Control Number: 27706

Item Number: 461

Addendum StartPage: 0

PROJECT NO. 27706

REPORTS OF THE ELECTRIC RELIABILITY COUNCIL OF TEXAS	§ § §	**PUBLIC UTILITY COMMISSION OF TEXAS**

ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.'S NOTICE OF ENDORSEMENT OF A TIER 2 TRANSMISSION PROJECT AND ACCEPTANCE OF TWO TIER 3 TRANSMISSION PROJECTS

Pursuant to ERCOT Protocol Section 3.11.4.9(1), Electric Reliability Council of Texas, Inc. (ERCOT) files this notice of ERCOT's endorsement of a Tier 2 transmission project submitted by Texas-New Mexico Power Company (TNMP), an ERCOT-registered Transmission Service Provider (TSP), as reflected in Attachments A – B.

ERCOT also provides courtesy notice of acceptance of a Tier 3 transmission project submitted by Oncor Electric Delivery Company LLC, an ERCOT-registered TSP, as reflected in Attachments C – D; and ERCOT's acceptance of a Tier 3 transmission project submitted by American Electric Power Service Corporation (AEPSC), as reflected in Attachments E and F. AEP Texas Central Company is the ERCOT-registered TSP responsible for the transmission project.

ERCOT is prepared to provide the Commission with any additional information it may request regarding these projects.

Respectfully Submitted,

/s/ Gibson Hull
Chad V. Seely
Vice President and General Counsel
Texas Bar No. 24037466
(512) 225-7035 (Phone)
(512) 225-7079 (Fax)
chad.seely@ercot.com

Juliana Morehead
Assistant General Counsel
Texas Bar No. 24046474
(512) 225-7184 (Phone)
(512) 225-7079 (Fax)
juliana.morehead@ercot.com

461

Gibson Hull
Associate Corporate Counsel
Texas Bar No. 24106844
(512) 225-7179 (Phone)
(512) 225-7079 (Fax)
gibson.hull@ercot.com

ERCOT
7620 Metro Center Drive
Austin, Texas 78744

ATTORNEYS FOR ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.

ercot
Your Power. Our Promise.

Taylor
[illegible]

Austin
[illegible]

ercot.com

September 22, 2020

Mr. Anthony Hudson
Director of System Operations
TNMP
2641 E. Hwy 6
Alvin, TX 77511

RE: Texas City Transmission Improvement Project

Dear Mr. Hudson:

On September 16, 2020, the Electric Reliability Council of Texas (ERCOT) endorsed the following Tier 2 transmission project in accordance with ERCOT Protocol Section 3.11.4:

Texas City Transmission Improvement Project:

- Construct a new Cattail 138-kV substation near the existing Texas City Main 69-kV substation
- Install a new 138/69-kV transformer at Texas City Main, which is currently owned by TNMP
- Construct a new Texas City Main – Cattail 138-kV line (~0.01 mi)
- Construct a new Greenbelt – Cattail 138-kV line (~2.5 mi). The existing Greenbelt 138 kV substation is currently owned by TNMP
- Construct a new Cherokee – Cattail 138-kV line (~1.5 mi). The existing Cherokee 138 kV substation is currently owned by TNMP

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

Sincerely,

D. W. Rickerson
Vice President, Grid Planning and Operations
Electric Reliability Council of Texas

cc:

Bill Magness, ERCOT
Warren Lasher, ERCOT
Jeff Billo, ERCOT
Shun Hsien (Fred) Huang, ERCOT
Sun Wook Kang, ERCOT
Juliana Morehead, ERCOT

ERCOT Independent Review of TNMP Texas City Transmission Improvement Project

Document Revisions

Date	Version	Description	Author(s)
9/16/2020	1	Final Report	Md Mainul Islam
		Reviewed by	Sun Wook Kang, Shun Hsien (Fred) Huang, Jeff Billo

Table of Contents

1. Executive Summary

Texas-New Mexico Power (TNMP) submitted the Texas City Transmission Improvement Project to the Regional Planning Group (RPG) in April 2020. TNMP developed this project to reliably serve 93 MW of a new confirmed load with an associated 63 MW cogeneration plant. Both the load and the plant are expected to be in-service by June 1, 2022 in Texas City, Galveston County. Without transmission upgrades, thermal overloads under various contingencies are expected to occur on TNMP's 69-kV system in 2022.

ERCOT performed an Independent Review of the RPG proposal and confirmed the reliability needs driven by the integration of the new load and cogeneration facility. Among six different transmission project options evaluated in the Independent Review, ERCOT recommends the following option (Option 5) based on the study results described in this report:

- Construct a new Cattail 138-kV substation near the existing Texas City Main 69-kV substation
- Install a new 138/69-kV transformer at Texas City Main with normal and emergency ratings of at least 200 MVA
- Construct a new Texas City Main – Cattail 138-kV line (~0.01 mi) with normal and emergency ratings of at least 379 MVA
- Construct a new Greenbelt – Cattail 138-kV line (~2.5 mi) with normal and emergency ratings of at least 717 MVA
- Construct a new Cherokee – Cattail 138-kV line (~1.5 mi) with normal and emergency ratings of at least 717 MVA

The recommended option is a Tier 2 project estimated to cost $33.13 Million. A Certificate of Convenience and Necessity (CCN) application is required for the new rights-of-way associated with the new 138-kV lines. The expected in-service date of this project is before June 2022.

2. Introduction

In April 2020, TNMP submitted the Texas City Transmission Improvement Project to the RPG to address reliability issues primarily driven by a proposed facility with 93 MW of new confirmed load and an associated 63 MW cogeneration plant This facility is to be constructed on the northeast side of Texas City industrial complex by June 2022 The transmission project proposed by TNMP was classified as a Tier 2 project pursuant to Protocol Section 3 11 4 3, with an estimated cost of $29 3 Million The project requires new rights-of-way (ROW) for new proposed 138-kV transmission lines in the study area.

According to the RPG submittal, TNMP currently serves approximately 400 MW peak load from its 138-kV and 69-kV network in Texas City, Galveston County Approximately 75% of this current peak load is industrial in nature, including numerous refineries, petroleum products facilities, pipeline facilities, and other petroleum industry downstream support facilities interconnected from transmission points of delivery

TNMP also expects an additional 140 MW of potential conceptual load to be interconnected at the existing Amoco 138-kV substation in the future This additional load at the Amoco substation was not confirmed at the time of this Independent Review *Figure 1* shows the approximate locations of the 93 MW load and 63 MW cogeneration plant, and the additional potential 140 MW load

ERCOT performed an Independent Review for this RPG project to identify the reliability need and evaluate various transmission upgrade options This report describes the study assumptions, methodology and the results of the ERCOT Independent Review

