North Dakota Transmission Authority

North Dakota Industrial Commission

BIL 40101(d) Application

Project Title:
Kenaston Switchyard 60 kV Breaker Additions

Applicant:
Burke-Divide Electric Cooperative, Inc.

Date of Application:
11/20/2023

Date of Application Revision:
08/30/2024

Amount of Grant Request:
$550,000

Total Amount of Proposed Project:
$820,000

Duration of Project:
4 months (Construction)

Point of Contact (POC):
Eric Sieg, Operations Manager

POC Telephone:
701-939-6671

POC Email:
eric@bdec.coop

POC Address:
9549 Hwy 5

TABLE OF CONTENTS

Please use this table to fill in the correct corresponding page number.

Applicant Description

Burke-Divide Electric Cooperative, Inc. (BDEC) is a consumer-owned, not-for-profit Rural Electric Cooperative (REC) located in northwestern North Dakota. BDEC's mission statement is:
to provide reliable, high-quality electricity at a competitive cost, to strengthen the area economy and to lead in improving the region's quality of life through innovative, state of the art products, and service while operating within cooperative principles.

BDEC was originally formed in 1945 and currently serves approximately 1,410 members and 3,470 meters across all or parts of Burke, Divide, Ward, Renville, Mountrail, and Williams counties in northwestern North Dakota as detailed in Figure 1.

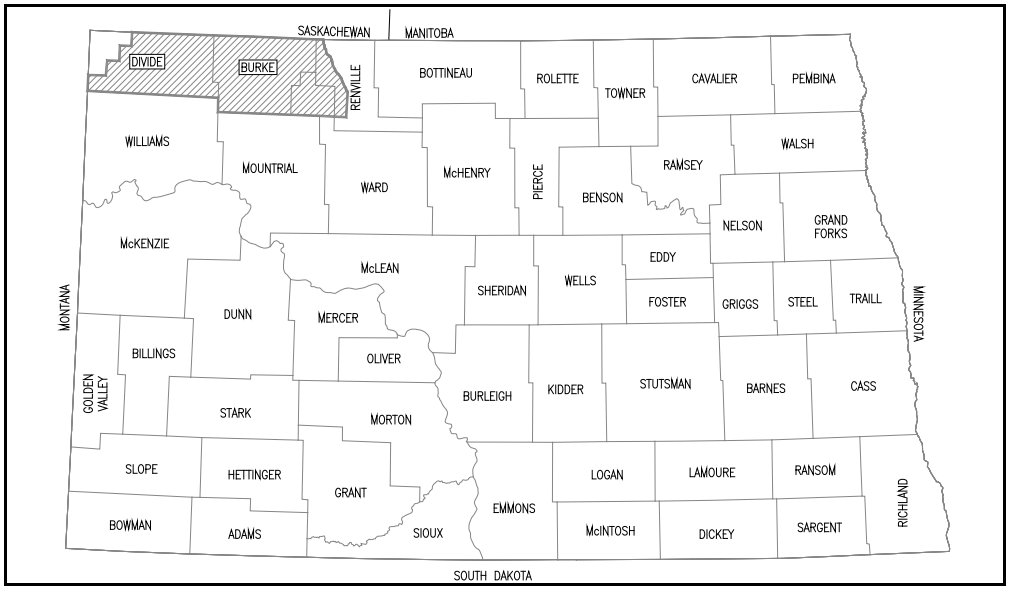

Figure 1: BDEC Service Territory

BDEC purchases its wholesale power through Upper Missouri Power Cooperative (UMPC), who in turn purchases power from Western Area Power Administration (WAPA) and Basin Electric Power Cooperative (BEPC). BDEC currently owns and operates approximately 130 miles of

transmission line, 2,641 miles of distribution line, and 16 distribution substations with most recently reported total annual sales of 189,359 MWh.

BDEC has 31 full-time employees and is governed by a Board of Directors comprised of 7 member consumers. The board meets on the last Wednesday of each month and hosts an annual meeting for its membership in June of each year. BDEC headquarters is located at 9549 W Hwy 5, Columbus, ND 58727 and has outposts located in Kenmare and Crosby.

Project Description

BDEC intends to install two (2) high-voltage circuit breakers on its 60 kV transmission system emanating from the Kenaston Switchyard, a joint-owned substation with BEPC. BDEC owns and maintains the 25 MVA, 115-60 kV transformer and subsequent downline 60 kV equipment, while Basin Electric owns and maintains the 115 kV side and associated high-side equipment upstream of the transformer.

