DOCKETED	
Docket Number:	25-OPT-02
Project Title:	Prairie Song Reliability Project
TN #:	264411
Document Title:	App 2D-F Project Description Appendices Part 4
Description:	N/A
Filer:	Erin Phillips
Organization:	Dudek
Submitter Role:	Applicant Consultant
Submission Date:	6/20/2025 12:39:22 PM
Docketed Date:	6/20/2025

Section 2.0

Project Description

Appendices

4 of 4

Appendix 2D

Electric and Magnetic Fields Calculation

ISSUE SUMMARY
Form SOP-0402-07, Revision 12

DESIGN CONTROL SUMMARY			
CLIENT:	Prairie Song Reliability Project LLC	UNIT NO.:	PAGE NO.: 1
PROJECT NAME:	**Prairie Song Reliability Project 500kV Transmission Line**		
PROJECT NO.:	15474.001	S&L NUCLEAR QA PROGRAM	
CALC. NO..:	15474-001-TL-001	APPLICABLE ☐ YES ☒ NO	
TITLE:	EMF Calculation		
EQUIPMENT NO.:			

IDENTIFICATION OF PAGES ADDED/REVISED/SUPERSEDED/VOIDED & REVIEW METHOD

Original Issue

INPUTS/ ASSUMPTIONS
☐ VERIFIED
☐ UNVERIFIED

REVIEW METHOD:		REV.:	1
STATUS:	☐ APPROVED ☐ SUPERSEDED BY CALCULATION NO. ☐ VOID	DATE FOR REV.:	5 MAY 2025
PREPARER:	John O'Connor	DATE:	5 MAY 2025
REVIEWER:	Freddy Martinez	DATE:	5 MAY 2025
APPROVER:		DATE:	

IDENTIFICATION OF PAGES ADDED/REVISED/SUPERSEDED/VOIDED & REVIEW METHOD

INPUTS/ ASSUMPTIONS
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REVIEW METHOD:		REV.:	
STATUS:	☐ APPROVED ☐ SUPERSEDED BY CALCULATION NO. ☐ VOID	DATE FOR REV.:	
PREPARER:		DATE:	
REVIEWER:		DATE:	
APPROVER:		DATE:	

IDENTIFICATION OF PAGES ADDED/REVISED/SUPERSEDED/VOIDED & REVIEW METHOD

INPUTS/ ASSUMPTIONS
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REVIEW METHOD:		REV.:	
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PREPARER:		DATE:	
REVIEWER:		DATE:	
APPROVER:		DATE:	

NOTE: PRINT AND SIGN IN THE SIGNATURE AREAS

PRAIRIE SONG RELABILITY PROJECT

500kV TRANSMISSION LINE
EMF CALCULATION

REVISION: 1

DATED: 05/05/2025

PRELIMINARY - ISSUED FOR REVIEW

PROJECT NO. 15474-001

REPORT NO. 15474-001-TL-001

55 East Monroe Street
Chicago, IL 60603-5780 USA
312-269-2000
www.sargentlundy.com

Sargent & Lundy

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1.0. Purpose & Scope

The purpose of this calculation is to document the Electromagnetic Frequency design for the proposed Prairie Song Reliability Project transmission line from the Project Substation to the SCE Vincent Substation. This project is located in Los Angeles County, California. This calculation will be submitted to the California Energy Commission and documentation for their permitting process.

The scope of this project is the design of a 500 kV transmission line carrying triple bundled 795 kcmil ACSR (26/7) cables. Custom steel Monopoles on concrete caisson foundations are being used for the new design. This calculation is for the permitting package and will document design inputs, assumptions for the project design, methodology & acceptance criteria, calculations, results, PLS-CADD attachments, wire information, structural information, and inputs/constraints for the alignment and design. The lattice tower structure types are for the SCE part of the design. These structures have the same OHGW and OPGW but have different conductors. The lattice towers will use double bundle 2156 kcmil ASCR (84/16).

2.0. Design Inputs

Wire Data:
All wire properties are based on manufacturer provided data referenced in Attachments C, D, and E.
Wire types evaluated are subject to change.

Properties	Prairie Song Conductor	SCE Conductor	OPGW	OHGW
Type	ACSR	ACSR	AFL 36 Fiber Hexacore	Extra High Strength Steel
Code Name	Drake	Bluebird	DNO-10162 CC-38/48/551	1/2" 7 Strand
Bundle	3	2	N/A	N/A
Size	795 kcmil	2156 kcmil	N/A	N/A
Stranding	26/7	84/16	36 Fiber	7
Diameter (in)	1.108	1.762	0.551	0.495
Weight (lbs/ft)	1.094	2.511	0.355	0.517
Sub-conductor Horizontal Spacing (in)	18	18	N/A	N/A

Table 1 – Wire Properties

Conductor Midspan Height:
The lowest conductor midspan height is determined based on the final sag of the conductor at 212°F, assuming a clearance to ground of 35 ft.

Shield Wire Midspan Height:
OPGW and OHGW sag is calculated as 75% of conductor sag at average ambient temperature (AAT).
OPGW and OHGW midspan height is calculated based on structure dimensions and OPGW sag

Ground Elevation:
The project elevation is approximately 3,000 ft ASL.

3.0 Assumptions

Conductor Phasing:
EMF calculations are evaluated for the preferred phase layouts. The figures below display the preferred phasing set up for monopoles.

Measurement Height:
Audible noise is evaluated at a height of 5 ft (1.524 m) above ground.

OHGW OPGW
C
A
B

Figure 1 – Deadend Monopole Phasing Configuration

OHGW OPGW
C
B A

Figure 2 – Delta Monopole Phasing Configuration

OHGW OPGW
C
A
B

Figure 3 – Lattice Tower Phasing Configuration

Calculation Extent:
Project right of way width is 150 ft total, therefore, EMF calculations are evaluated for a cross section width of 150 ft (75 ft from center of structure).

4.0 Methodology & Acceptance Criteria

4.1 Methodology & Acceptance Criteria

Acceptance Criteria:
Since no specific requirement is provided, only the results will be presented.

4.2 Computer Programs Used

The following computer programs were used:

Program Name	S&L Program Number	Source Files/Database Location
Bonneville Power Administration Corona and Field Effects Program v3.1	N/A	N/A
Microsoft Office 2016 v16.0	03.2.435-16.0	N/A
PLS_CADD STE 64bit v19.01	03.7.893-19.01	Prairie Song Reliability Project New Line 500kV.xyz

Table 3 – Computer Programs Used

4.3. General Inputs

Below is the list of inputs used to create the line model in the BPA Program:
•Voltage: V= 500 kV
•Current: = 2165.06 MVA / (√3×500) = 2500 A
•The average span length for the tangent structure spans is 805 ft
•The shield wire and conductor sags were obtained from PLS-CADD sag tension report for 801 ft ruling span.

Delta Monopole:
795 Drake Conductor at 212°F, no wind, no ice, final condition: 22.7 ft
OPGW at 60°F, no wind, no ice, final condition: 12.3 ft
OHGW at 60°F, no wind, no ice, final condition: 12.3 ft

Deadend Monopole:
795 Drake Conductor at 212°F, no wind, no ice, final condition: 25.4 ft
OPGW at 60°F, no wind, no ice, final condition: 14.0 ft
OHGW at 60°F, no wind, no ice, final condition: 14.0 ft

Lattice Tower
2156 Bluebird Conductor at 212°F, no wind, no ice, final condition: 29.1 ft
OPGW at 60°F, no wind, no ice, final condition: 15.7 ft
OHGW at 60°F, no wind, no ice, final condition: 15.7 ft

4.4. Structure Geometry

See Attachment B: Structure Framing Configurations for the structure heights, dimensions, and clearances. The structure framings in Attachment B represent the typical configurations used in this design,

5.0. Calculations

The 500kV conductors, OHGW, and OPGW are modeled in Bonneville Power Administration (BPA) v3.1. EMF values were calculated based on a voltage phase-to-ground of 288.675kV and an emergency rated current of 2,500 amp for a 150 ft right of way width with structures located at the center of the Right of Way.

6.0. Results

The results shown in Table 4 and 5 provide the maximum calculated electric and magnetic fields at the edge of the right of way. Table 6 and 7 provides the max corona gradient and max audible noise.

