# Montana-Dakota Utilities Co. and Otter Tail Power Company APPLICATION TO THE PUBLIC UTILITIES COMMISSION OF THE STATE OF SOUTH DAKOTA FOR A FACILITY PERMIT

## Big Stone South-Ellendale Project 345-kV Transmission Line

**August 14, 2013**

BSSE

Big Stone South to Ellendale

EXHIBIT 1

# 1.0 Executive Summary

Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc., a Delaware corporation (Montana-Dakota), and Otter Tail Power Company, a Minnesota corporation (Otter Tail Power), (jointly, the Applicants), propose to construct the Big Stone South to Ellendale Project (Project). The Project consists of both a 345-kilovolt (kV) transmission line that is approximately 160 to 170 miles long traversing through North Dakota and South Dakota, and the Ellendale 345-kV Substation located near Ellendale, North Dakota. The Applicants submit this Application for a facility permit (Application) to the Public Utilities Commission of the State of South Dakota (the Commission) pursuant to South Dakota Codified Laws (SDCL) Chapter 49-41B and Administrative Rules of South Dakota (ARSD) Chapter 20:10:22. The South Dakota Facility for which the Applicants are seeking a facility permit in this Application consists of approximately 150 to 160 miles (for the purposes of this Application, the Applicants have used 155 miles in their calculations) of alternating current 345-kV transmission line and associated facilities. The line will cross the South Dakota and North Dakota border in Brown County, South Dakota and extend south and east through Brown, Day, and Grant counties to the Big Stone South Substation in Grant County, South Dakota near Big Stone City. Modifications to the South Dakota Facility may occur depending on the final route permitted, land rights, and final engineering design.

Exhibit 1 provides a map showing the route of the Project.

Exhibit 2 provides a more detailed map showing the South Dakota Facility.

The Project was identified as one of seventeen Multi-Value Projects (MVPs) by Midcontinent Independent System Operator, Inc. (MISO, formerly Midwest Independent Transmission System Operator [Midwest ISO]). The Applicants are MISO members. Significant study and input shows that MVPs will reduce the wholesale cost of energy delivery for consumers across the MISO region by enabling the delivery of low-cost generation to load, reducing congestion costs, and increasing system reliability.

The South Dakota Facility is anticipated to cost approximately $250 to $320 million in 2013 dollars. The total Project is expected to cost approximately $293 to $370 million in 2013 dollars and the cost will be allocated to and shared among MISO members in accordance with the MISO tariff. In general, the South Dakota Facility will be constructed with single-pole steel structures. The average height of the structures will range from approximately 100 to 155 feet. The average span between structures will range from 700 to 1,200 feet (typically about 1,000 feet) and will vary depending on geological or engineering constraints determined in final design. The right-of-way (ROW) for the South Dakota Facility will generally be 150-feet-wide. Two fiber optic regeneration stations about 100-feet-wide by 100-feet-long will be located outside of the ROW. A 30-foot-wide temporary travel path within the ROW will be used for construction. This temporary travel path is for vehicle traffic for work required to install structures and string conductors. In addition, the Project will require temporary laydown yards and wire stringing areas outside of the ROW. Specialty structures and foundations may be required in certain circumstances. Land rights procurement agreements with landowners of parcels crossed by the South Dakota Facility are currently underway. Construction on the South Dakota Facility is scheduled to begin in 2016 and is expected to be in-service in 2019.

The Applicants took a multi-faceted approach to identify a route for the South Dakota Facility. The process included more than one year of outreach to public, agency, and tribal stakeholders, publicly available data, and data gathered during route analysis such as a cultural resources literature review, bald eagle stick nest survey, and land cover modeling. Multiple alternative routes were considered and refined, and ultimately the proposed route was selected through this process. The Applicants have addressed the Application submittal requirements as described in in SDCL Chapter 49-41B and in ARSD Chapter 20:11:22 (Energy Facility Siting Rules).

## 1.1 Completeness Checklist

The contents required for an application with the Commission are described in SDCL 49-1-8 and further clarified in ARSD 20:10:13:01(1) et seq. The Commission submittal requirements are listed in Table 1, with cross-references indicating where the information can be found in this Application.