As referenced in Figure 2, The Kenaston Switchyard is a crucial facility that serves 20+ miles of BDEC owned 60 kV transmission line and provides power to BDEC's Niobe, Norma, and Sauk Prairie distribution substations.

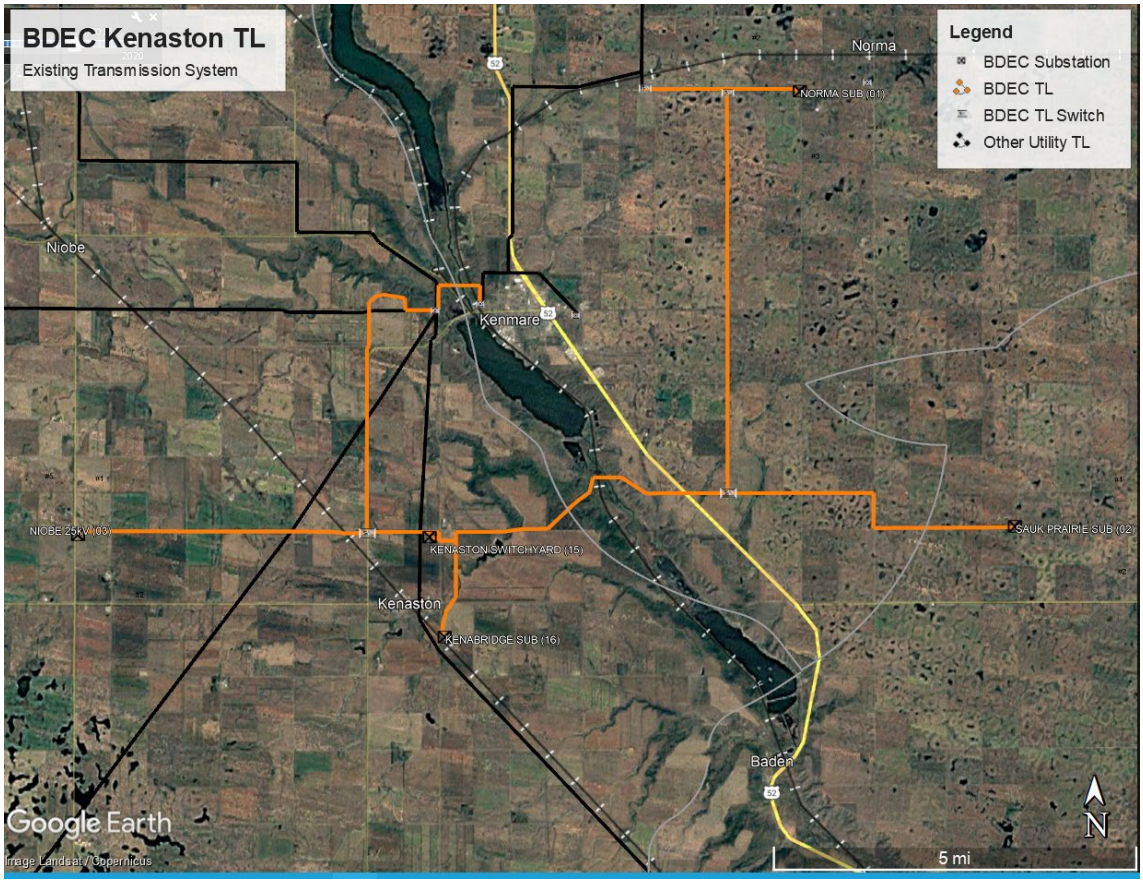

Figure 2: Kenaston Switchyard Transmission Area

The breaker additions will be on the BDEC side of the 115-60 kV transformer. Currently, the only fault clearing device in place in the Kenaston Switchyard allows all faults to travel back through the 115-60 kV transformer to a Basin Electric owned breaker on the 115 kV side. When this happens, power is lost to three (3) BDEC substations which collectively provide power to 784 meters.

BDEC plans to add two (2) breakers on its 60 kV system splitting its transmission line out of the Kenaston Switchyard into two (2) directions one (1) span outside of this sub. The addition of these breakers will help isolate the cause/location of the fault, reduce the number of members affected by an outage, and, hopefully, reduce the duration of an outage. It will also help sustain longevity of the 115/60 kV transformers life as it should not see the line faults travel back thru to the current 115 kV breaker.