Table 4 – Electric Field Results

Case Designation	Max Calculated Electric Field at Edge of Right of Way (kV/m)	Max Calculated Electric Field Within Right of Way (kV/m)
Structure 1 – Lattice Tower	1.777	7.875
Structure 2 – Delta Monopole	1.928	8.132
Structure 3 – Deadend Monopole	0.342	8.650

Table 5 – Magnetic Field Results

Case Designation	Max Calculated Magnetic Field at Edge of Right of Way (mG)	Max Calculated Magnetic Field Within Right of Way (mG)
Structure 1 – Lattice Tower	171.29	319.68
Structure 2 – Delta Monopole	105.53	401.57
Structure 3 – Deadend Monopole	99.09	325.22

Table 6 – Max Corona Gradient

Case Designation	Max Calculated Corona Gradient (kV/cm)
Structure 1 – Lattice Tower	15.55
Structure 2 – Delta Monopole	18.26
Structure 3 – Deadend Monopole	17.80

Table 7 – Max Audible Noise

Case Designation	Max Calculated Audible Noise at Edge of Right of Way (L50 Fair - dBA)	Max Calculated Audible Noise at Edge of Right of Way (L50 Rain - dBA)
Structure 1 – Lattice Tower	30.1	55.1
Structure 2 – Delta Monopole	26.0	51.0
Structure 3 – Deadend Monopole	24.6	49.6

7.0. Conclusion

Given the inputs described in this report, the results show the EMF values of the proposed transmission line for the California Energy Commission Permit.

8.0 References

- National Electrical Safety Code (NESC) – C2-2023
- EPRI AC Transmission Line Reference Book – 200kV and Above
- Specification DNO-4711
- Southwire Overhead Conductor Manual 2nd edition for Conductor and Shield Wire Specifications

9.0. Attachments

- **Attachment A: BPA Results**
- **Attachment B: Structure Framing Configurations**
- **Attachment C: Conductor Properties**
- **Attachment D: OPGW Properties**
- **Attachment E: OHGW Properties**

Attachment A: BPA Results

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Û E F F E C T S   P R O G R A M   V E R. 3.1  Û
Û   Source: Bonneville Power Administration   Û
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INPUT DATA LIST

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 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  5 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

 OPTIONS: COMB,,,,,,,,,,
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1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 CROSS SECTION 1,,,,,,,,,,
 LATTICE TOWER SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,,
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
C-PHASE'	107.00	104.00	14.42	1.76	2	18.00	288.67	0.00	2.50	9.927
A-PHASE'	107.00	69.50	15.55	1.76	2	18.00	288.67	120.00	2.50	16.203
B-PHASE'	107.00	35.00	15.42	1.76	2	18.00	288.67	-120.00	2.50	15.302
OHGW'	67.20	130.00	5.70	0.50	1	0.00	0.00	0.00	0.00	0.000
OPGW'	82.80	130.00	7.91	0.55	1	0.00	0.00	0.00	0.00	0.000

```
 AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  6.6 FT, TV ANT. HT.=  9.8 FT, ALTITUDE=  3000.0 FT
 RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 0.500 MPH, GROUND CONDUCTIVITY =  10.0 MMHOS/M
 E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT

 LATERAL DIST       AUDIBLE NOISE   RADIO INTERFERENCE        TVI              OZONE
     FROM          (RAIN)   (FAIR)   (RAIN)    (FAIR)         TOTAL        FOR RAIN RATE OF        ELECTRIC     MAGNETIC
```

REFERENCE (FEET)	L50 DBA	L50 DBA	L50 DBUV/M	L50 DBUV/M	RAIN DBUV/M	0.04 IN/HR AT 0. FT LEVEL PPB	FIELD KV/M	FIELD GAUSS
0.0	52.2	27.2	60.2	43.2	22.1	0.000000	0.185	0.05998
5.0	52.4	27.4	60.7	43.7	22.5	0.000000	0.176	0.06428
10.0	52.6	27.6	61.2	44.2	22.9	0.000000	0.169	0.06901
15.0	52.8	27.8	61.8	44.8	23.3	0.000000	0.168	0.07424
20.0	53.0	28.0	62.3	45.3	23.7	0.000000	0.181	0.08003
25.0	53.2	28.2	62.9	45.9	24.2	0.000000	0.217	0.08646
30.0	53.4	28.4	63.4	46.4	24.7	0.000000	0.281	0.09362
35.0	53.6	28.6	64.0	47.0	25.2	0.000000	0.375	0.10160
40.0	53.9	28.9	64.6	47.6	25.8	0.000000	0.504	0.11054
45.0	54.1	29.1	65.2	48.2	26.4	0.000000	0.674	0.12056
50.0	54.3	29.3	65.8	48.8	27.0	0.000000	0.893	0.13181
55.0	54.6	29.6	66.4	49.4	27.7	0.000000	1.173	0.14446
60.0	54.9	29.9	67.0	50.0	28.3	0.000000	1.528	0.15868
65.0	55.1	30.1	67.7	50.7	29.1	0.000000	1.973	0.17462
70.0	55.4	30.4	69.1	52.1	29.9	0.000000	2.526	0.19239
75.0	55.7	30.7	70.5	53.5	30.7	0.000000	3.199	0.21197
80.0	56.0	31.0	72.0	55.0	31.5	0.000000	3.997	0.23313
85.0	56.3	31.3	73.5	56.5	32.4	0.000000	4.901	0.25525
90.0	56.5	31.5	74.8	57.8	33.2	0.000000	5.859	0.27712
95.0	56.8	31.8	76.1	59.1	34.0	0.000000	6.771	0.29683
100.0	56.9	31.9	77.0	60.0	34.5	0.000000	7.492	0.31185
105.0	57.0	32.0	77.4	60.4	34.8	0.000000	7.875	0.31968
110.0	57.0	32.0	77.4	60.4	34.8	0.007860	7.824	0.31878
115.0	56.9	31.9	76.8	59.8	34.4	0.292143	7.352	0.30935
120.0	56.7	31.7	75.8	58.8	33.8	0.421667	6.567	0.29317
125.0	56.5	31.5	74.6	57.6	33.1	0.466514	5.624	0.27285
130.0	56.2	31.2	73.2	56.2	32.2	0.470746	4.658	0.25080
135.0	55.9	30.9	71.7	54.7	31.4	0.456010	3.761	0.22880
140.0	55.7	30.7	70.2	53.2	30.5	0.433661	2.976	0.20792
145.0	55.4	30.4	68.8	51.8	29.7	0.409211	2.317	0.18869
150.0	55.1	30.1	67.5	50.5	28.9	0.385167	1.777	0.17129

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    Û       C O R O N A   A N D   F I E L D       Û
    Û E F F E C T S   P R O G R A M   V E R. 3.1  Û
    Û   Source: Bonneville Power Administration   Û
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 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  5 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

 OPTIONS: COMB,,,,,,,,,,
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 'A-PHASE'','A',   94.00,   35.00, 3,   1.108,  18.000, 288.675, 120.000,   2.500,   0.000
 'B-PHASE'','A',   56.00,   35.00, 3,   1.108,  18.000, 288.675,-120.000,   2.500,   0.000
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 'OPGW'   ','A',   87.80,  119.40, 1,   0.551,   0.000,   0.000,   0.000,   0.000,   0.000
 100    0.0    5.0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 CROSS SECTION 1,,,,,,,,,,
 DELTA MONOPOLE SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,,




             DIST. FROM             MAXIMUM  SUBCON   NO. OF      SUBCON   VOLTAGE  PHASE    CURRENT  CORONA
          CENTER OF TOWER  HEIGHT   GRADIENT  DIAM.   SUBCON      SPACING    L-N    ANGLE             LOSSES
               (FEET)      (FEET)   (KV/CM)   (IN)                (IN)      (KV)  (DEGREES)  (kAmps)  (KW/MI)

 C-PHASE'        94.00       72.00    16.59     1.11       3       18.00    288.67     0.00     2.50    6.539
 A-PHASE'        94.00       35.00    18.26     1.11       3       18.00    288.67   120.00     2.50   12.168
 B-PHASE'        56.00       35.00    17.46     1.11       3       18.00    288.67  -120.00     2.50    9.092
 OHGW'           62.20      119.40     4.80     0.50       1        0.00      0.00     0.00     0.00    0.000
 OPGW'           87.80      119.40     6.35     0.55       1        0.00      0.00     0.00     0.00    0.000
 AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  6.6 FT, TV ANT. HT.=  9.8 FT, ALTITUDE=  3000.0 FT
 RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 0.500 MPH, GROUND CONDUCTIVITY =  10.0 MMHOS/M
 E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT

 LATERAL DIST       AUDIBLE NOISE   RADIO INTERFERENCE        TVI              OZONE
     FROM          (RAIN)   (FAIR)   (RAIN)    (FAIR)         TOTAL        FOR RAIN RATE OF        ELECTRIC     MAGNETIC
```

REFERENCE (FEET)	L50 DBA	L50 DBA	L50 DBUV/M	L50 DBUV/M	RAIN DBUV/M	0.04 IN/HR AT 0. FT LEVEL PPB	FIELD KV/M	FIELD GAUSS
0.0	50.4	25.4	62.6	45.6	25.5	0.000000	1.928	0.10553
5.0	50.7	25.7	63.8	46.8	26.2	0.000000	2.275	0.11770
10.0	50.9	25.9	65.0	48.0	26.9	0.000000	2.696	0.13185
15.0	51.3	26.3	66.4	49.4	27.7	0.000000	3.203	0.14832
20.0	51.6	26.6	67.8	50.8	28.4	0.000000	3.809	0.16748
25.0	51.9	26.9	69.2	52.2	29.3	0.000000	4.518	0.18966
30.0	52.3	27.3	70.7	53.7	30.1	0.000000	5.322	0.21508
35.0	52.6	27.6	72.2	55.2	31.0	0.000000	6.185	0.24363
40.0	53.0	28.0	73.5	56.5	31.8	0.000000	7.031	0.27465
45.0	53.3	28.3	74.7	57.7	32.5	0.000000	7.735	0.30666
50.0	53.6	28.6	75.5	58.5	33.0	0.000000	8.132	0.33733
55.0	53.8	28.8	75.9	58.9	33.3	0.000000	8.078	0.36385
60.0	54.0	29.0	75.7	58.7	33.2	0.038612	7.523	0.38388
65.0	54.1	29.1	75.1	58.1	32.8	0.229640	6.579	0.39635
70.0	54.2	29.2	74.0	57.0	32.8	0.242667	5.561	0.40157
75.0	54.3	29.3	75.1	58.1	33.7	0.218170	4.984	0.40048
80.0	54.4	29.4	76.4	59.4	34.4	0.192325	5.263	0.39375
85.0	54.5	29.5	77.4	60.4	35.1	0.170455	6.097	0.38142
90.0	54.5	29.5	78.0	61.0	35.5	0.152601	6.925	0.36315
95.0	54.4	29.4	78.2	61.2	35.6	0.138007	7.396	0.33904
100.0	54.3	29.3	77.8	60.8	35.4	0.335239	7.383	0.31024
105.0	54.0	29.0	77.0	60.0	34.9	0.498339	6.937	0.27888
110.0	53.7	28.7	75.9	58.9	34.1	0.505667	6.210	0.24734
115.0	53.4	28.4	74.5	57.5	33.3	0.475963	5.370	0.21752
120.0	53.0	28.0	73.0	56.0	32.5	0.439133	4.544	0.19057
125.0	52.7	27.7	71.6	54.6	31.6	0.403863	3.807	0.16691
130.0	52.3	27.3	70.1	53.1	30.8	0.372372	3.187	0.14653
135.0	52.0	27.0	68.7	51.7	30.0	0.344851	2.685	0.12920
140.0	51.7	26.7	67.4	50.4	29.2	0.320905	2.289	0.11459
145.0	51.3	26.3	66.1	49.1	28.5	0.300018	1.980	0.10237
150.0	51.0	26.0	64.9	47.9	27.9	0.281706	1.737	0.09217

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Û       C O R O N A   A N D   F I E L D       Û
Û E F F E C T S   P R O G R A M   V E R. 3.1  Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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INPUT DATA LIST

```
                 4/ 1/2025         09:42:33
 CROSS SECTION 1,,,,,,,,,,
 DEADEND MONOPOLE SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,,
 1,0, 3, 5,0.0,   0.50,   0.04,3000.00

 (ENGLISH UNITS OPTION)

 (GRADIENTS ARE COMPUTED BY PROGRAM)

 PHYSICAL SYSTEM CONSISTS OF  5 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

 OPTIONS: COMB,,,,,,,,,,
   5.000,  6.600,  9.800,  0.000,  1.000, 75.000,  3.280, 10.000,  3.280
 'C-PHASE'','A',   75.00,  107.00, 3,   1.108,  18.000, 288.675,   0.000,   2.500,   0.000
 'A-PHASE'','A',   75.00,   71.00, 3,   1.108,  18.000, 288.675, 120.000,   2.500,   0.000
 'B-PHASE'','A',   75.00,   35.00, 3,   1.108,  18.000, 288.675,-120.000,   2.500,   0.000
 'OHGW'   ','A',   62.00,  138.40, 1,   0.495,   0.000,   0.000,   0.000,   0.000,   0.000
 'OPGW'   ','A',   88.00,  138.40, 1,   0.551,   0.000,   0.000,   0.000,   0.000,   0.000
 100    0.0    5.0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 CROSS SECTION 1,,,,,,,,,,
 DEADEND MONOPOLE SINGLE CIRCUIT WITH 1 500KV LINE,,,,,,,,,,
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
C-PHASE'	75.00	107.00	16.74	1.11	3	18.00	288.67	0.00	2.50	6.934
A-PHASE'	75.00	71.00	17.80	1.11	3	18.00	288.67	120.00	2.50	10.311
B-PHASE'	75.00	35.00	17.70	1.11	3	18.00	288.67	-120.00	2.50	9.955
OHGW'	62.00	138.40	9.88	0.50	1	0.00	0.00	0.00	0.00	0.000
OPGW'	88.00	138.40	9.01	0.55	1	0.00	0.00	0.00	0.00	0.000

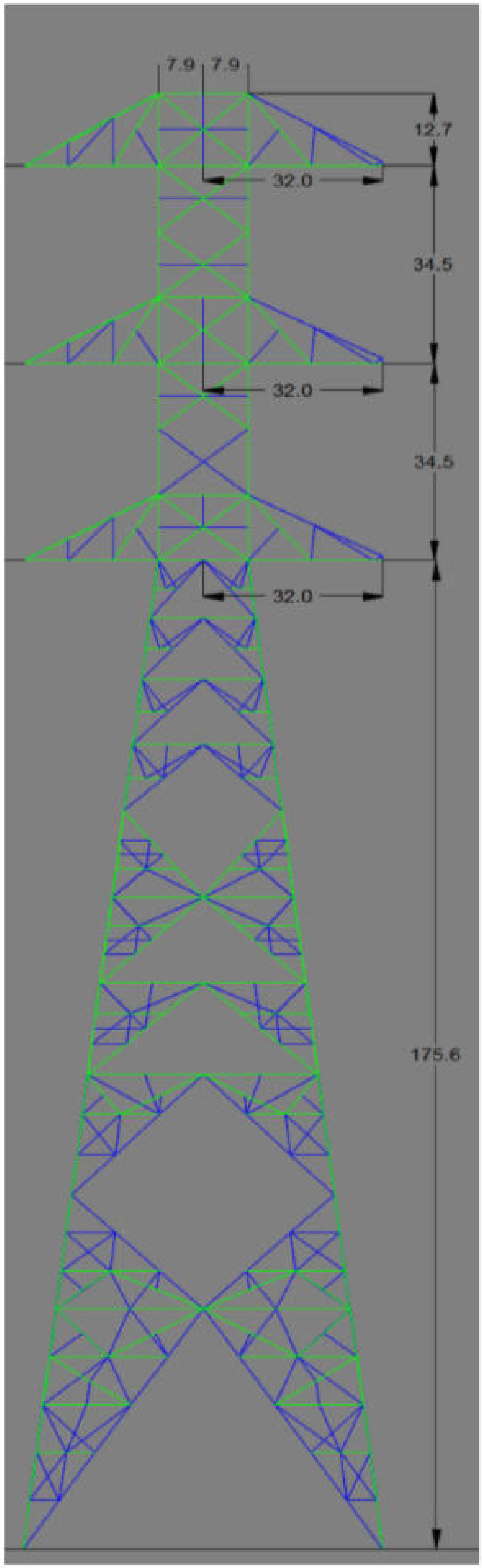
```
 AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  6.6 FT, TV ANT. HT.=  9.8 FT, ALTITUDE=  3000.0 FT
 RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 0.500 MPH, GROUND CONDUCTIVITY =  10.0 MMHOS/M
 E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT

 LATERAL DIST       AUDIBLE NOISE   RADIO INTERFERENCE        TVI              OZONE
     FROM          (RAIN)   (FAIR)   (RAIN)    (FAIR)         TOTAL        FOR RAIN RATE OF        ELECTRIC     MAGNETIC
```

