



**Interconnection Facilities Study  
For  
Southwestern Public Service/Xcel  
Energy  
Shared Network Upgrade(s)  
Transmission Facilities**

***SPP Generator  
Interconnection Studies***

***(#IFS-2014-002)***

**February 2016**

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## Revision History

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Date	Author	Change Description
9/18/2015	SPP	Final Shared Network Upgrade(s) Facilities Study Report Revision 0 Issued
1/11/2016	SPP	Final Shared Network Upgrade(s) Facilities Study Report Revision 0 Issued Accounting for DISIS-2014-002-4 Network Upgrade(s)
2/2/2016	SPP	Revised study report to account for the withdrawal of GEN-2014-053 and GEN-2014-054

## Summary

Southwestern Public Service/Xcel Energy (SPS) a performed a detailed Interconnection Facility Study at the request of Southwest Power Pool (SPP) for Shared Network Upgrade(s) assigned in SPP Generator Interconnection (GI) impact study DISIS-2014-002 and its subsequent restudies. The latest restudy iteration is DISIS-2014-002-5 that was posted on January, 2016. Interconnection Request(s) that have cost allocation responsibilities for assigned network upgrades will require the assigned network upgrades to be in-service for full Interconnection Service. The request for interconnection was placed with SPP in accordance with SPP's Open Access Transmission Tariff, which covers new generator interconnections on SPP's transmission system. Based on DISIS-2014-002-5 Impact Restudy results, the the following Shared Network Upgrade(s) are needed:

- Plant X – Tolk 230kV rebuild circuit #1 and #2
  - Cost Estimate: \$9,921,693
- Tuco Substation – Replace 345/230kV transformer #1.
  - Cost Estimate: \$3,347,036
- Pleasant Hill – Norton 230/115kV transmission circuit and transformer
  - Cost Estimate: \$49,592,501

## Generator Interconnection Request(s)

The Interconnection Request(s) assigned the Shared Network Upgrade(s) are listed in the corresponding **Tables 1 – 4**.

**Table 1: Generator Interconnection Requests for Plant X – Tolk 230kV rebuild circuit #1 and #2**

GI Request Number	Point of Interconnection (POI)	Capacity (MW)
ASGI-2014-002	Tucumcari 115kV	49.6
ASGI-2014-005	Strata 69kV	10
ASGI-2014-008	South Loving 69kV	10
ASGI-2014-009	Wood Draw 115kV	10
ASGI-2014-010	Ochoa 115kV	10
ASGI-2014-012	Cooper Ranch 115kV	10
GEN-2013-027/IFS-2014-002-02	Tap Tolk - Yoakum 230kV	150
GEN-2014-033/IFS-2014-002-10	Chaves 115kV	70
GEN-2014-034/IFS-2014-002-11	Chaves 115kV	70
GEN-2014-035/IFS-2014-002-12	Chaves 115kV	30
GEN-2014-047/IFS-2014-002-16	Crossroads 345kV	40

**Table 2: Generator Interconnection Requests for TUCO 345/230kV transformer replacement**

GI Request Number	Point of Interconnection (POI)	Capacity (MW)
ASGI-2014-002	Tucumcari 115kV	49.6
GEN-2013-027/IFS-2014-002-02	Tap Tolk - Yoakum 230kV	150
GEN-2014-033/IFS-2014-002-10	Chaves 115kV	70

GEN-2014-034/IFS-2014-002-11	Chaves 115kV	70
GEN-2014-035/IFS-2014-002-12	Chaves 115kV	30
GEN-2014-047/IFS-2014-002-16	Crossroads 345kV	40

**Table 3: Generator Interconnection Requests for Pleasant Hill – Norton 230/115kV transmission circuit and transformer**

GI Request Number	Point of Interconnection (POI)	Capacity (MW)
ASGI-2014-002	Tucumcari 115kV	49.6

The Interconnection Request(s) mentioned above were included in the DISIS-2014-002 Impact Study and its subsequent restudies, the latest being DISIS-2014-002-5.

### **Shared Network Upgrade(s) Facilities Descriptions and Costs**

Shared Network Upgrade(s) description and total costs are shown in **Table 5**. The Network Upgrades are described below.

- Plant X – Tolk 230kV rebuild circuit #1 and #2
  - Rebuild both Plant X – Tolk 230kV transmission circuits. Circuit #1 and Circuit #2 are each approximately 10 miles in length. The existing 795 MCM ACSR conductor for both circuits will be replaced with 995 MCM ACCS conductor along with upgrading associated disconnect switches, structural steel, foundations, relay, protective, and metering equipment, and all associated and miscellaneous materials.
  - Current estimated Engineering and Construction (E&C) lead time is approximately eighteen (18) months after fully executed Generator Interconnection Agreements (GIAs).
- TUCO 345/230kV transformer replacement
  - The existing 345/230kV 560/560MVA autotransformer at Tuco Substation will be replaced with a new transformer unit to match the other transformer at this site. The new transformer can be installed at Tuco Substation by removing the existing transformer from the existing foundation and replacing with the new unit. New 345kV and 230kV electrical connections will be required. All new control cable terminations will be required. The new transformer will have top emergency ratings of 644MVA in the summer/spring/fall seasons and 700MVA in the winter season.
  - Current estimated Engineering and Construction (E&C) lead time is approximately twenty-four (24) months after fully executed Generator Interconnection Agreements (GIAs).