BDEC also plans to install a second 3-way switch just outside the switchyard for added system flexibility. Further details on the proposed project can be found in EXHIBIT I – Existing Kenaston Switchyard Layout and EXHIBIT II – Proposed Kenaston Switchyard Layout.

Standards of Success

Outage Statistics

Burke-Divide Electric records the duration and frequency of outages on their electrical system annually. In recent years, BDEC has experienced higher-than-normal outages during the winter months of January, November, and December due to frost and ice, but also during summer months of June and July due to wind and lightning strikes.

Table 1 summarizes outage statistics across BDEC system from 2018-2023. The proposed improvements for the Kenaston Switchyard will help reduce outage durations and interruptions by increasing sectionalizing capabilities in the area.

Table 1: BDEC Outage Information (2018-2023)

Year	Outage Duration (min)	Outage Interruptions	Consumers	SAIDI	CAIDI
2018	382.0	615	3,489	0.11	0.62
2019	654.0	579	3,485	0.19	1.13
2020	240.0	525	3,442	0.07	0.46
2021	281.0	477	3,418	0.08	0.59
2022	7626.0	1094	3,442	2.22	6.97
2023	2090.0	979	3,446	0.61	2.13
Average	1878.8	711.5	3,453.7	0.55	1.98

Specifically, the circuit breaker additions will enable BDEC to segment the 60 kV transmission system out of Kenaston and effectively reducing cascading system events and overall fault exposures.

Community Benefits

Operating as a REC, BDEC serves most of the farming communities within northwestern North Dakota including the areas around the Kenaston Switchyard. While neither BDEC nor the surrounding Kenaston area may qualify as "disadvantage communities" per the Justice40 Initiative, BDEC does operates on seven core cooperative principles that guides their daily operations.

One of these core values is *Voluntary and Open Membership*, meaning that membership in the cooperative is open to all persons, regardless of gender, religion, or race. *Concern for Community* is another core cooperative principle that BDEC follows and actively adheres to this principle as evident by continuing to provide area high-school scholarships, donating funds to local fire departments, and other notable charitable contributions proposed by the membership.

BDEC strives to provide reliable electrical service to its customers by properly maintaining its' current infrastructure, replacing aged or damaged equipment, and incorporating new industry available technology. The installation of these circuit breakers is in line with the NDTA's objectives for grid resiliency and reliable energy to local communities.

The scope of work defined within this project will need to be contracted out to an outside source. This will bring in an influx of funding to the project area as contract crews will need food, fuel, and lodging while working on this project.

Operational Benefits

Within the last two (2) years, BDEC has experienced twelve interruptions along the 60 kV transmission system out of Kenaston which fell back to the high-side, 115 kV circuit breaker to clear the faults which in turn dropped services to all three (3) distribution substations. The circuit breaker additions would reduce exposure to all 748 meters by allowing one (1) circuit breaker to provide protection to 347 meters and with the other circuit breaker protecting the remaining 437 meters.

Continuing to allow operations to roll through the Kenaston power transformer raises the risk of eventual equipment failure by unnecessarily exposing the power transformer to high levels of fault current. The 60 kV circuit breakers can be coordinated with upstream 115 kV circuit breaker to act as the first line of defense preserving long-term reliability for the broader Kenaston service territory.

Operational Savings
Segmenting the 60 kV transmission line will reduce the time it takes for a dispatched crew to complete a patrol to verify damage so they can restore power to the membership. And allow BDEC to monitor the breaker operations via our SCADA system which will notify us when any operations have occurred.

Project Timeline

This project has been identified in BDEC's 2024-2027 Construction Work Plan with a tentative start date in the 2nd quarter of 2026 and completion being in the 3rd quarter of 2026, primarily due to extensive material lead-times. Certain long-lead time materials have already been placed on order to alleviate projected time constraints.

Engineering design, project coordination, and material procurement will all be required in advance in order for BDEC to meet projected timelines and maintain viability. BDEC intends to coordinate with adjacent power supplier (MDU) to provide alternative power source for BDEC's three (3) distribution substations. Once this project begins, it is important that it stays on schedule so that power feeds can be switched back to normal as quickly as possible to ensure BDEC is able to continue to provide reliable power to its membership.

Key project milestones would be to have all major material procured and a construction contract awarded by end of 2025. Construction would then be scheduled through the 2026 construction season.

Project Budget

This project is estimated at a total cost of **$820,000.**

This includes costs to rework the substation steel infrastructure to accommodate the dual breaker additions, installation of two (2) 60 kV breakers and associated relaying equipment, and the installation of a 3-way switch and LAM pole directly outside the substation structure for additional system flexibility.

