

**1RSC-2020-2**

**Interconnection Facilities Study Report  
75MW Tapping Comanche – Daniels  
Park 345kV Line (Tundra Switching  
Station)**

**5/24/2021**



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## 1.0 Executive Summary

The total estimated cost of the transmission system improvements for 1RSC-2020-2 is \$50K (Tables 1 and 2).

Energy Resource Interconnection Service of 1RSC-2020-2 before Network Upgrades is: 75MW (after required transmission system improvements in Tables 1 and 2).

Energy Resource Interconnection Service of 1RSC-2020-2 is: 75MW (after required transmission system improvements in Tables 1 and 2).

The maximum combined output of GI-2018-24 and 1RSC-2020-2 at the POI shall not exceed 325MW at any time, which will be limited using the Plant Controller. The output will also be monitored by PSCo operations. The construction of the Tundra 345kV Switching Station for GI-2018-24 will require a CPCN and the estimated time frame for regulatory activities (CPCN) and to site, design, procure and construct the interconnection facilities (entire Project) is approximately 36 months after authorization to proceed has been obtained. Any delays in obtaining the CPCN may delay the COD of 1RSC-2020-2.

## 2.0 Introduction

1RSC-2020-2 is a 75MW<sub>ac</sub> increment in the output of GI-2018-24 hybrid Generating Facility received in the Transitional Cluster. The combined output of 1RSC-2020-2 and GI-2018-24 at the POI will be 325MW<sub>ac</sub>. The hybrid Generating Facility will have the same nameplate capacity as GI-2018-24 i.e., AC-coupled 250MW rated Solar PV generator and a 125MW rated Battery Energy Storage (BES) generator. The inverters, pad mount step-up transformer, 34.5kV collector system, gen-tie configuration and POI remain the same between 1RSC-2020-2 and GI-2018-24. But 1RSC-2020-2 changes the main step-up transformer configuration from one (1) 34.5/345/13.8kV, 255/340/425MVA Z=8.5% transformer to two (2) 34.5/345kV, 114/152/190MVA main step-up transformers.

The net output of GI-2018-24 and 1RSC-2020-2 will not exceed 325MW at any time, which will be limited using the Plant Power Controller. The PV and BES generating facilities will operate in back-feed voltage control mode



The proposed Commercial Operation Date (COD)<sup>1</sup> of 1RSC-2020-2 is December 31, 2022. Since the POI will be backfed for GI-2018-24, a back-feed date is not applicable to 1RSC-2020-2.

The updated Phase 2 report of 1RSC-2020 Definitive Interconnection System Impact Study cluster (RSC) is posted at [https://www.rmao.com/public/wtpp/Final\\_Studies/1RSC-2020%20Phase%202%20Updated%20Study%20Report\\_final.pdf](https://www.rmao.com/public/wtpp/Final_Studies/1RSC-2020%20Phase%202%20Updated%20Study%20Report_final.pdf).

The request was studied for Energy Resource Interconnection Service (ERIS)<sup>2</sup>.

### **3.0 Study Scope**

The scope of the Interconnection Facilities Study which is Phase 4 of the Definitive Interconnection Study process includes standalone non-binding cost estimates and construction schedule of the Interconnection Facilities and Network Upgrades identified for 1RSC-2020-2 in the update Phase 2 report.

### **4.0 Cost Estimates and Assumptions**

PSCo Engineering has developed cost estimates for Interconnection Facilities and Network/Infrastructure Upgrades required for the interconnection of the 1RSC-2020-2 on the Comanche – Daniels Park tap point (Tundra Switching Station), at the same POI as GI-2018-24. The cost estimates are in 2021 dollars with escalation and contingencies applied. Allowances for Funds Used During Construction (AFUDC) is not included. The estimated costs include all applicable labor and overheads associated with the siting, engineering, design, and construction of these new PSCo facilities. The estimate does not include the cost for any Customer owned equipment and associated design and engineering.

Tables 1 and 2 list the improvements required to accommodate the interconnection and the delivery of the customer's 75 MW solar generation facility generation output. The cost responsibilities associated with these facilities shall be handled as per current FERC guidelines.

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<sup>1</sup> Commercial Operation Date of a unit shall mean the date on which the Generating Facility commences Commercial Operation as agreed to by the Parties pursuant to Appendix E to the Standard Large Generator Interconnection Agreement

<sup>2</sup> Energy Resource Interconnection Service shall mean an Interconnection Service that allows the Interconnection Customer to connect its Generating Facility to the Transmission Provider's Transmission System to be eligible to deliver the Generating Facility's electric output using the existing firm or non-firm capacity of the Transmission Provider's Transmission System on an as available basis. Energy Resource Interconnection Service in and of itself does not convey transmission service



The total cost of the required transmission improvement required for 1RSC-2020-2 to interconnect at the Tundra Switching Station for ERIS of 75MW is \$50K.

