



**Interconnection Facilities Study
For
Generator Interconnection
Request
GEN-2014-047
(IFS-2014-002-16)**

***SPP Generator
Interconnection Studies***

***(#GEN-2014-047)
(#IFS-2014-002-16)***

March 2016

Revision History

| Date | Author | Change Description |
|------------|--------|---|
| 9/16/2015 | SPP | Draft Interconnection Facilities Study Report Revision 0 Issued |
| 10/20/2015 | SPP | Final Interconnection Facilities Study Report Revision 0 Issued |
| 1/29/2016 | SPP | Facilities Study Report Revised for changes in DISIS-2014-002-5 Shared Network Upgrades |
| 3/11/2016 | SPP | Facilities Study Report Revised for changes in DISIS-2014-002-6 Shared Network Upgrades |

Summary

Southwestern Public Service Company (SPS), an operating company subsidiary of Xcel Energy Inc., performed a detailed Interconnection Facilities Study (IFS) at the request of Southwest Power Pool (SPP) for Generator Interconnection request GEN-2014-047/IFS-2014-002-16 (40.00 MW/Solar) located in Roosevelt County, New Mexico. The Interconnection Customer's originally proposed in-service date for GEN-2014-047/IFS-2014-002-16 is December 1, 2016. SPP has proposed the full interconnection service in-service date will be after the assigned Transmission Owner Interconnection Facilities, Non-Shared Network Upgrade(s), and Shared Network Upgrade(s) are completed. Full Interconnection Service will require the Network Upgrade(s) listed in the "Other Network Upgrades" section. The request for interconnection was placed with SPP in accordance with SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system.

Phases of Interconnection Service

It is not expected that interconnection service will require phases however, interconnection service will not be available until all interconnection facilities and network upgrades can be placed in service.

Interconnection Customer Interconnection Facilities

The Interconnection Customer's generation facility consists of eighty (80) Advanced Energy (A.E.) 500NX 0.5MW solar inverters for a total nameplate rating of 40.00 MW. The 34.5kV collector system for this solar facility is planned to be connected to one (1) 345/34.5kV Interconnection Customer owned and maintained transformer at the Interconnection Customer owned substation. An approximate nine (9) mile overhead 345kV transmission circuit will connect GEN-2014-047/IFS-2014-002-16 to the Point of Interconnection (POI) at the planned 345kV bus at the SPS owned Crossroads Substation. The Interconnection Customer will be responsible for all of the transmission facilities connecting the Interconnection Customer owned substation to the POI.

The Interconnection Customer will be responsible for any equipment located at the Customer substation necessary to maintain a power factor of 0.95 lagging to 0.95 leading at the POI. The Interconnection Customer will need to coordinate with the Transmission Owner for relay, protection, control, and communication system configurations.

Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s)

To facilitate interconnection the Transmission Owner will construct a new 345kV terminal at the Crossroads 345kV substation. In order to add another 345kV terminal, SPS will need to expanding the planned three (3) breaker ring configuration to breaker-and-half configuration, add three (3) 3000A continuous ampacity 345kV circuit breakers and associated terminal equipment for acceptance of the Interconnection Customer's Interconnection Facilities. Currently, SPS estimates an Engineering and Construction (E&C) lead time of approximately eighteen (18) months after a fully executed Generator Interconnection Agreement (GIA) for the completion of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, GEN-2014-047/IFS-2014-002-16 is responsible for \$3,164,380 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s). **Table 1** displays the estimated costs for Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s).

