



## Facility Study Report

Southwest Power Pool Generation Interconnections

DSIS-16

Prepared for the Midcontinent ISO

March 25, 2022

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## **Table of Contents**

1. Project Overview .....	5
i. Executive Summary .....	5
ii. Facility Study Background .....	6
2. Generator Description .....	7
3. Study .....	8
i. Short Circuit Study .....	8
4. Network Upgrades .....	9
i. Stand Alone Network Upgrades .....	9
ii. Non-Stand Alone Network Upgrades .....	9
a. Bagley Junction Capacitor .....	9
5. Transmission Owner Interconnection Facilities .....	10
6. Distribution Upgrades .....	10
7. Right of Way Requirements.....	10
8. Major Permits.....	10
9. Interconnection Customer Interconnection Facilities .....	10
10. Special Protection Facilities.....	10
11. Other Agreements/Studies .....	10
12. Exhibits .....	11
Exhibit A1- Customer One Line and Site Map.....	11
Exhibit A2 - Transmission Owner One Line .....	12
Exhibit A3 - Site Plans.....	13
Exhibit A4 - Transmission Line Plan and Profile.....	14
Exhibit A5 - Facilities to be Constructed by Transmission Owner .....	15
Exhibit A6 - Detailed Cost of Facilities to be Constructed by Transmission Owner .....	16
Exhibit A6-1 –Bagley Junction Capacitor .....	16
Exhibit A7 - Facilities to be Constructed by Interconnection Customer .....	17
Exhibit A8 - Detailed Cost of Transmission Owner Facilities to be Constructed by Interconnection Customer .....	18
Exhibit A9 - Facilities Subject to Transmission Service Credits.....	19
Exhibit A10 - Contingent Facilities .....	20
Exhibit A11 – Interconnection Customer Milestones.....	21
Exhibit A12 - Construction and Coordination Schedules.....	22

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

Exhibit A13 - Permits, Licenses, Regulatory Approvals, and Authorization.....	23
Exhibit A14 - Interconnection and Operating Guidelines .....	24
Exhibit A15 – Approvals .....	25

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*



# 1. Project Overview

## i. Executive Summary

This study is being done by the Transmission Owner for MISO since the facilities impacted are under MISO's control. The Network Upgrade consists of upgrades or additions to Otter Tail Power Company's transmission system to accommodate the interconnection of 1,287.5 MW of generation into the Southwest Power Pool system. The upgrade addressed in this facility study for Southwest Power Pool Projects Gen-2016-36, Gen-2016-074, Gen-2016-087, Gen-2016-094, Gen-2016-115, Gen-2016-130, Gen-2016-147, and Gen-2016-151 and includes the addition of a 20 MVAR capacitor bank at Bagley Junction.

The cost to construct these facilities is:

Classification of Upgrades	Cost
<b>Network Upgrades</b>	\$808,145
<b>Total</b>	\$808,145

The Transmission Owner is electing to self-fund the Network Upgrades.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## ***ii. Facility Study Background***

Per the General Interconnection Facility Study Proposal submitted to MISO, Transmission Owner provided a scope and estimate for an Interconnection Facilities Study for the Southwest Power Pool DSIS-16. This Facilities Study report is based on the proposal submitted to and requested by MISO and on the Transmission Owner's best information that it has on the requested interconnection project. It is the Transmission Owner's understanding that the Interconnection Customer selected the option for a +/-20% cost estimate. This Facilities Study report is being prepared for and submitted to MISO.

This Facilities Study report documents the required Network Upgrades to the Transmission Owner's substation as identified in the MISO Affected System Study. MISO's Affected System Study identified this facility for the interconnection of the Interconnection Customers' generation facilities into the Southwest Power Pool's DSIS-16 group study.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## 2. Generator Description

The Interconnection Customers that are impacting the facilities are identified in the table below.

Queue #	Capacity	Service	Fuel Type	Proposed Point of Interconnection
GEN-2016-036	44.6	ER	Wind	Granite Falls 115kV
GEN-2016-074	200	ER/NR	Wind	Sweetwater 345kV
GEN-2016-087	98.9	ER	Wind	Bismark - Glenham 230kV line
GEN-2016-094	200	ER/NR	Wind	Tap Ft Thompson - Oahe 230kV
GEN-2016-115	300	ER	Wind	Holt County 345kV
GEN-2016-130	202	ER	Wind	Leland Olds 345kV
GEN-2016-147	40	ER	Solar	Sidney 115kV
GEN-2016-151	202	ER	Wind	Tande 345kV

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

### **3. Study**

#### ***i. Short Circuit Study***

A short circuit study is not required for this addition.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*



## 4. Network Upgrades

### i. Stand Alone Network Upgrades

None

### ii. Non-Stand Alone Network Upgrades

#### a. Bagley Junction Capacitor

##### Project Overview:

Due to the interconnection of 1,287.5 MW of generation into the Southwest Power Pool system, MISO's Affected System indicated voltage issues in the Transmission Owner's Bagley area. To resolve this voltage issue, the Transmission Owner will install a 20 MVAR capacitor and necessary controls and communications at the Bagley Junction facility.