- The cost of Transmission Provider’s Interconnection Facilities is \$50K (Table 1)
- The cost of Station Network Upgrades is 0 (Table 2)

**Table 1 – 1RSC-2020-2 Transmission Provider’s Interconnection Facilities**

Element	Description	Cost Est. (Millions)
GI-2018-24’s Tundra 345kV Switching Station	Interconnect 1RSC-2020-2 Generating Facility. The new equipment includes: • testing of communications, relays	\$0.05
	Transmission line tap into substation:	0
	Siting and Land Rights support for siting studies, land and ROW acquisition and construction	0
	<b>Total Cost Estimate for Transmission Providers Interconnection Facilities</b>	<b>\$0.05</b>
<b>Time Frame</b>	<b>Site, design, procure and construct</b>	<b>12 Months</b>

**Table 2– 1RSC-2020-2 Station Network Upgrades**

Element	Description	Cost Est. (Millions)
N/A	N/A	0
	Siting and Land Rights support for substation construction	0
	<b>Total Cost Estimate for Network Upgrades for Interconnection</b>	<b>0</b>
<b>Time Frame</b>	<b>Site, design, procure and construct</b>	<b>NA</b>

- Labor is estimated for straight time only – no overtime included.
- Lead times for materials were considered for the schedule.
- Since 1RSC-2020-2 is only an incremental output in GI-2018-24 capacity, no additional costs are expected, except the cost of testing the 75MW output for energization.

## 5.0 Conclusion

The total estimated cost of the transmission system improvements for 1RSC-2020-2: \$50K (Tables 1 and 2).

Energy Resource Interconnection Service of 1RSC-2020-2 before Network Upgrades is: 75MW (after required transmission system improvements in Table 1 and 2)

Energy Resource Interconnection Service of 1RSC-2020-2 is: 75MW (after required transmission system improvements in Table 1 and 2)

The maximum combined output of GI-2018-24 and 1RSC-2020-2 at the POI shall not exceed 325MW at any time, which will be limited using the Plant Controller. The output will also be monitored by PSCo operations. The construction of the Tundra 345kV Switching Station for GI-2018-24 will require a CPCN and the estimated time frame for regulatory activities (CPCN) and to site, design, procure and construct the interconnection facilities (entire Project) is approximately 36 months after authorization to proceed has been obtained. Any delays in obtaining the CPCN may delay the COD of 1RSC-2020-2.

## 6.0 Contingent Facilities

The following is the list of the unbuilt Interconnection Facilities and Network Upgrades upon which the costs, timing, and study findings of 1RSC-2020-2 is dependent, and if delayed or not built, could cause a need for re-studies of the Interconnection Request or a reassessment of the Interconnection Facilities and/or Network Upgrades and/or costs and timing. The maximum allowable output of 1RSC-2020-2 may be decreased if these Contingent Facilities are not in-service. The contingent facilities identified for 1RSC-2020-2 are as follows:

1. The following unbuilt transmission projects/planned facility rating upgrades modeled in the Base Case:
  - PSCo's Monument – Flying Horse 115kV Series Reactor project
  - PSCo's terminal upgrade project to upgrade the Daniels Park – Prairie3 230kV line to 576MVA
  - PSCo's terminal upgrade project to upgrade the Daniels Park – Prairie1 230kV line to 576MVA



- TSGT's planned project to upgrade the Fuller – Vollmer – Black Squirrel 115 kV line to 173 MVA
  - CSU's project to close Tesla - Cottonwood 34.5kV line and open the Kettle Creek – Tesla 34.5kV line
  - PSCo's upgrade to upgrade Greenwood – Priarie1 230kV line to 576MVA
  - PSCo's upgrade to upgrade Greenwood – Priarie3 230kV line to 576MVA
  - PSCo's upgrade to upgrade Daniels Park 345/230kV # T4 to 560MVA
  - PSCo's upgrade to upgrade MidwayPS – GI-2014-9 230kV line to 478MVA
  - Briargate S 115/230kV transformer project
  - Fuller 230/115kV transformer project
  - BCHE's West Station - Pueblo West - North Penrose planned project
  - BCHE's Boone - South Fowler 115 kV planned project
2. Interconnection Facilities identified in Table 1 and Table 2 of this report.
  3. Upgrades identified for higher-queued GI-2018-24