Burke-Divide Electric Cooperative is requesting **$550,000** from the North Dakota Transmission Authority to offset the cost of this project.

Burke-Divide Electric Cooperative will cover the remainder of the project costs through long-term financing with Rural Utility Services (RUS).

EXHIBIT I – Existing Kenaston Switchyard Layout

EXISTING KENASTON SWITCHYARD LAYOUT

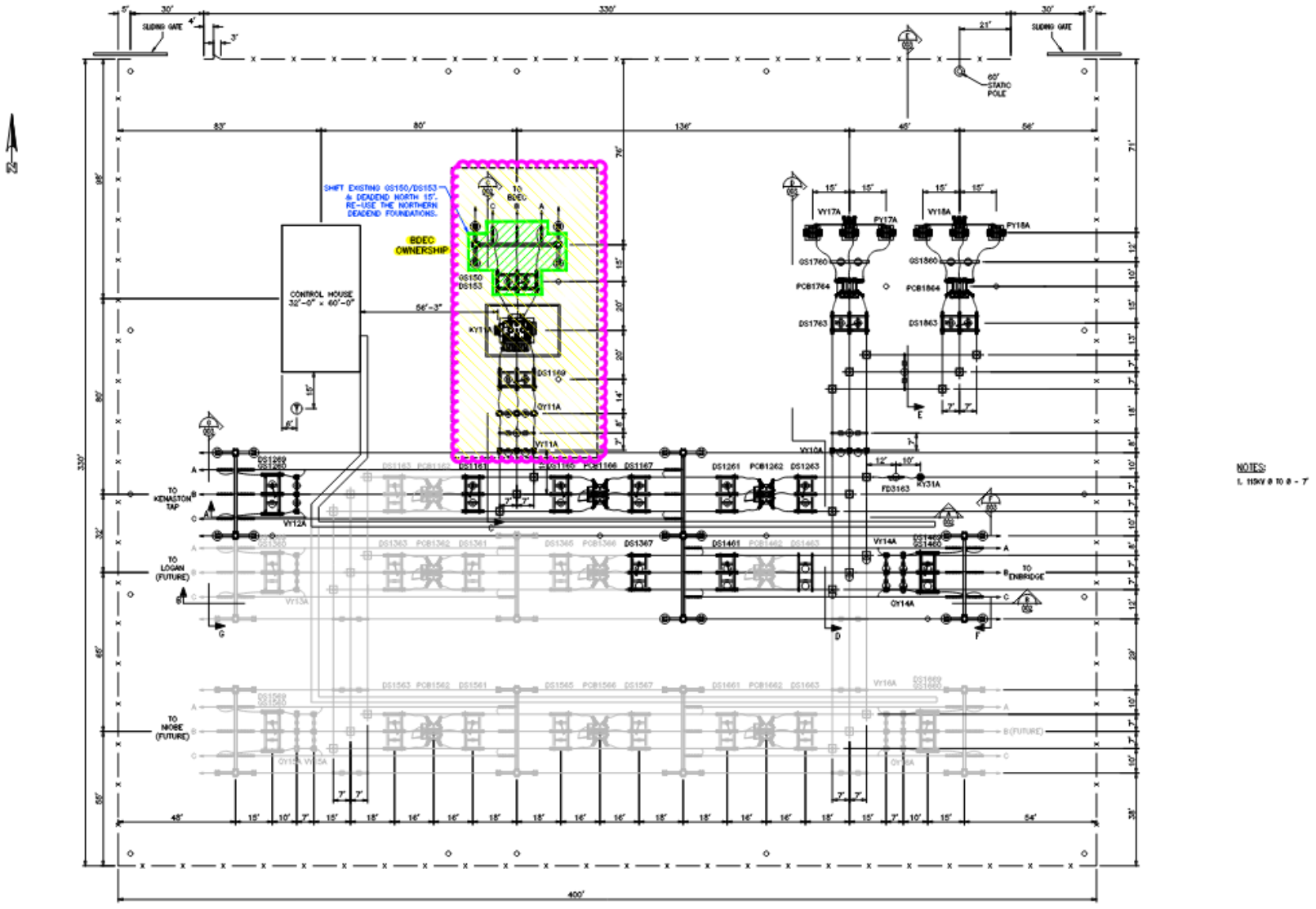

EXHIBIT II – Proposed Kenaston Switchyard Layout