



INTERCONNECTION FACILITIES STUDY REPORT

GEN-2015-066
(IFS-2015-002-38)

Published May 2017

By SPP Generator Interconnections Dept.

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION	COMMENTS
3/15/2017	SPP	Initial draft report issued.	
5/9/2017	SPP	Initial final report issued.	

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SUMMARY

INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request GEN-2015-066/IFS-2015-002-38 is for a 248.40 MW generating facility located in Pawnee County, Oklahoma. The Interconnection Request was studied in the DISIS-2015-002 Impact Study for Energy Resource Interconnection Service (ERIS). The Interconnection Customer's requested in-service date is December 1, 2017.

The interconnecting Transmission Owner, Oklahoma Gas and Electric Company (OKGE), performed a detailed IFS at the request of SPP. The full report is included in Appendix A. Additionally, the Affected System Transmission Owner, Associated Electric Cooperative Inc. (AECI) has performing a detailed Affected System Interconnection Facilities Study (AS-IFS) for impacts on the AECI transmission system. The full report is included in Appendix B. SPP has determined that full Interconnection Service will be available after the assigned Transmission Owner Interconnection Facilities and Shared Network Upgrades are completed.

The primary objective of the IFS is to identify necessary Transmission Owner Interconnection Facilities, Network Upgrade(s), other direct assigned upgrade(s), and associated upgrade lead times needed to grant the requested Interconnection Service at the specified Point of Interconnection (POI).

PHASE(S) OF INTERCONNECTION SERVICE

It is not expected that Interconnection Service will occur in phases. However, Interconnection Service will not be available until all Interconnection Facilities and Network Upgrade(s) can be placed in service.

CREDITS/COMPENSATION FOR AMOUNTS ADVANCED FOR NETWORK UPGRADE(S)

Interconnection Customer shall be entitled to compensation in accordance with Attachment Z2 of the SPP OATT for the cost of SPP Network Upgrades, including any tax gross-up or any other tax-related payments associated with the Network Upgrades, that are not otherwise refunded to the Interconnection Customer. Compensation shall be in the form of either revenue credits or incremental Long Term Congestion Rights (iLTCR).

INTERCONNECTION CUSTOMER INTERCONNECTION FACILITIES

The Generating Facility is proposed to consist of one hundred-eight (108) 2.3 MW General Electric (G.E.) wind generators for a total generating nameplate capacity of 248.40 MW.

The Interconnection Customer's Interconnection Facilities to be designed, procured, constructed, installed, maintained, and owned by the Interconnection Customer at its sole expense include:

- A 34.5kV collector system;
- One (1) 345/34.5kV 170/220/280 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- A less than one (<1) mile overhead 345kV line to connect the Interconnection Customer's substation to the POI at the 345kV bus at the new OKGE substation ("GEN-2015-066 Tap") to be owned and maintained by OKGE. GEN-2015-066 Tap would tap and loop in the Cleveland – Sooner 345kV transmission circuit. GEN-2015-066 Tap is planned to be located approximately ten (10) miles from Sooner 345kV on the Cleveland – Sooner 345kV transmission circuit;
- All transmission facilities required to connect the Interconnection Customer's substation to the POI;
- Equipment at the Interconnection Customer's substation necessary to maintain a power factor at the POI between 95% lagging and 95% leading, including approximately 13.1Mvars¹ of reactors to compensate for injection of reactive power into the transmission system under no/reduced generating conditions. The Interconnection Customer may use wind turbine manufacturing options for providing reactive power under no/reduced generation conditions. The Interconnection Customer will be required to provide documentation and design specifications demonstrating how the requirements are met.

The Interconnection Customer shall coordinate relay, protection, control, and communication system configurations and schemes with the Transmission Owner.

TRANSMISSION OWNER INTERCONNECTION FACILITIES AND NON-SHARED NETWORK UPGRADE(S)

To facilitate interconnection, the interconnecting Transmission Owner will perform work as shown below necessary for the acceptance of the Interconnection Customer's Interconnection Facilities.

