Black Hills Corporation
Trevor Rombough
Manager, Transmission Planning

7001 Mt. Rushmore Rd. (57702)
PO Box 1400
Rapid City, SD 57709-1400
P: 605.800.1799

April 30, 2025

Rebecca White
Director
Public Utilities Commission of the State of Colorado
1560 Broadway, Suite 250
Denver, Colorado 80202

Re: Proceeding No. 25M-0005E, 2025 Filing pursuant to Rule 3206 (d), 4 *Code of Colorado Regulations*, 723-3

Ms. White:

Pursuant to subpart (d) of Rule 3206, 4 *Code of Colorado Regulations*, 723-3, Black Hills Colorado Electric, LLC d/b/a Black Hills Energy, herewith files the required information for planned transmission facilities. The information covers the current calendar year (2025) as well as the next three calendar years (2026-2027).

Included in this Report are updates to three projects that have been included in previous 3206 Reports and three new projects. The Company requests that the Commission find these projects in the ordinary course of business and no CPCN is required. All other projects identified in the report have already been approved by the Commission in prior Rule 3206 Decisions. The Company has provided a status update on these projects.

Appendix C is included in this report as informational. Appendix C provides a project description of transmission investments which will be submitted for cost recovery in the Company's next annual Transmission Cost Adjustment ("TCA") filing.

In Proceeding 24AL-0275E the Commission issued Decision No. C25-0183 requesting that the Company and Staff both present long term residential rate forecast in the upcoming Distribution Plan ("DSP") and the instant filing. In the DSP, the Company will be filing Supplemental testimony soon after the filing of this Report. The Company anticipates that it will work with the Staff to come to an agreed upon methodology for forecasting rate impacts (as guided by the DSP proceeding forecast) and the Company will supplement the filing in this case accordingly. The Commission also directed the Company to provide five years of budget transmission capital expenditures in an executable format. This is included as Appendix D.

If there are any questions, please contact me, or Dan Ahrens at (970) 707-9846.

Sincerely,

Trevor Rombough
Manager, Transmission Planning
trevor.j.rombough@blackhillscorp.com

Proceeding No. 23M-0005E
Black Hills Colorado Electric, LLC d/b/a Black Hills Energy (BHCE)
2025 Rule 3206 Report

Table of Contents

[1] Filed pursuant to Decision C21-0814 in Proceeding No. 21AL-0516E.

Proceeding No. 23M-0005E
Black Hills Colorado Electric, LLC d/b/a Black Hills Energy (BHCE)
2025 Rule 3206 Report

Background. No later than April 30 of each year, each electric utility shall file with the Colorado Public Utilities Commission (the "Commission") its proposed new construction or extension of transmission facilities for the next three calendar years, commencing with the year following the filing. The purpose of this filing is to advise the Commission of planned transmission system development and inform their decision as to whether those projects require a Certificate of Public Convenience and Necessity ("CPCN") or are considered in the ordinary course of business. This report covers 2025 and the three-year planning period 2026 through 2028.

Transmission projects. The transmission and/or substation projects 1 through 3 below have been included in previous Rule 3206 filings. An update to the status of these facilities is being provided pursuant to Rule 3206(d)(I)(G). Where applicable, references are included to past Commission decisions on the previous Rule 3206 filings, including determinations pursuant to Colo. Rev. Stat. § 40-5-101 that the projects were necessary in the ordinary course of Black Hills' business, and thus, no CPCNs for the projects were required.

Commission Decision C21-0814 in Proceeding No. 21AL-0516E (the "TCA 2021 filing"), at Paragraph 12, states "In order to clarify future reporting obligations for TCA projects, a utility should report for each included project in either: (a) the specific Commission decision granting the CPCN; (b) the specific Commission decision that no CPCN is required; or (c) the specific source of authority, such as a Commission rule that the project's scope does not require a CPCN or its inclusion in a Rule 3206, 4 CCR 723-3 Annual Filing with an approval order by the Commission." [emphasis added]

Consistent with Decision C21-0814, the Company therefore requests that the Commission find the TCA projects in this Rule 3206 filing (Appendix C) are in the ordinary course of business and no CPCN is required.

Energy storage systems. Consideration of energy storage systems among project alternatives is a requirement within Rule 3206. This rule requirement was established by the Commission on November 28, 2018 in Decision C18-1124; the rule requirement became effective on March 2, 2019. The rule requirement is codified at Rule 3206(d)(I)(D). This Rule 3206 filing addresses the consideration of any new alternatives that were not previously examined and addressed.

Proceeding No. 23M-0005E
Black Hills Colorado Electric, LLC d/b/a Black Hills Energy (BHCE)
2025 Rule 3206 Report

Projects with Updated Scope or Status, Filed Pursuant to Rule 3206(d)(I)(G):

These projects have had a change in the project scope or status since the previous Rule 3206 filing.

1. Rodrigues 115 kV Distribution Substation

   This project has been rescoped to only include distribution work. Therefore, this project will be removed from future filings.**Error! Bookmark not defined.**

2. West Station –Canon West 115 kV line Rebuild

   (Decision No. C23-0810; S*ee* Project Sheets, Page A-6)

   This planned project has an estimated cost of $41.6 million and a proposed in-service date of Q2 2026. Some portions of the line rebuild have been completed along with the West Cañon 230/69 kV transformer replacement.

3. Pueblo Plant 115kV Substation Rebuild

   (Decision pending in Proceeding 24-M005E; See Projects Sheets, Page A-9 Company filing)

   This planned project has an estimated cost of $2.2 million of Transmission with a project total cost of $6.5 million and a proposed in-service date of Q4 2029. This project was included in the 2024 filing, but we have not received a commission decision.

New Projects for Commission Ruling:

These are new projects that the company is requesting the commission find in the ordinary course of business. The Company notes that the Commission has approved the addition of renewable generation in Proceeding 22A-0230E, the Company's most recent Resource Plan, and the Company has yet to complete engineering studies for these interconnections.

4. La Junta 115/69 kV Transformer Upgrade

   (See Projects Sheets, Page A-12)

5. Hyde Park 115/13.2 kV Transformer Addition

   (See Projects Sheets, Page A-15)

6. Nyberg – La Junta (Boone Bypass) 115 kV

   (See Projects Sheets, Page A-18)

Appendix A

Project Sheets

West Station – Canon West 115 kV Rebuild

Project Sponsor:	Black Hills Colorado Electric
Additional Project Participants:	
Project Description:	Rebuild the 115 kV lines from West Station to Canon West to 221 MVA
Voltage Class:	115 kV
Facility Rating:	221MVA
Point of Origin/Location:	West Station, CO
Point of Termination:	Canon West, CO
Intermediate Points:	Portland Substation, Skala Substation, Canon Plant Substation
Length of Line (in Miles):	41
Type of Project:	Transmission & Distribution
Development Status:	Planned
Routing:	
Subregional Planning Group:	CCPG
Purpose of Project:	Load service & Reliability
Estimated Cost:	$41.6 Million
Schedule:	
Construction Date:	2023
Planned Completion/In-Service Date:	2026
Regulatory Info:	
Regulatory Date:	
Permitting Info:	
Permitting Date:	
Contact Information:	Trevor Rombough, Transmission Planning
Email	Trevor.J.Rombough@blackhillscorp.com

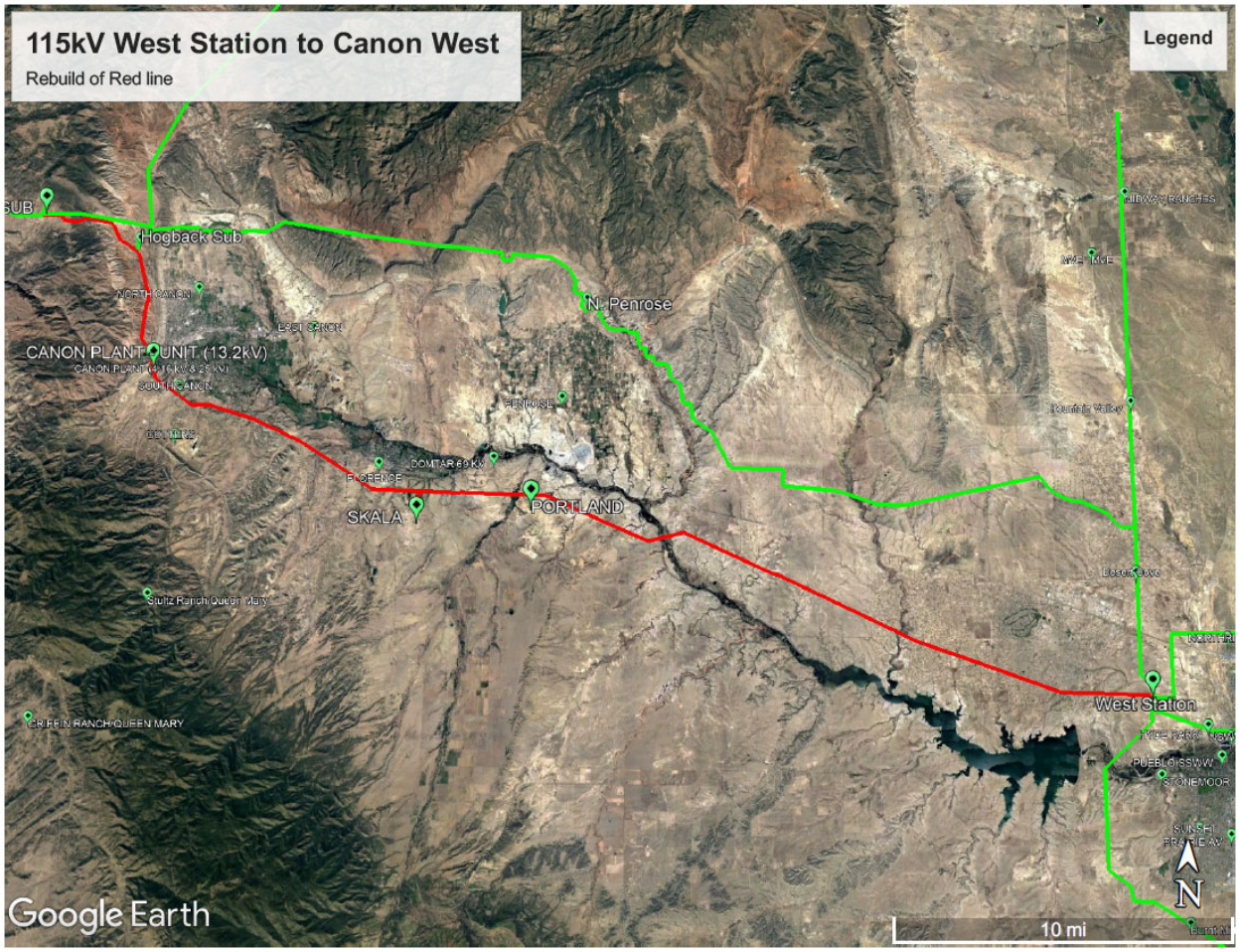
West Station – Canon West 115 kV Rebuild

Description. Past TPL-001-4 reliability[2] and interconnection studies and summer peak operational studies have shown overloads on the Portland-Skala, Skala-Cañon City, and Portland-West Station #1 and #2 115 kV lines. Also, the West Cañon 230/69 kV transformer, which supports the Cañon City network from the west end, is a long lead time piece of equipment that adds additional overload scenarios to the above mentioned 115 kV lines if the transformer were to fail. This project is a rebuild of 41 miles of the existing transmission line from West Station to Canon West and replaces aging infrastructure, which resulted in overloads and N-1 contingencies. The need for this project was delayed with the completion of the West Station – Hogback project, however, the project timeline was moved up when this line was identified as a network upgrade to accommodate the Large Generation Interconnection Agreement ("LGIA"). At the time of the 2022 Rule 3206 filing, this LGIA was not intending to move forward. LGIA discussions were revived in late 2022 resulting in a signed LGIA in October 2022. The LGIA has since suspended but the projects are still needed for reliability and asset renewal. Construction started in April 2023 and is expected to continue through March 2026. Some portions of the line rebuild have been completed along with the West Cañon 230/69 kV transformer replacement.

Consideration of project alternatives including energy storage systems (Rule 3206(d)(I)(D)). This line rebuild is caused by a Large Generator Interconnection. Non-wires alternatives such as large scale battery storage are not an option for this project

Decision. The Commission determined that CPCN is not necessary in Decision No. C23-0810.