##### Design Criteria:

The Transmission Owner has used the National Electrical Safety Code (NESC) C2-2017 and its design standards for this Facilities Study. Where no applicable standards were available, Transmission Owner substituted industry standards and other good utility practices.

##### Protection and Control Overview:

New protection and control systems will be designed to provide adequate protection and control of the 115 kV capacitor bank, 115 kV bus, and additional 115 circuit breakers.

The Transmission Owner's design standards will be used to develop and construct one new relay panel for capacitor bank control & protection, one new relay panel for the new ring bus circuit breaker, and one new panel for 115 kV bus protection. Station alarms and SCADA requirements will require additional equipment.

##### SCADA and Metering Communication:

The existing communication between the Bagley Junction and the Transmission Owner's Dispatch center and this site will be used for the SCADA communication.

##### MAJOR ITEMS:

- 1 (one) 20 MVAR 115 kV capacitor bank
- 2 (two) 115kV SF6 breakers
- 3 (three) 115kV gang operated switches
- 3 (three) 115kV CCVT
- Steel and support foundations

Total Cost Estimate Accuracy:

+/-20%

Total Project Cost:

\$808,145

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## **5. Transmission Owner Interconnection Facilities**

Not Applicable

## **6. Distribution Upgrades**

Not Applicable

## **7. Right of Way Requirements**

The expansion necessary of Bagley Junction does not require any additional land.

## **8. Major Permits**

Please see Exhibit A13 for a list of possible permits.

## **9. Interconnection Customer Interconnection Facilities**

Not Applicable.

## **10. Special Protection Facilities**

Not Applicable.

## **11. Other Agreements/Studies**

Not Applicable.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## 12. Exhibits

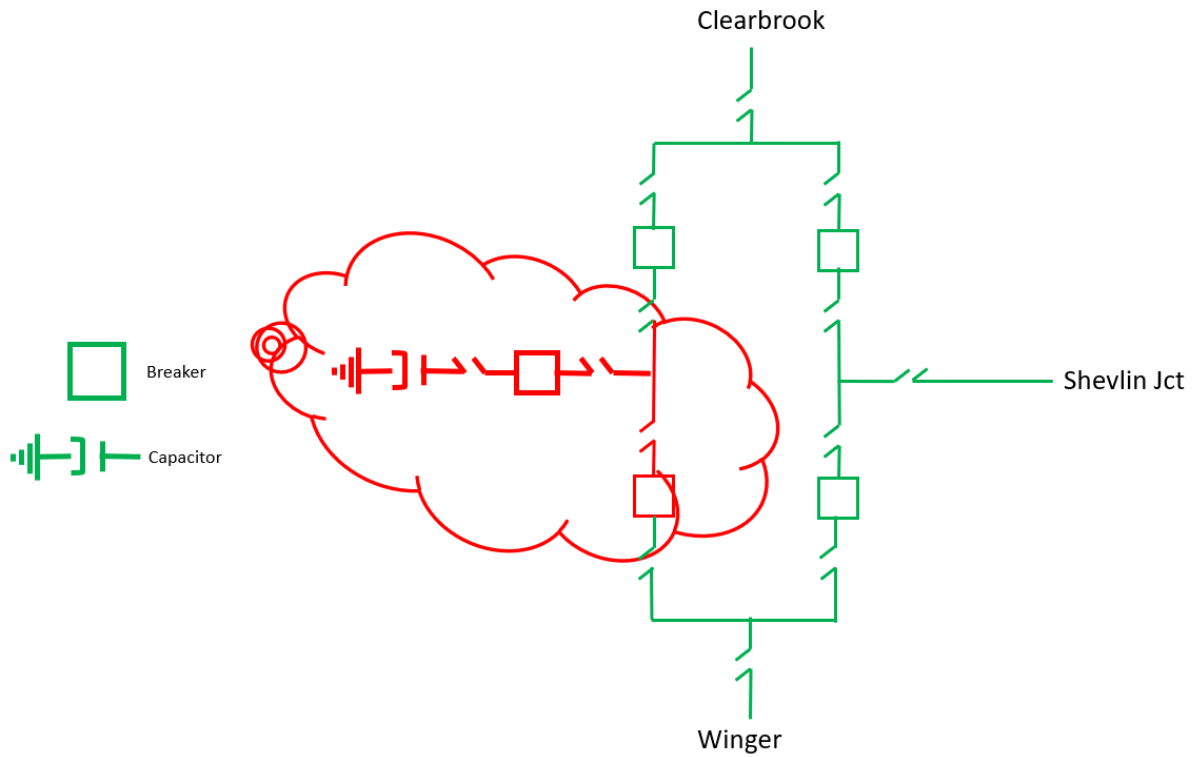
The following exhibits are part of this report and are attached at the end of this document.