Table 1 lists the Interconnection Customer's estimated cost responsibility for Transmission Owner Interconnection Facilities (TOIF) and Non-Shared Network Upgrade(s) and provides an estimated lead time for completion of construction. The estimated lead time begins when the Generator Interconnection Agreement has been fully executed.

¹ This approximate minimum reactor amount is needed for the current configuration of the wind farm as studied in the DISIS-2015-002 Impact Study.

Table 1: Interconnection Customer TOIF and Non-Shared Network Upgrade(s)

TOIF and Non-Shared Network Upgrades Description	Allocated Cost Estimate (\$)	Allocated Percent (%)	Total Cost Estimate (\$)	Estimated Lead Time
<u>OKGE GEN-2015-066 Tap Interconnection Substation: Transmission Owner Interconnection Facilities</u> Construct one (1) 345 kV line terminal, line switches, dead end structure, line relaying, communications, revenue metering, line arrester and all associated equipment and facilities necessary to accept transmission line from Interconnection Customer’s Generating Facility.	\$1,099,958	100%	\$1,099,958	13 Months*
<u>OKGE GEN-2015-066 Tap Interconnection Substation - Non-Shared Network Upgrades*</u> Install three (3) 3000 continuous ampacity breakers, cut in transmission line and re-terminate, control panels, line relaying, disconnect switches, structures, foundations, conductors, insulators, and all other associated work and materials.	\$9,213,042*	100%	\$9,213,042	
Total	\$10,313,000	100%	\$10,313,000	

*Estimated costs, descriptions, and lead time are based on the Interconnection Customer providing the Transmission Owner land for the new substation.

AFFECTED SYSTEM UPGRADE(S)

To facilitate interconnection, the Affected System Transmission Owner, has performed study work necessary for the acceptance of the Interconnection Customer’s Interconnection Facilities.

Cleveland – Silver City 138kV upgrade is required by the Interconnection Request and also GEN-2015-047/IFS-2015-002-02. This shared upgrade cost assignment will be determined by AECI if both requests proceed into a construction agreement with AECI. If GEN-2015-047/IFS-2015-002-02 withdraws, then the total cost for the Cleveland – Silver City 138kV upgrade could be assigned to this Interconnection Request.

The Interconnection Customer’s costs for Affected System Upgrade(s) are estimated in **Table 2** below.

Table 2: Interconnection Customer Affected System Upgrades

Shared Network Upgrades Description	Allocated Cost Estimate (\$)	Allocated Percent (%)	Total Cost Estimate (\$)
<u>AECI Cleveland – Silver City 138kV circuit #1</u> uprate Cleveland – Silver City 138kV line to operate at 100C temperature, remove silver city wave trap, reconfigure CT ration at Silver City and Cleveland	TBD by AECI *	TBD by AECI *	\$790,900
Total	TBD by AECI*	TBD by AECI*	\$790,900

*To be determined by AECI if this upgrade is a shared upgrade with GEN-2015-047.

SHARED NETWORK UPGRADE(S)

The Interconnection Customer’s share of costs for Shared Network Upgrades is estimated in **Table 3** below.

Table 3: Interconnection Customer Shared Network Upgrades

Shared Network Upgrades Description	Allocated Cost Estimate (\$)	Allocated Percent (%)	Total Cost Estimate (\$)
<u>Currently none</u>	\$0	N/A	\$0
Total	\$0	N/A	\$0

All studies have been conducted assuming that higher-queued Interconnection Request(s) and the associated Network Upgrade(s) will be placed into service. If higher-queued Interconnection Request(s) withdraw from the queue, suspend or terminate service, the Interconnection Customer’s share of costs may be revised. Restudies, conducted at the customer’s expense, will determine the Interconnection Customer’s revised allocation of Shared Network Upgrades.

OTHER NETWORK UPGRADE(S)

Certain Other Network Upgrades are currently not the cost responsibility of the Interconnection Customer but will be required for full Interconnection Service.

