not independently verify the accuracy or completeness of the information provided. As such, the conclusions and results presented in this report may vary depending on the extent to which actual future conditions differ from the assumptions made or information used herein.

2.0 Project and Modification Request

The GEN-2016-071 Interconnection Customer has requested a modification to its Interconnection Request (IR) with a point of interconnection (POI) at the Middleton Tap 138 kV Substation. At the time of the posting of this report, GEN-2016-071 is an active Interconnection Request with a queue status of "IA FULLY EXECUTED/ON SCHEDULE." GEN-2016-071 is a wind farm and has a maximum summer and winter queue capacity of 200.1 MW with Energy Resource Interconnection Service (ERIS).

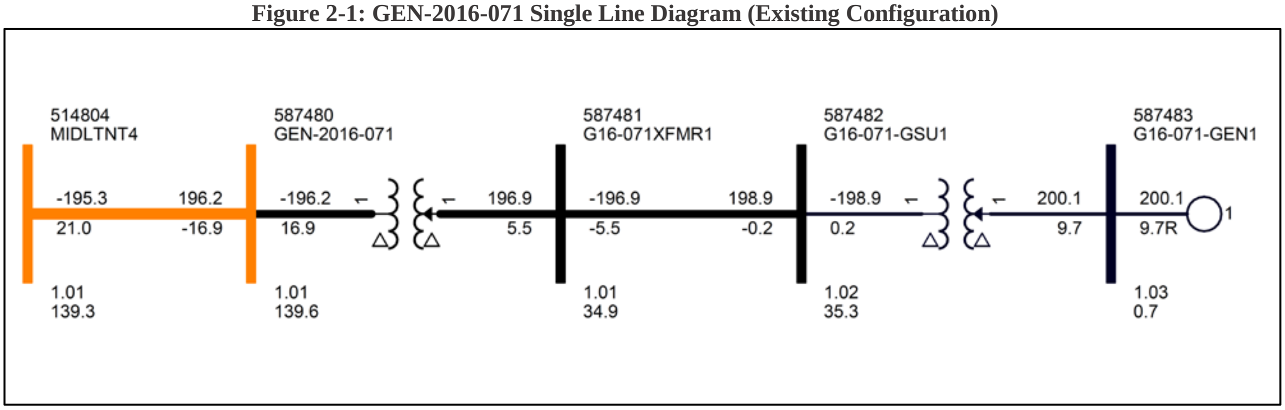
The GEN-2016-071 project was originally studied in the DISIS-2016-001 study. Figure 2-1 shows the power flow model single line diagram for the existing GEN-2016-071 configuration.

The GEN-2016-071 project interconnects in the Oklahoma Gas & Electric (OKGE) control area with a capacity of 200.1 MW as shown in Table 2-1 below.

Table 2-1: GEN-2016-071 Existing Configuration

Request	Point of Interconnection	Existing Generator Configuration	GIA Capacity (MW)
GEN-2016-071	Middleton Tap 138 kV (514804)	87 x GE 2.3 MW	200.1

Figure 2-1: GEN-2016-071 Single Line Diagram (Existing Configuration)



This Study has been requested by the Interconnection Customer to evaluate the modification of GEN-2016-071 to a turbine configuration of 60 x GE 2.82 MW for a total capacity of 169.2 MW. In addition, the modification request included changes to the collection system and generator step-up transformers. Figure 2-2 shows the power flow model single line diagram for the GEN-2016-071 modification. The existing and modified configurations for GEN-2016-071 is shown in Table 2-2.

