

Consulting Agreement Study

Completed for

██████████
(“Transmission Customer”)

Proposed Resource & Transmission
“██████████” ██████████ County, WY
&
138 kV Transmission in Southwest Wyoming

November 2016

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1.0 Description

Transmission Customer and PacifiCorp Transmission are parties to a Transmission Consulting Study Agreement (“Agreement”). The Agreement allows for Transmission Customer to engage PacifiCorp Transmission for transmission planning consulting services where PacifiCorp shall act as Transmission Customer’s consultant to evaluate specific study requests submitted from time to time by Transmission Customer, and provide high level descriptions and general cost estimates of facility requirements, for possible Network Resource designations or terminations.

In accordance with Section 2 of the Agreement, Transmission Customer submitted a written request for study. This study report evaluates the Transmission Provider’s main grid system to identify any system constraints in order to supply the requested service for the following request:

- Transmission Customer requests that PacifiCorp Transmission include in its study report a complete examination of Transmission Customer’s planning redispatch options (and any associated costs) under the Network Operating Agreement (NOA) between Transmission Customer and PacifiCorp Transmission, Section 8.1, Planning Re-dispatch Procedures.

PacifiCorp Transmission has performed the study considering the re-dispatch of the proposed 98.9 MW [REDACTED] facility interconnecting on the [REDACTED] Tap to [REDACTED] 138 kV line with assumed in-service dates of December 31, 2018 or December 31, 2019. The study findings are described in Section 3.

2.0 Overall Assumptions

The following assumptions were used for the study and are common for both in-service dates that were studied:

- The new resource is interconnected on the 138 kV line between [REDACTED] Tap and [REDACTED] delivering output to a new 138 kV substation.
- A conventional resource (thermal) in southern Utah was commensurately backed down in order to accommodate this new resource.
- The project was assumed to have the GE 2.0 MW wind turbines.
- Only existing resources and resources with transmission service requests, e.g., Q2060, in that area were considered for this study. Resources that are currently in PacifiCorp’s Generation Interconnection Queue that are neither designated network resources nor have a transmission service request were not considered in the study.
- All facilities will meet or exceed the minimum Western Electricity Coordinating Council (“WECC”), North American Electric Reliability Corporation (“NERC”), and the

- Transmission Provider's performance and design standards.
- All existing and proposed remedial action schemes (RAS) are assumed to be in service for this study.
 - A synchronous condenser at Standpipe Substation is assumed to be in service for this study (2016).
 - The Railroad to Croydon to Silver Creek 138 kV line is in-service (2017).
 - The two Monument phase shifting transformers were adjusted to allow 200 MW of power flow each in the east-to-west direction.
 - Other wind generation in close proximity was also considered to be at a higher output.
 - The following power factor requirement was assumed for the Project:

“9.6.1 Power Factor Design Criteria. Interconnection Customer shall design the Large Generating Facility to maintain a composite power delivery at continuous rated power output at the Point of Interconnection at a power factor within the range of 0.95 leading to 0.95 lagging, unless Transmission Provider has established different requirements that apply to all generators in the Control Area on a comparable basis. Non-synchronous generators shall only be required to maintain the above power factor when their output is above 10 percent of the Generating Facility Capacity.”

3.0 Study Results

A Western Electricity Coordinating Council (WECC) approved 2016 Heavy Summer operating case modified to represent the 2017 heavy load conditions and a 2018 light load conditions case were used to perform the power flow studies using PSS/E version 33.7. Power flow studies were performed on both peak and off-peak load cases. The off-peak load case was chosen to demonstrate the stress on the higher kV transmission system under light load conditions.

Based on the location of the interconnection, the proposed project would need to be incorporated into the Naughton West Remedial Action Scheme (RAS). The Naughton West RAS monitors the flows on the West of Naughton and West of Evanston paths. If the average of those flows is above 900 MW, the RAS is armed to drop the following generation for an N-2 outage of Ben Lomond to Birch Creek and Ben Lomond to Naughton 230 kV lines:

- Part of Naughton generation
- Mountain Wind generation
- Hinshaw generation

In order to accommodate the output from the [REDACTED] facility and alleviate the thermal overload due to the outage mentioned above, the Naughton West RAS must be modified to include the [REDACTED] facility.

4.0 Conclusions

This study looked at interconnecting 98.9 MW of wind generation in [REDACTED] County in southwest Wyoming on the PacifiCorp owned 138 kV system. This added generation was dispatched against conventional (thermal) generation in southern Utah.

The location of this wind facility will require it to be incorporated into the existing Naughton RAS. If the average of the flows on West of Naughton and West of Evanston is above 900 MW, the interconnecting facility will be armed to trip for the N-2 outages of either Ben Lomond to Birch Creek and Ben Lomond to Naughton 230 kV lines or Naughton to Birch Creek and Ben Lomond to Naughton 230 kV lines.