1) Currently None

Depending upon the status of higher- or equally-queued customers, the Interconnection Request’s in-service date is at risk of being delayed or Interconnection Service is at risk of being reduced until the in-service date of these Other Network Upgrades.

CONCLUSION

After all Interconnection Facilities, Network Upgrades, and Affected System Upgrade(s) have been placed into service, Interconnection Service for 248.40 MW can be granted. Interconnection Service will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades are completed. The Interconnection Customer’s estimated cost responsibility for Transmission Owner Interconnection Facilities, Non-Shared Network Upgrades is summarized in the table below.

Table 4: Cost Summary

Description	Allocated Cost Estimate
Transmission Owner Interconnection Facilities	\$1,099,958
Network Upgrades	\$9,213,042
Affected System Upgrades	TBD by AECI
Total	\$10,313,000

A draft Generator Interconnection Agreement will be provided to the Interconnection Customer consistent with the final results of this IFS report. The Transmission Owner and Interconnection Customer will have 60 days to negotiate the terms of the GIA consistent with the SPP OATT.

APPENDICES

A: TRANSMISSION OWNER'S INTERCONNECTION FACILITIES STUDY REPORT

See next page for the Transmission Owner's Interconnection Facilities Study Report.



FACILITY STUDY

for

Generation Interconnection Request 2015-066

248.4 MW Wind Generating Facility
In Pawnee County
Oklahoma

May 12, 2016

Andrew R. Aston, P.E.
Lead Engineer
Transmission Planning
OG&E Electric Services

Summary

Pursuant to the tariff and at the request of the Southwest Power Pool (SPP), Oklahoma Gas and Electric (OG&E) performed the following Facility Study to satisfy the Facility Study Agreement executed by the requesting customer for SPP Generation Interconnection request Gen-2015-066. The request for interconnection was placed with SPP in accordance SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system. The requirements for interconnection consist of building a new EHV substation, with three new 345kV breakers, a terminal for the wind farm line, a terminal for a line to Sooner, and a terminal for a line to Cleveland. The total cost for OKGE to build the new substation with three new 345kV breakers, and three line terminals in a new EHV Substation, the interconnection facility, is estimated at \$10,313,000.

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Introduction

The Southwest Power Pool has requested a Facility Study for the purpose of interconnecting a wind generating facility within the service territory of OG&E Electric Services (OKGE) in Pawnee County Oklahoma. The proposed 345kV point of interconnection is at a new EHV Substation in Pawnee County. This substation will be owned by OKGE and will be located approximately 10 miles from Sooner on the Sooner-Cleveland Transmission line. The cost for adding a new 345kV terminal to a new EHV Substation, the required interconnection facility, is estimated at \$1,099,958.

Network Constraints in the Southwest Public Service (SPS), OKGE and Western Farmers Electric Cooperative (WFEC) systems may be verified with a transmission service request and associated studies.

Other Network Constraints in the American Electric Power West (AEPW), Southwest Public Service (SPS), OKGE and Western Farmers Electric Cooperative (WFEC) systems may be verified with a transmission service request and associated studies.

Interconnection Facilities

The primary objective of this study is to identify attachment facilities. The requirements for interconnection consist of adding a new 345kV terminal in a new EHV Substation. This 345kV addition shall be constructed and maintained by OKGE. It is assumed that obtaining all necessary right-of-way for the line into the new OKGE 345kV substation facilities will be performed by the interconnection customer.

The total cost for OKGE to add a new 345kV terminal in a new EHV Substation, the interconnection facility, is estimated at \$1,099,958. This cost does not include building the 345kV line from the Customer substation into the new EHV Substation. The Customer is responsible for this 345kV line up to the point of interconnection. This cost does not include the Customer's 345-34.5kV substation and the cost estimate should be determined by the Customer.

