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#### **PROJECT NO. 55999**

## REPORTS OF THE ELECTRIC § RELABILITY COUNCIL OF TEXAS §

## PUBLIC UTILITY COMMISSION OF TEXAS

#### ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.'S NOTICE OF ACCEPTANCE OF A TIER 3 TRANSMISSION PROJECT

Pursuant to ERCOT Protocol Section 3.11.4.9(1), Electric Reliability Council of Texas, Inc. (ERCOT) files this Notice of the ERCOT Regional Planning Group (RPG)'s acceptance of a Tier 3 transmission project submitted by Oncor Electric Delivery Company LLC (Oncor), as reflected in Attachments A-B. Oncor is the ERCOT-registered Transmission Service Provider (TSP) responsible for the transmission project. ERCOT is prepared to provide the Commission with any additional information it may request regarding this matter.

Dated: May 1, 2024

Respectfully Submitted,

#### <u>/s/ Katherine Gross</u>

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April 2, 2024

Mr. Eithar Nashawati Senior Director, Asset Planning Oncor Electric Delivery 2233-B Mountain Creek PKWY Dallas, TX 75211-6716

RE: Oncor Prairieland 345/138-kV Switch and Prairieland Switch – Quartz Sand Switch/Hog Mountain POD 138-kV Line Project

Dear Mr. Nashawati:

The Electric Reliability Council of Texas (ERCOT) Regional Planning Group (RPG) has reviewed and accepted the following Tier 3 transmission project in accordance with ERCOT Protocol Section 3.11.4:

Prairieland 345/138-kV Switch and Prairieland Switch – Quartz Sand Switch/Hog Mountain POD 138-kV Line Project:

- Build a new Prairieland 345/138-kV Switch, including two 600 MVA autotransformers, approximately 17 miles east of the existing Consavvy 345/138-kV Switch, along the Consavvy Morgan Creek 345-kV transmission line. The Prairieland 345/138-kV Switch will initially be installed with a 6-breaker, 345-kV, breaker-and-a-half bus arrangement, a single 345-kV breaker for each 345/138-kV autotransformer, tapped directly off the 345-kV bus, and a 6-breaker, 138-kV, breaker-and-a-half bus arrangement will meet or exceed 5000 A, all 345-kV terminal equipment associated with the autotransformers tapped directly off the 345-kV bus will meet or exceed 3200 A, and all 138-kV terminal equipment will meet or exceed 3200 A;
- Construct an approximately 0.1-mile loop of the existing Consavvy Morgan Creek/Longshore 345kV double-circuit transmission line into the new Prairieland 345-kV Switch with a normal and emergency rating of 1072 MVA;
- Construct a new approximately 1-mile 138-kV line from the new Prairieland 345/138-kV Switch to Hog Mountain 138-kV Point of Delivery (POD) on double-circuit capable structures with one circuit in place using a conductor rated 2569 A or greater (normal and emergency rating of 614 MVA); and
- Install a new, approximately 7-mile, 138-kV circuit from Prairieland 345/138-kV Switch to Quartz Sand 138-kV Switch on the vacant position of the existing double-circuit capable structures using a conductor rated 2569 A or greater (normal and emergency rating of 614 MVA).

Should you have any questions please contact me at any time.

Sincerely,

jisti Hobbs

Kristi Hobbs Vice President, System Planning and Weatherization Electric Reliability Council of Texas

cc:

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Pablo Vegas, ERCOT Woody Rickerson, ERCOT Prabhu Gnanam, ERCOT Robert Golen, ERCOT Brandon Gleason, ERCOT

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# PRAIRIELAND 345/138 KV SWITCH AND PRAIRIELAND SWITCH – QUARTZ SAND SWITCH/HOG MOUNTAIN POD 138 KV LINE

ERCOT RPG Submittal February 22, 2024

Business and Operations Services Assets Planning

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## **Executive Summary**

Oncor Electric Delivery Company LLC (Oncor) proposes a Tier 3 project (Proposed RPG Project) that will:

- Establish the new Prairieland 345/138 kV Switch, including two 600 MVA autotransformers, approximately 17 miles east of the existing Consavvy 345/138 kV Switch, along the Consavvy Morgan Creek 345 kV Line. The Prairieland 345/138 kV Switch will initially be installed with (1) a 6-breaker, 345 kV, breaker-and-a-half bus arrangement, (2) a single 345 kV breaker for each 345/138 kV autotransformer, tapped directly off the 345 kV bus, and (3) a 6-breaker, 138 kV, breaker-and-a-half bus arrangement. All 345 kV terminal equipment in the breaker-and-a-half bus arrangement will meet or exceed 5000 A, all 345 kV terminal equipment associated with the autotransformers tapped directly off the 345 kV bus will meet or exceed 3200 A, and all 138 kV terminal equipment will meet or exceed 3200 A;
- Construct an approximately 0.1-mile loop of the existing Consavvy Morgan Creek/Longshore 345 kV DCKT Line (normal and emergency rating of 1072 MVA) into the new Prairieland 345 kV Switch;
- Construct a new approximately 1-mile 138 kV line from the new Prairieland 345/138 kV Switch to Hog Mountain 138 kV Point-of-Delivery (POD) on double-circuit capable structures with one circuit in place using a conductor rated 2569 A or greater, (normal and emergency rating of 614 MVA); and
- Install a new approximately 7-mile, 138 kV circuit from Prairieland 345/138 kV Switch to Quartz Sand 138 kV Switch on the vacant position of the existing double-circuit capable structures using a conductor rated 2569 A or greater, (normal and emergency rating of 614 MVA).

Oncor continues to experience significant load growth in West Texas due to the high level of activities in the oil and gas industry. The 138 kV load-serving network sourced by the Einstein, North McCamey, and Consavvy 345 kV Switches is experiencing a substantial amount of this load growth. Steady state assessments of the existing transmission facilities in this area of West Texas indicate that by the summer of 2025, low voltages are seen at several 138 kV load-serving substations along the same 138 kV corridor under post-contingency conditions. The assessments also observed thermal overloading of an existing 138 kV transmission line.

The Proposed RPG Project would eliminate all identified voltage and thermal violations, improve system operational flexibility, reduce customer exposure, support future load growth, increase system capacity in the area, create a new 138 kV pathway with a stronger source, and allow bi-directional power flow in the area.

Oncor recommends this \$56 million, Tier 3 project in Glasscock County to meet a summer 2025 in-service date. No portion of this Proposed RPG Project will require a CCN. The completion date may change depending on design, material acquisition, outage coordination, and construction progress. The cost estimate accounts for Oncor's expectation that construction activities will occur in an energized transmission line corridor. If necessary, Oncor will work with ERCOT to develop and implement Constraint Management Plans (CMPs) such as line sectionalizing or mobile equipment/capacitor installation, based on summer 2025 and 2026 operational conditions.

## Introduction

This submittal describes the need to 1) establish the new Prairieland 345/138 kV Switch, 2) construct a new approximately 1-mile 138 kV line from Prairieland 345/138 kV Switch to Hog Mountain 138 kV Point-of-Delivery (POD) on double-circuit capable structures with one circuit in place using a conductor rated 2569 A or greater, and 3) install a new approximately 7-mile 138 kV circuit from Prairieland 345/138 kV Switch to Quartz Sand 138 kV Switch on existing double-circuit capable structures using a conductor rated 2569 A or greater in Glasscock County. Oncor continues to experience significant load growth in this area of West Texas due to the high level of activities in the oil and gas industry. Additional load in the region causes post-contingency low voltages at several 138 kV load-serving substations beginning in summer 2025. The addition of new industrial loads in the area also result in post-contingency thermal overloading of existing 138 kV transmission lines.

