



Modification Request Impact Study for Generator Interconnection Request

GEN-2015-022

July 2016

Generator Interconnection

Revision History

| Date | Author | Change Description |
|-----------|--------|---|
| 6/17/2016 | SPP | Modification Request Impact Study Report Revision 0 Issued |
| 7/20/2016 | SPP | Modification Request Impact Study Report Revision 1 Issued Account for GEN-2014-074 ERIS/NRIS material modification outcome |

Executive Summary

<OMITTED TEXT> (Interconnection Customer) has requested a modification to Generation Interconnection Request GEN 2015-022 in accordance with Section 4.4 of the Generator Interconnection Procedures (GIP) of the Southwest Power Pool Open Access Transmission Tariff (OATT). Interconnection Customer has requested to drop its service type request for Network Resource Interconnection Service (NRIS) and to be designated as Energy Resource Interconnection Service (ERIS) only. SPP has evaluated this Modification Request Impact Study (MRIS) to determine the impacts on other Interconnection Requests for accommodating the modification request. Since the original GEN-2015-022 MRIS report posting, equally queued Generator Interconnection Request (GIR), GEN-2014-074, has elected to retain NRIS as a result of its Material Modification request. As a result, GEN-2015-022 has been re-evaluated for material impacts to lower or equally queued ERIS/NRIS requests.

The results of the initial analysis indicate that Interconnection Customer request to drop NRIS is constituted as Material Modification. The Interconnection Customer's request to drop NRIS could be considered non Material if the Interconnection Customer continues to agree to fund its assigned portion of cost allocation responsibilities of the Sundown Interchange 230/115/13kV transformer replacement, Wolfforth Interchange 230/115/13kV transformer replacement, and Terry County Interchange – Wolfforth Interchange 115kV circuit #1 terminal equipment Network Upgrade(s).

Stability Analysis was not performed and is not required to be performed for this Interconnection Service type MRIS study.

Nothing in this study should be construed as a guarantee of transmission service. If the customer wishes to sell power from the facility, a separate request for transmission service shall be requested on Southwest Power Pool's OASIS by the Customer.

This study fulfills SPP's requirements in accordance with GIP 4.4.3 to evaluate the Customer's modification. In accordance, with GIP 4.4.2, the Customer may choose to withdraw its request for modification.

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Introduction

<OMITTED TEXT> (Interconnection Customer) has requested a modification to Generation Interconnection Request, GEN 2015-022, in accordance with Section 4.4 of the Generator Interconnection Procedures (GIP) of the Southwest Power Pool Open Access Transmission Tariff (OATT). The Interconnection Customer has requested to drop its request for Network Resource Interconnection Service (NRIS) and to be designated as Energy Resource Interconnection Service (ERIS) only. SPP has undertaken this Modification Request Impact Study (MRIS) to determine the impacts to the transmission system of accommodating the modification request. Since the original GEN-2015-022 MRIS report posting, equally queued Generator Interconnection Request (GIR), GEN-2014-074, has elected to retain NRIS as a result of its own Material Modification request. As a result, GEN-2015-022 is re-evaluated for material impacts to lower or equally queued ERIS/NRIS requests.

In the latest iteration of DISIS-2015-001-2 posted in March 2016, GEN-2015-022 was assigned the following upgrades for NRIS.

- Cox-Hale County 115kV rebuild
- Sundown 230/115kV transformer replacement
- Tuco-Jones 230kV line traps
- Wolfforth-Terry County terminal equipment
- Wolfforth 230/115kV transformer replacement

The MRIS will determine whether these upgrades are required for equally queued or lower queued Interconnection Customers if GEN-2015-022 drops its request for NRIS. If the equally or lower queued Interconnection Requests have their costs go up or are determined to need the upgrades, the request will be considered a Material Modification.

The analysis consists of two parts. The first part (Initial Analysis) determines if lower or equally queued Interconnection Requests are using depending upon the NRIS Network Upgrades that are currently assigned to GEN-2015-022. If it is determined that there are equally or lower queued Interconnection Requests that are dependent upon the upgrades, a second analysis for power flow (Power flow Analysis) will be performed to determine if the upgrades are required if GEN-2015-022 drops its NRIS designation. The second analysis, Power Flow Analysis, was analyzed with GEN-2014-074 as ERIS/NRIS.

If both analyses determine that equally or lower queued Interconnection Requests are impacted by the modification request, the request will be considered a Material Modification.

Purpose

The purpose of this Modification Request Impact Study (MRIS) is to evaluate the impact of the proposed modification to other interconnection customers. The MRIS considers the Base Case as well as all Generating Facilities (and with respect to (b) below, any identified Network Upgrades associated with such higher queued interconnection) that, on the date the MRIS is commenced:

- a) are directly interconnected to the Transmission System;
- b) are interconnected to Affected Systems and may have an impact on the Interconnection Request;
- c) have a pending higher queued Interconnection Request to interconnect to the Transmission System; or
- d) have no Queue Position but have executed an LGIA or requested that an unexecuted LGIA be filed with FERC.
- e) Lower queued interconnection customers that may be impacted.