This Facility Study does not guarantee the availability of transmission service necessary to deliver the additional generation to any specific point inside or outside the Southwest Power Pool (SPP) transmission system. The transmission network facilities may not be adequate to deliver the additional generation output to the transmission system. If the customer requests firm transmission service under the SPP Open Access Transmission Tariff at a future date, Network Upgrades or other new construction may be required to provide the service requested under the SPP OATT.

The costs of interconnecting the facility to the OKGE transmission system are listed in Table 1.

Short Circuit Fault Duty Evaluation

It is standard practice for OG&E to recommend replacing a circuit breaker when the current through the breaker for a fault exceeds 100% of its interrupting rating with re-closer de-rating applied, as determined by the ANSI/IEEE C37.5-1979, C37.010-1979 & C37.04-1979 breaker rating methods.

For this generator interconnection, no breakers were found to exceed their interrupting capability after the addition of the Customer’s 248.4 MW generation and related facilities. OG&E found no breakers that exceeded their interrupting capabilities on their system. Therefore, there is no short circuit upgrade costs associated with the Gen-2015-066 interconnection.

Table 1: Required Interconnection Network Upgrade Facilities

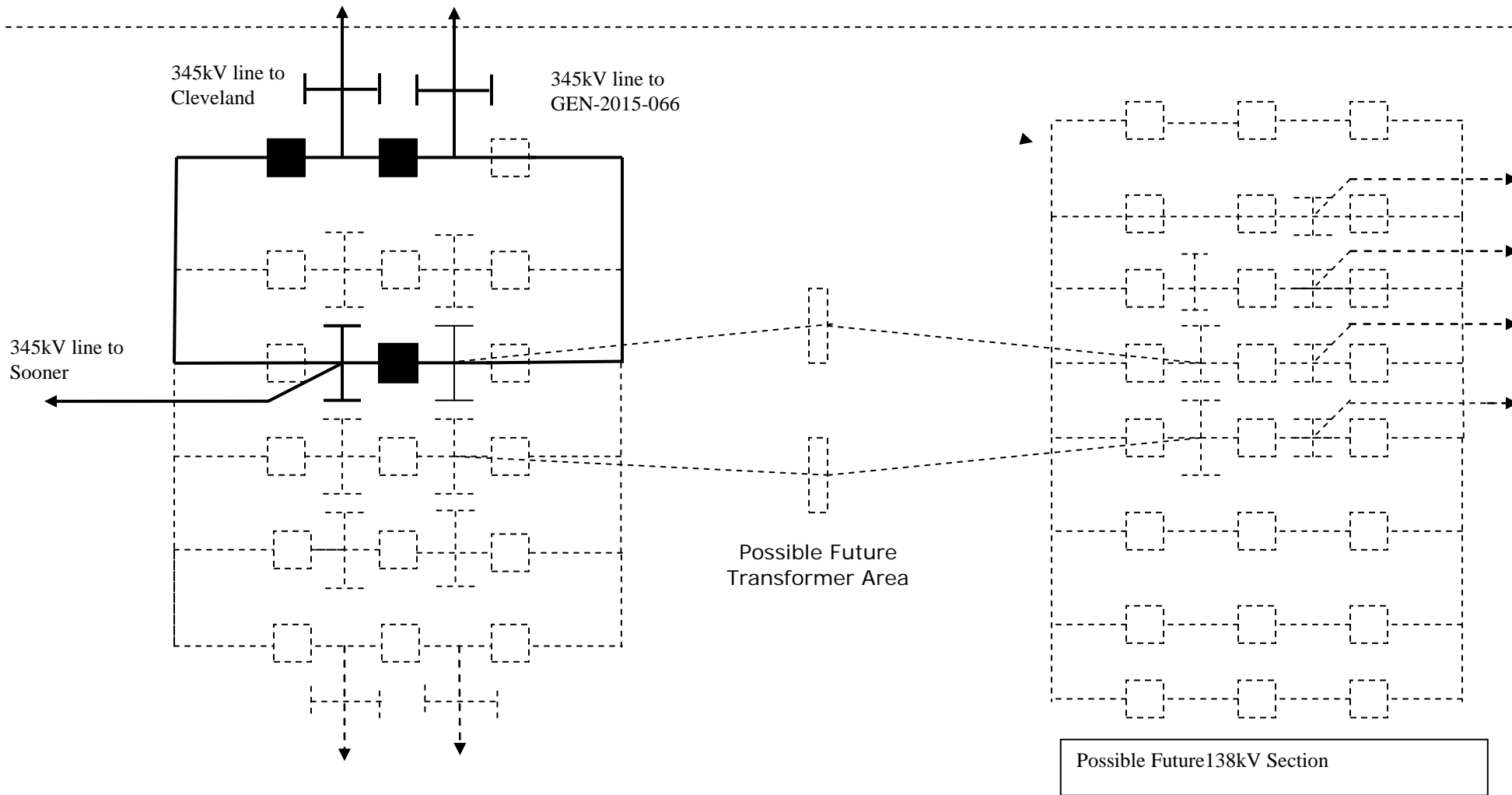
Facility	ESTIMATED COST (2016 DOLLARS)
OKGE – Interconnection Facilities - Add a single 345kV line terminal to a new EHV Substation. Dead end structure, line switch, line relaying, revenue metering including CTs and PTs	\$1,099,958
OKGE – Network Upgrades at a new EHV sub, Install 3-345kV 3000A breakers, line relaying, disconnect switches, and associated equipment.	\$9,213,042
OKGE – Land for substation provided by GEN-2015-066	\$0
Total	\$10,313,000