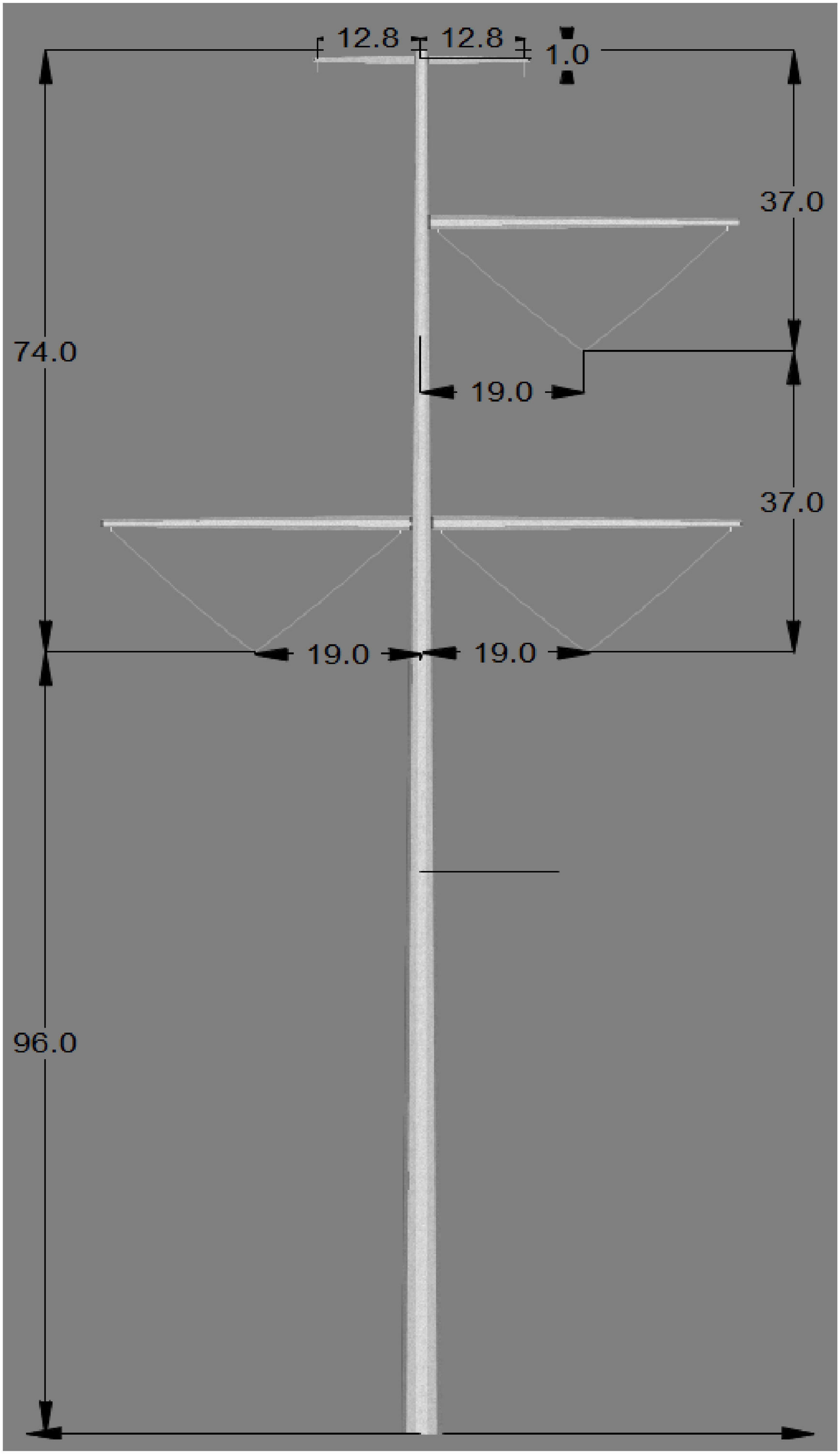
REFERENCE (FEET)	L50 DBA	L50 DBA	L50 DBUV/M	L50 DBUV/M	RAIN DBUV/M	0.04 IN/HR AT 0. FT LEVEL PPB	FIELD KV/M	FIELD GAUSS
0.0	49.6	24.6	62.7	45.7	24.1	0.000000	0.341	0.09909
5.0	49.8	24.8	63.3	46.3	24.6	0.000000	0.459	0.10756
10.0	50.0	25.0	63.8	46.8	25.2	0.000000	0.619	0.11704
15.0	50.3	25.3	64.4	47.4	25.8	0.000000	0.828	0.12767
20.0	50.5	25.5	65.0	48.0	26.4	0.000000	1.095	0.13960
25.0	50.8	25.8	65.6	48.6	27.1	0.000000	1.435	0.15302
30.0	51.1	26.1	66.2	49.2	27.8	0.000000	1.864	0.16808
35.0	51.3	26.3	67.4	50.4	28.5	0.000000	2.398	0.18492
40.0	51.6	26.6	68.8	51.8	29.3	0.000000	3.055	0.20363
45.0	51.9	26.9	70.2	53.2	30.2	0.000000	3.846	0.22410
50.0	52.2	27.2	71.7	54.7	31.0	0.000000	4.766	0.24597
55.0	52.5	27.5	73.2	56.2	31.9	0.000000	5.785	0.26839
60.0	52.7	27.7	74.5	57.5	32.7	0.000000	6.823	0.28987
65.0	52.9	27.9	75.6	58.6	33.4	0.000000	7.753	0.30820
70.0	53.1	28.1	76.3	59.3	33.8	0.000000	8.411	0.32073
75.0	53.1	28.1	76.6	59.6	34.0	0.000000	8.650	0.32522
80.0	53.1	28.1	76.3	59.3	33.8	0.102731	8.411	0.32073
85.0	52.9	27.9	75.6	58.6	33.4	0.302828	7.753	0.30820
90.0	52.7	27.7	74.5	57.5	32.7	0.373184	6.823	0.28987
95.0	52.5	27.5	73.2	56.2	31.9	0.395161	5.785	0.26839
100.0	52.2	27.2	71.7	54.7	31.0	0.392779	4.767	0.24597
105.0	51.9	26.9	70.2	53.2	30.2	0.378835	3.846	0.22410
110.0	51.6	26.6	68.8	51.8	29.3	0.360256	3.055	0.20363
115.0	51.3	26.3	67.4	50.4	28.5	0.340512	2.398	0.18492
120.0	51.1	26.1	66.2	49.2	27.8	0.321233	1.864	0.16808
125.0	50.8	25.8	65.6	48.6	27.1	0.303116	1.436	0.15302
130.0	50.5	25.5	65.0	48.0	26.4	0.286404	1.096	0.13960
135.0	50.3	25.3	64.4	47.4	25.8	0.271123	0.828	0.12767
140.0	50.0	25.0	63.8	46.8	25.2	0.257199	0.620	0.11704
145.0	49.8	24.8	63.3	46.3	24.6	0.244522	0.460	0.10756
150.0	49.6	24.6	62.7	45.7	24.1	0.232970	0.342	0.09909

Attachment B: Structure Framing Configurations

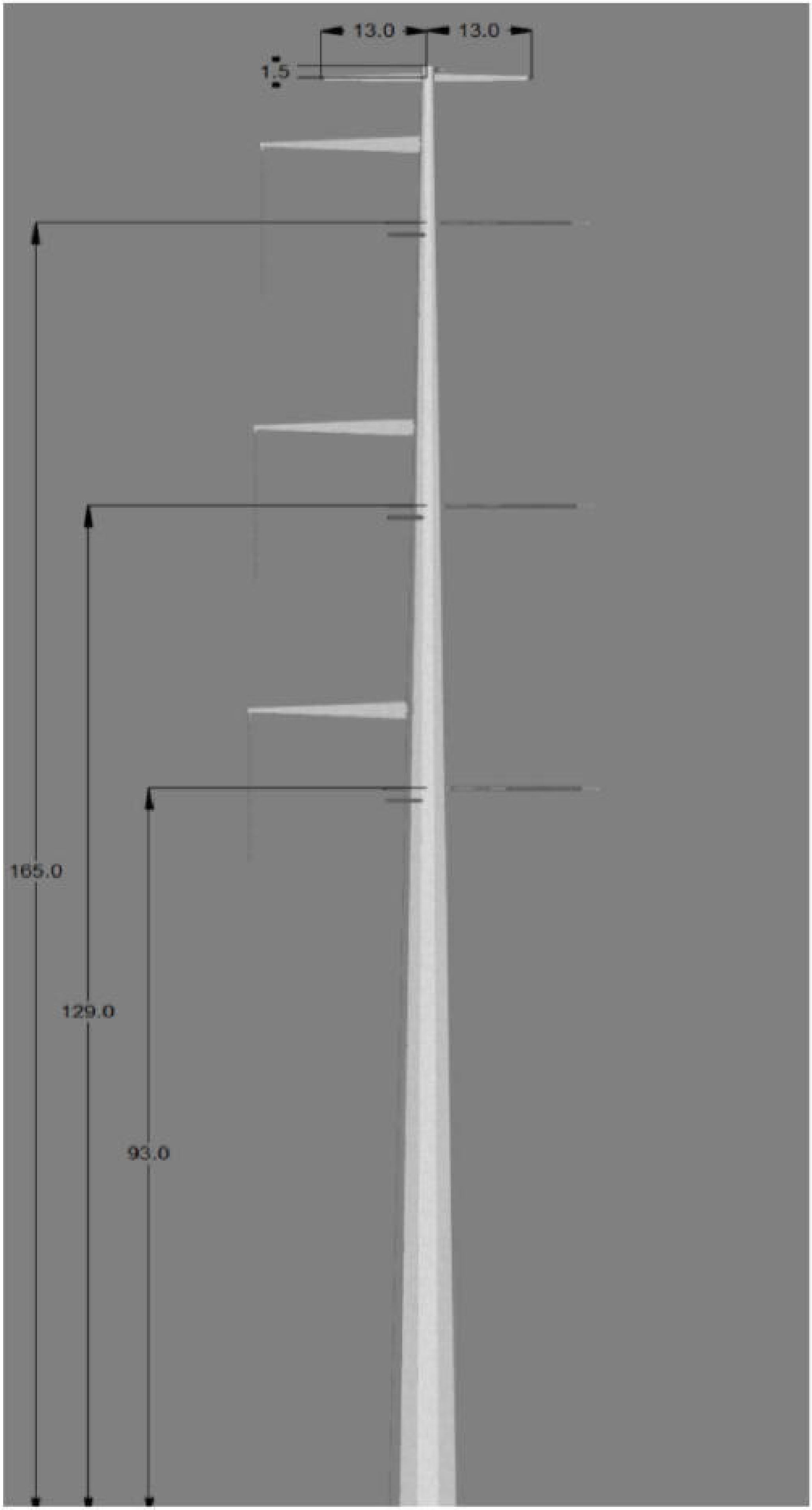
STRUCTURE 1: LATTICE TOWER



STRUCTURE 2: DELTA MONOPOLE



STRUCTURE 3: DEADEND MONOPOLE



Attachment C: Conductor Properties

TABLE 1-29
ALUMINUM CONDUCTOR STEEL REINFORCED (ACSR)