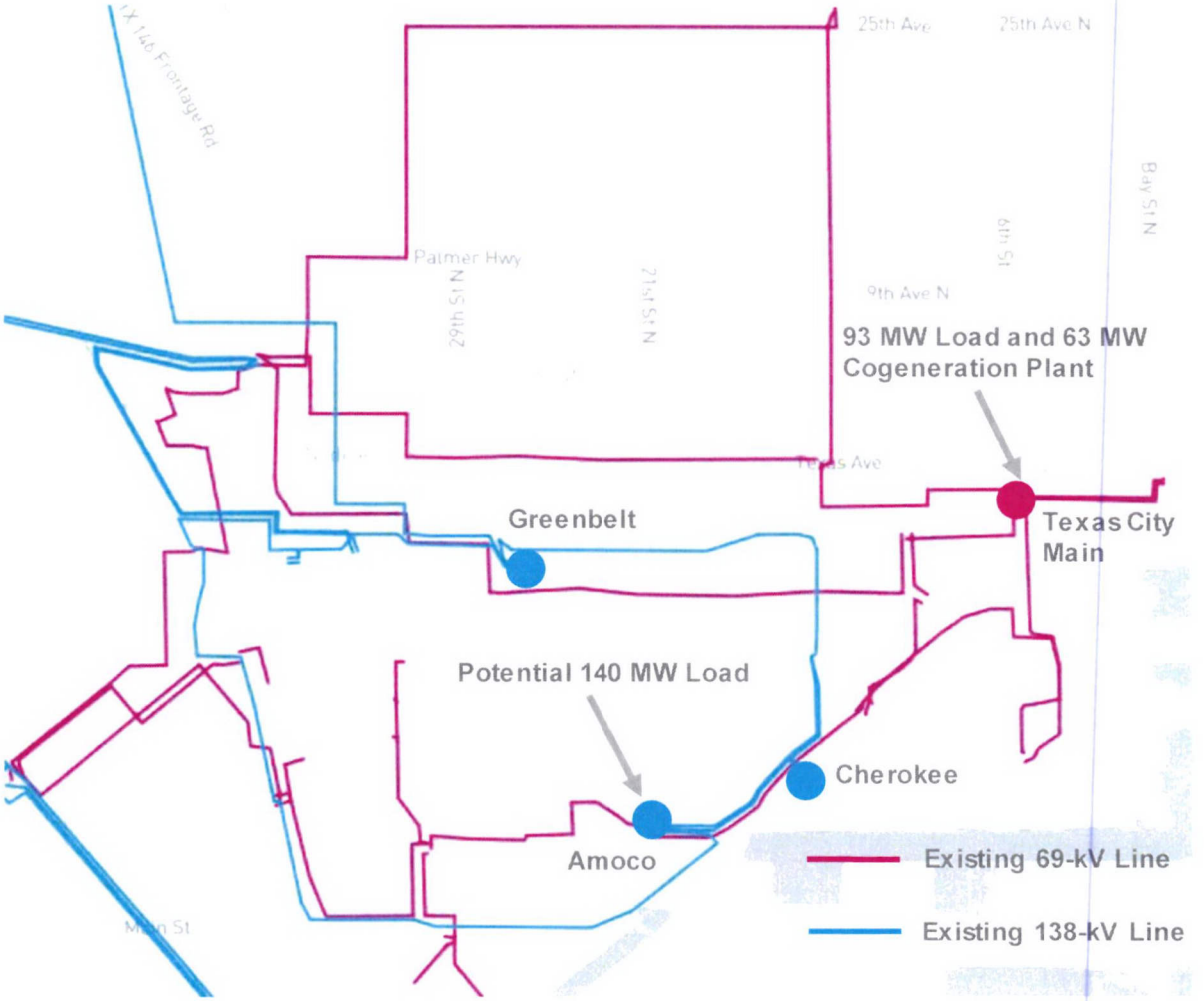


Figure 1: TNMP's 69-kV and 138-kV System in Galveston County

3. Study Assumptions and Methodology

ERCOT performed studies under various system conditions to serve the 93 MW load and associated 63 MW cogeneration plant in Texas City to identify the most cost-effective and feasible solution to meet the reliability needs in the study area. This section describes the study assumptions and criteria.

3.1. Study Assumptions

The study area of this review included TNMP's 69-kV and 138-kV network in Galveston County which is located in the Coast Weather Zone.

Study Base Case

The steady-state study base case was developed from the following final 2019 Regional Transmission Plan (RTP) 2022 East/Coast Summer peak case posted on the MIS on December 23, 2019:

- Case: 2019RTP_2022_SUM_EC_12232019

Transmission Topology

New transmission projects that were projected to be in-service within the study area by June 1, 2022, were added to the study base case in accordance with the ERCOT Transmission Project Information and Tracking (TPIT) report published on MIS in June 2020. These transmission projects are listed in the following *Table 1*.

Table 1: List of New Transmission Projects Added to the Study Base Case

TPIT Number	Project Title	Projected In-Service Date
4010	Rebuild Magnolia - Seminole 138-kV Line.	June 2020
52181	ENCO (ENC) 138-kV Substation	October 2020
52183	EXTER 69-kV Substation Removal	May 2021
54118	Rebuild Alvin – Mainland - Freeway Park (795 ACSS)	Dec 2021

Generation

Table 2 shows the list of new generators that met the Planning Guide Section 6.9(1) conditions for inclusion in the planning models at the time of study, according to the March 2020 Generator Interconnection Status (GIS) report posted on MIS on April 1, 2020. These units were added to the study base case. The new renewable generation projects were dispatched consistent with the 2020

RTP methodology.

Table 2: List of New Generation Capacity Added to the Study Base Case

TPIT Number	Project Name	Fuel	Project COD	MW Capacity
18INR0050	Mustang Creek Solar	SOLAR	05/01/2021	150
18INR0062	Wagyu Solar	SOLAR	06/03/2020	120
19INR0014	Formosa Increase	GAS	08/03/2020	240
19INR0041	Myrtle Solar	SOLAR	06/01/2021	240
20INR0069	Danish Fields Solar	SOLAR	06/01/2021	201
20INR0206	PES1	GAS	12/01/2020	363
20INR0287	STP Unit 1 repower	NUCLEAR	04/30/2020	13
20INR0308	Gibbons Creek TEERP	COAL	07/27/2020	493
21INR0016	Danish Fields II	SOLAR	06/01/2021	201
21INR0017	Danish Fields III	SOLAR	06/01/2021	201

Loads

Loads in the study area were adjusted to the 2020 RTP load level. In addition, the 93 MW load and associated 63 MW cogeneration plant were included at the existing 69-kV Texas City Main substation.

For the comparison of the four short-listed transmission upgrade options, ERCOT modeled an additional 140 MW of potential conceptual load in the study case, assuming that it would be interconnected at the existing Amoco 138-kV substation.

3.2. Contingencies and Criteria for Violations

Steady-state reliability analysis in this study was performed according to North American Electric Reliability Corporation (NERC) TPL-001-4 and ERCOT Planning Criteria as follows:

- P0
- P1
- P2-1, Other P2 (EHV only)
- P3 (G-1 + N-1)
- P4 (EHV only)
- P5 (EHV only)
- P6 (X-1 + N-1)

- P7-1
- Certain planned maintenance outage scenarios provided by TNMP

All 60 kV and above buses, transmission lines, and transformers in the study area were monitored (excluding generator step-up transformers).

Thermal violation

- Rate A for Pre-contingency Conditions
- Rate B for Post-contingency Conditions

Voltage violation criteria

- Voltages exceeding their pre-contingency and post-contingency limits
- Voltage deviations exceeding 8% on non-radial load buses

3.3. Study Tools

ERCOT utilized the following software tools as part of its independent review of the TNMP Texas City Transmission Improvement Project.