Figure 2-2: GEN-2016-071 Single Line Diagram (Modification Configuration)

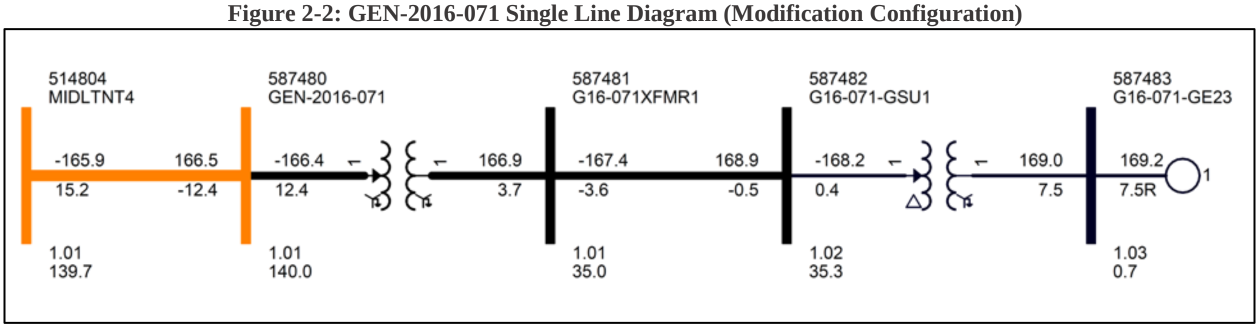


Table 2-2: GEN-2016-071 Modification Request

Facility	Existing Configuration	Modification Configuration
Point of Interconnection	Middleton Tap 138 kV (514804)	Middleton Tap 138 kV (514804)
Configuration/Capacity	87 x GE 2.3 MW = 200.1 MW	60 x GE 2.82 MW = 169.2 MW
Generation Interconnection Line	Length = 3.25 miles R = 0.002379 pu X = 0.011948 pu B = 0.003768 pu Rating MVA = 0 MVA	Length = 3.25 miles R = 0.002379 pu X = 0.011948 pu B = 0.003768 pu Rating [A/B] MVA = 255/323 MVA
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Equivalent Collector Line[2]	R = 0.005252 pu X = 0.006821 pu B = 0.080550 pu	R = 0.005660 pu X = 0.007541 pu B = 0.059337 pu
Generator Power Factor	±0.95	±0.95

1) X/R based on Winding MVA, 2) all pu are on 100 MVA Base

3.0 Existing vs Modification Comparison

To determine which analyses are required for the Study, the differences between the existing configuration and the requested modification were evaluated. Aneden performed this comparison and the resulting analyses using a set of modified study models developed based on the modification request data and the DISIS-2017-001 study models.

The methodology and results of the comparisons are described below. The analysis was completed using PSS/E version 33 software.

3.1 POI Injection Comparison

The real power injection at the POI was determined using PSS/E to compare the DISIS-2017-001 power flow configuration and the requested modification for GEN-2016-071. The percentage change in the POI injection was then evaluated. If the real power (MW) difference was determined to be significant, greater than 10%, power flow analysis would be performed to assess the impact of the modification request.

SPP determined that power flow analysis was required due to the change (decrease of 14.36%) in the real power output at the POI between the studied DISIS-2017-001 power flow configuration and requested modification shown in Table 3-1.

Table 3-1: GEN-2016-071 POI Injection Comparison

Interconnection Request	Existing POI Injection (MW)	Modification POI Injection (MW)	POI Injection Difference %
GEN-2016-071	193.7	165.9	-14.36%

3.2 Turbine Parameters Comparison

The turbine dynamic stability models from the existing configuration and the requested modification were compared to determine if the change in modeling parameters was significant. For the turbine collection, as the turbine changes were from GE turbines to GE turbines, the modeling parameters of the dynamic stability models did not change significantly. The parameter differences are shown in Table 3-2.

Table 3-2: GEN-2016-071 Turbine Parameter Differences

Parameters	Existing	Modification
	2.3MW	2.82MW
Tfv - V-regulator filter	0.15	0.5
QMX - V-regulator max limit	0.436	0.312
QMN - V-regulator min limit	-0.436	-0.312
KQi - MVAR/Volt gain	0.1	0.41
FRb - Freq. response curve	0.996	0.9994
FRc - Freq. response curve	1.004	1.0006
Qmax limit in WindFREE Mode	0.12	0.1357
Qmin limit in WindFREE Mode	-0.12	-0.1357

SPP determined that dynamic stability analysis and short circuit analysis should not be required due to the change in turbines parameters as the differences between the existing GE turbine and the requested modification's GE turbine were not significant enough to change the previously made stability and short circuit conclusions. The generator dynamic model for the modification can be found in Appendix A. The full parameter comparison can be found in Appendix B.