Code Word	Conductor Size kcmil	Stranding (Al/St)	Cross-Sectional Area Sq. in		Layers of Al	Diameter				Weight/1000 ft		
			Aluminum	Total		Individual Wires Aluminum in	Individual Wires Steel in	Steel Core in	Complete Cable in	Aluminum lbs	Steel lbs	Total lbs
Waxwing	266.8	18/1	0.2094	0.2210	2	0.1217	0.1217	0.1217	0.609	249.9	39.2	289.1
Partridge	266.8	26/7	0.2095	0.2436	2	0.1013	0.0788	0.2364	0.642	251.3	115.6	366.9
Junco	266.8	30/7	0.2095	0.2584	2	0.0943	0.0943	0.2829	0.660	251.9	165.5	417.4
Ostrich	300	26/7	0.2355	0.2738	2	0.1074	0.0835	0.2505	0.680	282.5	129.7	412.2
Merlin	336.4	18/1	0.2642	0.2789	2	0.1367	0.1367	0.1367	0.684	315.3	49.5	364.8
Linnet	336.4	26/7	0.2640	0.3070	2	0.1137	0.0884	0.2652	0.720	316.6	145.4	462.0
Oriole	336.4	30/7	0.2642	0.3259	2	0.1059	0.1059	0.3177	0.741	317.7	208.7	526.4
Chickadee	397.5	18/1	0.3122	0.3295	2	0.1486	0.1486	0.1486	0.743	372.5	58.5	431.0
Ptarmigan	397.5	20/7	0.3123	0.3339	2	0.1410	0.0627	0.1881	0.752	374.5	73.2	447.7
Brant	397.5	24/7	0.3122	0.3527	2	0.1287	0.0858	0.2574	0.772	374.4	137.0	511.4
Ibis	397.5	26/7	0.3120	0.3626	2	0.1236	0.0961	0.2883	0.783	374.1	171.9	546.0
Lark	397.5	30/7	0.3121	0.3849	2	0.1151	0.1151	0.3453	0.806	375.3	246.5	621.8
Pelican	477	18/1	0.3747	0.3955	2	0.1628	0.1628	0.1628	0.814	447.1	70.2	517.3
Tailorbird	477	20/7	0.3745	0.4004	2	0.1544	0.0686	0.2058	0.824	449.1	87.6	536.7
Flicker	477	24/7	0.3747	0.4233	2	0.1410	0.0940	0.2820	0.846	449.4	164.5	613.9
Hawk	477	26/7	0.3744	0.4354	2	0.1354	0.1053	0.3159	0.858	449.0	206.4	655.3
Hen	477	30/7	0.3747	0.4621	2	0.1261	0.1261	0.3783	0.883	450.4	296.0	746.4
Osprey	556.5	18/1	0.4369	0.4612	2	0.1756	0.1758	0.1758	0.879	521.4	81.8	603.3
Sapsucker	556.5	22/7	0.4368	0.4797	2	0.1590	0.0883	0.2649	0.901	523.9	145.1	669.0
Parakeet	556.5	24/7	0.4372	0.4938	2	0.1523	0.1015	0.3045	0.914	524.3	191.8	716.1
Dove	556.5	26/7	0.4371	0.5083	2	0.1463	0.1138	0.3414	0.927	524.2	241.0	765.2
Eagle	556.5	30/7	0.4371	0.5391	2	0.1362	0.1362	0.4086	0.953	525.4	345.2	870.7
Peacock	605	24/7	0.4753	0.5370	2	0.1588	0.1059	0.3177	0.953	570.1	208.7	778.8
Squab	605	26/7	0.4749	0.5522	2	0.1525	0.1186	0.3558	0.966	569.5	261.8	831.3
Wood Duck	605	30/7	0.4751	0.5860	2	0.1420	0.1420	0.4260	0.994	571.2	375.3	946.5
Teal	605	30/19	0.4751	0.5834	2	0.1420	0.0852	0.4260	0.994	571.2	367.4	938.6
Kingbird	636	18/1	0.4997	0.5275	2	0.1880	0.1880	0.1880	0.940	596.3	93.6	689.9
Swift	636	36/1	0.4994	0.5133	3	0.1329	0.1329	0.1329	0.930	596.0	46.8	642.8
Goldfinch	636	22/7	0.4994	0.5484	2	0.1700	0.0944	0.2832	0.963	598.8	165.8	764.7
Rook	636	24/7	0.4996	0.5643	2	0.1628	0.1085	0.3255	0.977	599.1	219.1	818.2
Grosbeak	636	26/7	0.4995	0.5808	2	0.1564	0.1216	0.3648	0.990	599.0	275.2	874.2
Scoter	636	30/7	0.4995	0.6160	2	0.1456	0.1456	0.4368	1.019	600.5	394.6	995.1
Egret	636	30/19	0.4995	0.6135	2	0.1456	0.0874	0.4370	1.019	600.5	386.7	987.2
Flamingo	666.6	24/7	0.5238	0.5917	2	0.1667	0.1111	0.3333	1.000	628.2	229.7	857.9
Gannet	666.6	26/7	0.5234	0.6086	2	0.1601	0.1245	0.3735	1.014	627.7	288.5	916.2
Stilt	715.5	24/7	0.5622	0.6350	2	0.1727	0.1151	0.3453	1.036	674.2	246.6	920.8
Starling	715.5	26/7	0.5620	0.6535	2	0.1659	0.1290	0.3870	1.051	674.0	309.7	983.7
Crow	715.5	54/7	0.5619	0.6347	3	0.1151	0.1151	0.3450	1.040	673.8	246.5	920.4
Redwing	715.5	30/19	0.5617	0.6897	2	0.1544	0.0926	0.4630	1.081	675.3	434.0	1109.3
Coot	795	36/1	0.6244	0.6417	3	0.1486	0.1486	0.1486	1.040	745.1	58.5	803.6
Cuckoo	795	24/7	0.6244	0.7053	2	0.1820	0.1213	0.3639	1.092	748.8	273.9	1022.6
Drake	795	26/7	0.6247	0.7264	2	0.1749	0.1360	0.4080	1.108	749.1	344.3	1093.4
Skimmer	795	30/7	0.6245	0.7702	2	0.1628	0.1628	0.4884	1.140	750.7	493.3	1244.0
Macaw	795	42/7	0.6246	0.6567	3	0.1376	0.0764	0.2292	1.055	749.0	108.6	857.6
Tern	795	45/7	0.6242	0.6674	3	0.1329	0.0886	0.2658	1.063	748.6	146.1	894.7
Condor	795	54/7	0.6240	0.7049	3	0.1213	0.1213	0.3639	1.092	748.4	273.9	1022.2
Mallard	795	30/19	0.6245	0.7669	2	0.1628	0.0977	0.4885	1.140	750.7	483.2	1233.9
Ruddy	900	45/7	0.7066	0.7555	3	0.1414	0.0943	0.2829	1.131	847.4	165.6	1013.0
Canary	900	54/7	0.7069	0.7985	3	0.1291	0.1291	0.3873	1.162	847.7	310.2	1157.9
Corncrake	954	20/7	0.7492	0.8010	2	0.2184	0.0971	0.2910	1.165	898.5	175.5	1074.0
Redbird	954	24/7	0.7495	0.8466	2	0.1994	0.1329	0.3990	1.196	898.8	328.7	1227.5
Rail	954	45/7	0.7492	0.8010	3	0.1456	0.0971	0.2913	1.165	898.5	175.5	1074.0
Cardinal	954	54/7	0.7491	0.8462	3	0.1329	0.1329	0.3987	1.196	898.3	328.7	1227.1
Canvasback	954	30/19	0.7491	0.9199	2	0.1783	0.1070	0.5350	1.248	900.5	579.6	1480.1
Snowbird	1033.5	42/7	0.8121	0.8539	3	0.1569	0.0872	0.2616	1.203	973.9	141.5	1115.4
Ortolan	1033.5	45/7	0.8112	0.8673	3	0.1515	0.1010	0.3030	1.212	972.8	189.9	1162.7
Curlew	1033.5	54/7	0.8112	0.9164	3	0.1383	0.1383	0.4149	1.245	972.8	356.0	1328.8
Bluejay	1113	45/7	0.8745	0.9350	3	0.1573	0.1049	0.3147	1.259	1048.7	204.8	1253.6
Finch	1113	54/19	0.8746	0.9855	3	0.1436	0.0862	0.4310	1.293	1053.9	376.1	1430.1
Bunting	1192.5	45/7	0.9367	1.0014	3	0.1628	0.1085	0.3255	1.302	1123.4	219.1	1342.5
Grackle	1192.5	54/19	0.9365	1.0552	3	0.1486	0.0892	0.4460	1.338	1128.6	402.8	1531.4
Bittern	1272	45/7	0.9987	1.0678	3	0.1681	0.1121	0.3363	1.345	1197.7	233.9	1431.6
Pheasant	1272	54/19	0.9993	1.1259	3	0.1535	0.0921	0.4605	1.382	1204.3	429.4	1633.7
Dipper	1351.5	45/7	1.0614	1.1347	3	0.1733	0.1155	0.3465	1.386	1272.9	248.3	1521.2
Martin	1351.5	54/19	1.0614	1.1958	3	0.1582	0.0949	0.4745	1.424	1279.1	455.9	1735.0
Bobolink	1431	45/7	1.1236	1.2013	3	0.1783	0.1189	0.3567	1.427	1347.5	263.1	1610.6
Plover	1431	54/19	1.1241	1.2665	3	0.1628	0.0977	0.4885	1.465	1354.6	483.2	1837.8
Nuthatch	1510.5	45/7	1.1862	1.2682	3	0.1832	0.1221	0.3663	1.466	1422.5	277.5	1700.0
Parrot	1510.5	54/19	1.1856	1.3357	3	0.1672	0.1003	0.5015	1.505	1428.8	509.2	1938.1
Lapwing	1590	45/7	1.2492	1.3355	3	0.1880	0.1253	0.3759	1.504	1498.1	292.2	1790.3
Falcon	1590	54/19	1.2489	1.4072	3	0.1716	0.1030	0.5150	1.545	1505.0	537.0	2042.1
Chukar	1780	84/19	1.3986	1.5126	4	0.1456	0.0874	0.4370	1.602	1685.4	386.7	2072.1
Mockingbird	2034.5	72/7	1.5979	1.6671	4	0.1681	0.1122	0.3360	1.681	1925.7	234.3	2160.0
Roadrunner	2057	76/19	1.6152	1.7032	4	0.1645	0.0768	0.3840	1.700	1946.5	298.6	2245.1
Bluebird	2156	84/19	1.6931	1.8309	4	0.1602	0.0961	0.4805	1.762	2040.4	467.5	2507.9
Kiwi	2167	72/7	1.7022	1.7758	4	0.1735	0.1157	0.3471	1.735	2051.4	249.2	2300.6
Thrasher	2312	76/19	1.8155	1.9144	4	0.1744	0.0814	0.4070	1.802	2187.9	335.4	2523.3
Joree	2515	76/19	1.9750	2.0826	4	0.1819	0.0849	0.4245	1.880	2380.1	364.9	2745.0