Prepared by Andrew R. Aston, PE
Lead Engineer, Transmission Planning
OG&E Electric Services

May 12, 2016

Reviewed by:
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Steve M. Hardebeck, P.E.
Manager, Transmission Planning

New Substation in Pawnee County



PL

B: AFFECTED SYSTEM TRANSMISSION OWNER'S AFFECTED SYSTEM INTERCONNECTION FACILITIES STUDY REPORT

See next page for the Affected System Transmission Owner's Affected System Interconnection Facilities Study Report.



Associated Electric Cooperative, Inc.

Your Touchstone Energy® Partner 

Affected System Study

Omitted Text



December 2016

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Executive Summary

Associated Electric Cooperative, Inc. (AECI) was identified as a potentially Affected System in the Southwest Power Pool's (SPP) Definitive Interconnection System Impact Study for Generation Interconnection Requests (DISIS-2015-002) analysis of their GEN-2015-066 interconnection request. Omitted Text requested AECI perform an Affected System Study for the interconnection of 248.4 MW of wind generation on the Sooner to Cleveland 345 kV line.

The impact was evaluated against NERC Reliability Standard TPL-001-4 category P0, P1, and P6 events using AECI's Planning Criteria. The Affected System Study was a load flow analysis only. Stability and short circuit analysis have been performed by SPP and were not performed as part of the Affected System Study.

The interconnection request does not constitute a request for transmission service nor do the results of the Affected System Study confer upon Omitted Text any right to receive transmission service neither on the AECI transmission system nor on neighboring systems. All requests for transmission service must be requested in accordance with the AECI Open Access Transmission Tariff as well as in accordance with the rules of neighboring systems, if such request is made of them.

The results of the N-1 simulations show that the generators in the DISIS-2015-002 study cause the Cleveland-Silver City 138 kV line to overload for the loss of the Cleveland –North Tulsa 345 kV line. In the 2020 light load case the loading increases 39.0% from 80.4% to 119.4%.

The sensitivity results show the Omitted Text (GEN-2015-066) has a 10.4% impact on the Cleveland-Silver City 138 kV line loading.

The Omitted Text (GEN-2015-066) has a greater than 5% impact on the overloaded Cleveland-Silver City 138 kV line, and thus is required to mitigate the overload.

The estimated cost to mitigate the overload is \$790,900.