3.3 Equivalent Impedance Comparison Calculation

The impedances from all the components of the transmission lines, substation and step-up transformers, and equivalent collector line impedances were added in series for GEN-2016-071 before and after the modification request. The percentage increase in the impedances before and after the modification request were then compared. If the percentage increase was greater than 10%, additional dynamic stability analysis and short circuit analysis would be performed to determine the impact of the requested modification. Table 3-3 shows the impedance differences before and after the modification request. Table 3-4 shows the increases in impedances from the original impedances to the modification request impedances.

Table 3-3: GEN-2016-071 Impedance Comparisons

System Component	Existing Model Impedances (p.u.)			Modification Request Impedances (p.u.)		
	R	*X*		*R*	*X*	
Gen Tie Line from POI to GEN-2016-071	0.00238	0.01195		0.00238	0.01195	
GEN-2016-071 collector system equivalent	0.00525	0.00682		0.00566	0.00754	
	R	*X*	*MVA Base*	*R*	*X*	*MVA Base*
GEN-2016-071 Main Transformer @ 100 MVA	0.00185	0.05923	100	0.00185	0.05923	100
GEN-2016-071 Unit GSU @ 100 MVA Base	0.0033	0.0263	100	0.00293	0.02934	100
	R	*X*	*Z*	*R*	*X*	*Z*
Total Impedance from POI to Collector System	0.012768	0.104286	0.105065	0.012824	0.108061	0.108819

Table 3-4: GEN-2016-071 Combined Impedance Comparison

Interconnection Request	Existing Impedance Z (p.u.)	MRIS Impedance Z (p.u.)	Impedance Z Difference %
GEN-2016-071 Impedance Increase	10.51%	10.88%	3.57%

SPP determined that the change in impedance (3.57%) would not require dynamic stability analysis and short circuit analysis to be performed.

4.0 Power Flow Analysis

The power flow analysis was performed using the most recently studied DISIS-2017-001 Group 8 ERIS power flow models. The model development, power flow analysis methodology, and power flow results are presented in this Section.

4.1 Model Development

The Study models were built using SPP provided ERIS models (baseline models). These baseline models were modified to represent the modification request details for GEN-2016-071.

This Study used the Transfer Case (TC) DISIS-2017-001 Group 8 ERIS power flow models as shown in Table 4-1. These Group 8 TC models include all in-group renewable projects dispatched to 100% max capacity.

Table 4-1: Power Flow Models Evaluated

Case Year (TC Models)	Existing DISIS DISIS-2017-001 Group 08 ERIS	Modification DISIS-2017-001 Group 08 ERIS
2019WP	x	x
2020SP	x	x
2020G	x	x
2024LL	x	x
2024SP	x	x
2024WP	x	x
2029SP	x	x

4.2 Power Flow Analysis Methodology

A power flow analysis was conducted using the most recently studied DISIS-2017-001 Group 8 ERIS power flow models under Transfer Case (TC) conditions (in-group renewable projects dispatched to 100% max capacity) as well as modified versions of these models with the Modification Request Impact Study (MRIS) modifications (GEN-2016-071 online with new configuration).

PowerGEM TARA software was used to simulate system intact and contingency conditions. The contingency and other necessary study files were provided by SPP.

The system conditions with and without the GEN-2016-071 modification were compared in order to identify the impact associated with this modification. SPP's Impact Criteria[4] was applied to identify any reliability criteria exceptions. A Transfer Distribution Factor (TDF) analysis was performed to identify the relevance of any new constraints associated with the Modification request.

For ERIS, thermal overloads are defined as being greater than 100% of Rate A for N-0 conditions, and greater than 100% of Rate B for N-1 contingencies. These overloads were then analyzed to determine if they meet any of the following three criteria:

- 3% Distribution Factor (DF) for N-0 conditions,
- 20% DF upon outage-based (N-1) conditions,
- or 3% DF on contingent elements that resulted in a non-converged solution.