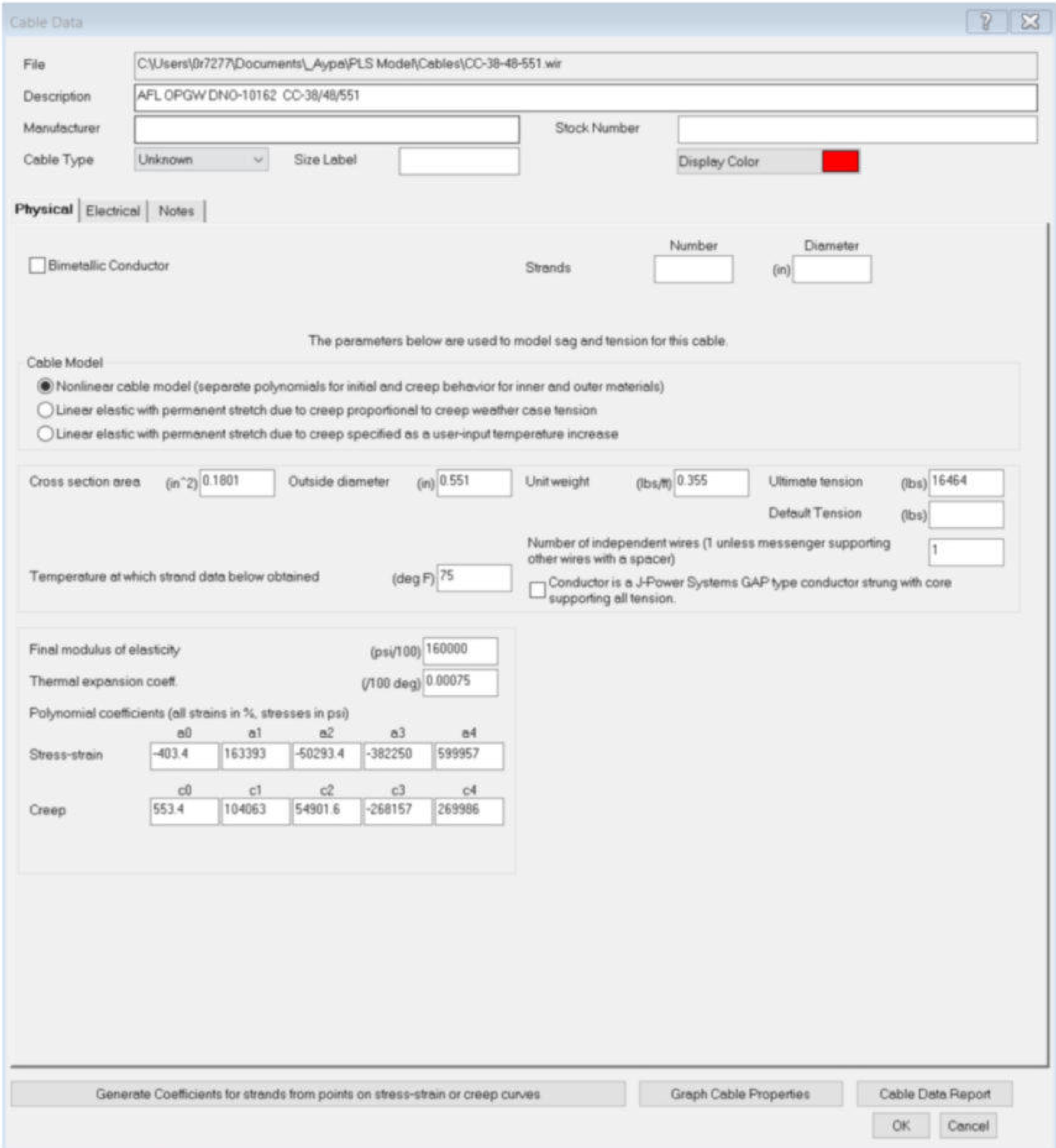
Notes: (1) Data based on a nominal cable manufactured in accordance with ASTM B 232.

(2) Resistance and ampacity based on an aluminum conductivity of 61.2% IACS at 20°C and a steel conductivity of 8% IACS at 20°C.

(3) Ampacity based on a 75°C conductor temperature, 25°C ambient temperature, 2 ft/sec wind, in sun, with an emissivity of 0.5 and a coefficient of solar absorption of 0.5, at sea level.

(4) Rated strengths based on Class A galvanized steel core wire in accordance with ASTM B 498.