- Pleasant Hill – Norton 230/115kV transmission circuit and transformer
  - New Transmission Line: Construct approximately sixty (60) miles of 230kV transmission circuit with 795 MCM ACSR single conductor per phase from Norton – Pleasant Hill and install corresponding structures and associated miscellaneous structure materials.
  - Pleasant Hill Substation: The work includes the addition of a 230kV transmission line terminal at Pleasant Hill. The Pleasant Hill Substation work will include the addition of one (1) 3000 continuous ampacity 230kV circuit breaker, associated disconnect switches, structural steel, foundations, relay, protective, and metering equipment and all associated and miscellaneous materials.
  - Norton Substation – The work includes the addition of a 230kV substation switchyard 115kV switchyard expansion, one (1) 230/115/13kV 250 MVA autotransformer, and the addition of the 115kV terminal to connect the autotransformer. The Norton Substation work will include the addition of one (1) 3000 continuous ampacity 230kV circuit breaker, four (4) 3000 continuous ampacity 115kV circuit breakers, associated disconnect switches, structural steel, foundations, relay, protective, and metering equipment and all associated and miscellaneous materials.
  - Current estimated Engineering and Construction (E&C) lead time is approximately thirty (30) months after fully executed Generator Interconnection Agreements (GIAs).

**Table 4: Shared Network Upgrade(s) Facilities Costs**

<b>Network Upgrade(s)</b>	<b>Total Cost</b>
Plant X – Tolk 230kV rebuild circuit #1 and #2	\$9,921,693
Tuco 345/230kV transformer replacement	\$3,347,036
Pleasant Hill – Norton 230/115kV transmission circuit and transformer	\$49,592,501
<b>Total</b>	<b>\$63,221,230</b>

If higher or equally queued Interconnection Requests(s) withdraw from the SPP GI Queue, suspend or terminate their Generator Interconnection Agreement (GIA), restudies will have to be conducted to determine the need for Network Upgrades and if applicable the Interconnection Requests' 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 and upgrades being placed in service.

#### **Shared Network Upgrade(s) Cost Allocation by Request(s)**

Shared Network Upgrade(s) Cost Allocation by each Interconnection Request(s) responsibility is shown in the **Appendix A**.

If higher or equally queued Interconnection Requests(s) withdraw from the SPP Generator Interconnection Queue, suspend or terminate their Generator Interconnection Agreement (GIA), restudies will have to be conducted to determine the need for Network Upgrades and if applicable the Interconnection Requests' 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 and upgrades being placed in service.

### **Conclusion**

The Network Upgrades listed in this Shared Interconnection Facilities Study are required for Interconnection Service for the Interconnection Request(s) listed in **Tables 1 - 4**. Interconnection Service will be delayed until the Shared Network Upgrades listed in **Table 5** are constructed. Currently, The Interconnection Customer(s) are responsible for \$63,221,230 of Shared Network Upgrades.

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# Appendix A

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# Cost Allocation by Upgrade

## Norton - Pleasant Hill 230kV CKT 1

**\$49,592,501**

Build approximately 60 miles of new 230kV line. Modify Norton substation to add 230kV bus and autotransformer.

ASGI-2014-002 \$49,592,501

**Total Allocated Costs \$49,592,501**

## Tolk - Plant X 230kV CKT 1 & 2

**\$9,921,693**

Rebuild circuit 1 and 2 between Tolk - Plant X 230kV to 1200 amps each.

ASGI-2014-002 \$1,096,300

ASGI-2014-005 \$162,859

ASGI-2014-008 \$170,321

ASGI-2014-009 \$159,022

ASGI-2014-010 \$155,376

ASGI-2014-012 \$144,893

GEN-2013-027 \$3,701,930

GEN-2014-033 \$1,382,781

GEN-2014-034 \$1,382,781

GEN-2014-035 \$592,620

GEN-2014-047 \$972,809

**Total Allocated Costs \$9,921,693**

## TUCO 345/230/13.2kV CKT 1

**\$3,347,036**

Replace existing TUCO 345/230/13.2kV Transformer circuit #1 with 700MVA.

ASGI-2014-002 \$396,707

GEN-2013-027 \$1,227,920

GEN-2014-033 \$574,565

GEN-2014-034 \$574,565

GEN-2014-035 \$246,242

GEN-2014-047 \$327,037

**Total Allocated Costs \$3,347,036**

\* Withdrawal of higher queued projects will cause a restudy and may result in higher costs