[2] Including both BHCT TCPC & CCPG studies


115kV West Station to Canon West
Rebuild of Red line
Legend
Hogback Sub
N. Penrose
CANON PLANT UNIT (13.2kV)
PENROSE
FLORENCE
SKALA
PORTLAND
West Station
Google Earth
10 mi
N

Pueblo Plant 115 kV Substation Rebuild

Project Sponsor:	Black Hills Colorado Electric
Additional Project Participants:	
Project Description:	Rebuild the Pueblo Plant 115/13.8 kV Substation
Voltage Class:	115 kV
Facility Rating:	221MVA
Point of Origin/Location:	Pueblo, CO
Point of Termination:	
Intermediate Points:	
Length of Line (in Miles):	
Type of Project:	Transmission & Distribution
Development Status:	Planned
Routing:	
Subregional Planning Group:	CCPG
Purpose of Project:	Load service & Reliability
Estimated Cost :	$2.2 Million Transmission with a project total cost of $6.5 million
Schedule:	
Construction Date:	2028
Planned Completion/In-Service Date:	2029
Regulatory Info:	
Regulatory Date:	
Permitting Info:	
Permitting Date:	
Contact Information:	Trevor Rombough, Transmission Planning
Email	Trevor.J.Rombough@blackhillscorp.com

Pueblo Plant 115 kV Substation Rebuild

Description. Past TPL-001-4 reliability[3] and interconnection studies along with current summer peak operational studies have shown overloads on the Pueblo Plant – Reader and Pueblo Plant – Hyde Park 115 kV lines. These 115 kV lines are limited by terminal equipment at the Pueblo Plant substation. Additionally, the 2023 Distribution System Plan (DSP) Report identified N-1 risks and numerous equipment overloads inside the Pueblo Plant 13.8 kV distribution substation. Replacing the limiting substation equipment is a challenge due to the small geographic size and substation layout. To address the limiting 115 kV equipment, the entire 115 kV substation must be de-energized for safe working clearances.

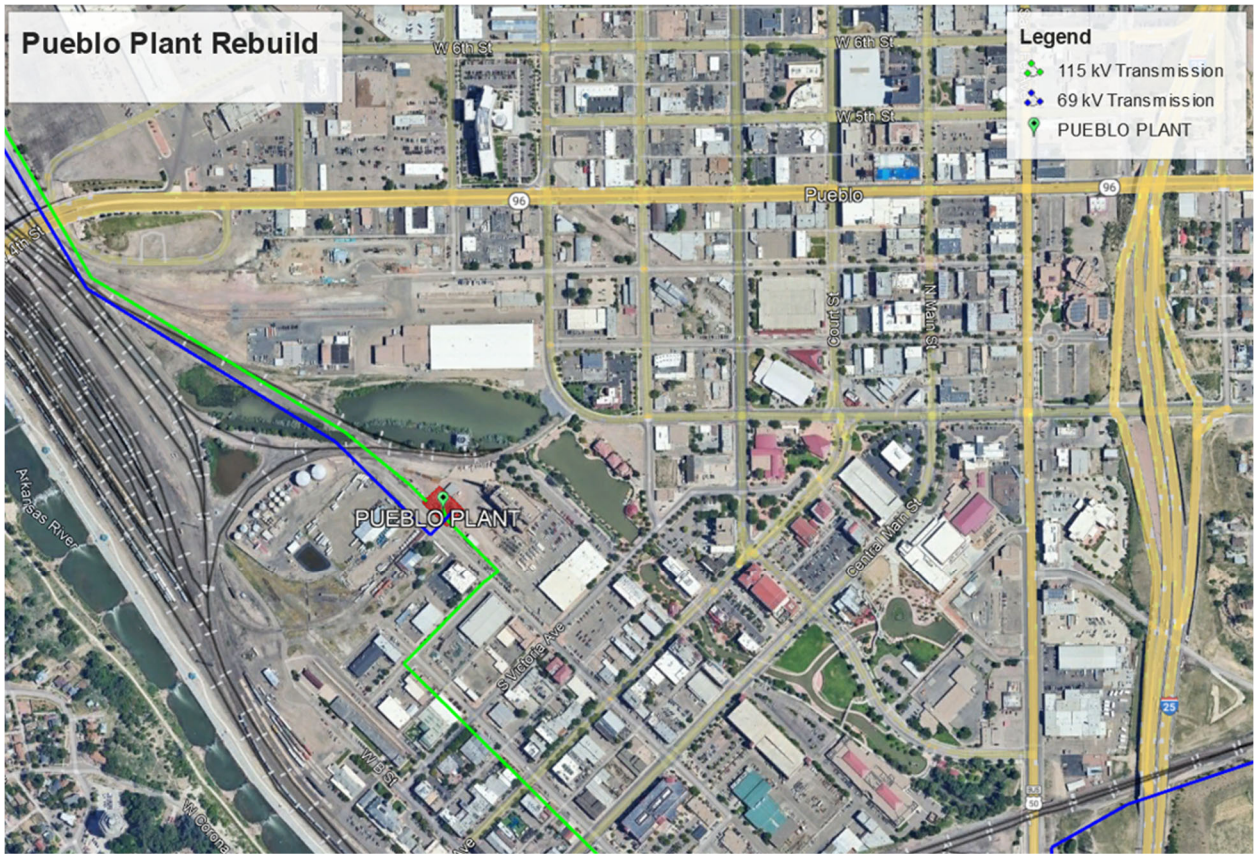
This project will rebuild the existing Pueblo Plant 115/13.8 kV substation to address the limiting substation equipment and improve the load serving redundancy. Additionally, this site will go from two 115/13.2 kV transformers to a single 115/13.2 kV transformer. In order to accomplish this adjustment, a second 115/13.2 kV transformer must be added at the Hyde Park Substation, described below.

The engineering and design work associated with the substation portion of the project will be performed to ensure that the completed project will meet the established noise and magnetic field requirements as stated in Rule 3206 (f) and Rule 3206 (e), respectively. Namely, the noise level of the substation will not exceed 50 db(A) at a distance of 25 feet beyond the property line, and the magnetic field level at the property line, one meter above the ground, will not exceed 150 MilliGauss.

Consideration of project alternatives including energy storage systems (Rule 3206(d)(I)(D)). Providing back-up energy to radial loads under contingency conditions is a benefit provided by energy storage technology and may address some of the needs associated with this project. However, energy storage cannot address the outage and clearance safety concerns related to the age and layout of the existing substation. A substation rebuild is the most effective solution to address all the project needs.

Decision. Black Hills Colorado Electric requests that the Commission determine that the project is in the ordinary course of business and that a CPCN is not necessary.

[3] Including both BHCT TCPC & CCPG studies


Pueblo Plant Rebuild
Legend
115 kV Transmission
69 kV Transmission
PUEBLO PLANT
W 6th St
W 5th St
Pueblo
96
Court St
N Main St
Central Main St
PUEBLO PLANT
Arkansas River
Santa Fe Ave
W Evans
W Orone
25

La Junta 115/69 kV Transformer Upgrade

Project Sponsor:	Black Hills Colorado Electric
Additional Project Participants:	
Project Description:	Upgrade the La Junta 115/69 kV transformer to 50 MVA and upgrade limiting terminal equipment
Voltage Class:	115 kV
Facility Rating:	50 MVA
Point of Origin/Location:	La Junta, CO
Point of Termination:	
Intermediate Points:	
Length of Line (in Miles):	
Type of Project:	Transmission & Distribution
Development Status:	Planned
Routing:	
Subregional Planning Group:	CCPG
Purpose of Project:	Load service & Reliability
Estimated Cost:	$3.9 Million
Schedule:	
Construction Date:	2029
Planned Completion/In-Service Date:	2029
Regulatory Info:	
Regulatory Date:	
Permitting Info:	
Permitting Date:	
Contact Information:	Trevor Rombough, Transmission Planning
Email	Trevor.J.Rombough@blackhillscorp.com

La Junta 115/69 kV Transformer Upgrade

Description. Past TPL-001-4 reliability[4] and interconnection studies along with current summer peak operational studies have shown overloads on the La Junta 115/69 kV transformer. These overloads are currently mitigated operationally with diesel generation and sectionalizing the 69 kV system. The Rocky Ford diesel generation is planned to be retired in 2029 and will no longer be available to alleviate this overload.

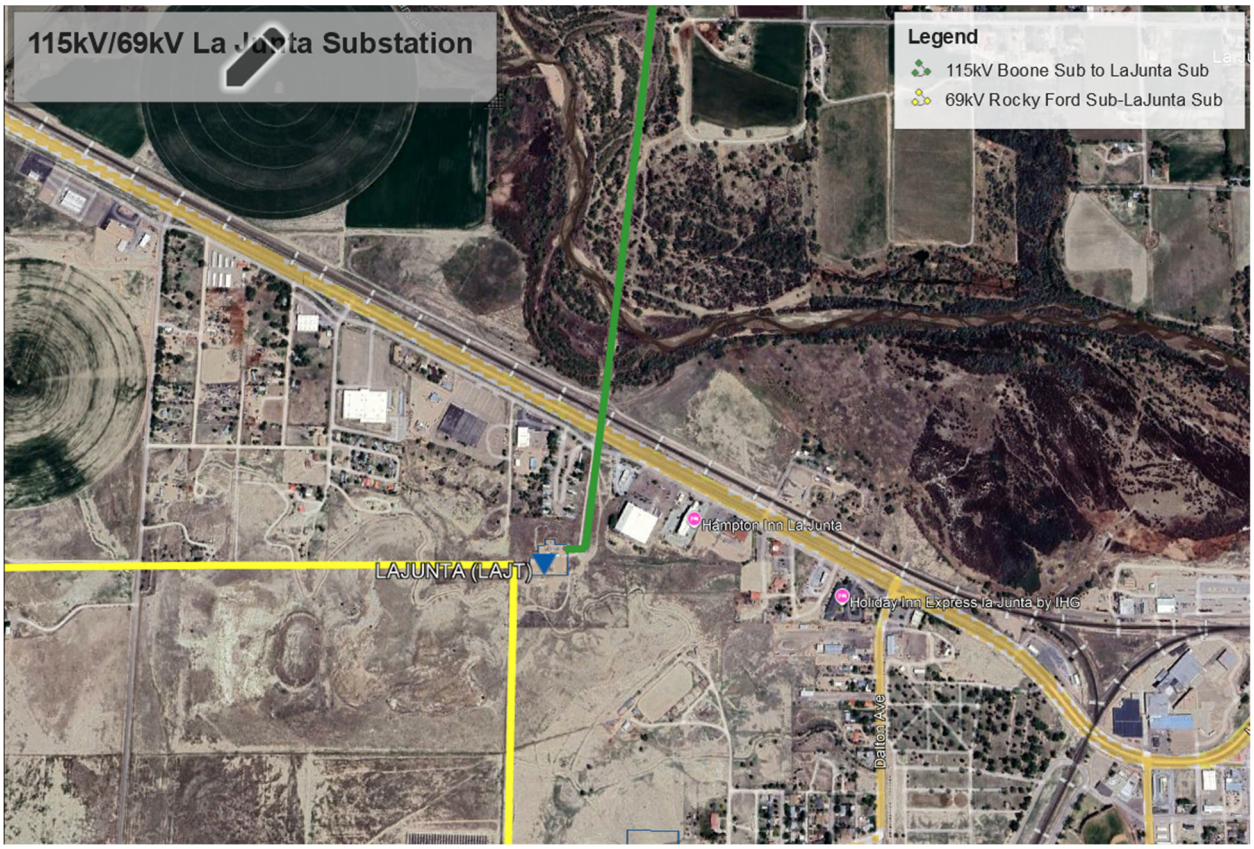
This project will replace the existing La Junta 115/69 kV transform to increase the rating from 25 MVA to 50 MVA.

The engineering and design work associated with the substation portion of the project will be performed to ensure that the completed project will meet the established noise and magnetic field requirements as stated in Rule 3206 (f) and Rule 3206 (e), respectively. Namely, the noise level of the substation will not exceed 50 db(A) at a distance of 25 feet beyond the property line, and the magnetic field level at the property line, one meter above the ground, will not exceed 150 MilliGauss.

Consideration of project alternatives including energy storage systems (Rule 3206(d)(I)(D)). Providing back-up energy to radial loads under contingency conditions is a benefit provided by energy storage technology and may address some of the needs associated with this project. However, the La Junta transformer is 57 years old and will need to be replaced for asset renewal in the near future. A transformer replacement is the most effective solution to address all the project needs.