[4] Definitive Interconnection System Impact Study Manual, December 2021

Contingency analysis was also used to determine voltage constraints in accordance with the guidelines in the Transmission Owner planning criteria. The identified voltage constraints were analyzed to determine if they met all the following criteria:

- 3% DF on the contingent element,
- and 2% change in pu voltage.

4.3 Results

There were no new thermal or voltage constraints that met the TDF criteria associated with the GEN-2016-071 modification when compared to the most recently studied DISIS-2017-001 TC models. The Group 8 constraints found in the DISIS-2017-001-1 Power Flow Restudy[5] were evaluated with the MRIS models to determine how the modification affected the previously found constraints.

Table 4-2 below shows that the thermal constraints previously identified in the DISIS-2017-001-1 report were lessened by the modification.

Table 4-2: GEN-2016-071 MRIS Impact on Existing Thermal Constraints (DISIS-2017-001-1)

Monitored Element	Limiting Rate (MVA)	Contingency	DISIS-2017-001-1 Worst TC %Loading	Modification Worst %Loading	Previously Identified DISIS-2017-001-1 Mitigation
505480 BEAVER 5 161 506932 EUREKA 5 161 1	247	System Intact	100.7	100.53	Beaver to Eureka 161kV Rebuild (DISIS-2017-001) (AEP), Beaver to Eureka 161kV Rebuild (DISIS-2017-001) (SWPA)
532765 HOYT 7 345 532766 JEC N 7 345 1	1036	System Intact	107.38	106.73	Hoyt - JEC 345kV Rebuild (DISIS-2017-001)
532937 NEOSHO 5 161 547469 RIV4525 161 1	205	System Intact	121.31	121.15	SPP-2019-AG1-AFS-2 Upgrade: Neosho to Riverton 161kV Rebuild
532793 NEOSHO 7 345 588544 G17-009-TAP 345 1	956	P12:345:WERE:WAVS-LACY_345::	123.22	122.36	2019 ITP Upgrade: Wolf Creek to Blackberry 345kV New Line
532799 WAVERLY7 345 542981 LACYGNE7 345 1	1141	System Intact	109.9	109.41	2019 ITP Upgrade: Wolf Creek to Blackberry 345kV New Line

The results of this modification request do not introduce the need for additional mitigation.

[5] DISIS-2017-001-1 Restudy of Power Flow, November 3, 2021

5.0 Charging Current Compensation Analysis

The charging current compensation analysis was performed for GEN-2016-071 to determine the capacitive charging effects during reduced generation conditions (unsuitable wind speeds, unsuitable solar irradiance, insufficient state of charge, idle conditions, curtailment, etc.) at the generation site and to size shunt reactors that would reduce the project reactive power contribution to the POI to approximately zero.

5.1 Methodology and Criteria

The GEN-2016-071 generator was switched out of service while other collection system elements remained in-service. A shunt reactor was tested at the project's collection substation 34.5 kV bus to set the MVAr flow into the POI to approximately zero. The size of the shunt reactor is equivalent to the charging current value at unity voltage and the compensation provided is proportional to the voltage effects on the charging current (i.e. for voltages above unity, reactive compensation is greater than the size of the reactor).

5.2 Results

The results from the analysis showed that the GEN-2016-071 project needed a 6.35 MVAr shunt reactor on the 34.5 kV bus of the project substation, to reduce the POI MVAr to zero. This is a decrease from the 8.4 MVAr found for the existing GEN-2016-071 configuration calculated using the existing configuration. Figure 5-1 illustrates the shunt reactor size needed to reduce the POI MVAr to approximately zero with the existing configuration. Figure 5-2 illustrates the shunt reactor size needed to reduce the POI MVAr to approximately zero with the updated topology. The final shunt reactor requirements for GEN-2016-071 is shown in Table 5-1.

The information gathered from the charging current compensation analysis is provided as information to the Interconnection Customer and Transmission Owner (TO) and/or Transmission Operator. The applicable reactive power requirements will be further reviewed by the Transmission Owner and/or Transmission Operator.