Introduction

Associated Electric Cooperative, Inc. (AECI) was identified as a potentially Affected System in the Southwest Power Pool’s (SPP) Definitive Interconnection System Impact Study for Generation Interconnection Requests (DISIS-2015-002) analysis of their GEN-2015-066 interconnection request. **Omitted Text** requested AECI perform an Affected System Study for the interconnection of 248.4 MW of wind generation on the Sooner to Cleveland 345 kV line.

The objective of the affected system study is to confirm SPP’s study and evaluate the impact of the addition of wind generation on the Sooner to Cleveland 345 kV line upon AECI’s transmission system, develop solutions/system improvements with cost estimates, and determine a schedule for completing the improvements.

The impact was evaluated against NERC Reliability Standard TPL-001-4 category P0, P1, and P6 events using AECI’s Planning Criteria. The Affected System Study was a load flow analysis only. Stability and short circuit analysis have been performed by SPP and were not performed as part of the Affected System Study.

System Representation

The base models used for the Affected System Study were models SPP developed for the July 8, 2016 DISIS-2015-002 generation interconnection requests as shown in Table 1.

Table 1 Models

<u>Year</u>	<u>Season</u>	<u>Base Case</u>	<u>Generation Case</u>
2016	Winter	BC0016WP0-C	TC0016WP0-C
2016	Winter	BC00NR16WP0-C	TC00NR16WP0-C
2016	Winter	BC08ALL16WP0-C	TC08ALL16WP0-C
2017	Summer	BC0017SP0-C	TC0017SP0-C
2017	Spring	BC08ALL17G0-C	TC08ALL17G0-C
2017	Spring	BC08NR17G0-C	TC08NR17G0-C
2020	Summer	BC0020SP0-C	TC0020SP0-C
2020	Winter	BC0020WP0-C	TC0020WP0-C
2020	Summer	BC00NR20SP0-C	TC00NR20SP0-C
2020	Winter	BC00NR20WP0-C	TC00NR20WP0-C
2020	Light Load	BC08NR20L0-C	TC08NR20L0-C
2020	Light Load	BC08ALL20L0-C	TC08ALL20L0-C
2020	Summer	BC08ALL20SP0-C	TC08ALL20SP0-C
2020	Winter	BC08ALL20WP0-C	TC08ALL20WP0-C
2025	Summer	BC0025SP0-C	TC0025SP0-C
2025	Summer	BC00NR25SP0-C	TC00NR25SP0-C
2025	Summer	BC08ALL25SP0-C	TC08ALL25SP0-C

These models were checked against AECI models to identify any needed topology changes and updated as appropriate.

Figure 1 below shows a one-line of the Proposed Point of Interconnection for GEN-2015-066.