Nothing in this System Impact Study constitutes a request for transmission service or confers upon the Interconnection Customer any right to receive transmission service

Initial Analysis

The Initial Analysis consists of an evaluation of whether the Network Upgrades assigned to GEN-2015-022 are used for other Interconnection Requests. The initial study for DISIS-2015-002 indicated several NRIS upgrades were required by lower queued Interconnection Requests. It was determined that a pending restudy of DISIS-2015-002 for withdrawals should be performed for a better determination of impact. Therefore, the power flow analysis was performed.

Power Flow Analysis

A power flow analysis was conducted for the Interconnection Customer's facility using a modified version of the 2015 series Integrated Transmission Planning models (used in the 2016 ITPNT) including the 2016 winter peak (16WP) season, the 2017 spring (17G) and 2017 summer peak (17SP) seasons, the 2020 light load (20L), summer (20SP) and winter peak (20WP) seasons, and the 2025 summer peak (25SP) season models. The output of the Interconnection Customer's facility was offset in the model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ERIS) Interconnection Request.

Network constraints are found by using PSS/E AC Contingency Calculation (ACCC) analysis with PSS/E MUST First Contingency Incremental Transfer Capability (FCITC) analysis on the entire cluster grouping dispatched at the various levels previously mentioned. This satisfies the "more probable" contingency testing criteria mandated by NERC and the SPP criteria.

For Energy Resource Interconnection Service (ERIS), thermal overloads are determined for system intact (n-0) (greater than 100% of Rate A - normal) and for contingency (n-1) (greater than 100% of Rate B – emergency) conditions.

The overloads are then screened to determine which of generator interconnection requests have at least

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

The analysis consisted of performing the power flow analysis for all Interconnection Requests in Hitchland (Group 02) and Texas/New Mexico (Group 06) groups for DISIS-2015-002.

Considerations for Analysis

Impact on DISIS-2015-001 Interconnection Requests – SPP has completed a study that analyzed a request for GEN-2014-074 to drop its NRIS designation. GEN-2014-074 elected not to proceed with its modification and this study was performed to account for its election to retain NRIS.

Impact on DISIS-2015-002 Interconnection Requests – DISIS-2015-002 Interconnection Requests were recently required to state their intent to move into the Interconnection Facilities Study Queue. Some Interconnection Requests have chosen not to move forward into the Interconnection Facilities Study Queue. It has been determined that no remaining Group 6 Interconnection Requests in DISIS-2015-002 went into the Interconnection Facilities Study with an NRIS designation. Therefore, no DISIS-2015-002 NRIS Interconnection Requests are found to use the GEN-2015-022 upgrades for NRIS. An ERIS analysis will be performed to determine if DISIS-2015-002 Interconnection Requests could potentially depend on some of the GEN-2015-022 Network Upgrades for NRIS service.

Therefore, a restudy of Power flow Analysis for DISIS-2015-002 for withdrawals is required to determine if the GEN-2015-022 upgrades are still required for ERIS. The initial results from the DISIS-2015-002-1 study and the second analysis, Power Flow Analysis, results were used for this analysis.

The analysis consisted of performing the power flow analysis for all Interconnection Requests in Hitchland (Group 02) and Texas/New Mexico (Group 06) groups for DISIS-2015-002.

The second analysis, Power Flow Analysis, consisted of performing the power flow analysis for all Interconnection Requests DISIS-2015-001 and GEN-2014-074 as ERIS/NRIS.

Results

ACCC Initial Analysis shows that none of the GEN-2015-022 network upgrades are needed for DISIS-2015-002 Group 2 and Group 6 ERIS generators. The results can be seen in **Table 1**.

Table 1: Generator Impacts on Lower Queued Network Upgrade(s)

| Source | Season | Group | Constraint | TDF | TC Loading | Contingency |
|---|--------|-------|------------|-----|------------|-------------|
| None of GEN-2015-022 network upgrades are required lower queued projects. | | | | | | |

ACCC second analysis, Power Flow Analysis, observed Sundown Interchange 230/115/13kV transformer replacement, Wolfforth Interchange 230/115/13kV transformer replacement, and Terry County Interchange – Wolfforth Interchange 115kV circuit #1 terminal equipment mitigation upgrades are still required for DISIS-2015-001-2 Group 06 NRIS generators. The results can be seen in **Table 2**.