Decision. Black Hills Colorado Electric requests that the Commission determine that the project is in the ordinary course of business and that a CPCN is not necessary.

[4] Including both BHCT TCPC & CCPG studies


115kV/69kV La Junta Substation
Legend
115kV Boone Sub to LaJunta Sub
69kV Rocky Ford Sub-LaJunta Sub
Hampton Inn La Junta
LAJUNTA (LAJT)
Holiday Inn Express la Junta by IHG
Dalton Ave

Hyde Park 115/13.2 kV Transformer Addition

Project Sponsor:	Black Hills Colorado Electric
Additional Project Participants:	
Project Description:	Add second 115/13.2 kV transformer at Hyde park
Voltage Class:	115 kV
Facility Rating:	30 MVA
Point of Origin/Location:	Pueblo, CO
Point of Termination:	
Intermediate Points:	
Length of Line (in Miles):	
Type of Project:	Transmission & Distribution
Development Status:	Planned
Routing:	
Subregional Planning Group:	CCPG
Purpose of Project:	Load service & Reliability
Estimated Cost:	$4.0 Million
Schedule:	
Construction Date:	2026
Planned Completion/In-Service Date:	2027
Regulatory Info:	
Regulatory Date:	
Permitting Info:	
Permitting Date:	
Contact Information:	Trevor Rombough, Transmission Planning
Email	Trevor.J.Rombough@blackhillscorp.com

Hyde Park 115/13.2 kV Transformer Addition

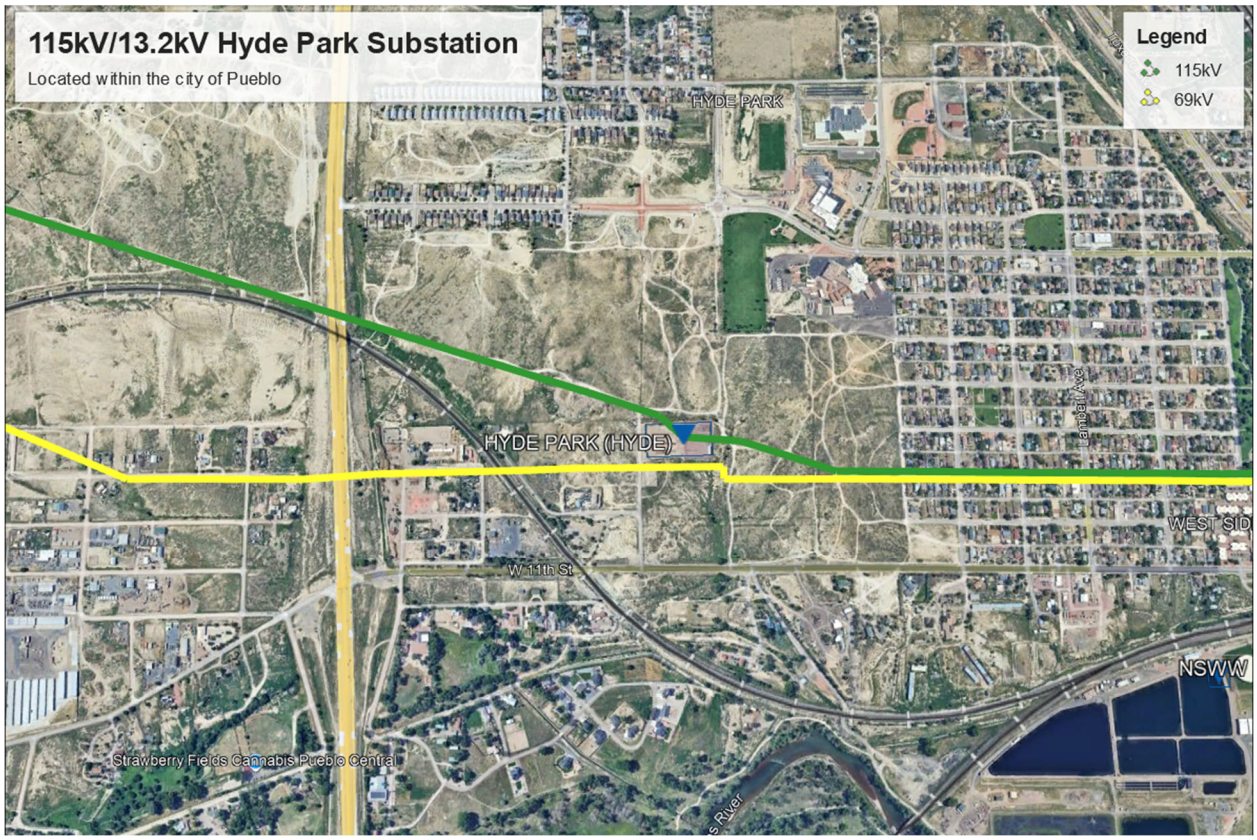
Description. The area served by the Hyde Park T1 transformer is projected to have high growth due to residential and commercial developments. The T1 transformer has existing N-1 risks, and these risks are expected to increase with the projected growth. To meet future capacity needs and address the N-1 risks, a second transformer and corresponding feeders will be needed at the current Hyde Park substation.

This project will add a second 30 MVA 115/13.2 kV transformer and associated switchgear to allow for system contingencies and address load growth in the area. This project will also offload Pueblo Plant to support the Pueblo Plant project described above.

The engineering and design work associated with the substation portion of the project will be performed to ensure that the completed project will meet the established noise and magnetic field requirements as stated in Rule 3206 (f) and Rule 3206 (e), respectively. Namely, the noise level of the substation will not exceed 50 db(A) at a distance of 25 feet beyond the property line, and the magnetic field level at the property line, one meter above the ground, will not exceed 150 MilliGauss.

Consideration of project alternatives including energy storage systems (Rule 3206(d)(I)(D)). Providing back-up energy to radial loads under contingency conditions is a benefit provided by energy storage technology. In the Company's DSP, this was considered and was deemed as not a viable option.

Decision. Black Hills Colorado Electric requests that the Commission determine that the project is in the ordinary course of business and that a CPCN is not necessary.


115kV/13.2kV Hyde Park Substation
Located within the city of Pueblo
Legend
115kV
69kV
HYDE PARK
HYDE PARK (HYDE)
W 11th St
WEST SID
NSWW
Strawberry Fields Cannabis Pueblo Central

Nyberg – La Junta 115 kV (Boone Bypass)

Project Sponsor:	Black Hills Colorado Electric
Additional Project Participants:	
Project Description:	Tie existing Boone – La Junta and Boone – Nyberg 115 kV lines together and remove extension into Boone substation
Voltage Class:	115 kV
Facility Rating:	50 MVA
Point of Origin/Location:	Boone, CO
Point of Termination:	
Intermediate Points:	
Length of Line (in Miles):	
Type of Project:	Transmission & Distribution
Development Status:	Planned
Routing:	
Subregional Planning Group:	CCPG
Purpose of Project:	Load service & Reliability
Estimated Cost:	$0.4 Million
Schedule:	
Construction Date:	2026
Planned Completion/In-Service Date:	2026
Regulatory Info:	
Regulatory Date:	
Permitting Info:	
Permitting Date:	
Contact Information:	Trevor Rombough, Transmission Planning
Email	Trevor.J.Rombough@blackhillscorp.com

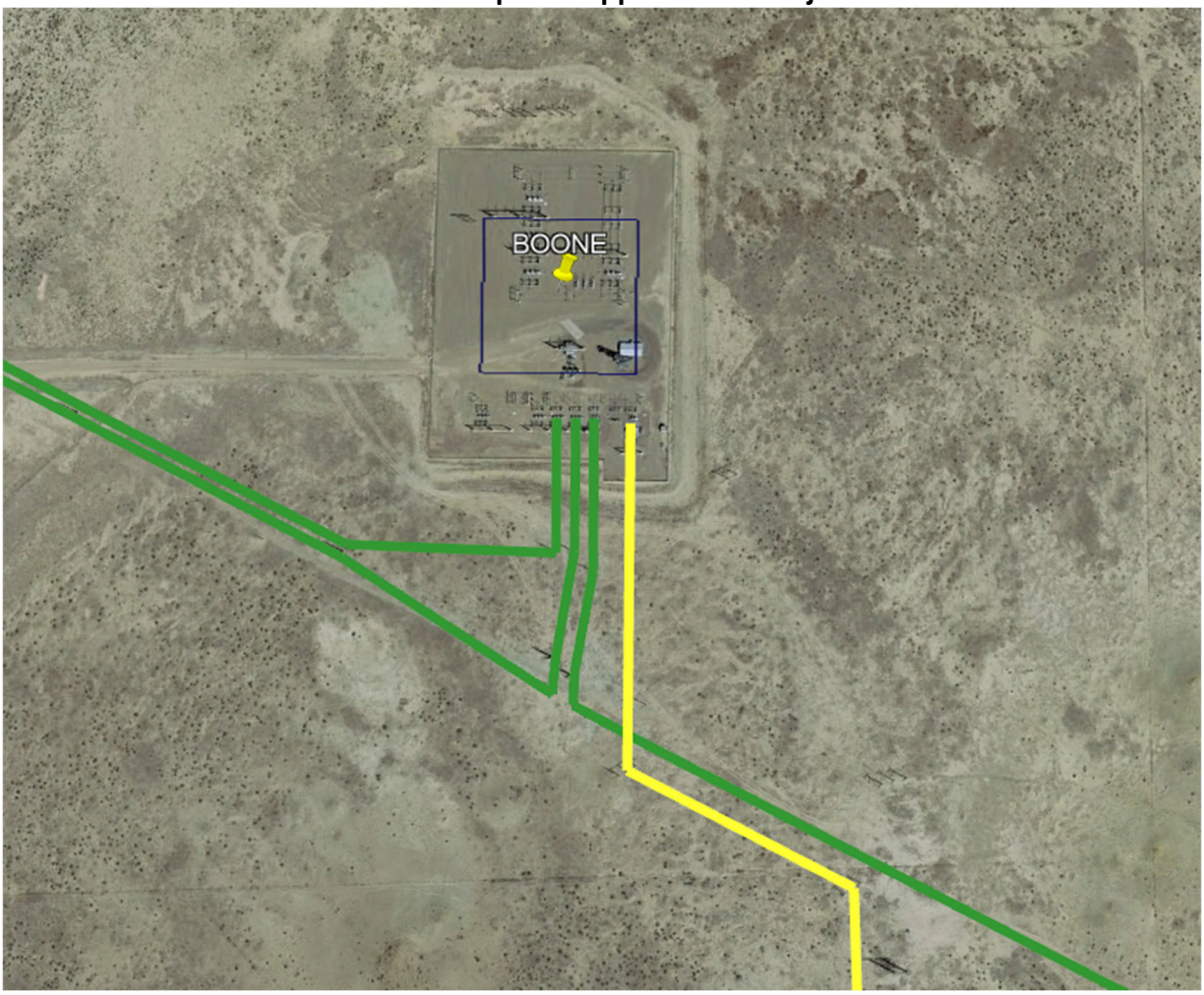
Nyberg – La Junta 115 kV (Boone Bypass)

Description. The La Junta, Fowler and Rocky Ford areas are primarily fed from Boone 115kV on two lines with an additional very weak source via the normally open tie to Tristate on the Philips tap line. During a bus fault the entire area load is dropped. This makes it challenging to take outages on the Boone 115 kV bus.

This project will tie the existing Boone – La Junta and Boone – Nyberg 115 kV lines together and remove the extension into the Boone substation to create an alternate 115 kV source for the La Junta, Fowler, and Rocky Ford area. This project will allow the La Junta, Fowler, and Rocky Ford area to be served from Nyberg during outages at the Boone substation.

Consideration of project alternatives including energy storage systems (Rule 3206(d)(I)(D)). This is the most cost-effective solution to provide an alternate source to the La Junta, Fowler, and Rocky Ford area. All other viable alternatives would require additional transmission and/or substation work.

Decision. Black Hills Colorado Electric requests that the Commission determine that the project is in the ordinary course of business and that a CPCN is not necessary.


BOONE

Appendix B

Black Hills Colorado Electric

EMF and Noise Report

115kV Transmission Lines

Magnetic Fields and Audible Noise

Black Hills Colorado Electric Utility, Inc.