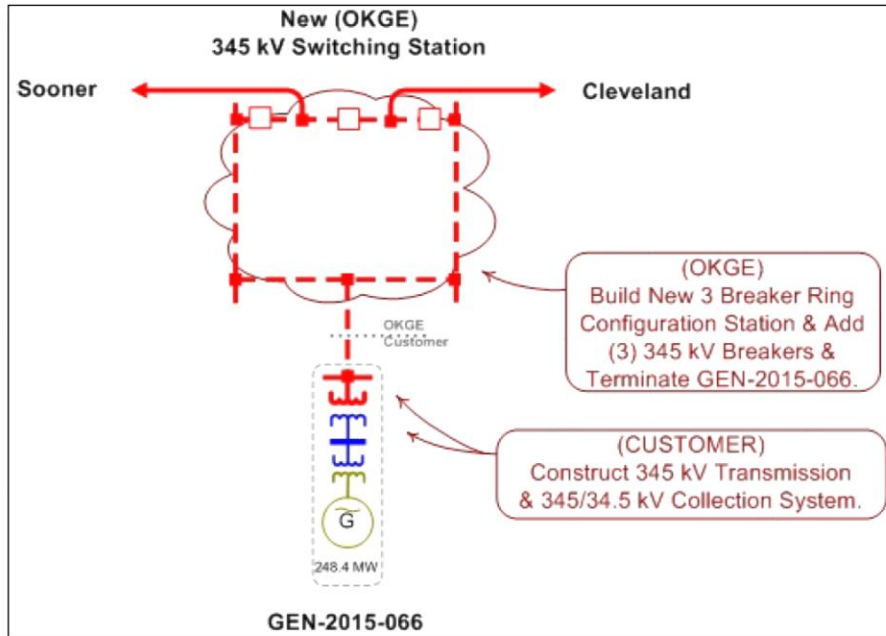


Figure 1: GEN-2015-066 Proposed Point of Interconnection

System Analysis Methodology

Normal conditions and Contingency analysis were simulated on the July 8, 2016 updated DISIS-2015-002 SPP models.

- Normal conditions (TPL-001-4 P0)
- All N-1 single-element contingencies 69 kV and above in the following areas were simulated (TPL-001-4 P2):
 - AREA 330 /*AECI
 - AREA 333 /*City of Columbia
 - AREA 523 /*GRDA
 - AREA 347 /*TVA
 - AREA 327 /*EES-ARK
 - AREA 351 /*EES
 - AREA 356 /*AMMO
 - AREA 515 /*SWPA
 - AREA 520 /*AEPW
 - AREA 524 /*OKGE
 - AREA 525 /*WFEC
 - AREA 536 /*WERE
 - AREA 540 /*MIPU
 - AREA 541 /*KACP
 - AREA 544 /*EMDE
 - AREA 545 /*INDN
 - AREA 546 /*SPRM
 - AREA 627 /*ALTW
 - AREA 635 /*MEC
 - AREA 640 /*NPPD
 - AREA 645 /*OPPD

- AREA 650 /*LES
- AREA 652 /*WAPA
- Select N-2 Contingencies 69 kV and above in the project area were evaluated (TPL-001-4 P6).

Monitoring of Facilities

- AECI monitored all AECI 69 kV and above facilities for criteria violations
- AECI developed corrective plans for all N-1 violations identified.

Sensitivity

If criteria violations were observed, then GEN-2015-066 was removed from service, and the problem contingencies were simulated again to determine the impact of the generator.

The generator was deemed to have a negative impact on a facility if it caused more than a 5% impact on a post-project criteria violation that was not already a pre-project violation (based upon the impacted facility's rating).

N-1 Results

The N-1 simulation results as shown in Table 1 below shows DISIS-2015-002 Projects' impacts to the Cleveland-Silver City 138 kV line.

Table 2: Impacts of All DISIS-2015-002 Projects

CASE	ELEMENT	CONTINGENCY	MVA RATING	Pre-Projects		Post-Projects		% Delta
				MVA Flow	% Load	MVA Flow	% Load	
2020 Light Load 08ALL	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV Ckt #1 Out	174	145	80.4%	213.5	119.4%	39.0%

N-1 Sensitivity Results

GEN-2015-066, was turned off and the contingencies in Table 2 were simulated again to determine the impacts attributable to GEN-2015-066. Table 3 below shows the impacts with GEN-2015-066 turned off. The results indicate that GEN-2015-066 over loads the Cleveland-Silver City 138kV Ckt 1 line (2020LL) with an impact of greater than 5%.

Table 3: Sensitivity Results of Gen-066 Impacts

CASE	ELEMENT	CONTINGENCY	Pre-Projects % Load	Post-Projects % Load	Post-Projects without Gen-066 % Load	% Delta (Gen-066 Impact)
2020 Light Load 08ALL	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV Ckt #1 Out	80.4%	119.4%	109.0%	10.4%

Mitigation Improvements

To address the Cleveland-Silver City 138 kV line overload, the existing 795 ASCR line conductor rated at 174 MVA was modeled as being uprated to an operating temperature of 100C with a rating of 244 MVA. The contingency simulations were then run again on the updated models.

Table 4 below shows the results of the simulations without and with the improvements.