Table 1: GEN-2014-047/IFS-2014-002-16 TOIF and Non-Shared Network Upgrade(s)

| Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades Description | Allocated Cost (\$) | Allocated Percent (%) | Total Cost (\$) |
|---|---------------------|-----------------------|-----------------|
| Interconnection Substation - Transmission Owner Interconnection Facilities 345kV Substation work for a new line terminal position, line switch, dead end structure, communications, revenue metering, and line arrestors | \$337,375 | 100% | \$337,375 |
| Interconnection Substation - Network Upgrade(s) 345kV Substation work for substation expansion, new terminal position, build three (3) 3000A continuous ampacity 345kV breakers and associated switches, structures, other terminal equipment. | \$2,827,005 | 100% | \$2,827,005 |
| Total | \$3,164,380 | 100% | \$3,164,380 |

Full Study Detail

For the full Interconnection Facilities Study performed by Xcel Energy/SPS for the Interconnection Substation, please refer to the 1st revision of this study. The link for the 1st revision can be found here.

http://sppoasis.spp.org/documents/swpp/transmission/studies/files/2014_Generation_Studies/GEN-2014-047-IFS-2014-002-16_FacilityStudy-R1-FINAL_clean_2-2-16.pdf

Shared Network Upgrade(s)

The Interconnection Customer was studied within the DISIS-2014-002 Impact Study, and its subsequent restudies, the latest iteration being DISIS-2014-002-5, with Energy Resource Interconnection Service (ERIS) only. At this time, the Interconnection Customer is allocated \$1,572,354 for Shared Network Upgrades. If higher queued interconnection customers withdraw from the queue, suspend or terminate their GIA, restudies will have to be conducted to determine the Interconnection Customers' allocation of Shared Network Upgrades. All studies have been conducted on the basis of higher queued interconnection requests and the upgrades associated with those higher queued interconnection requests

being placed in service. At this time, the Interconnection Customer is allocated the following cost for Shared Network Upgrades:

Table 2: GEN-2014-047/IFS-2014-002-16 Shared Network Upgrade(s)

| Shared Network Upgrades Description | Allocated Cost (\$) | Allocated Percent (%) | Total Cost (\$) |
|---|---------------------|-----------------------|---------------------|
| Tolk – Plant X 230kV Circuit #1 & #2: Rebuild Tolk – Plant X circuits #1 and #2 | \$1,201,337 | 12.11 | \$9,921,693 |
| TUCO Substation 345/230kV Transformer replacement: Replace existing 345/230kV 560MVA transformer with unit with emergency ratings of 644MVA(summer)/700MVA(winter) | \$371,017 | 11.08 | \$3,374,036 |
| Total | \$1,572,354 | | \$13,295,729 |

Other Network Upgrades

Certain Other Network Upgrades are currently not the cost responsibility of the Customer but will be required for full Interconnection Service. Currently, the following Other Network Upgrades are assigned to GEN-2014-047/IFS-2014-002-16:

- China Draw 115kV Reactive Power Support build assigned in 2015 Integrated Transmission Plan Near Term Assessment (ITPNT) per SPP-NTC-C-200324
- Livingston Ridge – Sage Brush – Lagarto – Cardinal 115kV circuit #1 assigned in the High Priority Increment Load Study (HPILs) per SPP-NTC-200309 with current on schedule 6/1/2018 in-service
- Potash Junction Project 230/115kV assigned in High Priority Increment Load Study (HPILs) per SPP-NTC-200282 with current on schedule 12/1/2015 in-service
- Potash Junction 230kV Reactive Power Support assigned in 2015 Integrated Transmission Plan Near Term Assessment (ITPNT) per SPP-NTC-C-200324
- Road Runner 115kV Reactive Power Support assigned in 2015 Integrated Transmission Plan Near Term Assessment (ITPNT) per SPP-NTC-C-200324

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

Conclusion

Interconnection Service for GEN-2014-047/IFS-2014-002-16 will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades are constructed. The Interconnection Customer is responsible for \$3,164,380 of Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated \$1,572,354 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 40.00 MW, as requested by GEN-2014-047/IFS-2014-002-16, can be allowed.

At this time the total allocation of costs assigned to GEN-2014-047/IFS-2014-002-16 for interconnection Service are estimated at \$4,736,734.