- PowerWorld Simulator version 20 for Security Constrained Optimal Power Flow (SCOPF) and steady-state contingency analysis; and
- UPLAN version 10.4.0.22733 for congestion analysis

4. Project Need

4.1. Steady-State Reliability Analysis

The steady-state reliability analysis was performed in accordance with NERC TPL-001-4 and ERCOT Planning Criteria. No post-contingency voltage violations were observed in TNMP's 69-kV and 138-kV system in Galveston County in the study case. However, thermal overload issues were identified under a P3 (G-1 + N-1) contingency in the study area. These are summarized in *Table 3*. Detailed study case criteria violations are provided in Appendix A.

Table 3: Thermal Overloads

NERC Contingency Category	Overloaded Element	kV	Max. Loading (%)
P3 (G-1 + N-1)	Texas City Main – Northside Tap ckt 1	69	109.6
	Choctaw Tap – Texas City Main ckt 1	69	106.2

5. Initial Options

ERCOT initially evaluated six options to address the thermal overload issues that were observed in the study case. All six options resolved the thermal overload issues in the study area. Transmission upgrades respective to all six options are described in *Table 4*, and a one-line diagram of each option is provided in Appendix B.

Table 4: Six Upgrade Options to Address the Reliability Issues

Transmission Upgrade	Length (mi)	Normal & Emergency Rating (MVA)	Opt 1	Opt 2	Opt 3	Opt 4	Opt 5	Opt 6
Upgrade the existing Heights - Northside 69-kV ckt 1	3.5	386	✓					
Upgrade the existing Heights - Northside Tap 69-kV ckt 1	2.6	386	✓					
Upgrade the existing Northside Tap - Texas City Main 69-kV ckt 1	1.1	386	✓					
Upgrade the existing Choctaw Tap - Texas City Main ckt 1	0.5	386	✓					
Convert the existing 69-kV Northside Tap and Northside stations to 138-kV	N/A	N/A		✓				
Convert the existing Heights - Northside 69-kV line to 138-kV	3.5	717		✓				
Convert the existing Heights - Northside Tap 69-kV line to 138-kV	2.6	717		✓				
Convert the existing Northside Tap – Texas City Main 69-kV line to 138-kV	1.1	717		✓				
Convert the existing Northside Tap - Northside 69-kV line to 138-kV	1.8	717		✓				
Add a new 138-kV Cattail substation near Texas City Main	N/A	N/A		✓	✓	✓	✓	✓
Add a new 138/69-kV Transformer at the existing Texas City Main	N/A	200		✓	✓	✓	✓	✓
Add a New Texas City Main – Cattail 138-kV line	0.01	379		✓	✓	✓	✓	✓
Add a new Greenbelt – Cattail 138-kV line	2.5	717		✓	✓	✓	✓	✓
Add a new Comanche – Cattail 138-kV line	1.5	717				✓		
Add a new Cherokee – Cattail 138-kV line	1.5	717					✓	
Add a new Amoco – Cattail 138-kV line	2.2	717						✓

6. Short-Listed Options

6.1. Planned Maintenance Outage (N-1-1) Analysis

According to TNMP, the load in the area is relatively constant throughout the year, and there are no off-peak periods with reduced customer demand to schedule maintenance outages under the existing system conditions. Thus, it can be challenging to schedule maintenance outages of equipment without operating in a state such that the contingency of another facility causes thermal overload or voltage violations. To give due consideration for needed operational flexibility and reliability in the study area, ERCOT also evaluated the reliability performance of each option under various potential high impact maintenance outage scenarios based on the feedback from TNMP. In these studies the load in the Coast Weather Zone was reduced by 6% to reflect off-peak season load. This 6% reduction was estimated based on the historical real-time load data in the Coast Weather Zone. Based on the off-peak season load, ERCOT compared the performance of all six options under the maintenance scenarios to select short-listed options.

The maintenance outage scenarios provided by TNMP are summarized as follows:

- M1 – Heights – Northside Tap 69-kV ckt 1

  Northside Tap – Northside 69-kV ckt 1

  Northside Tap – Texas City Main 69-kV ckt 1
- M2 – Heights – Choctaw Tap 69-kV ckt 1

  Choctaw Tap – Northside 69-kV ckt 1

  Choctaw Tap – Texas City Main 69-kV ckt 1
- M3 – Amoco – Grant Avenue 69-kV ckt 1
- M4 – Heights 138/69-kV Transformer ckt 1
- M5 – Tejas – Greenbelt 138-kV ckt 1
- M6 – Tejas – Comanche 138-kV ckt 1
- M7 – Comanche – Cherokee 138-kV ckt 1
- M8 – Cherokee – Amoco 138-kV ckt 1

These maintenance outages were applied individually to the study base case with each of the six options. No voltage violations or unsolved contingencies were observed with any of the six options. However, thermal overload issues were identified with Options 1 and 2, whereas Options 3, 4, 5 and 6 had no reliability issues under the maintenance outage scenarios. *Table 5* summarizes the results of reliability analysis under the maintenance outage scenarios. Detailed maintenance outage scenario criteria violations can be found in Appendix C. Based on the results, it was concluded that Options 3,

4, 5, and 6 have better operational flexibility under maintenance outage scenarios, and therefore, were selected as short-listed options for further sensitivity analysis.

Table 5: Results of Reliability Analysis with Six Initial Upgrade Options for 93 MW Load Associated with 63 MW Cogeneration Plant under Maintenance Outage Scenarios

Index	Overloaded Element	kV	Max. Loading (%)					
			Opt 1	Opt 2	Opt 3	Opt 4	Opt 5	Opt 6
M1	Heights - Choctaw Tap ckt 1	69	126.9	-	-	-	-	-
M5	Choctaw Tap – Choctaw ckt 1	69	107.5	114.5	-	-	-	-
M6	Heights 138/69-kV Transformer ckt 1	138/69	102.7	-	-	-	-	-
	Heights 138/69-kV Transformer ckt 2	138/69	102.7	-	-	-	-	-

7. Sensitivity Analysis

ERCOT further performed a sensitivity analysis to assess the load-serving capability of the short-listed options for the additional potential 140 MW load assumed at the Amoco 138-kV station in Texas City. No reliability issues were observed in the study area with all four short-listed options under NERC TPL-001-4 and ERCOT Planning Criteria. Also, results of the reliability analysis under maintenance outage conditions revealed no voltage violations in the study area with the short-listed options. However, under maintenance outage conditions with the potential 140 MW load, several thermal violations were noted. Similar thermal overload issues were observed with Options 4, 5, and 6 whereas Option 3 had an additional thermal overload as shown in *Table 6*. Detailed results of the reliability analysis with the short-listed options for the additional potential 140 MW load under maintenance outage scenarios can be found in Appendix D.

Table 6: Results of Reliability Analysis with Short-Listed Options for Additional Potential 140 MW Load under Planned Maintenance Outage Scenarios

Index	Overloaded Element	kV	Max. Loading (%)			
			Opt 3	Opt 4	Opt 5	Opt 6
M1	Amoco - Apache ckt 1	138	101.7	-	-	-
	Caddo SW STA – Apache Ckt 1	138	100.5	-	-	-
	Tejas – Comanche ckt 1	138	102.3	-	-	-
M6	Amoco - Apache ckt 1	138	101.7	101.2	101.1	101.2
	Caddo SW STA – Apache ckt 1	138	100.5	99.9	99.8	100.0

8. Comparison of Short-Listed Options

The study results demonstrated that all four short-listed options resolved the reliability criteria violations under NERC TPL-001-4 and ERCOT Planning Criteria. In addition, no reliability issues were observed with all four short-listed options under planned maintenance outage scenarios.