Figures 1 and 2 show an area map and the current configuration of the area around the Proposed RPG Project.



Figure 1 - Prairieland 345/138 kV Switch Area Map



Figure 2 - Study Area One-Line Diagram

## **Purpose and Necessity**

The existing transmission infrastructure in this area of West Texas, needs a new 345 kV injection point and a new 138 kV pathway to allow bi-directional power flow to respond to customer needs for high quality, reliable power. A large postcontingency voltage deviation makes voltage regulation using more conventional devices, such as shunt capacitors, impractical and/or insufficient for a wide range of system conditions. Adding a new 345/138 kV pathway in this area will further enhance system reliability and power quality.

#### **Steady-State Analysis**

Oncor steady-state assessments for the 2025, 2026 and 2029 summer peak cases revealed low voltage criteria violations at multiple load-serving stations under post-contingency conditions. The cases used for this study were the ERCOT Steady State Working Group (SSWG) cases published on October 10, 2022, (22SSWG\_2025\_SUM1\_U1\_FINAL\_10102022.sav, 22SSWG\_2026\_SUM1\_U1\_FINAL\_10102022.sav, and 22SSWG\_2029\_SUM1\_U1\_FINAL\_10102022.sav). The base case was modified to include approximately 625 MW of newly signed Oncor loads in the area contracted through May 2023.

Additionally, Oncor's Peck – Driver 138 kV Project (endorsed by ERCOT 5/19/23), Stanton Loop South Dynamic Reactive Power Project (approved by RPG 9/13/23), and recently approved Rockhound 345/138 kV Switch and Grey Well Draw – Buffalo 2nd 138 kV Circuit Project (approved by RPG 2/6/24) were also included in the analysis. The post-contingency conditions that resulted in voltage and thermal limit violations included several contingency scenarios per NERC Standard TPL-001-5 and ERCOT Planning Guide Reliability Performance Criteria 4.1.1.2. The results justifying the need for the proposed project and anticipated results following the completion of the proposed project are summarized in Tables 1 and 2.

## Voltage Violations

Post-contingency Voltage Performance									
NERC Category	Most Impactful Contingency	Monitored Bus Number	Monitored Bus Name	Voltage (p.u.)					
				2025 Summer		2026 Summer		2029 Summer	
				Pre- Project	Post- Project	Pre- Project	Post- Project	Pre- Project	Post- Project
P1	Spraberry – Quartz Sand (PSSE Buses 1329 - 1328 id 1)	23850	Dewey Lake	0.935	0.998	0.934	0.995	0.936	0.993
		18552	Hog Mountain POD	0.932	1.002	0.931	0.999	0.933	0.997
		11350	Wrage Ranch POD	0.937	0.998	0.936	0.996	0.938	0.994
P2.1	Spraberry – CRMWD #7 Tap (PSSE Buses 1329 - 1337 id 1)	1338	CRMWD #7	0.907	0.989	0.907	0.987	0.908	0.985
		1337	CRMWD #7_Tap	0.907	0.989	0.907	0.987	0.908	0.985
		11394	Stephenson Lake POD	0.907	0.989	0.907	0.987	0.909	0.985
		11372	Meyers Draw POD	0.908	0.99	0.908	0.988	0.91	0.986
		23850	Dewey Lake	0.911	0.993	0.911	0.991	0.912	0.989
		18552	Hog Mountain POD	0.908	0.999	0.908	0.996	0.909	0.994
		11350	Wrage Ranch POD	0.913	0.993	0.914	0.992	0.915	0.99
P6.2	Einstein Autotransformer #1 (PSSE Buses 23852 - 23874 - 23875 id 1)	23850	Dewey Lake	0.87	0.987	0.881	0.986	0.861	0.981
		18552	Hog Mountain POD	0.867	0.994	0.878	0.992	0.858	0.988
	Spraberry – Quartz Sand (PSSE Buses 1329 - 1328 id 1)	11350	Wrage Ranch POD	0.873	0.988	0.883	0.986	0.864	0.981
		1328	Quartz Sand	0.871	0.988	0.881	0.986	0.862	0.981

