Interconnection Facilities Study
For
Generator Interconnection Request
GEN-2014-033
(IFS-2014-002-10)

SPP Generator Interconnection Studies

(#GEN-2014-033)
(#IFS-2014-002-10)

July 2016

Revision History

Date	Author	Change Description
9/15/2015	SPP	Draft Interconnection Facilities Study Report Revision 0 Issued
10/19/2015	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
7/27/2016	SPP	Facilities Study Report Revised for changes in Solar Inverters

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-2014-033/IFS-2014-002-10 (70.00 MW/Solar) located in Chaves County, New Mexico. The Interconnection Customer's originally proposed in-service date for GEN-2014-033/IFS-2014-002-10 is December 31, 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 seventeen (17) GE Prolec 4 MVA, two (2) GE Prolec 1 MVA, and five (5) Schneider XC680 0.680 MVA photovoltaic (solar) inverters for a total Interconnection Service amount of 70.00 MW. The 34.5kV collector system for this solar facility is planned to be connected to one (1) 115/34.5kV Interconnection Customer-owned-and-maintained transformer at the Interconnection Customer-owned substation. An approximately one-tenth (1/10) mile overhead 115kV transmission circuit will connect GEN-2014-033/IFS-2014-002-10 to the Point of Interconnection (POI) at the existing 115kV bus at the SPS-owned Chaves County 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. Also, 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 115kV terminal position to the Chaves County Interchange. In order to add another 115kV terminal, SPS will need to add expand the breaker-and-a-half bus configuration, two (2) 3000A, 115kV circuit breakers and associated terminal equipment for acceptance of the Interconnection Customer's Interconnection Facilities. Additional Network Upgrade work will be needed to relocate the existing capacitor bank(s) and existing reactor bank(s) to a more suitable location on the 115kv bus configuration to accommodate the addition of the new rung. Currently, SPS estimates an Engineering and Construction (E&C) lead time of approximately twenty-four (24) 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-2014-033/IFS-2014-002-10 is responsible for an estimated $2,090,343 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-2014-033/IFS-2014-002-10 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 115kV Substation work for a new line terminal position, line switch, dead end structure, communications, revenue metering, and line arrestors	$260,000	100%	$260,000
Interconnection Substation - Network Upgrade(s) 115kV Substation work for a new terminal position, build new rung, two (2) 3000A breakers and associated 3000A switches, structures, other terminal equipment. Capacitor Bank(s) & Reactor Bank(s) relocation work and equipment.	$1,830,343	100%	$1,830,343
Total	$2,090,343	100%	$2,090,343

If GEN-2014-034/IFS-2014-002-11 or GEN-2014-035/IFS-2014-002-12 withdraw or terminate their Generator Interconnection Requests (GIRs), Transmission Owner Interconnection Facilities and Non-Shared Network Upgrade(s) and cost requirements for GEN-2014-034/IFS-2014-002-11 or GEN-2014-035/IFS-2014-002-12 could be assigned to GEN-2014-033/IFS-2014-002-10.

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

http://sppoasis.spp.org/documents/swpp/transmission/studies/files/2014_Generation_Studies/GEN-2014-033-IFS-2014-002-10_FacilityStudy-R0-FINAL.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 an estimated $2,360,190 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 estimated cost for Shared Network Upgrades:

Table 2: GEN-2014-033/IFS-2014-002-10 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	$1,708,374	17.22	$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)	$651,816	19.47	$3,374,036
Total	$2,360,190		$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-2014-033/IFS-2014-002-10:

- Amoco Wasson – Oxy Tap 230kV circuit #1 replace terminal equipment assigned to DISIS-2012-002 Interconnection Customer(s)
- Livingston Ridge – Sage Brush – Lagarto – Cardinal 115kV circuit #1 assigned in the High Priority Incremental Load Study (HPIL) per SPP-NTC-200309 currently on-schedule for a 6/1/2018 in-service date
- Potash Junction 230kV 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-2014-033/IFS-2014-002-10 will be delayed until the Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades are constructed. The Interconnection Customer is responsible for an estimated $2,090,343 of

Transmission Owner Interconnection Facilities and Non-Shared Network Upgrades. At this time, the Interconnection Customer is allocated an estimated $2,360,190 for Shared Network Upgrades. After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for 70.00 MW, as requested by GEN-2014-033/IFS-2014-002-10, can be allowed.

At this time the total allocation of costs assigned to GEN-2014-033/IFS-2014-002-10 for interconnection Service are estimated at $4,450,533.