### ***Exhibit A1- Customer One Line and Site Map***

Not Applicable

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## Exhibit A2 - Transmission Owner One Line



*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## ***Exhibit A3 - Site Plans***

Available upon request.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## ***Exhibit A4 - Transmission Line Plan and Profile***

Not Applicable

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

***Exhibit A5 - Facilities to be Constructed by Transmission Owner***

	<b>Upgrade Type</b>	<b>Facilities to be Constructed by Transmission Owner</b>	<b>Estimate in 2022 Dollars</b>
<b>1</b>	<b>Non-Stand Alone Network Upgrade</b>	Bagley Junction Capacitor	\$808,145
<b>2</b>		Total Estimated Project Costs	\$808,145

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

***Exhibit A6 - Detailed Cost of Facilities to be Constructed by  
Transmission Owner***

**Exhibit A6-1 –Bagley Junction Capacitor**

ROW	\$0
Permitting	\$1,000
Material	\$370,615
Construction Labor	\$188,960
Engineering, & Project Management	\$142,160
Other	\$105,410
Total	\$808,145

*This report may contain CEII and Trade Secret information and should not be released without  
consent from Otter Tail Power Company*



## ***Exhibit A7 - Facilities to be Constructed by Interconnection Customer***

There are no Transmission Owner Network Upgrades or Transmission Owner Interconnection Facilities that the Interconnection Customer will construct.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

***Exhibit A8 - Detailed Cost of Transmission Owner Facilities to be Constructed by Interconnection Customer***

There are no Transmission Owner Network Upgrades or Transmission Owner Interconnection Facilities that the Interconnection Customer will construct; no estimates are required.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

***Exhibit A9 - Facilities Subject to Transmission Service Credits***

	<b>Network Upgrade Type</b>	<b>Facilities to be Constructed by Transmission Owner</b>	<b>Estimate in 2022 Dollars</b>
<b>1</b>	<b>Network Upgrade</b>	Bagley Junction Capacitor	\$808,145
<b>2</b>		Total	\$808,145

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## ***Exhibit A10 - Contingent Facilities***

Not Applicable

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

***Exhibit A11 – Interconnection Customer Milestones***

Not Applicable.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## ***Exhibit A12 - Construction and Coordination Schedules***

The following schedule assumes no other major projects are occurring in the region that would not allow the required facilities to be taken out of service for construction. It also assumes all necessary permits are received in a timely manner and land can be secured in a reasonable timeframe.

Effective Date	Day 0
Receive Security	Day 45
Start Engineering & Permitting	Day 46
Start Procurement	Day 60
Start Construction	Day 190
Substantially Complete	Day 310

Transmission Owner's standard work schedule does not include working on weekends or Federal Holidays.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

## ***Exhibit A13 - Permits, Licenses, Regulatory Approvals, and Authorization***

### **Permits that may be required:**

Agency	Type of Approval	Status
<b>Federal Approvals</b>		
USACE	Section 404 Permit	As needed Nationwide Permit 12 will be used for placement of fill in jurisdictional waters of the US.
USFWS	Section 7 Permit	Section 7 consultation is required for threatened or endangered species along the route. USFWS recommendations will be implemented during construction.
Federal Aviation Administration	FAA form 7460-1	Consultation with FAA and local airports.
<b>State of Minnesota</b>		
Public Utilities Commission	Certificate of Need	PUC requirement
Public Utilities Commission	Route Permanent	PUC requirement
Pollution Control Agency	NPDES Stormwater permit	After final pole placement and preparing Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will be submitted to MPCA.
SHPO	Permit to Investigate Effects on Cultural Resources	Will need to comply with NDCC 55-03 to assess the potential project effects to cultural resources. No cultural resource report has been filed.
	Section 106 Compliance Approval	Class III pedestrian survey has not been completed.
Department of Transportation	Road Approach/Access Permit	These permits will be applied for once the Corridor Certificate and Route Permit are obtained and as needed during construction.
	Utility Permit	The permit application will need to be submitted for state Highway Crossings
<b>Local</b>		
County/Township	Conditional Use Permit	As required based on line placement and local government regulations
Township/County	Set Back Variances	As needed based on line placement
Township/County	Building Permit	As needed
County	Haul Road Agreement	These permits will be applied for once the Corridor Certificate and Route Permit are obtained and as needed during construction.
County	Utility Permit	The permit application will be submitted as required
<b>BNSF or Soo Line Railroad Permits</b>		
Crossing	Wire Line Crossing or Longitudinal Communication and Electric Permit	As required one route is selected

Note: This list identifies possible permits that may be required for construction and may not be all-inclusive. Specific permits will be dependent on detailed design and final alignment.

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*

***Exhibit A14 - Interconnection and Operating Guidelines***

Not applicable

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*



## ***Exhibit A15 – Approvals***

X 

Dean Pawlowski  
Principal Engineer

*This report may contain CEII and Trade Secret information and should not be released without consent from Otter Tail Power Company*