Table 1 - Post-Contingency Voltage Performance

#### **Thermal Violations**

Post-contingency Thermal Performance									
NERC Category	Most Impactful Contingency	Monitored Element	Percent Loading						
			2025 Summer		2026 Summer		2029 Summer		
			Pre- Project	Post- Project	Pre- Project	Post- Project	Pre- Project	Post- Project	
P6	Einstein Autotransformer #1 (PSSE Buses 23852 - 23874 - 23875 id 1)	McDonald Road – Glasscock County North	134.6	34.9	138.5	39.5	145.7	45.5	
		Glasscock County North – Forsan Tap	134.6	35.0	138.5	39.5	145.7	45.5	
	Spraberry – Quartz Sand (PSSE Buses 1329 - 1328 id 1)	Forsan Tap – Polecat Creek	132.0	38.8	138.3	43.5	148.1	50.8	

Table 2 - Post-Contingency Thermal Performance

#### **Dynamic Analysis**

Oncor performed a dynamic analysis to evaluate the impact of the addition of this project on the transmission system in this area. The analysis was conducted using the latest Dynamic Working Group (DWG) 2025 summer peak case and 2026 HWLL case published in September 2023 (2025\_SP\_Final\_NonCnv35.sav and 2026\_HWLL\_Final\_NonCnv35.sav). System topology updates necessary to implement the proposed project were used in the study case as required. The results of the stability assessment with the addition of the Proposed RPG Project demonstrate that there will be no adverse effect on the transmission system. Oncor's most recent annual assessment indicates there are no known dynamic stability issues in this area. Based on this, Oncor did not perform additional dynamic analysis for this project through 2027. Oncor will continue to perform annual dynamic analysis for this area.

#### Short-Circuit Study

Oncor evaluated the short-circuit impacts of the proposed project using the System Protection Working Group case (ERCOT SPWG 2026 FY case) dated August 8, 2023. The SPWG case was modified to include changes associated with the proposed project, as well as other Oncor system changes that occurred since the development of the SPWG case. The analysis revealed no known overdutied breakers in this area. Therefore, Oncor did not perform additional short-circuit studies for the Proposed RPG Project through 2027. Oncor will continue to perform annual short-circuit studies.

#### Subsynchronous Resonance (SSR) Screening

Oncor performed an SSR screening assessment with all series capacitors and generator units in service to identify new potential SSR vulnerabilities within the ERCOT system as a result of the proposed project. The study was performed with and without the Proposed RPG Project and confirmed the Proposed RPG Project did not create any new or shorter paths leading to generation sources becoming radial with series capacitors in the event of fewer than 14 concurrent transmission outages. No further SSR analysis is required for the Proposed RPG Project.

## **Project Description**

In order to address the identified reliability concerns, Oncor recommends the following:

- Establish the new Prairieland 345/138 kV Switch, including two 600 MVA autotransformers, approximately 17 miles east of the existing Consavvy 345/138 kV Switch, along the Consavvy Morgan Creek 345 kV Line. The Prairieland 345/138 kV Switch will initially be installed with (1) a 6-breaker, 345 kV, breaker-and-a-half bus arrangement, (2) a single 345 kV breaker for each 345/138 kV autotransformer, tapped directly off the 345 kV bus, and (3) a 6-breaker, 138 kV, breaker-and-a-half bus arrangement. All 345 kV terminal equipment in the breaker-and-a-half bus arrangement will meet or exceed 5000 A, all 345 kV terminal equipment associated with the autotransformers tapped directly off the 345 kV bus will meet or exceed 3200 A, and all 138 kV terminal equipment will meet or exceed 3200 A;
- Construct an approximately 0.1-mile loop of the existing Consavvy Morgan Creek/Longshore 345 kV DCKT Line (normal and emergency rating of 1072 MVA) into the new Prairieland 345 kV Switch;
- Construct a new approximately 1-mile 138 kV line from the new Prairieland 345/138 kV Switch to Hog Mountain 138 kV Point-of-Delivery (POD) on double-circuit capable structures with one circuit in place using a conductor rated 2569 A or greater, (normal and emergency rating of 614 MVA); and
- Install a new approximately 7-mile, 138 kV circuit from Prairieland 345/138 kV Switch to Quartz Sand 138 kV Switch on the vacant position of the existing double-circuit capable structures using a conductor rated 2569 A or greater, (normal and emergency rating of 614 MVA).