Table 4: Results with Cleveland-Silver City 138 kV Line Uprated to 100C Operating Temperature

CASE	ELEMENT	CONTINGENCY	Pre-Projects		Post-Projects		Post Projects Mitigated	
			MVA Flow	% Load	MVA Flow	% Load	MVA Flow	% Load
2020 Light Load 08ALL	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV Ckt #1 Out	145	80.40%	213.5	119.4%	211.3	84.2%

Cost of Improvements

The estimated cost for the improvement is shown in Table 5 below.

Table 5: Cost Estimate of Improvement

Option / Description	Current Cost
Uprate Cleveland-Silver City 138 kV line to 100C operating temperature (21.822 mi)	\$675,000
Remove a Wave Trap at Silver City, Reconfigure CT ratio at Silver City and Cleveland	\$44,000
Contingencies	\$71,900
Total Cost	\$790,900

N-2 Results

For informational purposes, select N-2 (TPL-001-4 P6) contingencies were simulated. Table 6 below shows the results of those simulations.

Table 6: Impacts of All DISIS-2015-002 Projects for N-2 Contingencies

CASE	ELEMENT	CONTINGENCY	MVA RATING	Pre-Project		Post-Project		% Delta
				MVA Flow	% Load	MVA Flow	% Load	
2017 Spring 08ALL	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Sooner-SpringCreek Out	174	124.4	71.5%	208.4	119.8%	48.3%
2020 Light Load 08ALL	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Cleveland 161/69kV Xfmr#1 Out	174	141.6	81.4%	210.0	120.7%	39.3%
	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Cleveland 161/69kV Xfmr#1 Out	174	167.8	96.4%	249.3	143.3%	46.8%
2020 Summer 08ALL	Cleveland-Dist.-Osage 69kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Cleveland-SilverCity 138kV Out	44	38.9	88.5%	50.1	113.9%	25.4%
	Cleveland-Osage 69kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Cleveland-SilverCity 138kV Out	87	67.0	77.0%	87.7	100.9%	23.9%
	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Sooner-SpringCreek Out	174	119.6	68.7%	197.4	113.5%	44.7%
	Cleveland 138/69kV Xfmr #2 Loading	Cleveland-T.NO.--7 345kV & Cleveland 161/69kV Xfmr#1 Out	494	455.8	92.3%	571.3	115.7%	23.4%
2025 Summer 08ALL	Cleveland-Dist.-Osage 69kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Cleveland-SilverCity 138kV Out	44	34.4	78.2%	45.6	103.7%	25.5%
	Cleveland-Silver City 138kV Ckt 1 Line Loading	Cleveland-T.NO.--7 345kV & Sooner-SpringCreek Out	174	99.8	57.4%	176.5	101.4%	44.1%
	Cleveland 138/69kV Xfmr #2 Loading	Cleveland-T.NO.--7 345kV & Cleveland 161/69kV Xfmr#1 Out	494	407.2	82.4%	519.0	105.1%	22.6%

Assessment

The results of the N-1 simulations show that the generators in the DISIS-2015-002 study cause the Cleveland-Silver City 138 kV line to overload for the loss of the Cleveland –North Tulsa 345 kV line. In the 2020 light load case the loading increases 39.0% from 80.4% to 119.4%.

The sensitivity results show the Omitted Text (GEN-2015-066) has a 10.4% impact on the Cleveland-Silver City 138 kV line loading.

The Omitted Text (GEN-2015-066) has a greater than 5% impact on the overloaded Cleveland-Silver City 138 kV line, and thus is required to mitigate the overload.

The estimated cost to mitigate the overload is \$790,900.

The interconnection request does not constitute a request for transmission service nor do the results of the Affected System Study confer upon Omitted Text any right to receive transmission service neither on the AECI transmission system nor on neighboring systems. All requests for transmission service must be requested in accordance with the AECI Open Access Transmission Tariff as well as in accordance with the rules of neighboring systems, if such request is made of them.