According to the results of sensitivity analysis for the additional potential 140 MW load, Options 4, 5 and 6 provided relatively similar performance, while an additional thermal overload was identified in Option 3 compared to Options 4, 5 and 6.

A comparison of the four short-listed options along with their cost estimates provided by TNMP are summarized in *Table 7*. Based on the feedback from TNMP, Option 4 has construction challenges due to industrial development along its likely path in Texas City, and the cost estimate of Option 6 may increase by $10 Million if expansion of the existing Amoco substation is determined to be infeasible after detailed engineering review.

Table 7: Comparison of Short-Listed Options for 93 MW Load Associated with 63 MW Cogeneration Plant

Criteria	Option 3	Option 4	Option 5	Option 6
Meet NERC and ERCOT Planning Criteria	Yes	Yes	Yes	Yes
Improved Operational Flexibility under Maintenance Outage Scenarios	Yes	Yes	Yes	Yes
Cost Estimates ($M)	82.64	33.13	33.13	38.37

Based on the review of the system performance, constructability, and cost estimates of each short-listed option, ERCOT recommends Option 5, with an estimated cost of $33.13 Million, to solve the reliability criteria violations identified in this report.

9. Congestion Analysis

ERCOT performed a congestion analysis to identify any potential impact on system congestion related to the addition of the recommended project, Option 5. The 2022 and 2025 economic study cases from the 2020 Regional Transmission Plan (RTP) were used as the base cases for congestion analysis.

The results of congestion analysis indicated no additional congestion due to the addition of the recommended transmission upgrades.

10. Conclusion

ERCOT identified thermal overload issues in TNMP's 69-kV and 138-kV system in Texas City, Galveston County. ERCOT evaluated a total of six initial options to address the thermal overload issues. Based on the results of this Independent Review, ERCOT recommends Option 5 as the preferred solution because it meets the reliability need and provides operational flexibility, while it is the least cost option and may not have the significant construction challenges associated with other short-listed options evaluated. Option 5 consists of the following upgrades and is estimated to cost $33.13 Million.

- Construct a new Cattail 138-kV substation near the existing Texas City Main 69-kV substation
- Install a new 138/69-kV transformer at Texas City Main with normal and emergency ratings of at least 200 MVA
- Construct a new Texas City Main – Cattail 138-kV line (~0.01 mi) with normal and emergency ratings of at least 379 MVA
- Construct a new Greenbelt – Cattail 138-kV line (~2.5 mi) with normal and emergency ratings of at least 717 MVA
- Construct a new Cherokee – Cattail 138-kV line (~1.5 mi) with normal and emergency ratings of at least 717 MVA

11. Appendices

Index	Description	Document	Access
A	Project Need – Results of Reliability Analysis	Project Need.xlsx	Public
B	Map of Six Options	Map of Six Options.pptx	Public
C	Results of N-1-1 Analysis	N-1-1 - 93 MW L+63 MW Cogen.xlsx	Public
D	Results of N-1-1 Analysis with Additional Potential 140 MW Load	N-1-1 - 93 MW L+63 MW Cogen+140 MV	Public

Attachment C

ercot
Your Power. Our Promise.

Taylor
[illegible]

Austin
[illegible]

ercot.com

September 22, 2020

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

RE: Everman Switching Station Rebuild 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:

Oncor Everman Switching Station Rebuild Project:

- Rebuild the existing Everman 345 kV Switch with a 13-breaker 345 kV breaker-and-a-half bus arrangement and one 4-breaker 345 kV ring bus arrangement on an adjacent property and
- Install a new control house and all protective relaying, control, and sensing equipment with microprocessor based technology.

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

Sincerely,

D.W. Rickerson
Vice President, Grid-Planning and Operations
Electric Reliability Council of Texas

cc:

Bill Magness, ERCOT
Warren Lasher, ERCOT
Jeff Billo, ERCOT
Shun Hsien (Fred) Huang, ERCOT
Sun Wook Kang, ERCOT
Juliana Morehead, ERCOT

Attachment D

EVERMAN SWITCHING STATION REBUILD

ERCOT RPG Submittal
August 14, 2020

Business and Operations Services
Assets Planning

ONCOR®

Table of Contents

Executive Summary

Oncor proposes a Tier-3 rebuild of the Everman 345 kV Switching Station, located in Tarrant County, to replace aged infrastructure and increase operational flexibility and system reliability in a major transmission corridor serving the Dallas/Fort Worth Metroplex. There is a mixture of equipment within the Everman Switching station with aged elements including the slack span 345 kV bus, control house, ground grid, and legacy station 345 kV lattice structures and CCVTs, with some dating to the 1960's and nearing end of design life. Additionally, the station utilizes a mixture of single breaker terminals and double breaker terminals, with bus-tapped autotransformers, which limits operational flexibility. A mixed bus design leads to greater impact during bus outages leading to unnecessary outages on additional pieces of equipment, whereas a breaker and one half design improves operational flexibility, eliminates element outages during bus faults, and reduces the impact of breaker failure events. The main 345 kV bus is a bundled conductor slack span

As part of the rebuild project, a portion of the 345 kV station will be relocated to a nearby property owned by Oncor. This relocation provides the following benefits: (1) the existing substation location is physically constrained and additional area is required for the new breaker-and-a-have station configuration, and (2) relocation helps in the efficiency of the rebuild, including reduced potential impacts on the grid by reducing outage requirements and limiting potential area constraints due to long duration outages. The relocation site is depicted in Figure 1, and the station will be renamed to Timberview Switch after the rebuild This will also allow for future expansion in this part of the system.

The estimated cost for the rebuild project is $36 M and completion is targeted for December 2021. The completion dates may change depending on design, material acquisition, and construction progress