## **One-Line Diagram**

Figure 3 shows a one-line diagram with dashed elements depicting the proposed projects.



Figure 3 - Proposed RPG Project One-Line Diagram

## **Alternative Solution**

As an alternative to establishing the Proposed RPG Project, Oncor considered installing an additional 345/138 kV autotransformer at Einstein Switch and installing a 110.2 MVAR capacitor bank near or at Quartz Sand 138 kV Switch.

Oncor's analysis revealed that, while this alternative solution does provide voltage support and may be considered in future projects, this alternative would narrowly resolve the post-contingency violations identified in Tables 1 and 2. Oncor does not recommend this alternative because, 1) the Proposed RPG Project improves the overall system performance to a greater extent than the alternative, and 2) the alternative solution does not improve networking in the study area to support future load growth.

## Recommendation

Oncor recommends the following project as the best solution to resolve the post-contingency thermal and voltage issues identified in the analysis of the study area:

- Establish the new Prairieland 345/138 kV Switch, including two 600 MVA autotransformers, approximately 17 miles east of the existing Consavvy 345/138 kV Switch, along the Consavvy Morgan Creek 345 kV Line. The Prairieland 345/138 kV Switch will initially be installed with (1) a 6-breaker, 345 kV, breaker-and-a-half bus arrangement, (2) a single 345 kV breaker for each 345/138 kV autotransformer, tapped directly off the 345 kV bus, and (3) a 6-breaker, 138 kV, breaker-and-a-half bus arrangement. All 345 kV terminal equipment in the breaker-and-a-half bus arrangement will meet or exceed 5000 A, all 345 kV terminal equipment associated with the autotransformers tapped directly off the 345 kV bus will meet or exceed 3200 A, and all 138 kV terminal equipment will meet or exceed 3200 A;
- Construct an approximately 0.1-mile loop of the existing Consavvy Morgan Creek/Longshore 345 kV DCKT Line (normal and emergency rating of 1072 MVA) into the new Prairieland 345 kV Switch;
- Construct a new approximately 1-mile 138 kV line from the new Prairieland 345/138 kV Switch to Hog Mountain 138 kV Point-of-Delivery (POD) on double-circuit capable structures with one circuit in place using a conductor rated 2569 A or greater, (normal and emergency rating of 614 MVA); and
- Install a new approximately 7-mile, 138 kV circuit from Prairieland 345/138 kV Switch to Quartz Sand 138 kV Switch on the vacant position of the existing double-circuit capable structures using a conductor rated 2569 A or greater, (normal and emergency rating of 614 MVA).

This Proposed RPG Project resolves all identified area post-contingency voltage and thermal concerns in years 2025 through 2029. Oncor will work with ERCOT to develop and implement Constraint Management Plans (CMPs) based on summer 2025 and 2026 operational conditions, if needed. Completing the Proposed RPG Project will ensure reliability requirements are satisfied, relieve thermal overloading, maintain acceptable system voltages, add a new 345 kV injection point, improve overall system strength and import capability, and provide adequate transmission capacity for the system under pre- and post-contingency conditions. The estimated cost for this Tier 3 Proposed RPG project is \$56 million, based on the expectation that some elements of this project will be constructed using energized (hot) work processes.