Pueblo, Colorado
April 25, 2018

Contents

Tables

Figures

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1 115 kV Transmission Lines, Magnetic Fields and Audible Noise

1.1 Introduction

Black Hills Colorado Electric Utility, Inc. (BHCOE) is proposing to construct and rebuild several new 115 kV transmission lines around the Pueblo, CO area. Three (3) different structure configurations will be used depending on the particular location for these Projects. These include an H-frame, vertical configuration, and/or delta configuration, structures with either wood or steel poles. This report describes the modeling of magnetic fields and the audible noise produced from the line's voltage potential and current magnitude with varying right-of-way (ROW) widths.

1.2 Magnetic Fields

Electric transmission lines produce electric and magnetic fields (EMF) when they are in operation. These fields are affected by the different characteristics of the line and they can be evaluated separately. The voltage (potential) of the line produces electrical fields and the current (load) flowing on the line produces magnetic fields.

The voltage of a line is fairly constant, so the electric fields don't vary much over time while the line is operating. Magnetic fields however are dynamic and constantly changes with the loading on the line. For example, whenever an electric appliance on the electrical grid is turned on or off, the current flow changes to provide energy or remove it from the line.

1.3 Magnetic Field Modeling Methodology

The proposed transmission line was modeled to determine the resulting magnetic fields using the "CDEGS" (**C**urrent, **D**istribution, **E**lectromagnetic Fields, **G**rounding, and **S**oil Structure Analysis) program, which is distributed by Safe Engineering Services & Technologies Ltd. The specific module used was "SESEnviroPlus" which can be configured to match the outputs of several currently accepted method of measurement, such as Bonneville Power Administration (BPA) and Electric Power Research Institute (EPRI). This program accurately predicts the magnetic fields produced by linear transmission lines such as the proposed Projects. The commonly used magnetic field intensity unit of measure is the gauss (G). For most applications, the gauss is too large, so a much smaller unit, the milligauss (mG), is used for reporting magnetic field levels. The milligauss is one thousandth of a gauss. The magnetic field has both magnitude and direction.

To perform this modeling, detailed information was provided by BHCOE for their proposed 115 kV transmission lines. This included the maximum projected electrical power flow, operating voltage, structure configurations, conductor/shield wire size and type, the height and horizontal location of each conductor/shield wire, conductor sag and conductor phasing. The proposed BHCOE projects will operate at 115 kV, so the design

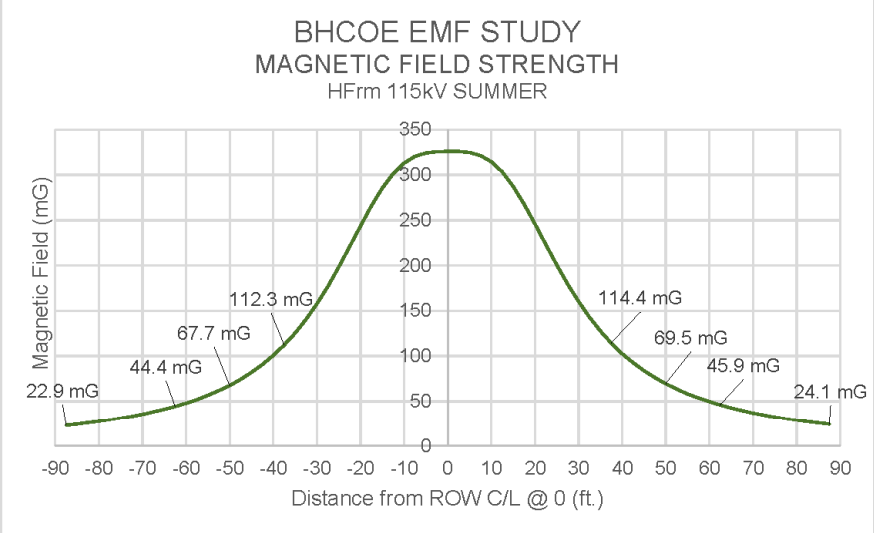
will need to meet the thresholds requirements in Colorado Public Utility Commission (CPUC) Rule 3106, (b (II)) for magnetic fields. Only the maximum load was considered at the lowest conductor sag at mid span to provide the highest (worst case) magnetic fields. Table 1 and Table 2 of Appendix A shows the electrical parameters (loading) and design information for each line.

The data provided in Tables A-1 and A-2 were input into the SESEnivroPlus program to calculate the lateral (at right angles to the ROW alignment) values of the magnetic field strength. These values were then plotted to produce the graphs that are presented on the following pages. The program calculated the magnetic field at minimum design clearance representing worse case. The accuracy of the modeling is dependent on the accuracy of the input data (i.e., if the maximum line loading (phase current) is higher than what was modeled, the resulting magnetic fields will be higher than what was modeled).

1.4 Magnetic Field Modeling Results

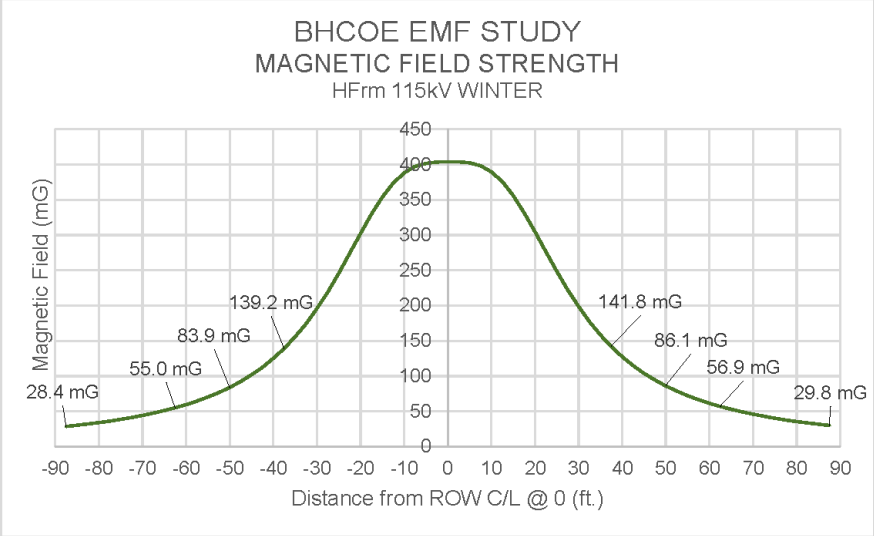
The magnetic field profile for the H-frame configured pole with 14''-6" phase spacing and a summer load current of 1110 amps is shown in Figure 1. The magnetic field values were labeled on the plot for the varying ROW widths of 75', 100', and 125'; so the edge of ROW would be 37.5', 50.0', and 62.5' from the centerline of ROW on both sides, respectively.

Figure 1 H-Frame Configuration with 115kV Phase Spacing SUMMER Magnetic Field Chart)



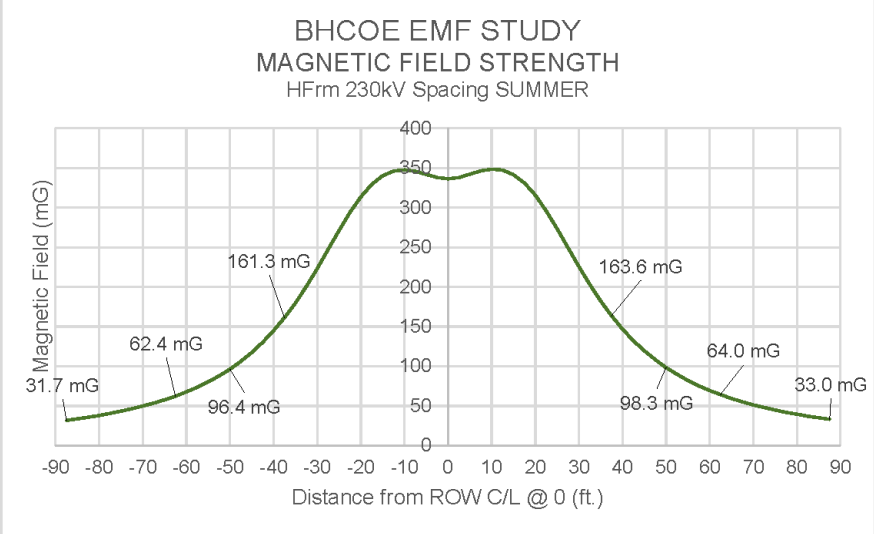
The magnetic field profile for the H-frame configured pole with 14''-6" phase spacing and a winter load current of 1376 amps is shown in Figure 2. The magnetic field values were labeled on the plot for the varying ROW widths of 75', 100', and 125'; so the edge of ROW would be 37.5', 50.0', and 62.5' from the centerline of ROW on both sides, respectively.

Figure 2 H-Frame Configuration with 115kV Phase Spacing WINTER Magnetic Field Chart



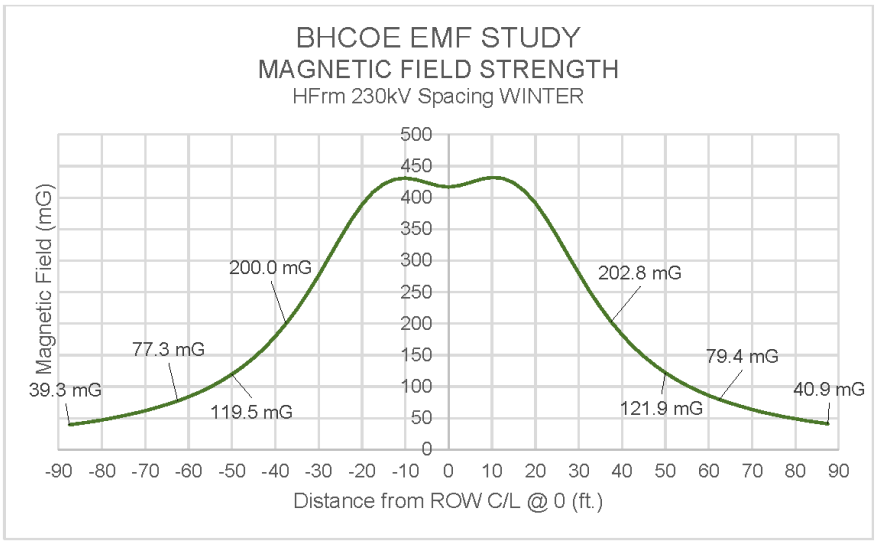
The magnetic field profile for the H-frame configured pole with 19'-6" phase spacing and a summer load current of 1110 amps is shown in Figure 3. The magnetic field values were labeled on the plot for the varying ROW widths of 75', 100', and 125'; so the edge of ROW would be 37.5', 50.0', and 62.5' from the centerline of ROW on both sides, respectively.

Figure 3 H-Frame Configuration with 230kV Phase Spacing SUMMER Magnetic Field Chart



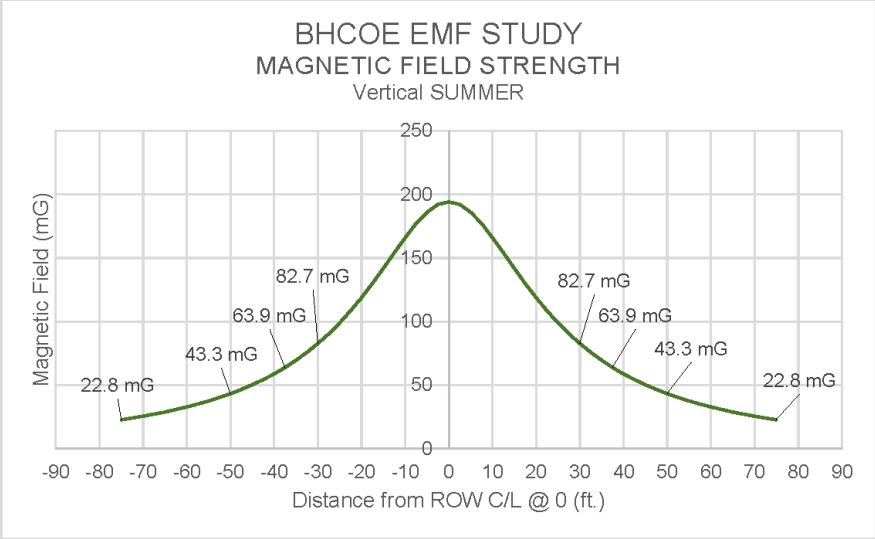
The magnetic field profile for the H-frame configured pole with 19'-6" phase spacing and a winter load current of 1376 amps is shown in Figure 4. The magnetic field values were labeled on the plot for the varying ROW widths of 75', 100', and 125'; so the edge of ROW would be 37.5', 50.0', and 62.5' from the centerline of ROW on both sides, respectively.