Attachment D: OPGW Properties


Cable Data
File
C:\Users\0r7277\Documents_Aypa\PLS Model\Cables\CC-38-48-551.wir
Description
AFL OPGW DNO-10162 CC-38/48/551
Manufacturer
Stock Number
Cable Type
Unknown
Size Label
Display Color
Physical
Electrical
Notes
Bimetallic Conductor
Strands
Number
Diameter
(in)
The parameters below are used to model sag and tension for this cable.
Cable Model
Nonlinear cable model (separate polynomials for initial and creep behavior for inner and outer materials)
Linear elastic with permanent stretch due to creep proportional to creep weather case tension
Linear elastic with permanent stretch due to creep specified as a user-input temperature increase
Cross section area (in^2) 0.1801
Outside diameter (in) 0.551
Unit weight (lbs/ft) 0.355
Ultimate tension (lbs) 16464
Default Tension (lbs)
Number of independent wires (1 unless messenger supporting other wires with a spacer) 1
Temperature at which strand data below obtained (deg F) 75
Conductor is a J-Power Systems GAP type conductor strung with core supporting all tension.
Final modulus of elasticity (psi/100) 160000
Thermal expansion coeff. (/100 deg) 0.00075
Polynomial coefficients (all strains in %, stresses in psi)
a0 a1 a2 a3 a4
Stress-strain -403.4 163393 -50293.4 -382250 599957
c0 c1 c2 c3 c4
Creep 553.4 104063 54901.6 -268157 269986
Generate Coefficients for strands from points on stress-strain or creep curves
Graph Cable Properties
Cable Data Report
OK
Cancel

Attachment E: OHGW Properties

TABLE 1-43

HIGH-STRENGTH, UTILITIES GRADE, AND EXTRA-HIGH-STRENGTH STEEL CONDUCTORS

			Diameter				Resistance					Reactance @ 1 ft Spacing, 60 Hz				
								ac-60 Hz				Inductive, Xa				
Size in	Stranding	Area Sq. in	Strand in	Complete Cable in	Weight lbs/1000 ft	Rated Strength lbs	dc 20°C Ω/mile	10 Amps Ω/mile	40 Amps Ω/mile	70 Amps Ω/mile	100 Amps Ω/mile	10 Amps Ω/mile	40 Amps Ω/mile	70 Amps Ω/mile	100 Amps Ω/mile	Capacitive X'a MΩ-mile
High-Strength Steel-Class A Galvanizing (1)																
5/8"	7	0.2356	0.207	0.621	813	29,600	2.15	2.22	2.27	2.44	2.60	0.97	1.12	1.26	1.39	0.1083
1/2"	7	0.1497	0.165	0.495	517	18,800	3.38	3.48	3.57	3.84	4.08	1.01	1.24	1.44	1.63	0.1150
7/16"	7	0.1156	0.145	0.435	399	14,500	4.38	4.51	4.62	4.97	5.28	1.04	1.33	1.58	1.81	0.1188
3/8"	7	0.0792	0.120	0.360	273	10,800	6.40	6.59	6.75	7.26	7.71	1.10	1.50	1.84	2.15	0.1244
Utilities Grade Steel (1) (2)																
7/16"	7	0.1156	0.145	0.435	399	18,000	4.53	4.66	4.74	5.01	5.36	1.00	1.28	1.52	1.74	0.1188
3/8"	7	0.0792	0.120	0.360	273	11,500	6.40	6.59	6.75	7.26	7.71	1.10	1.50	1.84	2.15	0.1244
Extra-High-Strength Steel-Class A Galvanizing (1)																
5/8"	7	0.2356	0.207	0.621	813	42,400	2.22	2.28	2.32	2.46	2.62	0.93	1.08	1.21	1.35	0.1083
1/2"	7	0.1497	0.165	0.495	517	26,900	3.50	3.60	3.66	3.87	4.13	0.98	1.20	1.39	1.57	0.1150
7/16"	7	0.1156	0.145	0.435	399	20,800	4.53	4.66	4.74	5.01	5.36	1.00	1.28	1.52	1.74	0.1188
3/8"	7	0.0792	0.120	0.360	273	15,400	6.63	6.81	6.93	7.33	7.83	1.06	1.44	1.77	2.07	0.1244
Extra-High-Strength Steel-Class C Galvanizing (1)																
7/16"	7	0.1156	0.145	0.435	399	20,800	—	3.68	3.69	3.73	3.77	0.83	0.85	0.89	0.95	0.1188
3/8"	7	0.0792	0.120	0.360	273	15,400	—	5.42	5.43	5.45	5.51	0.82	0.84	0.88	0.93	0.1244
5/16"	7	0.0595	0.104	0.312	205	11,200	—	6.84	6.84	6.87	6.89	0.85	0.87	0.94	1.04	0.1287

Notes: (1) Data based on a nominal cable manufactured in accordance with ASTM A 363 and ASTM A 475.

(2) Data accumulated by EPRI, and published in "The EPRI Transmission Line Reference Book - 345 KV and Above / Second Edition."

(3) — Data not available.

Appendix 2E
Corona Losses Report

Corona Losses

Prairie Song Reliability Project 500kV Transmission Line

Prepared for

Prairie Song Reliability Project LLC

Prepared by Sargent & Lundy

Report SL-15474-001-EAD-001

Revision 1

May 12, 2025

ISSUED FOR PERMIT

55 East Monroe Street
Chicago, IL 60603-5780 USA
312-269-2000
www.sargentlundy.com

Sargent & Lundy

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VERSION LOG

Version	Issue Date	Sections Modified
0	4/1/2025	Preliminary – Issued for Review
1	5/12/2025	Issued for Permit

ISSUE SUMMARY AND APPROVAL PAGE

This is to certify that this document has been prepared, reviewed, and approved in accordance with Sargent & Lundy's Standard Operating Procedure SOP-0405, which is based on ANSI/ISO/ASSQC Q9001 Quality Management Systems.

Contributors

Prepared by:

Name	Title	Signature	Date
Maeshal Hijazi	Electrical Associate II	Maeshal Hijazi Digitally signed by Maeshal Hijazi DN: C=US, E=maeshal.hijazi@sargentlundy, O=Sargent & Lundy, CN=Maeshal Hijazi Date: 2025.05.12 13:52:15-04'00'	

Reviewed by:

Name	Title	Signature	Date
Benjamin Marx	Senior Manager	Benjamin Marx Digitally signed by Benjamin Marx Date: 2025.05.12 14:07:28 -04'00'	

Approved by:

Benjamin Marx Digitally signed by Benjamin Marx
Date: 2025.05.12 14:07:41 -04'00'

Name Date
Title

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1. INTRODUCTION

1.1. PURPOSE

The Prairie Song Reliability Project is a proposed BESS facility located in Acton, California, that will be connected to a Southern California Edison (SCE) Substation via single circuit 500kV overhead transmission lines. The purpose of the calculation is to evaluate the corona losses for those 500kV transmission lines based on the tower structure used and their corresponding conductor related properties.

1.2. SCOPE

The scope of this calculation involves the evaluation of the corona losses for different tower configurations of the 500kV transmission line using SESEnviroPlus. The corona losses are calculated using EPRI Method (Ref. 7.1).

2. INPUT DATA

2.1. TOWER CONFIGURATIONS

The 500kV transmission lines have three different configurations which are: suspension delta monopole, vertical monopole, and an SCE lattice tower. All towers' configurations are shown in Figures 2-1 to 2-3.

2.2. CONDUCTOR & SHIELD WIRES

The 500kV transmission line utilizes a triple bundle "Drake" ACSR conductor for the first two towers (suspension delta monopole and vertical monopole). However, the SCE lattice tower utilizes a double bundle "Bluebird" ACSR conductor. The line also consists of two (2) shield wires which are ½" 7 Strand EHS steel and AFL DNO-10162 CC-38/48/551 OPGW.

2.3. CONDUCTOR AND SHIELD WIRES SAG

The conductors and the shield wires sags used in this calculation were at max operating temperatures and at maximum span (worst-case sags). Table 2-1 shows the sags for each tower configuration and for each conductor and shield wire.

Table 2-1: Worst-Case Conductor and Shield Wires Sags for each Tower Configuration

Tower Configuration	Sag (ft)		
	Conductor	½" EHS Steel	38/48/551 OPGW
Suspension Delta Monopole	Drake ACSR: 17.57 ft @ 212 °F	13.09 ft @ 120 °F	13.58 ft @ 120 °F
Vertical Monopole	Drake ACSR: 22.91 ft @ 212 °F	17.08 ft @ 120 °F	15.35 ft @ 120 °F
SCE Lattice Tower	Bluebird ACSR: 60.57 ft @ 212 °F	45.98 ft @ 120 °F	44.58 ft @ 120 °F