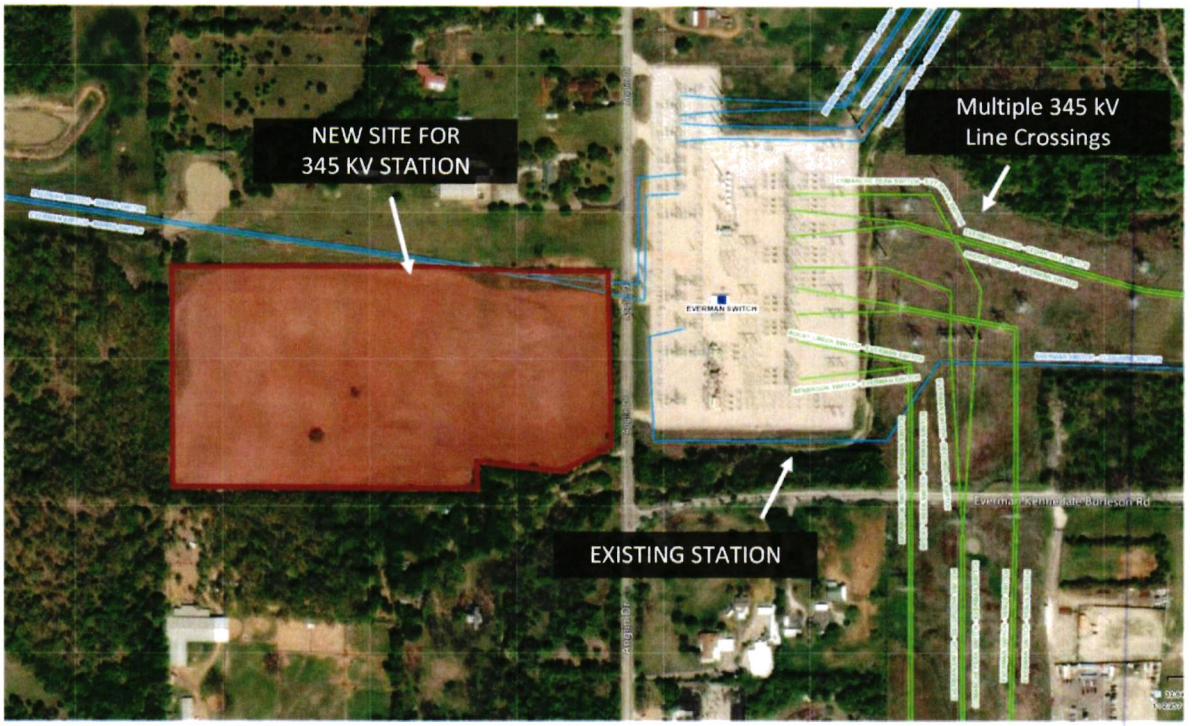


Figure 1 - Diagram of Existing Station and New Site on Nearby Property

Introduction

This submittal describes the need to rebuild the Everman 345 kV Switching Station to replace aged infrastructure, increase operational flexibility, and system reliability in a major transmission corridor serving the Dallas/Fort Worth Metroplex.

Purpose and Necessity

The Everman Switching Station is a 1960's era switching station located in Tarrant County. The station is comprised of two 345 kV bus sections that connect a mixture of single breaker and double breaker terminals, and includes bus-tapped autotransformers. In total, eight 345 kV transmission circuits terminate at the station and the station has two 600 MVA, 345/138 kV Autotransformers. The station is located in a major transmission corridor serving the Dallas/Fort Worth Metroplex.

The station has multiple aged elements, including the slack span 345 kV bus, control house, ground grid, and legacy station 345 kV lattice structures and CCVTs. Both 345 kV buses and one of the autotransformers at this station still depend on electromechanical relays for protection. The rebuild will include replacing the obsolete equipment with modern relays and breakers that require less maintenance which will improve reliability and reduce future operating and maintenance costs. Additionally, the number of line crossings outside of the station will be greatly reduced.

As a result of the importance of Everman Switching Station to the ERCOT system and the identified concerns, and given its close proximity to multiple generation sources and the DFW load center, Oncor has determined that the station needs to be rebuilt to provide reliable and flexible service to this part of the system.

Planning Analysis

While there are not any planning criteria violations currently, Oncor has performed analysis to evaluate potential impacts to the ERCOT system as a result of the submitted rebuild project.

Steady State Analysis

Steady-State Cases

Oncor evaluated the steady-state impacts of the station rebuild and reconfiguration using the 2020 SSWG 2022 Sum1 base case.

Steady-State Criteria Violations

Oncor did not identify any steady-state criteria violations related to this proposal.

Dynamic Analysis

Dynamic Cases

Oncor evaluated the stability impacts of the station rebuild and reconfiguration using the 2019 DWG 2021SP base case.

Stability Criteria Violations

Oncor did not identify any stability criteria violations related to this proposal.

Short-Circuit Study

Oncor evaluated the short-circuit impacts of the station rebuild and did not identify any overdutied breakers resulting from the submitted rebuild project

Subsynchronous Resonance (SSR) Screening

Oncor performed a system topology scan to evaluate potential SSR impacts of the station rebuild, and did not identify any generation resource that will become radial to a series capacitor in the event of less than 14 concurrent transmission outages as a result of the station rebuild. Therefore, no in-depth SSR analysis is required.

Project Description

Oncor proposes to rebuild the existing Everman 345 kV Switch with a 13-breaker 345 kV breaker-and-a-half bus arrangement and one 4-breaker 345 kV ring bus arrangement on an adjacent property. The Everman 138 kV Switch will remain as is in a double bus configuration. This includes installing a new control house and all protective relaying, control, and sensing equipment with microprocessor based technology to address reliability and protection requirements. In addition to resolving issues associated with aged infrastructure at this station, the breaker-and-a-half bus arrangement will contribute to operational flexibility in this major corridor. The estimated cost for this project is $36 million and completion is targeted for December 2021 The completion dates may change depending on design, material acquisition, and construction progress.

One-Line Diagram

Figure 2 shows a one-line diagram depicting the proposed project.