Figure 4 H-Frame Configuration with 230kV Phase Spacing WINTER Magnetic Field Chart



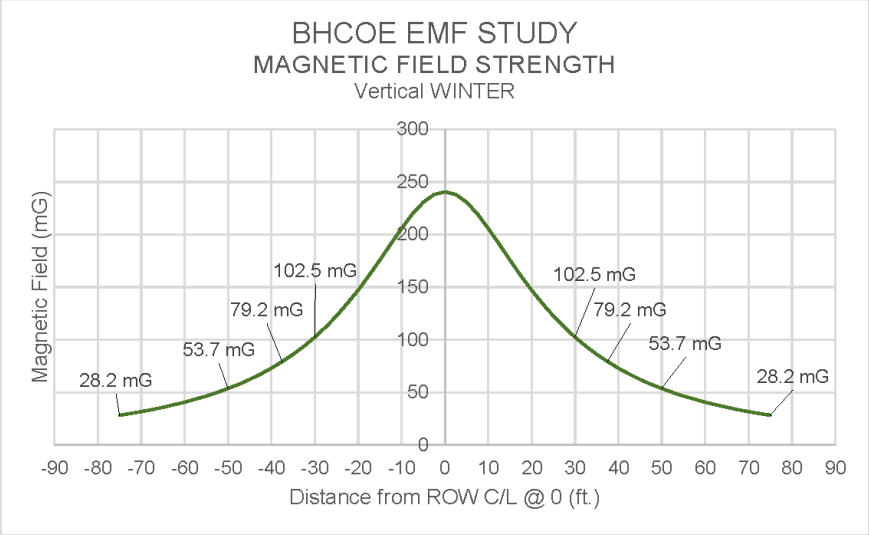
The magnetic field profile for the Vertical-frame configured pole and a summer load current of 1110 amps is shown in Figure 5. The magnetic field values were labeled on the plot for the varying ROW widths of 60', 75', and 100'; so the edge of ROW would be 30.0', 37.5', and 50.0' from the centerline of ROW on both sides, respectively.

Figure 5 Vertical Configuration SUMMER Magnetic Field Chart



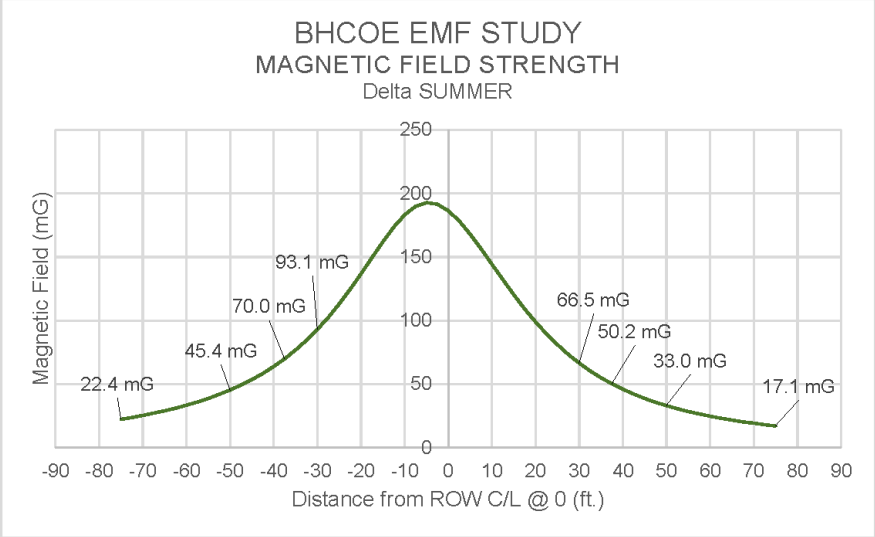
The magnetic field profile for the Vertical-frame configured pole and a winter load current of 1376 amps is shown in Figure 6. The magnetic field values were labeled on the plot for the varying ROW widths of 60', 75', and 100'; so the edge of ROW would be 30.0', 37.5', and 50.0' from the centerline of ROW on both sides, respectively.

Figure 6 Vertical Configuration WINTER Magnetic Field Chart



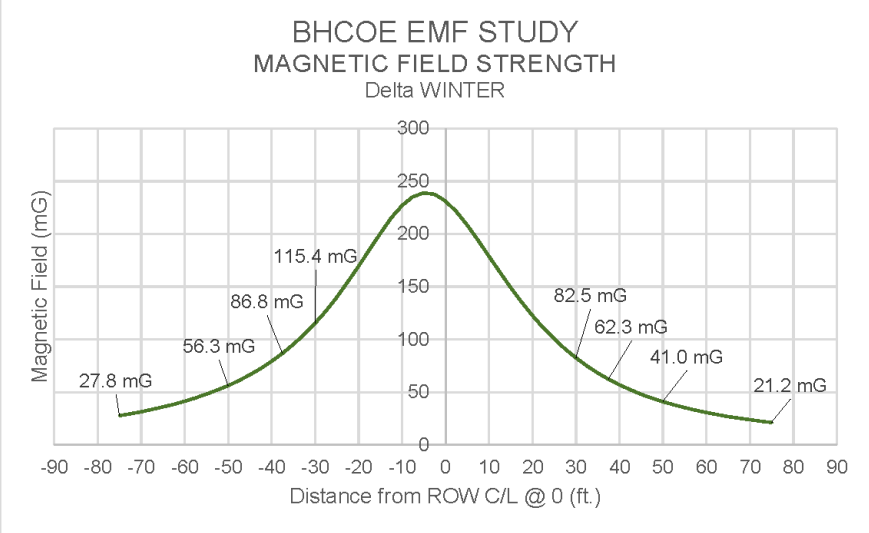
The magnetic field profile for the Delta-frame configured pole and a summer load current of 1110 amps is shown in Figure 7. The magnetic field values were labeled on the plot for the varying ROW widths of 60', 75', and 100'; so the edge of ROW would be 30.0', 37.5', and 50.0' from the centerline of ROW on both sides, respectively.

Figure 7 Delta Configuration SUMMER Magnetic Field Chart



The magnetic field profile for the Delta-frame configured pole and a winter load current of 1376 amps is shown in Figure 8. The magnetic field values were labeled on the plot for the varying ROW widths of 60', 75', and 100'; so the edge of ROW would be 30.0', 37.5', and 50.0' from the centerline of ROW on both sides, respectively.

Figure 8 Delta Configuration WINTER Magnetic Field Chart



1.5 Audible Noise (Corona)

Corona is the electrical ionization of the air that occurs near the surface of energized conductor, hardware, and insulators due to very high electric field strength. Corona may result in audible noise being produced by the transmission lines.

The amount of corona produced by a transmission line is a function of line voltage, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors, hardware, and insulators, and the local weather conditions. Power flow does not affect the amount of corona produced by a transmission line because it is related to the voltage, which is fairly constant and does not change much over time. Lower voltage lines like the proposed 115 kV Projects typically don't have corona issues because the electrical field gradient is lower at this voltage level.

The electric field gradient is greatest at the surface of the conductor. Larger diameter conductors have lower electric field gradients on the conductor surface compared to smaller conductors because there is more area, thereby lowering the electrical stress; everything being equal. The conductor chosen for the proposed Projects voltage was selected to have a larger diameter and thus reducing any potential to create audible noise.

Irregularities (such as nicks and scrapes on the conductor surface or sharp edges on the hardware) concentrate the electric field at these locations and thus increase the electric field gradient and the resulting corona at these locations. Similarly, foreign objects on the conductor surface, such as dust, insects, and water drops, can cause irregularities on the surface that are a source for corona.

Corona also increases at higher elevations where the density of the atmosphere is less than at sea level. Audible noise will vary with elevation with the relationship of A/300, where A is the elevation of the line above sea level measured in meters (EPRI). Audible noise at 600 meters elevation will be twice the audible noise at 300 meters, all other things being equal.

Raindrops, snow, fog, hoarfrost, ice, and condensation accumulated on the conductor surface are also sources of surface irregularities that can increase corona. During fair weather, the number of these condensed water droplets or ice crystals is usually small and the corona effect is also small. However, during wet weather, the number of these sources increases (for instance due to rain drops standing on the conductor) and corona effects are therefore greater. During wet or foul weather conditions, the conductor will produce the greatest amount of corona noise. It also important to note, during heavy rain the noise generated by the falling rain drops hitting the ground and other objects will typically be greater than the noise generated by corona and thus will mask the audible noise from the transmission line.

Corona produced on a transmission line can be reduced by the design of the transmission line and the selection of hardware and conductors used for the construction

of the line. For instance the use of conductor attachment hardware that have rounded rather than sharp edges and not protruding bolts with sharp edges will reduce corona. The conductors themselves can be made with larger diameters and handled so that they have smooth surfaces without nicks or burrs or scrapes in the conductor strands. The transmission lines proposed here are designed to reduce corona generation.

1.6 Audible Noise Modeling Methodology

CPUC Rule 3102 requires that the applicant for a CPCN for a new transmission line model the potential audible noise levels that the line could produce.

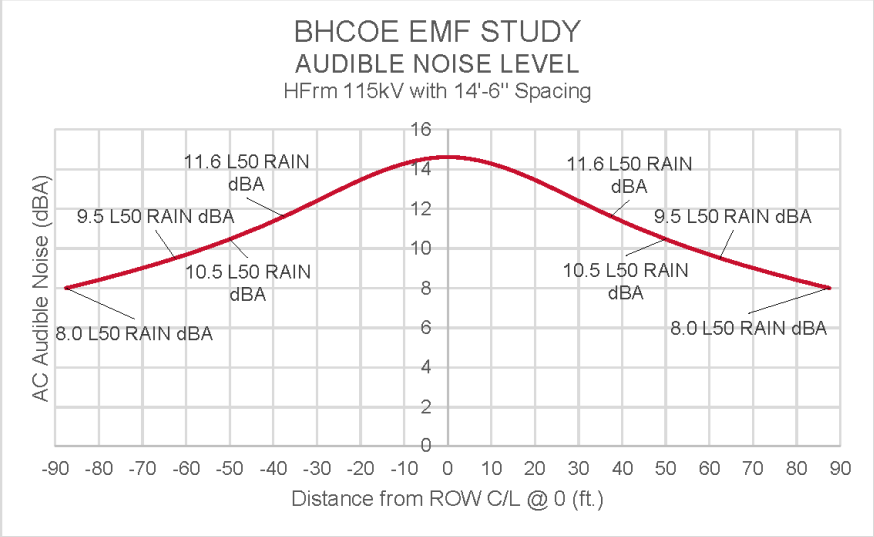
The audible noise from the proposed transmission lines was predicted using SES's SESEnviroPlus program. The same structure and ROW configurations used in the magnetic field calculations were used to predict the audible noise. The rated line voltage (115 kV) plus a 5% overvoltage was used at the lowest conductor sag at mid span to provide the worst case. Audible noise is calculated as an equivalent A-weighted sound-pressure level in decibels (dbA). The L_{50} audible noise for foul weather represents a predicted average (L_{50}) noise level present when the conductor is wet under foul (rain) weather conditions. The actual value is expected to be at or below this calculated L_{50} value 50% of the time, and above the value the other 50% of the time. The A-weighted decibels (dbA), most effectively approximates the human ear's response to sounds.

The data provided in Tables 1 and 2 of Appendix A was used as input into the SESEnviroPlus program which produced the lateral profiles of the audible noise from corona. Because the equations that predict audible noise were created from empirical measurements, the accuracy of the model is as good as these measurements that produced the original equations. In additions the model is as good as the accuracy of the parameters input to the model (e.g. the actual elevation of the transmission line at a particular location rather than the average elevation of the entire project). Therefore given these potential uncertainties, the resulting plots are within a few percent of the true value for the conditions modeled.

1.7 Audible Noise Modeling Results

Figure 9 shows the audible noise modeled for the proposed Project as an H-Frame configuration with 14'-6" phase spacing. The audible noise values were labeled on the plot for the varying ROW widths of 75', 100', and 125'; so the edge of ROW would be 37.5', 50.0', and 62.5' from the centerline of ROW on both sides, respectively.