Table 5-1: Shunt Reactor Size for Low Wind Study (Modification)

Machine	POI Bus Number	POI Bus Name	Reactor Size (MVAr)			
			19WP	21LL	21SP	28SP
GEN-2016-071	514804	Middleton Tap 138 kV	6.35	6.35	6.35	6.35

Figure 5-1: GEN-2016-071 Single Line Diagram (Existing Shunt Reactor)

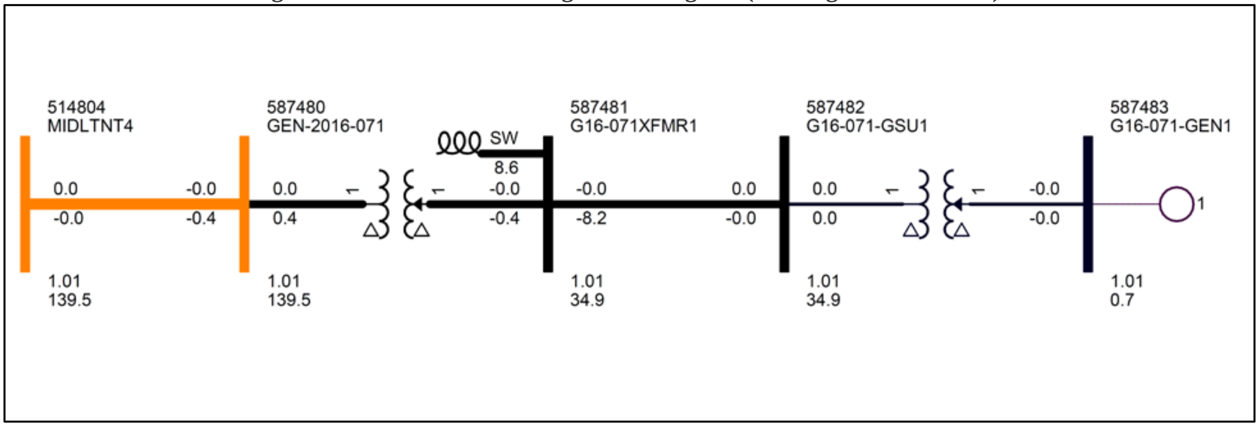
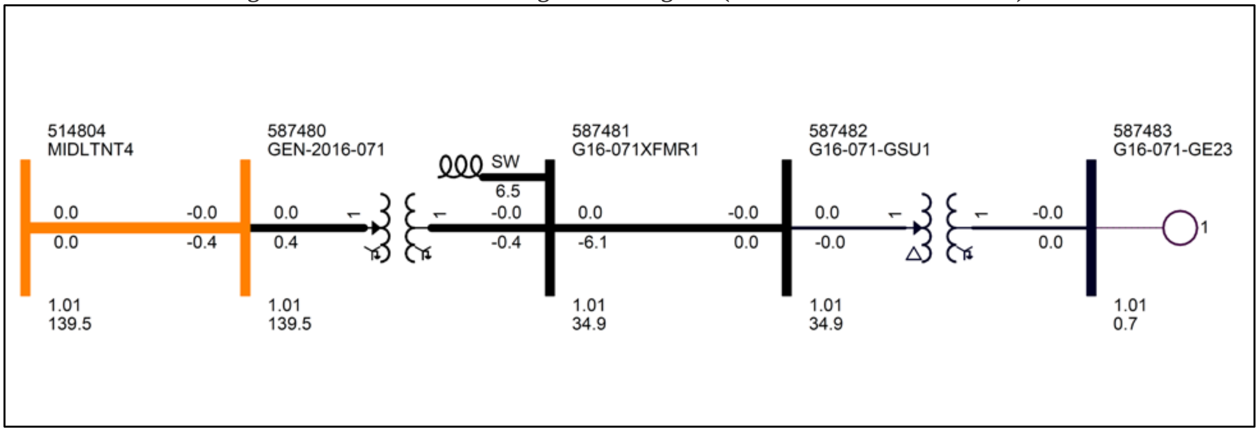


Figure 5-2: GEN-2016-071 Single Line Diagram (Modification Shunt Reactor)