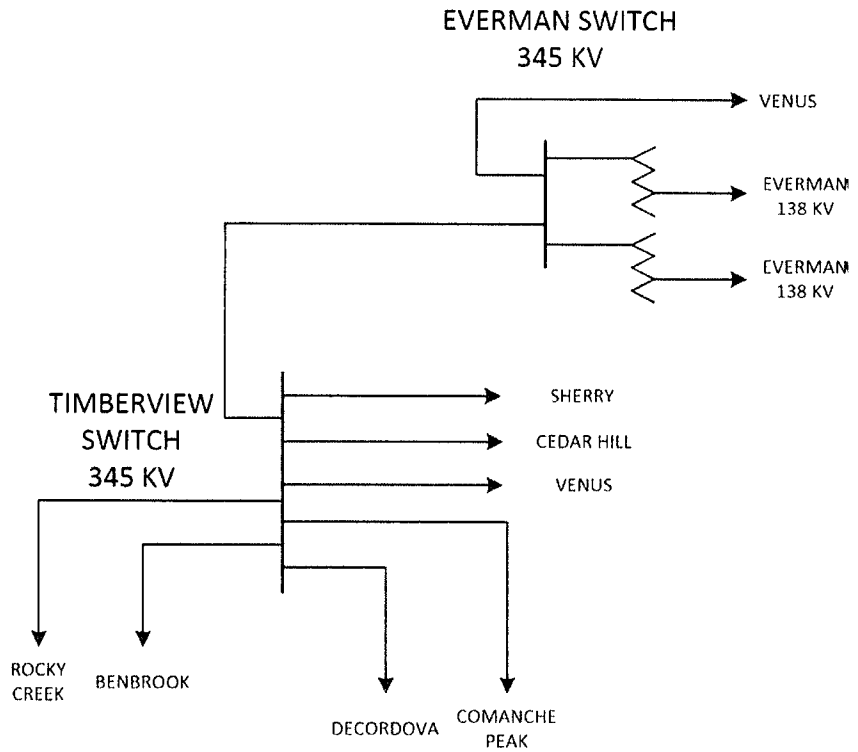


Figure 2 - Oneline Diagram of Everman and Timberview 345 kV Switching Stations

Alternative Solutions

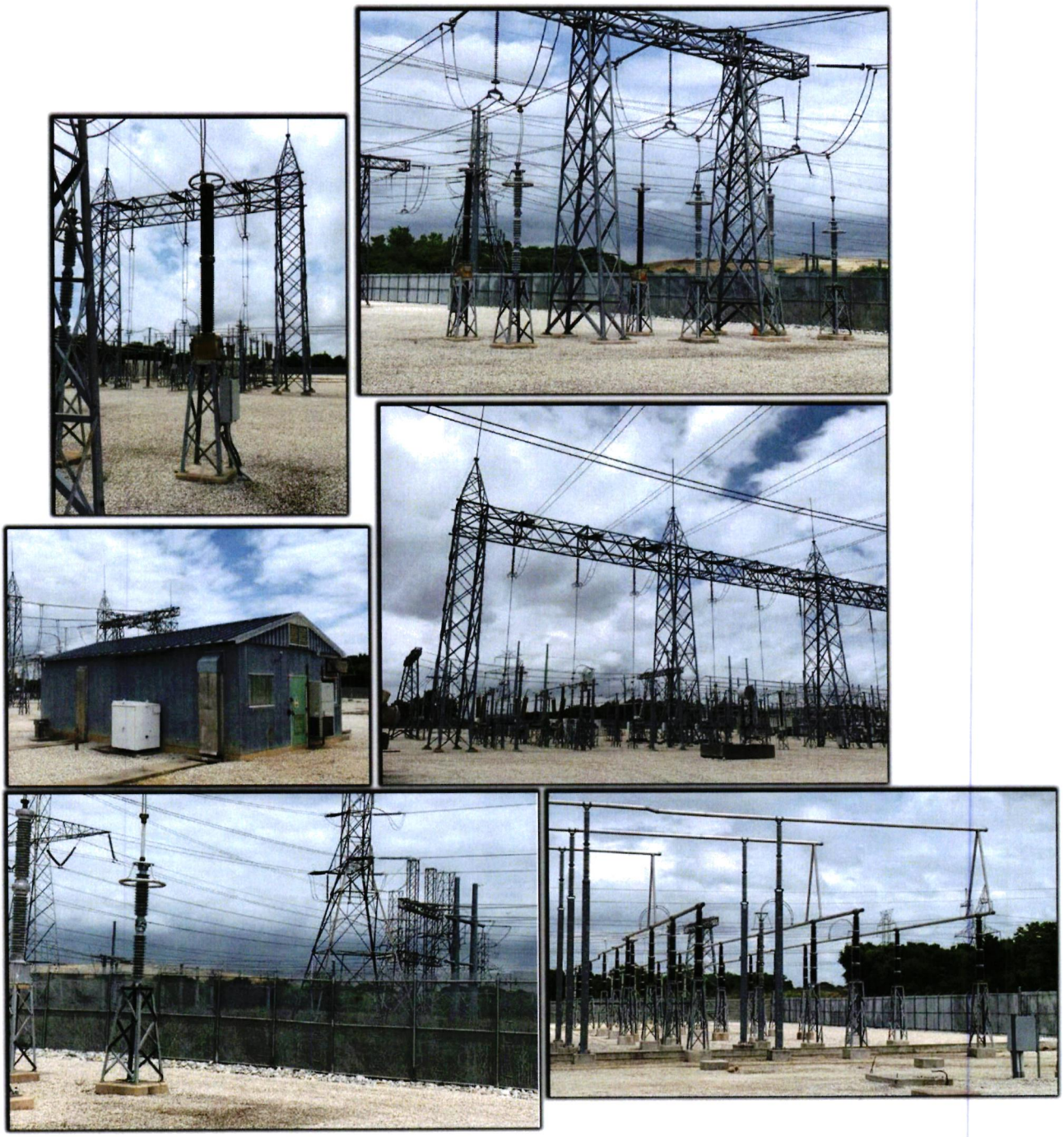
Oncor recommends that the Everman Switching Station be rebuilt, as opposed to unsystematic partial replacements made over time upon equipment failures, reducing the likelihood of failure events impacting the Metroplex. The replacement switching station will create a station better suited for future growth and operational flexibility by deploying current standards and modern equipment layouts.

Recommendation

As a result of the importance of Everman Switching Station to the ERCOT system and the identified concerns, Oncor recommends that the Everman Switching Station be rebuilt to provide increased reliability and flexibility to this part of the system.

Appendix A – Supporting Photos

The following photos highlight particular aspects of the aged infrastructure.



ercot
Your Power. Our Promise

Taylor
[illegible]

Austin
[illegible]

ercot.com

September 22, 2020

Mr. Robert W. Bradish
Vice President, Planning & Engineering
American Electric Power
8500 Smiths Mill Road, 3rd floor
New Albany, OH 43054

RE: Coleto Creek to Kenedy SS 138-kV Transmission Project

Dear Mr. Bradish:

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:

Coleto Creek to Kenedy SS 138-kV Transmission Project:

- Rebuild the existing 45-mile Coleto Creek - Rosata POD - Kenedy SS 138-kV line using single circuit structures on the existing right of way.

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

Sincerely,

D. W. Rickerson
Vice President, Grid Planning and Operations
Electric Reliability Council of Texas

cc:

Bill Magness, ERCOT
Warren Lasher, ERCOT
Jeff Billo, ERCOT
Shun Hsien (Fred) Huang, ERCOT
Sun Wook Kang, ERCOT
Juliana Morehead, ERCOT

Coleto Creek to Kenedy SS 138 kV Transmission Project

ERCOT Regional Planning Group Proposal

AMERICAN ELECTRIC POWER℠

BOUNDLESS ENERGY™

August 2020

Prepared By:
American Electric Power Service Corporation (AEPSC)
Texas Transmission Planning

Table of Contents

1. EXECUTIVE SUMMARY

The Coleto Creek to Kenedy SS 138 kV line is a 45-mile long circuit that spans Karnes and Goliad counties and was originally constructed in 1951. This circuit is a critical path out of the Coleto Creek station and supports load west of Goliad. In 2018, the Rosata station was connected to the Coleto Creek to Kenedy SS 138 kV line to serve a new customer.

The Coleto Creek to Kenedy SS line was aerially inspected in 2018 and was found to be in very poor physical condition. Although the Coleto Creek to Kenedy SS line has not experienced many outages over the past 10 years, given its current condition, it is highly likely it will experience future performance issues. Of the total 383 structures, 78% (299) have at least one adverse condition. These conditions range from broken X-braces, rot, split and broken cross arms, and woodpecker damage.

In 2019, a study was done on the Coleto Creek to Kenedy SS line to determine if the structures on this line were overstressed and if the conductors have the appropriate ground clearances. This study found that several of the structures had elements exceeding the NESC Light Grade C rating. Today, AEP's minimum standard for new and rebuilt lines is an NESC Grade B rating. In addition to the structural deficiencies, the study identified four instances where the conductor fell below the acceptable ground clearance.

This line was originally constructed in 1951 with direct embedded wood structures. Based upon the age of the material, outdated design standards, current condition, and expected future performance issues, American Electric Power Service Corporation (AEPSC), recommends rebuilding this 138 kV line using current AEP design standards.

Pursuant to ERCOT Nodal Protocols Sections 3.11.4.3.1 (d), this project is being submitted as a Tier 3 project. The proposed project is not expected to require a Certificate of Convenience and Necessity (CCN).

Project: Rebuild the existing 45-mile Coleto Creek to Kenedy SS 138 kV line using current AEP design standards.

Estimated Cost: $54.7 M

Estimated In Service Date: 11/30/2024

2. STUDY ASSUMPTIONS AND METHODOLOGY

A steady state analysis was performed using version 34 of Siemens/PTI Power System Simulator for Engineers software (PSS/E). The analysis utilized ERCOT's 2019 series SSWG cases to assess the Coleto Creek to Kenedy SS 138 kV reliability needs. The 2024 Summer model was used.

A short circuit analysis was performed using ASPEN. This analysis utilized ERCOT's 2019 series SPWG cases to assess the Coleto Creek to Kenedy SS 138 kV short circuit needs. The 2022 SPWG model was used.

Both options evaluated in this proposal involve a line rebuild with increased capacity and no topology changes. Therefore, a dynamic study was deemed unnecessary and was not performed.