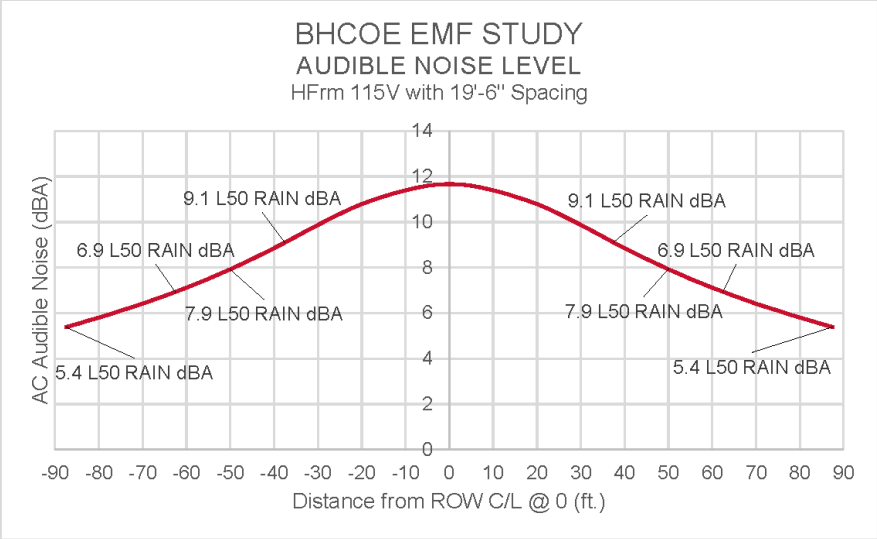
Figure 9 H-Frame Configuration with 115kV Phase Spacing AN Chart



a) Note: a change in load current will not change the Audible Noise (AN) as it is related to the voltage which is steady for the most part, therefore only one plot for each summer and winter load condition is needed.

Figure 10 shows the audible noise modeled for the proposed Project as an H-Frame configuration with 19'-6" phase spacing. The audible noise values were labeled on the plot for the varying ROW widths of 75', 100', and 125'; so the edge of ROW would be 37.5', 50.0', and 62.5' from the centerline on both sides, respectively.

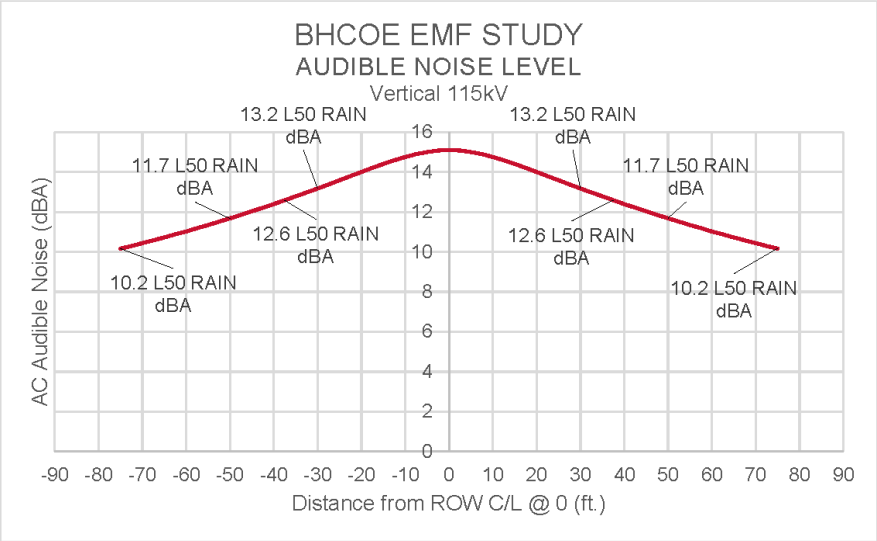
Figure 10 H-Frame Configuration with 230kV Phase Spacing AN Chart



a) Note: a change in load current will not change the Audible Noise (AN) as it is related to the voltage which is steady for the most part, therefore only one plot for each summer and winter load condition is needed.

Figure 11 shows the audible noise modeled for the proposed Project as a Vertical configuration. The audible noise values were labeled on the plot for the varying ROW widths of 60', 75', and 100'; so the edge of ROW would be 30.0', 37.5', and 50.0' from the centerline of ROW on both sides, respectively.

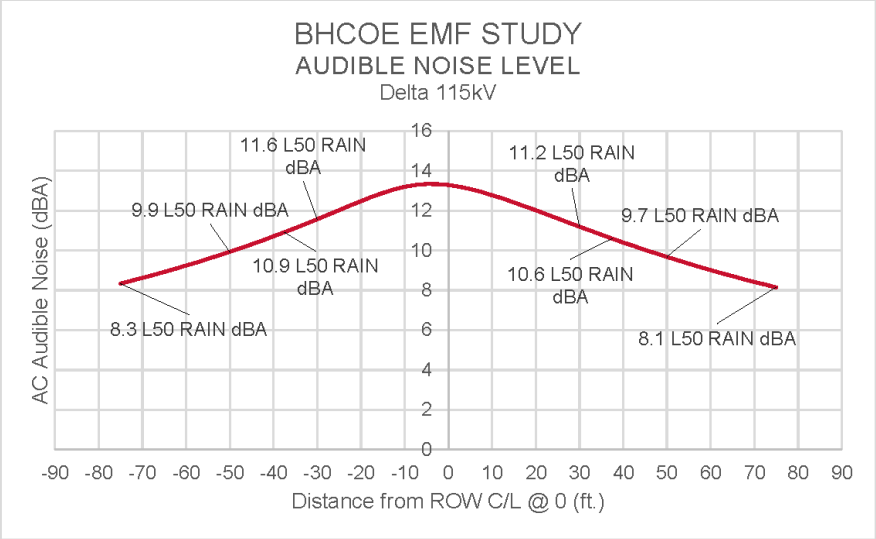
Figure 11 Vertical Frame Configuration AN Chart



a) Note: a change in load current will not change the Audible Noise (AN) as it is related to the voltage which is steady for the most part, therefore only one plot for each summer and winter load condition is needed.

Figure 12 shows the audible noise modeled for the proposed Project as a Delta configuration. The audible noise values were labeled on the plot for the varying ROW widths of 60', 75', and 100'; so the edge of ROW would be 30.0', 37.5', and 50.0' from the centerline of ROW on both sides, respectively.

Figure 12 Delta Frame Configuration AN Chart



a) Note: a change in load current will not change the Audible Noise (AN) as it is related to the voltage which is steady for the most part, therefore only one plot for each summer and winter load condition is needed.

Summary

Magnetic Field Summary

Per CPUC Rule 3106 (e) for magnetic fields, only the edge of the transmission line ROW is considered. All pole configurations are below the suggested 150 mG threshold at the edge of ROW with the exception of the 75 ft. ROW with 19'-6" pole spacing, H-frame construction. This configuration would require further study and possible mitigation to reduce the EMF levels at the edge of ROW. All other configurations studied in this report require no further action.

Audible Noise Summary

Per CPUC Rule 3106 (f) for audible noise, only 25' from the edge of the transmission line ROW is considered for 115 kV lines. All four (4) pole configurations are well below the suggested 50 dBA for a residential level threshold throughout the entire ROW and including 25' from the ROW edge, so no further action is required.

References

Code of Colorado Regulations, Secretary of State, State of Colorado, Colorado Public Utilities Commission (CPUC), Rules Regulating Electric Utilities, 4 CCR 723-3.

Electric Power Research Institute (EPRI), Transmission Line Reference Book 345 kV and Above "Red Book", Second Edition, 1982, Electric Power Research Institute, Palo Alto, California.

EMF, Electric and Magnetic Fields Associated with the Use of Electric Power, June 2002, National Institute of Environmental Health Sciences and National Institutes of Health, NIEHS/DOE EMF RAPID Program.

National Electric Safety Code (NESC C2 – 2012); The Institute of Electrical and Electronics Engineers, Inc., New York, New York.

115kV Transmission Lines
Magnetic Fields and Audible Noise

Appendix

Appendix A: Tables

Table 1: Electrical Parameters

Pole Configuration	Conductor	Shield Wire	OPGW	FAC-008 Loading (Amps)
H-Frame w/ 14'-6" Phase Spacing	Single 795 Drake ACSR	3/8" EHS	0.443"	1110 S/1376 W
H-Frame w/ 19'-6" Phase Spacing	Single 795 Drake ACSR	3/8" EHS	0.443"	1110 S/1376 W
Vertical	Single 795 Drake ACSR	3/8" EHS	N/A	1110 S/1376 W
Delta	Single 795 Drake ACSR	3/8" EHS	N/A	1110 S/1376 W

Source: Source: Emails from BHCOE, dated 3/3/18 & 3/29/18.
S = Summer and W = Winter

115kV Transmission Lines
Magnetic Fields and Audible Noise

Table 2: Line Design Information

Pole Configuration	Phase (Left to Right) or (top to bottom)	Horizontal Location (ft.)	Height (ft.)	Minimum Ground Clearance (ft.)
H-Frame with 14'-6" phase spacing	A	-14'-6"	22'-0"	22'-0"
	B	0'-0"	22'-0"	22'-0"
	C	14'-6"	22'-0"	22'-0"
	OPGW	-8'-0"	34'-0"	
	Shield Wire	8'-0"	34'-0"	
H-Frame with 19'-6" phase spacing	A	-19'-6"	22'-0"	22'-0"
	B	0'-0"	22'-0"	22'-0"
	C	19'-6"	22'-0"	22'-0"
	OPGW	-8'-0"	34'-0"	
	Shield Wire	8'-0"	34'-0"	
Vertical	A	-6-0"	46'-0"	22'-0"
	B	-6'-0"	34'-0"	22'-0"
	C	-6'-0"	22'-0"	22'-0"
	Shield Wire	0.7'-0"	56'-6"	
Delta	A	-6'-0"	42'-0"	22'-0"
	B	6'-0"	32'-0"	22'-0"
	C	-6'-0"	22'-0"	22'-0"
	Shield Wire	0.7'-0"	52'-6"	

Note: All dimensions are looking ahead on line from the centerline of the line.

115kV Transmission Lines
Magnetic Fields and Audible Noise

Table 3: Magnetic Field and Audible Noise Values

Distance	Magnetic Fields (Summer) 1110 A	Magnetic Fields (Winter) 1376 A	Audible Noise (Summer) 1110 A	Audible Noise (Winter) 1376 A
	H-Frame Configuration with 14'-6" Phase Spacing			
25.0 ft. from ROW Edge	24.1 mG	29.8 mG	8.0 L50 Rain dBA	8.0 L50 Rain dBA
62.5 ft. from ROW C/L	45.9 mG	56.9 mG	9.5 L50 Rain dBA	9.5 L50 Rain dBA
50.0 ft. from ROW C/L	69.5 mG	86.1 mG	10.5 L50 Rain dBA	10.5 L50 Rain dBA
37.5 ft. from ROW C/L	114.4 mG	141.8 mG	11.6 L50 Rain dBA	11.6 L50 Rain dBA
	H-Frame Configuration with 19'-6" Phase Spacing			
25.0 ft. from ROW Edge	33.0 mG	40.9 mG	5.4 L50 Rain dBA	5.4 L50 Rain dBA
62.5 ft. from ROW C/L	64.0 mG	79.4 mG	6.9 L50 Rain dBA	6.9 L50 Rain dBA
50.0 ft. from ROW C/L	98.3 mG	121.9 mG	7.9 L50 Rain dBA	7.9 L50 Rain dBA
37.5 ft. from ROW C/L	163.6 mG	202.8 mG	9.1 L50 Rain dBA	9.1 L50 Rain dBA
	Vertical Configuration			
25.0 ft. from ROW Edge	22.8 mG	28.2 mG	10.2 L50 Rain dBA	10.2 L50 Rain dBA
50.0 ft. from ROW C/L	43.3 mG	53.7 mG	11.7 L50 Rain dBA	11.7 L50 Rain dBA
37.5 ft. from ROW C/L	63.9 mG	79.2 mG	12.6 L50 Rain dBA	12.6 L50 Rain dBA
30.0 ft. from ROW C/L	82.7 mG	102.5 mG	13.2 L50 Rain dBA	13.2 L50 Rain dBA
	Delta Configuration			
25.0 ft. from ROW Edge	22.4 mG	27.8 mG	8.3 L50 Rain dBA	8.3 L50 Rain dBA
50.0 ft. from ROW C/L	45.4 mG	56.3 mG	9.9 L50 Rain dBA	9.9 L50 Rain dBA
37.5 ft. from ROW C/L	70.0 mG	86.8 mG	10.9 L50 Rain dBA	10.9 L50 Rain dBA
30.0 ft. from ROW C/L	93.1 mG	115.4 mG	11.6 L50 Rain dBA	11.6 L50 Rain dBA