Table 2: Generator Impacts on Equally Queued Network Upgrade(s)

| Source | Season | Group | Constraint | TDF | TC Loading | Contingency |
|---------|--------|-------|---|---------|------------|---|
| G14_074 | 17SP | 00NR | SUNDOWN INTERCHANGE (WH XDS70381) 230/115/13.8KV TRANSFORMER CKT 1 | 0.06742 | 104.2588 | AMOCO SWITCHING STATION - SUNDOWN INTERCHANGE 230KV CKT 1 |
| G14_074 | 17SP | 00NR | SUNDOWN INTERCHANGE (WH XDS70381) 230/115/13.8KV TRANSFORMER CKT 1 | 0.06742 | 106.857 | AMOCO SWITCHING STATION - SUNDOWN INTERCHANGE 230KV CKT 1 |
| G14_074 | 17SP | 00NR | SUNDOWN INTERCHANGE (WH XDS70381) 230/115/13.8KV TRANSFORMER CKT 1 | 0.06742 | 106.857 | AMOCO SWITCHING STATION - SUNDOWN INTERCHANGE 230KV CKT 1 |
| G14_074 | 17SP | 00NR | SUNDOWN INTERCHANGE (WH XDS70381) 230/115/13.8KV TRANSFORMER CKT 1 | 0.06742 | 104.2588 | AMOCO SWITCHING STATION - SUNDOWN INTERCHANGE 230KV CKT 1 |
| G14_074 | 25SP | 00NR | TERRY COUNTY INTERCHANGE - WOLFFORTH INTERCHANGE 115KV CKT 1 | 0.06419 | 109.7983 | TUCO INTERCHANGE - YOAKUM_345 345.00 345KV CKT 1 |
| G14_074 | 17SP | 00NR | WOLFFORTH INTERCHANGE (WH 7001668) 230/115/13.2KV TRANSFORMER CKT 1 | 0.05349 | 108.1682 | CARLISLE INTERCHANGE - LP-DOUD_TP 3115.00 115KV CKT 1 |
| G14_074 | 17SP | 00NR | WOLFFORTH INTERCHANGE (WH 7001668) 230/115/13.2KV TRANSFORMER CKT 1 | 0.05349 | 104.7612 | CARLISLE INTERCHANGE - LP-DOUD_TP 3115.00 115KV CKT 1 |

Determination

Since the Sundown Interchange 230/115/13kV transformer replacement, Wolfforth Interchange 230/115/13kV transformer replacement, and Terry County Interchange – Wolfforth Interchange 115kV circuit #1 terminal equipment replacement were identified to be needed for the GEN-2014-074 Interconnection Request, its costs would increase due to the request. Therefore, the request to drop NRIS by GEN-2015-022 is considered Material. The request to drop NRIS could be considered non Material if GEN-2015-022 continues to fund these identified Network Upgrades, thereby not causing any increased upgrade cost to GEN-2014-074.

Stability Analysis

Stability Analysis was not performed for this study.

Cost Allocation

This study does not change the cost allocation for the above listed Network Upgrades that was assigned in DISIS-2015-001-2.

Conclusion

<OMITTED TEXT> (Interconnection Customer) has requested a modification to Generation Interconnection Request GEN-2015-022, in accordance with Section 4.4 of the Generator Interconnection Procedures (GIP) of the Southwest Power Pool Open Access Transmission Tariff (OATT). Interconnection Customer has requested to drop its service type request for Network Resource Interconnection Service (NRIS) and to be designated as Energy Resource Interconnection Service (ERIS) only. Since the original GEN-2015-022 MRIS report posting, equally queued Generator Interconnection Request (GIR), GEN-2014-074, has elected to retain NRIS as a result of its own Material Modification request. As a result of study consideration changes, GEN-2015-022 is re-evaluated for material impacts to lower or equally queued ERIS/NRIS requests.

The results of the initial analysis indicate that Interconnection Customer request to drop NRIS is constituted as Material Modification. The Interconnection Customer's request to drop NRIS could be considered non Material if the Interconnection Customer continues to agree to fund its assigned portion of cost allocation responsibilities of the Sundown Interchange 230/115/13kV transformer replacement, Wolfforth Interchange 230/115/13kV transformer replacement, and Terry County Interchange – Wolfforth Interchange 115kV circuit #1 terminal equipment Network Upgrade(s).

Stability Analysis was not performed and is not required to be performed for this Interconnection Service type MRIS study.

This study does not include any constraints associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer requests transmission service through Southwest Power Pool's OASIS. It should be noted that the models used for simulation do not contain all SPP transmission service.

Nothing in this study should be construed as a guarantee of transmission service. If the customer wishes to sell power from the facility, a separate request for transmission service shall be requested on Southwest Power Pool's OASIS by the Customer.

This study fulfills SPP's requirements in accordance with GIP 4.4.3 to evaluate the Customer's modification. In accordance, with GIP 4.4.2, the Customer may choose to withdraw its request for modification.