Subsynchronous Resonance (SSR) impacts were not analyzed in this study as there is a low probability of SSR interactions with the proposed project.

This RPG submittal will focus on the facility highlighted in yellow in Figure 1 below.

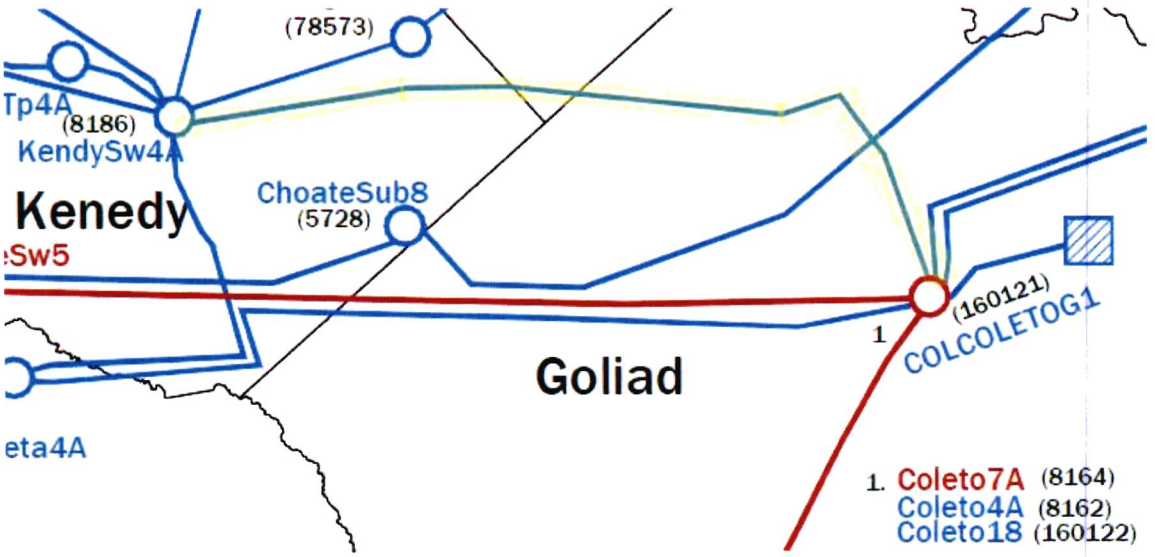


Figure 1: Study System

3. STEADY STATE

3.1 Contingency Definitions

The study system consisted of a limited subset of facilities in proximity to the Coleto Creek to Kenedy SS line. Equipment loading and voltages were monitored for all facilities in this study system. The following loading and voltage criteria were used for the analysis:

Thermal Rating of Lines and Transformers

- Normal operating conditions: Less than 100% of Rate A (% current)
- Contingency operating conditions: Less than 100% of Rate B (% current)

Voltage Rating of Buses

- Normal operating conditions: Greater than 95% and Less than 105%
- Contingency operating conditions: Greater than 92% and Less than 105%

3.2 Contingency Definitions

Type	NERC Category	Description
N-0	P0	Transmission system operating under normal conditions with zero facilities out of service.
N-1	P1, P2, P7	Transmission system operating with a forced outage of a single line, transformer, generator, or switched shunt ERCOT criteria consider double circuit lines greater than one ½ mile a single outage.
N-A-1	P6.2	Transmission system operating with an outage of a single 345kV autotransformer followed by a forced outage of a single line, transformer, generator, or switched shunt
N-G-1	P3	Transmission system operating with an outage of a single generating unit followed by a forced outage of a single line, transformer, generator, or switched shunt
N-1-1*	P6	Transmission system operating with a planned maintenance outage of a single line, transformer, generator, or switched shunt followed by a forced outage of a single line, transformer, generator, or switched shunt
N-X	P4, P5	Single breaker failure and delayed clearing of non-redundant relays were considered for EHV

*Since planned maintenance outages generally occur during off-peak conditions, this study used a modified summer case for the N-1-1 analysis.

Table 1: Contingency Events

The table above describes the contingency categories analyzed for this study. With the exception of P4 (HV), P5 (HV), and P6 these categories represent those that do not allow non-consequential load loss and would require system upgrades to resolve system constraints. The remaining contingency categories that allow non-consequential load loss were not explicitly analyzed.

3.3 Model Development

The only modeling change made to the Summer case was to implement the different options. The 2024 Spring case was created by using the generation and load values of the 2020 Spring case and placing them into the 2024 Summer case. This 2024 Spring case was used to run N-1-1 analysis.

3.4 Short Circuit Analysis

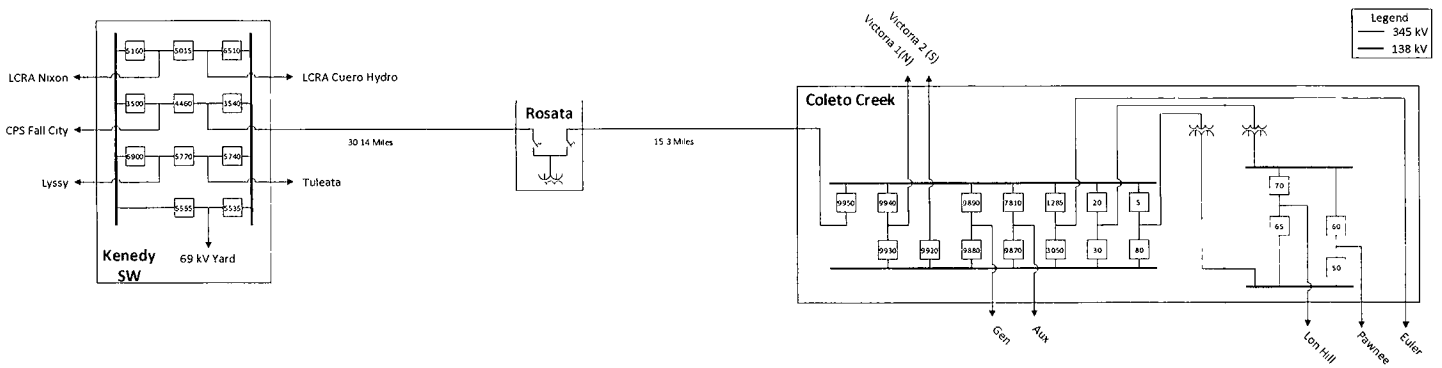
A short circuit analysis was performed to determine if the option presented would cause any fault current issues in the area.

4. DESCRIPTION OF TRANSMISSION OPTIONS EVALUATED

AEPSC analyzed two transmission system upgrade options to address the needs of the 69 year old Coleto Creek to Kenedy SS 138 kV line. The following options were evaluated and compared to address the contingency events described above:

Option 1: Rebuild the Coleto Creek-Rosata POD-Kenedy SS 138 kV line
Rebuild the existing 45-mile Coleto Creek to Kenedy SS 138 kV circuit using current AEP standards, single circuit structures, and the existing ROW. The estimated cost for Option 1 is $54.7 M. This is the preferred option. Since this is a rebuild using existing ROW, a CCN is not expected to be needed for this option.