Note: EMF values shown above are the highest on either side of their respective output plots when they are different

Appendix B Pole Diagrams

115kV Transmission Lines
Magnetic Fields and Audible Noise

Figure 13 (H-Frame with 14'-6" Phase Spacing)

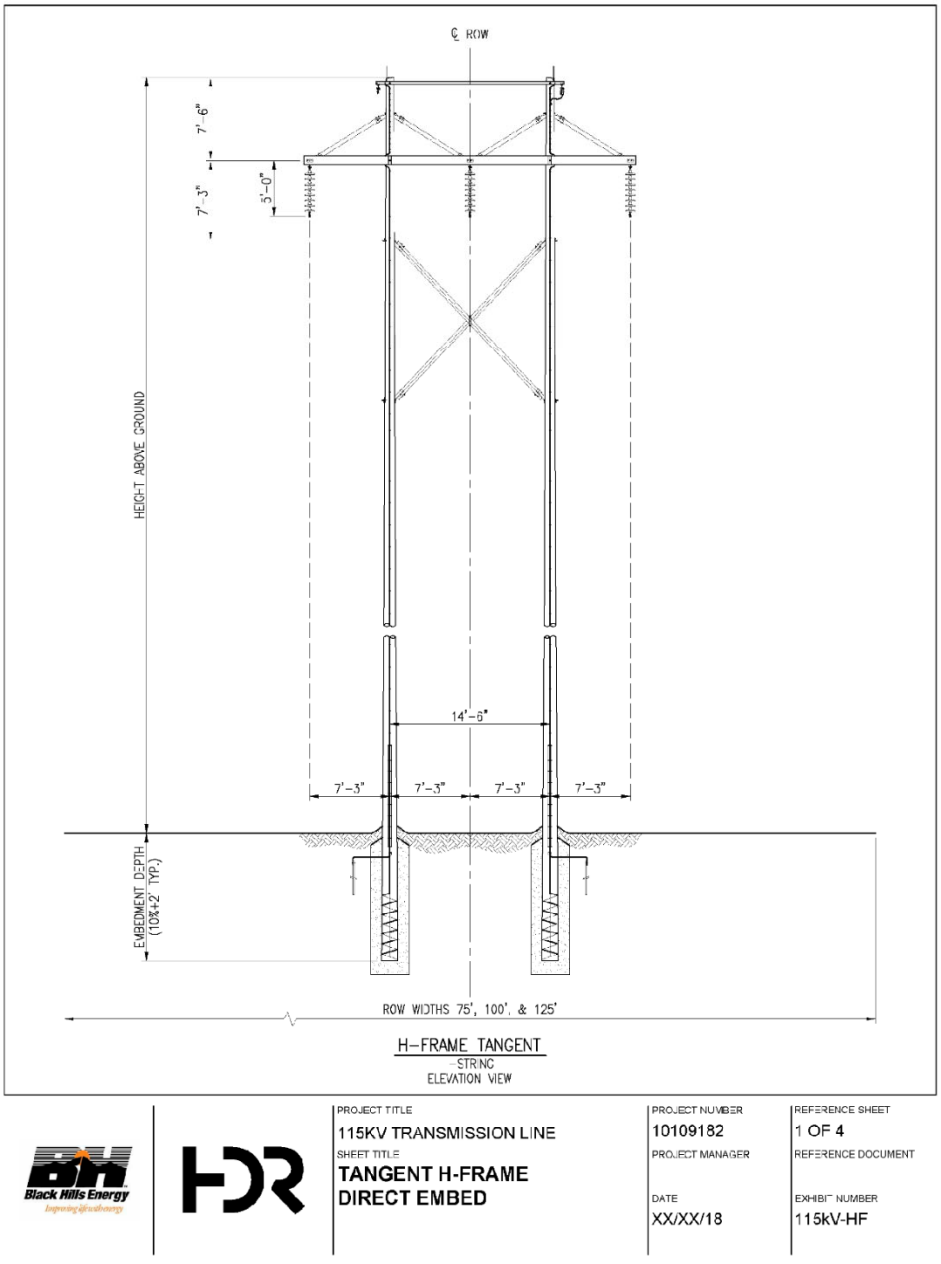
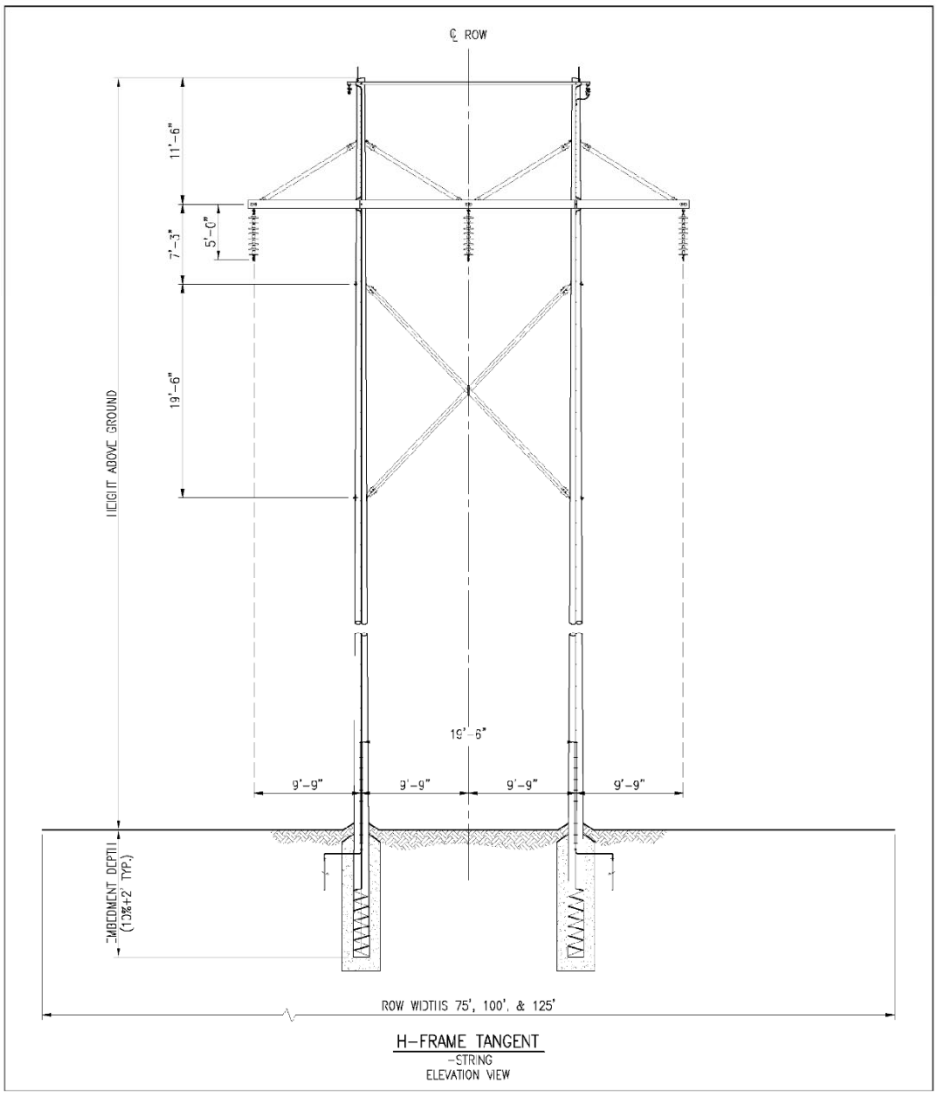


Figure 14 (H-Frame with 19'-6" Phase Spacing)



115kV Transmission Lines
Magnetic Fields and Audible Noise

Figure 15 (Vertical Configuration)

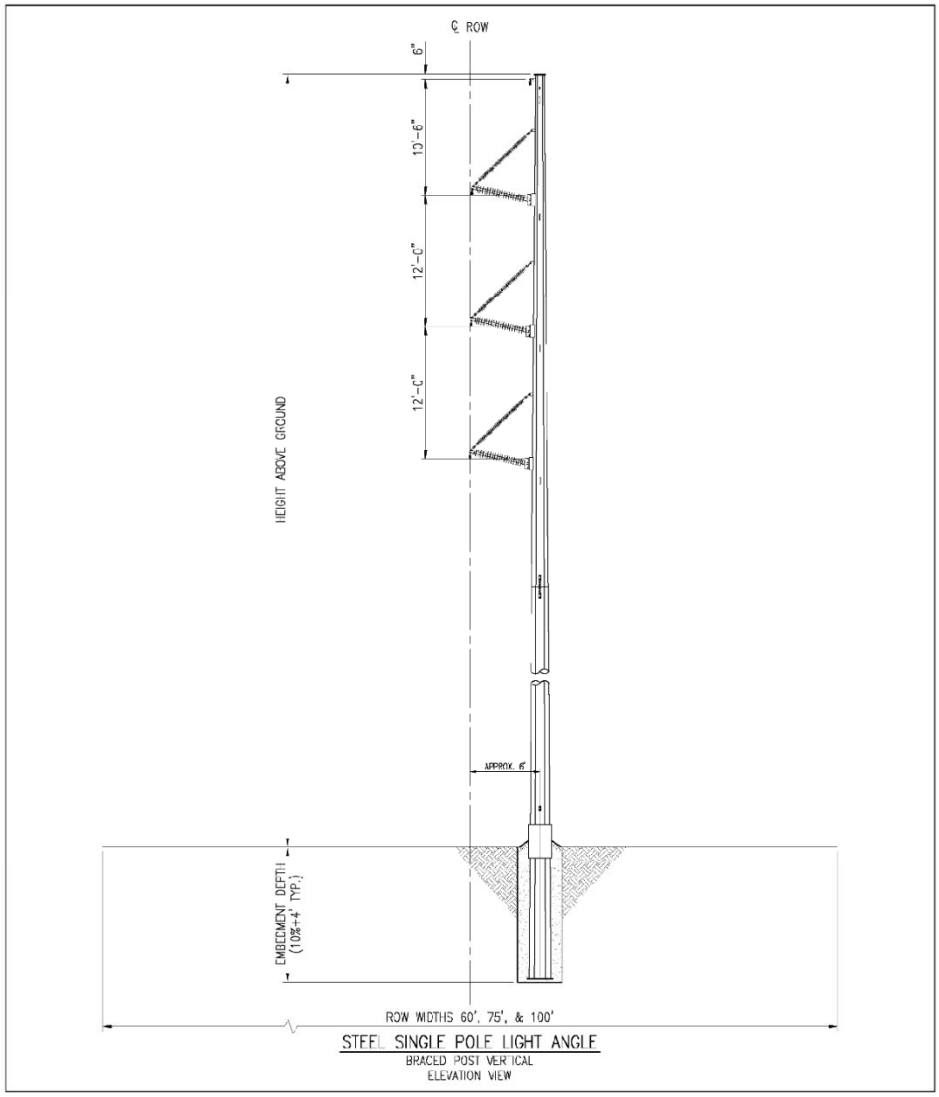
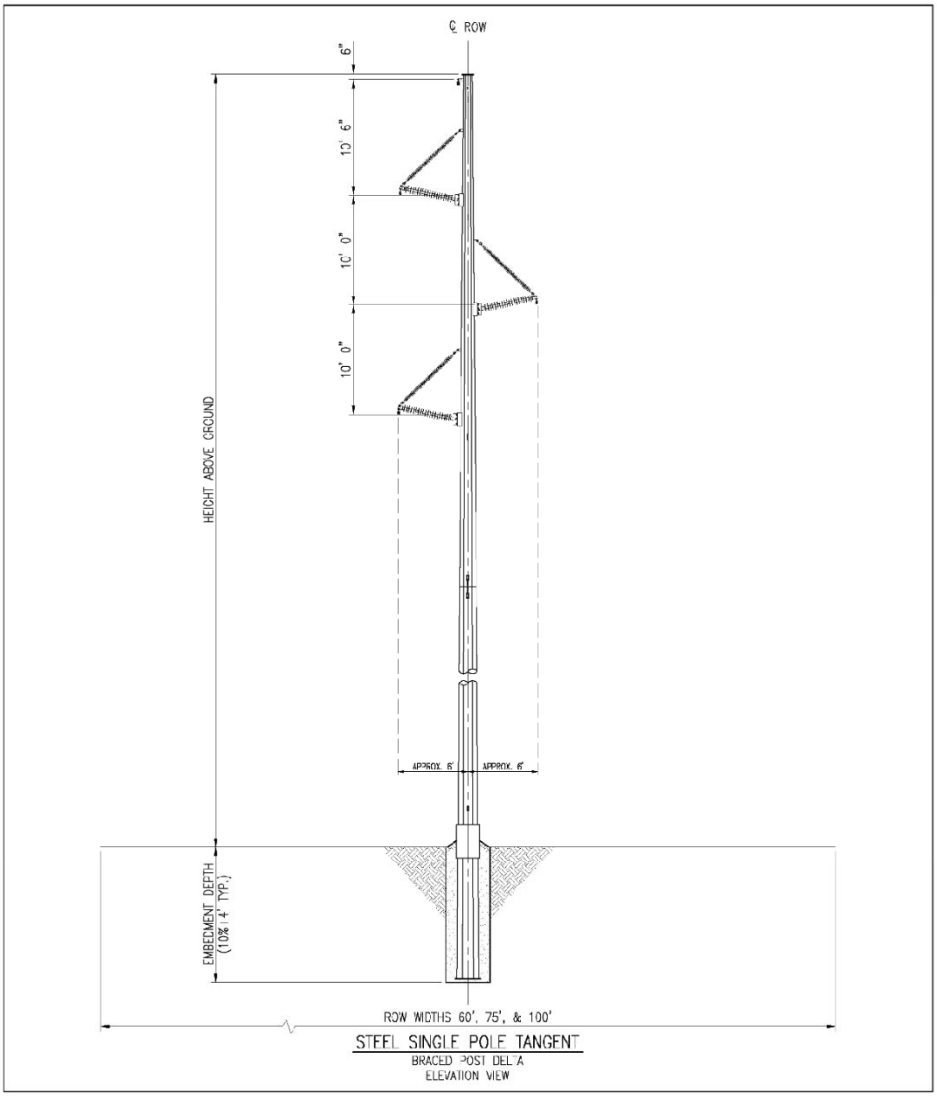