**Table 1. Completeness Checklist**

| SDCL | ARSD | Required Information | Location |
|---|---|---|---|
| 49-41B-35(2). | 20:10:22:05 | **List of Permits.** The application for a permit for a facility shall contain a list of each permit that is known to be required from any other governmental entity at the time of the filing. The list of permits shall be updated, if needed, to include any permit the applicant becomes aware of after filing the application. The list shall state when each permit application will be filed. The application shall also list each notification that is required to be made to any other governmental entity. | 24.0 |
| 49-41B-11(1) | 20:10:22:06 | **Names of participants required.** The application shall contain the name, address, and telephone number of all persons participating in the proposed facility at the time of filing, as well as the names of any individuals authorized to receive communications relating to the application on behalf of those persons. | 3.0 |
| 49-41B-11(7) | 20:10:22:07 | **Name of owner and manager.** The application shall contain a complete description of the current and proposed rights of ownership of the proposed facility. It shall also contain the name of the project manager of the proposed facility. | 3.0 |
| 49-41B-11(8) | 20:10:22:08 | **Purpose of facility.** The applicant shall describe the purpose of the proposed facility. | 4.0 |
| 49-41B-11(12) | 20:10:22:09 | **Estimated cost of facility.** The applicant shall describe the estimated construction cost of the proposed facility. | 5.0 |

# 23.0 Information Concerning Transmission Facilities (ARSD 20:10:22:35)

A high-voltage transmission line (HVTL) consists of three phases, each at the end of a separate insulator string, all physically supported by structures. Each phase consists of one or more conductors. When more than one conductor is used to make up a phase, the term "bundled" conductors is used. Conductors are metal cables consisting of multiple strands of steel and aluminum wire wound together. There are also two shield wires strung above the electrical phases to prevent damage from lightning strikes that may also include a fiber optic communication cable. The conductors will be approximately one to two inches in diameter. Transmission lines are constructed on a ROW, the width of which is primarily dependent on structure design, span length, and electrical safety requirements associated with the transmission line's voltage. The South Dakota Facility ROW typically will be 150 feet wide.

## 23.1 Configuration of Towers

The Applicants propose to use single pole steel single-circuit structures for the South Dakota Facility, unless engineering or environmental conditions require the use of steel H-frame or guyed mono-pole structures. Public input was a consideration in the selection of the structure type. Single steel pole structures are typically placed on concrete foundations measuring about 6 to 11 feet in diameter. Specialty structures, including dead-end structures, H-frame structures, or guyed mono-pole structures, may be used in certain circumstances. Typically, H-frame structures consist of two steel poles with cross bracing. A guyed mono-pole structure is a mono-pole with guy wires that extend diagonally out to the ground. Concrete pier foundations may be used for angle structures or if soil conditions are poor. As engineering continues, it will be determined if and where specialty structures may be used. Table 21 shows a summary of the configuration of the structures that are under consideration for the South Dakota Facility.

The South Dakota Facility will be designed to meet or surpass all relevant local and state codes, National Electric Safety Code (NESC) requirements and APLIC and Applicant standards. Appropriate standards will be met for construction and installation and all applicable safety procedures will be followed during and after installation.

**Table 21. Structure Design/Configuration Summary**

| Structure Type | Structure Material | ROW Width (feet) | Approx. Structure Height (feet) | Approx. Structure Base Diameter (feet) | Approx. Foundation Diameter (feet) | Average Span Between Structures (feet) | Pole to Pole Span on Single H-Frame Structure (feet) |
|---|---|---|---|---|---|---|---|
| Single Pole Davit Arm (majority of route) | Steel | 150 | 125-155 | 3-4 (tangent structures)<br>4-6 (angle structures) | 6-11 | 1,000 (range of 700 – 1200) | N/A |

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|---|---|---|---|---|---|---|---|
| Guyed Mono-Pole | Steel | 150 | 125-155 | 3-4 (tangent structures)<br>4-6 (angle structures) | 3-5 | 1,000 (range of 700 – 1200) | N/A |
| H-Frame (if necessary) | Steel | 150 | 100-130 | 3-4 (tangent structures) | 3-5 | 1,000 (range of 700 – 1200) | 30 |

## 23.2 Conductor Configuration

It is anticipated that each phase will consist of two conductor bundled (2x), TP (twisted pair) 477 kcmil (thousand circular mils), 26/7, Hawk, aluminum conductor steel reinforced (ACSR) or conductors of comparable capacity.

## 23.3 Proposed Transmission Site and Major Alternatives

The site of the South Dakota Facility is described in Sections 2.1 and 7.0, Appendix A, and shown on Exhibit 2. Section 8.0 outlines the route identification and selection process.

## 23.4 Reliability and Safety

### 23.4.1 *Transmission Line Reliability*

In general, transmission infrastructure is built to withstand weather extremes that can be encountered within this region. With the exception of severe weather conditions such as tornadoes and extreme ice, transmission lines usually only fail when they are subjected to conditions beyond the design parameters.

Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is detected on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent on high voltage transmission lines. As a result, the average annual availability of transmission infrastructure is very high, in excess of 99 percent.

### 23.4.2 *Safety*

The South Dakota Facility will be designed to meet the local, state, NESC and the Applicants' standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and ROW widths. Construction crews will comply with local, state, NESC and the Applicants' standards regarding installation of facilities and standard construction practices. The Applicants' and industry safety procedures will be followed during and after installation of the transmission line.