Option 2: Rebuild the Coleto Creek-Rosata POD-Kenedy SS 138 kV line using new ROW
Rebuild the existing 45-mile Coleto Creek to Kenedy SS 138 kV circuit using current AEP standards, single circuit structures, and new ROW. This option would allow for construction without taking an extended outage. Once construction is complete, AEPSC would remove and retire the existing line. This option is estimated to cost $60.2 M. Although this option would not require a lengthy line outage, it would require a CCN and would impact new landowners. It would require numerous routing options to be filed in the CCN application including a parallel to the existing line where feasible. The cost could vary considerably based on what route is approved, and the timing of the improvement will be longer because of the regulatory submittal and approval process before easements could be obtained for construction to begin. This time sensitive and involved process with cost uncertainty is why this option is not recommended over Option 1.



5. ASSESSMENT OF PROPOSED TRANSMISSION UPGRADES

5.1 Steady State

Transmission Option 1 and Option 2 in Section 4 were evaluated and compared with the base case for loading and voltage criteria violations defined in Section 3.1 for the study system.

The table below shows the results from the 2024 SUM1 case.

Event	BRANCH	LENGTH	RATING*	2024 SUM % Loading		
				BASE	Option 1	Option 2
N-1	8153 ROSATA4A 138.00 8162 COLETO4A 138.00 1	15.30	207/478	75.7	32.8	32.8
N-1	8153 ROSATA4A 138.00 8186 KENEDYSW4A 138.00 1	30.14	207/478	72.1	31.2	31.2
N-A-1	8153 ROSATA4A 138.00 8162 COLETO4A 138.00 1	15.30	207/478	88.2	38.2	38.2
N-A-1	8153 ROSATA4A 138.00 8186 KENEDYSW4A 138.00 1	30.14	207/478	84.5	36.6	36.6
N-G-1	8153 ROSATA4A 138.00 8162 COLETO4A 138.00 1	15.30	207/478	75.7	32.8	32.8
N-G-1	8153 ROSATA4A 138.00 8186 KENEDYSW4A 138.00 1	30.14	207/478	72.1	31.2	31.2
N-X	8153 ROSATA4A 138.00 8162 COLETO4A 138.00 1	15.30	207/478	87.1	37.7	37.7
N-X	8153 ROSATA4A 138.00 8186 KENEDYSW4A 138.00 1	30.14	207/478	83.4	36.1	36.1

*For the Rating column, the order of the ratings is as follows (Original Rating)/(Rebuild Rating)

Table 2: SUM Loading Results with Transmission Upgrades

The table below shows the results from the 2024 Spring case.

Event	BRANCH	LENGTH	RATING*	2024 SPG % Loading		
				BASE	Option 1	Option 2
N-1-1	8153 ROSATA4A 138.00 8162 COLETO4A 138.00 1	15.30	207/478	100.9	43.7	43.7
N-1-1	8153 ROSATA4A 138.00 8186 KENEDYSW4A 138.00 1	30.14	207/478	97.3	42.1	42.1

*For the Rating column, the order of the ratings is as follows (Original Rating)/(Rebuild Rating)

Table 3: Spring Loading Results with Transmission Upgrades

The steady state results show that rebuilding the line does not have any negative impact to system performance. The only significant loading change occurs on the rebuilt line itself, and this is driven by the rebuilt line utilizing a different conductor with a higher capacity. A higher rating for this circuit is necessary since the loading on the existing Coleto Creek to Kenedy SS 138 kV line is approaching 90% during the summer peak. There is also a contingency that will cause the line to overload under maintenance conditions, however re-dispatching generation can mitigate this overload.

5.2 Short Circuit

Transmission Option 1 and Option 2 in Section 4 were evaluated and compared with the base case to see the percent difference in fault current. If any element showed a percent increase of 2%, further investigation would be done to ensure that equipment can handle the new fault current. The table below shows the results.

Bus Name	Base		Option 1		Option 2	
	3PH Fault Current Level (A)	SLG Fault Current Level (A)	3PH Percent Change (%)	SLG Percent Change (%)	3PH Percent Change (%)	SLG Percent Change (%)
Coleto4A	34996.5	38833.7	0.16%	0.06%	0.16%	0.06%
Coleto7A	13139.7	12449.1	0.07%	0.01%	0.07%	0.01%
KenedySW4A	10942.6	7951.9	1.14%	-1.79%	1.14%	-1.79%
L_Runge_9_1Y	7023.8	4810.7	0.49%	-0.74%	0.49%	-0.74%
L_Helena8_1Y	7530	5167.5	0.64%	-0.95%	0.64%	-0.95%
Kenedysw2A	8719.6	7697.5	0.39%	-0.81%	0.39%	-0.81%
Victoria4a	35279.7	36257.2	0.01%	0.01%	0.01%	0.01%
Cranes4a	8916.7	6499.5	0.82%	-1.30%	0.82%	-1.30%
Loop463sub8	16991.9	12588.9	-0.15%	-0.07%	-0.15%	-0.07%
V_Dupsw4a	21348.5	17038.1	-0.19%	-0.10%	-0.19%	-0.10%
Magreder4a	17468.4	14158.3	-0.38%	-0.21%	-0.38%	-0.21%

Table 4: Short Circuit results with Transmission Upgrades

The results from the short circuit analysis show the rebuild will not have a meaningful impact to fault current in the area.

5.3 Dynamic Analysis

Dynamic stability analysis was not performed since there are no new dynamic devices introduced in the preferred option and AEPSC does not expect any dynamic issues on the 69 kV system.

5.4 SSR Analysis

Sub synchronous resonance (SSR) impacts were not analyzed in this study as there is a low probability of SSR interactions affect by the proposed project.

6. PROJECT NEED AND RECOMMENDATION

In 2018, an aerial inspection was performed and found 299 structures to have at least one adverse condition out of 388 structures inspected. These conditions range from broken X-braces, rot, split and broken cross arms, and woodpecker damage. Conditions requiring immediate repair were resolved after the inspections but the less immediate problems still exist on this line and each year new problems arise due to the age and construction of the line. The rebuild will address the current and future conditions and result in a number of additional benefits including, but not limited to, the following:

- Safe operation of the electric grid.
- Reduction in frequency of outage interruptions.
- Reduction in duration of outage interruptions.
- Improvement in service reliability and adequacy to customers.
- Reduction of risk of service disruptions (improved resiliency) associated with man-made and environmental threats.
- Proactive correction of reliability constraints that stem from asset failures.
- Reduction in system losses.
- Reduction in operations and maintenance costs.
- Increased system flexibility associated with day-to-day operations.
- Effective utilization of resources to provide efficient and cost-effective service to customers.

The two options evaluated are electrically the same:

Option 1: Rebuild the Coleto Creek-Rosata POD-Kenedy SS 138 kV line

Option 2: Rebuild the Coleto Creek-Rosata POD-Kenedy SS 138 kV line using new ROW

The benefit of building on new ROW is that an extended outage would not be necessary for construction. However, in this case, AEPSC does not believe eliminating an extended outage on a networked line justifies the additional cost of filing a CCN, purchasing new ROW from new landowners, and potentially having more structures if a more direct route cannot be obtained.

The analysis above shows that rebuilding the line will not have any negative impacts from either a steady state or short circuit perspective. The rebuild will address the existing condition of the line and resolve any future N-1 criteria violations or N-1-1 criteria violations by significantly increasing capacity.

In conclusion, based on the analysis performed and the poor condition of the existing line, AEPSC recommends rebuilding the Coleto Creek to Kenedy SS 138 kV line using current AEP design standards and existing ROW. This option is estimated to cost $54.7 M and be in service by 11/30/2024.

7. SUPPORTING PICTURES