Figure 16 (Delta Configuration)



Proceeding No. 25M-0005E
Black Hills Colorado Electric, LLC d/b/a Black Hills Energy
2025 Rule 3206 Report – Appendix C – TCA Rider Recovery Projects

New Planned TCA Projects Pursuant to Decision C21-0814 in Proceeding No. 21AL-0516E

Canon Plant 115/13.8 kV Transformer #2: This project will add an additional 50 MVA distribution transformer to the existing Canon Plant substation. This project is a reliability driven project to meet the needs to current and long-term load growth. To meet the planned in-service date of 2026, a transformer will need to be ordered in 2023. Non wires alternatives were considered as a solution to support load in an outage situation but were not chosen due to cost and ability to support long term load growth. Forecasted spend for 2024 is minimal, $10,000, with an overall cost of $1.0 million to cover the TCA Rider Recoverable portion of this project. The transformer and all 13.8kV is not included within this estimate. The estimate for the entire project is $4.3 million. This project was included in the 2024 Report, however the Commission has yet to issue a decision in that case. As such, the Company has included this project in the Appendix C in this proceeding.

Hyde Park 115/13.2 kV Transformer Addition: The area served by the Hyde Park T1 transformer is projected to have high growth due to residential and commercial developments. The T1 transformer has existing N-1 risks, and these risks are expected to increase with the projected growth. To meet future capacity needs and address the N-1 risks, a second transformer and corresponding feeders will be needed at the current Hyde Park substation. This project will add a second 30 MVA 115/13.2 kV transformer and associated switchgear to allow for system contingencies and address load growth in the area. This project will also offload Pueblo Plant to support the Pueblo Plant project described above.

For additional details on estimated cost and schedule, review the main Rule 3206 report.

La Junta 115/69 kV Transformer Upgrade: Past TPL-001-4 reliability[1] and interconnection studies along with current summer peak operational studies have shown overloads on the La Junta 115/69 kV transformer. These overloads are currently mitigated operationally with diesel generation and sectionalizing the 69 kV system. The Rocky Ford diesel generation is planned to be retired in 2029 and will no longer be available to alleviate this overload. This project will replace the existing La Junta 115/69 kV transform to increase the rating from 25 MVA to 50 MVA.

For additional details on estimated cost and schedule, review the main Rule 3206 report.

[1] Including both BHCT TCPC & CCPG studies

Capital Reporting Functions	Business Unit	Operating Unit	Plant Function (Type #2) of Project	Recovery Mechanism (Type #6) of Project	Reporting Cateogry (Type #1) of Project	Project->Program Type (Type #3) of Project	Project->Asset Type (Type #4) of Project	Project->Blanket/Specifc (Type #5) of Project	Project->Grandparent Funding Project of Project	Project	Score	Placed in Service Date PIS	2025	2026	2027	2028	2029
Capital TES	50507: BH COLORADO ELECTRIC LLC	110900: COE GENERAL	T: Transmission	Q: Rider	I: Integrity Programs	L: Replacement	D: Substations and Equipment	D: Specific- Tier 2	ROCKY FORD	10083248: 115kV South Fowler Sub Bay addition	769	Dec 2029			2,002	13,941	71,716
Capital TES	50507: BH COLORADO ELECTRIC LLC	110900: COE GENERAL	T: Transmission	Q: Rider	R: Reliability	C: Constraint Remediation	D: Substations and Equipment	D: Specific- Tier 2		10067626: 115kVCanon Plant XFMR#2(Trans)	518	Dec 2028	489	9,854	71,480	74,542	
Capital TES	50507: BH COLORADO ELECTRIC LLC	110993: COE SOUTH FOWLER SUB	T: Transmission	Q: Rider	I: Integrity Programs	L: Replacement	D: Substations and Equipment	D: Specific- Tier 2	ROCKY FORD	10083248: 115kV South Fowler Sub Bay addition	769	Dec 2029			132,476	235,116	1,751,465
Capital TES	50507: BH COLORADO ELECTRIC LLC	115114: COE PUEBLO	T: Transmission	Q: Rider	R: Reliability	K: Additional Assets	J: Poles towers and fixtures	D: Specific- Tier 2		10077412: 115kV Pueblo Plant T-line	501	Mar 2027	67,389	134,961	511,595		
Capital TES	50507: BH COLORADO ELECTRIC LLC	115114: COE PUEBLO	T: Transmission	Q: Rider	R: Reliability	L: Replacement	D: Substations and Equipment	C: Specific- Tier 1		10077410: 115kV Pueblo Plant Rebuild	501	Mar 2027	167,372	271,415	2,290,346		
Capital TES	50507: BH COLORADO ELECTRIC LLC	115114: COE PUEBLO	T: Transmission	Q: Rider	R: Reliability	L: Replacement	K: Line Transformer	D: Specific- Tier 2		10082342: PSCA XFMR		Dec 2025	2,170,977				
Capital TES	50507: BH COLORADO ELECTRIC LLC	115115: COE ROCKY FORD	T: Transmission	Q: Rider	I: Integrity Programs	L: Replacement	J: Poles towers and fixtures	C: Specific- Tier 1	ROCKY FORD	10078170: 115kV S Fowler to RF rebuild	769	Dec 2029		497,570	1,209,105	11,328,961	6,365,721
Capital TES	50507: BH COLORADO ELECTRIC LLC	115121: COE CANON WEST SUB	T: Transmission	Q: Rider	G: Growth	K: Additional Assets	D: Substations and Equipment	C: Specific- Tier 1		10080321: 115kV Network Upgrades Turkey Creek	569	May 2025	502,127				
Capital TES	50507: BH COLORADO ELECTRIC LLC	115154: COE LAJUNTA SUB	T: Transmission	Q: Rider	I: Integrity Programs	L: Replacement	D: Substations and Equipment	C: Specific- Tier 1	ROCKY FORD	10078175: 115kV La Junta Sub Rebuild	769	Oct 2029	101,545	251,406	792,734	508,628	2,270,368
Capital TES	50507: BH COLORADO ELECTRIC LLC	115164: COE PUEBLO 115/14 KV BUS SUB	T: Transmission	Q: Rider	R: Reliability	L: Replacement	D: Substations and Equipment	C: Specific- Tier 1		10077410: 115kV Pueblo Plant Rebuild	501	Mar 2027	16,841	28,367	23,423		
Capital TES	50507: BH COLORADO ELECTRIC LLC	115170: COE SUBST TRANSMISSION RELATED	T: Transmission	R: Rate Review	R: Reliability	L: Replacement	D: Substations and Equipment	B: Blanket		10046634: Trans I Substation Blanket	470		803,780	1,229,665	1,286,882	1,318,000	4,015,232
Capital TES	50507: BH COLORADO ELECTRIC LLC	115170: COE SUBST TRANSMISSION RELATED	T: Transmission	R: Rate Review	R: Reliability	L: Replacement	D: Substations and Equipment	B: Blanket		10081734: Trans I Unplanned Sub Blanket			100,391	100,248	100,248	100,368	100,248
Capital TES	50507: BH COLORADO ELECTRIC LLC	115174: COE SALT CREEK SUB	T: Transmission	Q: Rider	R: Reliability	K: Additional Assets	D: Substations and Equipment	C: Specific- Tier 1		10055971: 115kV New Rodrigues Sub	701	Jun 2026	10,146	4,880			
Capital TES	50507: BH COLORADO ELECTRIC LLC	115179: COE TURKEY CREEK SUB 200MW	T: Transmission	Q: Rider	G: Growth	K: Additional Assets	D: Substations and Equipment	C: Specific- Tier 1		10080320: 115kV Turkey Creek LGIA Sub	482	Mar 2028	23,136	697,486	5,991,232	583,465	
Capital TES	50507: BH COLORADO ELECTRIC LLC	115179: COE TURKEY CREEK SUB 200MW	T: Transmission	Q: Rider	G: Growth	K: Additional Assets	D: Substations and Equipment	C: Specific- Tier 1		10080321: 115kV Network Upgrades Turkey Creek	569	May 2025	151,997				
Capital TES	50507: BH COLORADO ELECTRIC LLC	115900: COE TRANSMISSION	T: Transmission	Q: Rider	I: Integrity Programs	L: Replacement	J: Poles towers and fixtures	C: Specific- Tier 1	ROCKY FORD	10078170: 115kV S Fowler to RF rebuild	769	Dec 2029		7,855	42,210	399,289	874,481
Capital TES	50507: BH COLORADO ELECTRIC LLC	115900: COE TRANSMISSION	T: Transmission	Q: Rider	R: Reliability	C: Constraint Remediation	O: Overhead & Above Ground	D: Specific- Tier 2		10067677: 115 kV Rodrigues Sub T-Line	701	Jun 2026	4,734	2,277			
Capital TES	50507: BH COLORADO ELECTRIC LLC	115900: COE TRANSMISSION	T: Transmission	Q: Rider	R: Reliability	L: Replacement	J: Poles towers and fixtures	D: Specific- Tier 2		10065006: 115KV WS-Portland-CCP-CW Rebuild	569	Mar 2026	21,046,027	5,627,195			
Capital TES	50507: BH COLORADO ELECTRIC LLC	115900: COE TRANSMISSION	T: Transmission	Q: Rider	R: Reliability	L: Replacement	O: Overhead & Above Ground	D: Specific- Tier 2		10065007: 115KV PSCo-WestStation Rebld	300	Sep 2029	4,538	4,431	4,402	722,758	690,479
Capital TES	50507: BH COLORADO ELECTRIC LLC	115900: COE TRANSMISSION	T: Transmission	R: Rate Review	R: Reliability	J: Asset Lifespan Extension	J: Poles towers and fixtures	B: Blanket		10052071: COE Transmission Pole Treatments	402		19,889	33,742	34,923	36,145	37,411
Capital TES	50507: BH COLORADO ELECTRIC LLC	115900: COE TRANSMISSION	T: Transmission	R: Rate Review	R: Reliability	J: Asset Lifespan Extension	O: Overhead & Above Ground	E: Specific- Tier 3		10065001: 115KV COE LiDAR Remediation	681	Mar 2025	76,901				
Capital TES	50507: BH COLORADO ELECTRIC LLC	115900: COE TRANSMISSION	T: Transmission	R: Rate Review	R: Reliability	L: Replacement	O: Overhead & Above Ground	B: Blanket		10046503: Trans I Overhead Trans Rel	501		627,659	451,714	451,714	200,762	200,762
													25,891,402	9,348,635	12,940,370	14,799,217	15,687,404