6.0 Material Modification Determination

In accordance with Attachment V of SPP's Open Access Transmission Tariff, for modifications other than those specifically permitted by Attachment V, SPP shall evaluate the proposed modifications prior to making them and inform the Interconnection Customer in writing of whether the modifications would constitute a Material Modification. Material Modification shall mean (1) modification to an Interconnection Request in the queue that has a material adverse impact on the cost or timing of any other Interconnection Request with a later Queue priority date; or (2) planned modification to an Existing Generating Facility that is undergoing evaluation for a Generating Facility Modification or Generating Facility Replacement, and has a material adverse impact on the Transmission System with respect to: i) steady-state thermal or voltage limits, ii) dynamic system stability and response, or iii) short-circuit capability limit; compared to the impacts of the Existing Generating Facility prior to the modification or replacement.

6.1 Results

SPP determined the requested modification is not a Material Modification based on the results of this Modification Request Impact Study performed by Aneden. Aneden evaluated the impact of the requested modification on the prior study results. Aneden determined that the requested modification did not negatively impact the prior study power flow results, and the modifications to the project were not significant enough to change the previously studied dynamic stability and short circuit conclusions.

This determination implies that any network upgrades already required by GEN-2016-071 would not be negatively impacted and that no new upgrades are required due to the requested modification, thus not resulting in a material adverse impact on the cost or timing of any other Interconnection Request with a later Queue priority date.

7.0 Conclusions

The Interconnection Customer for GEN-2016-071 requested a Modification Request Impact Study to assess the impact of the turbine and facility change to 60 x GE 2.82 MW consistent for a total combined capacity of 169.2 MW. In addition, the modification request included changes to the collection system and generator step-up transformers.

As the existing and modification configurations both utilized GE turbines with the GEWTG2 stability model, a turbine parameters comparison and equivalent impedance comparison were performed in order to determine the potential impact of the requested change. SPP determined that because the turbine parameters of the dynamic stability models did not change significantly and the equivalent impedance change of 3.57% was below the 10% threshold, the modification request did not require dynamic stability and short circuit analyses. However, SPP determined that power flow would need to be performed based on the POI MW injection decrease of 14.36% compared to the DISIS-2017-001 power flow models.

The scope of this modification request study included charging current compensation analysis and power flow analysis. The analyses were performed using the PTI PSS/E version 33 and PowerGEM TARA software and the results are summarized below.

The results of the power flow analysis showed that there were no new constraints identified in the modified study models based on the SPP Transfer Distribution Factor (TDF) requirements. In addition, the previously identified thermal constraints in the DISIS-2017-001-1 report were reduced by the GEN-2016-071 capacity reduction.

The results of the charging current compensation analysis performed using the 2019 Winter Peak, 2021 Light Load, 2021 Summer Peak, and 2028 Summer Peak models showed that the GEN-2016-071 project needed a 6.35 MVAr shunt reactor on the 34.5 kV bus of the project substation with the modifications in place, a decrease from the 8.4 MVAr found for the existing GEN-2016-071 configuration calculated using the DISIS-2017-001 models. This is necessary to offset the capacitive effect on the transmission network caused by the project's transmission line and collector system during low-wind or no-wind conditions. The information gathered from the charging current compensation analysis is provided as information to the Interconnection Customer and Transmission Owner (TO) and/or Transmission Operator. The applicable reactive power requirements will be further reviewed by the Transmission Owner and/or Transmission Operator.

The requested modification has been determined by SPP to not be a Material Modification. The requested modification does not have a material adverse impact on the cost or timing of any other Interconnection Request with a later Queue priority date.

In accordance with FERC Order No. 827, the generating facility will be required to provide dynamic reactive power within the range of 0.95 leading to 0.95 lagging at the high-side of the generator substation.

It is likely that the customer may be required to reduce its generation output to 0 MW in real-time, also known as curtailment, under certain system conditions to allow system operators to maintain the reliability of the transmission network.

Nothing in this study should be construed as a guarantee of transmission service or delivery rights. If the customer wishes to obtain deliverability to final customers, a separate request for transmission service must be requested on Southwest Power Pool's OASIS by the customer.