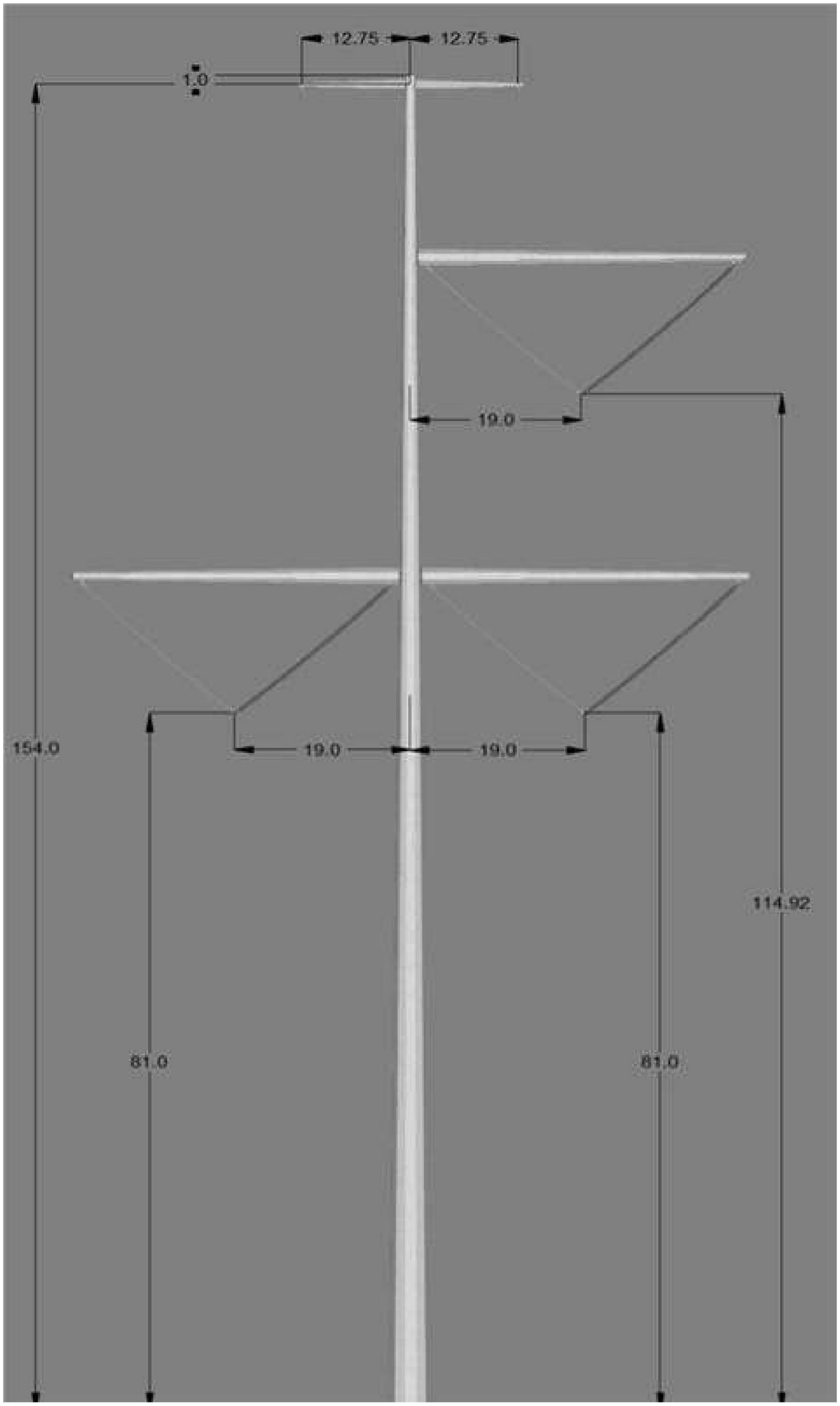

Figure 2-1: Delta Monopole Tower Characteristics

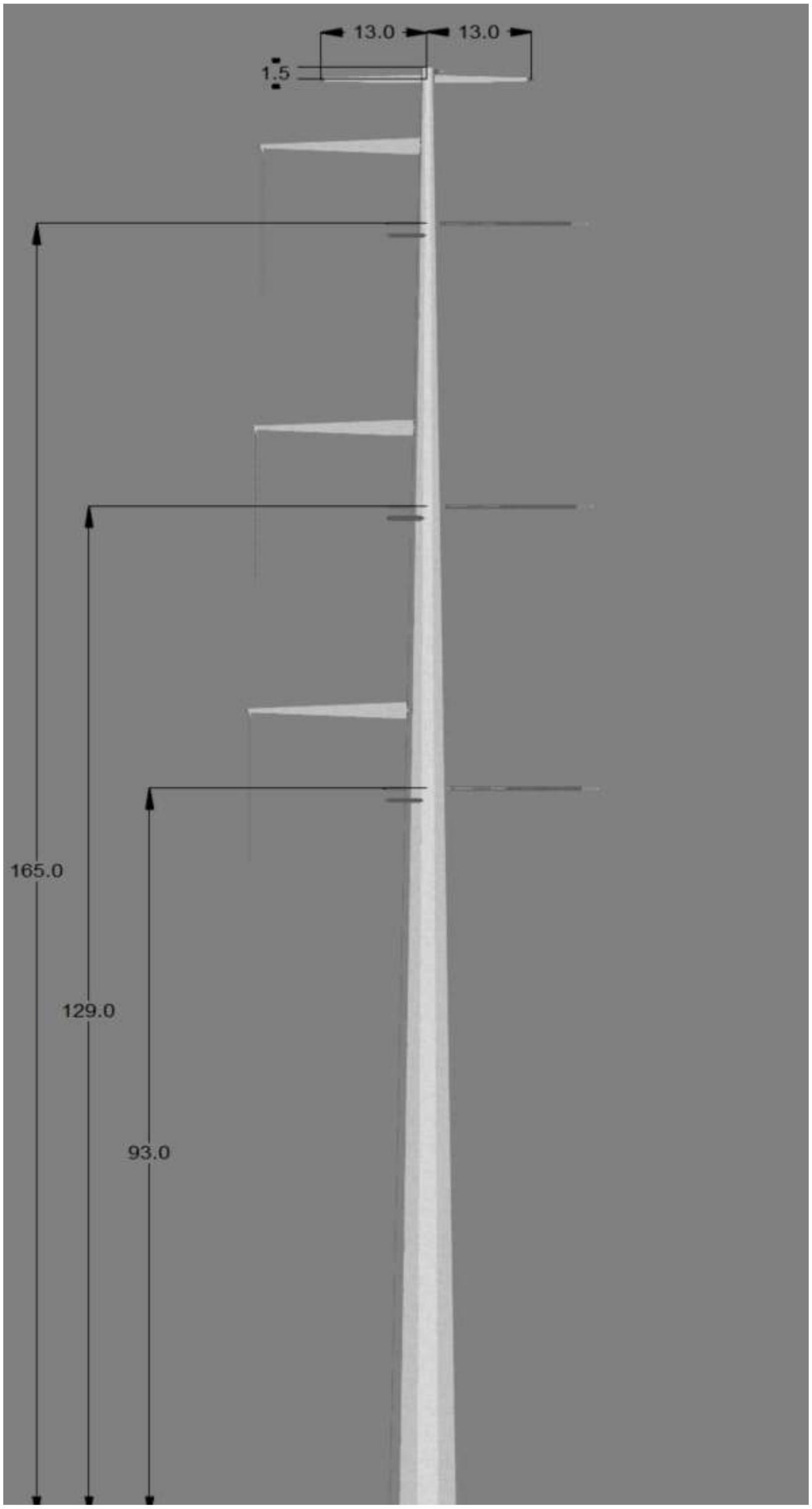

Figure 2-2: Vertical Monopole Tower Characteristics

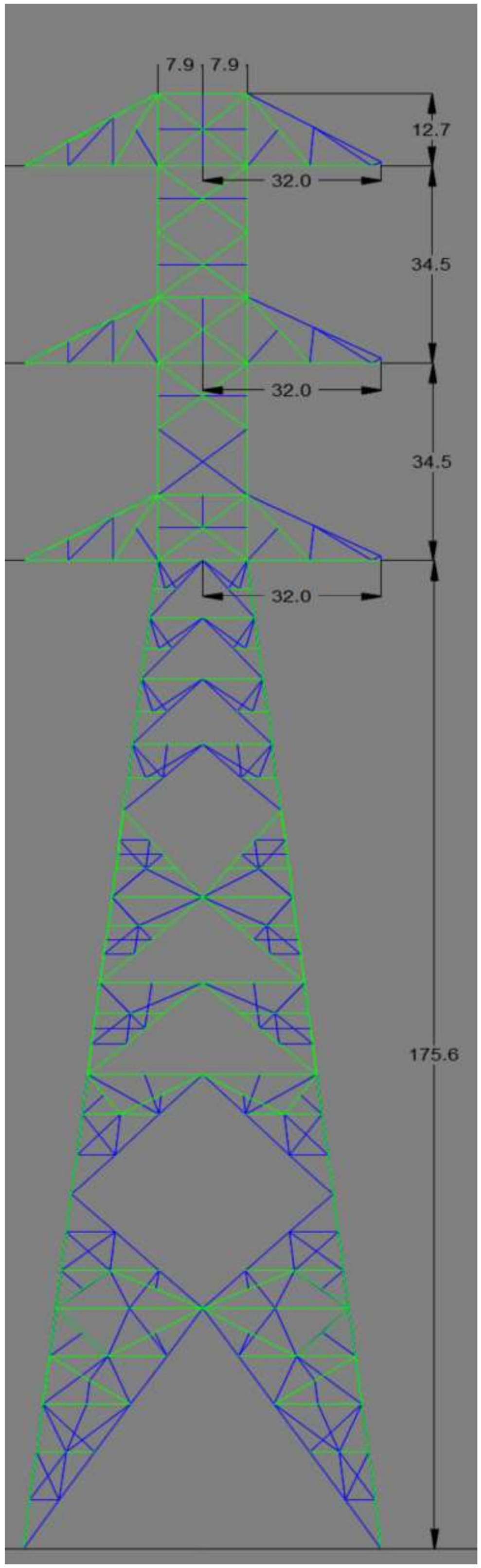

Figure 2-3: SCE Lattice Tower Characteristics

2.4. CONDUCTOR & SHIELD WIRES PHASING

The phasing for each tower configuration is shown below.

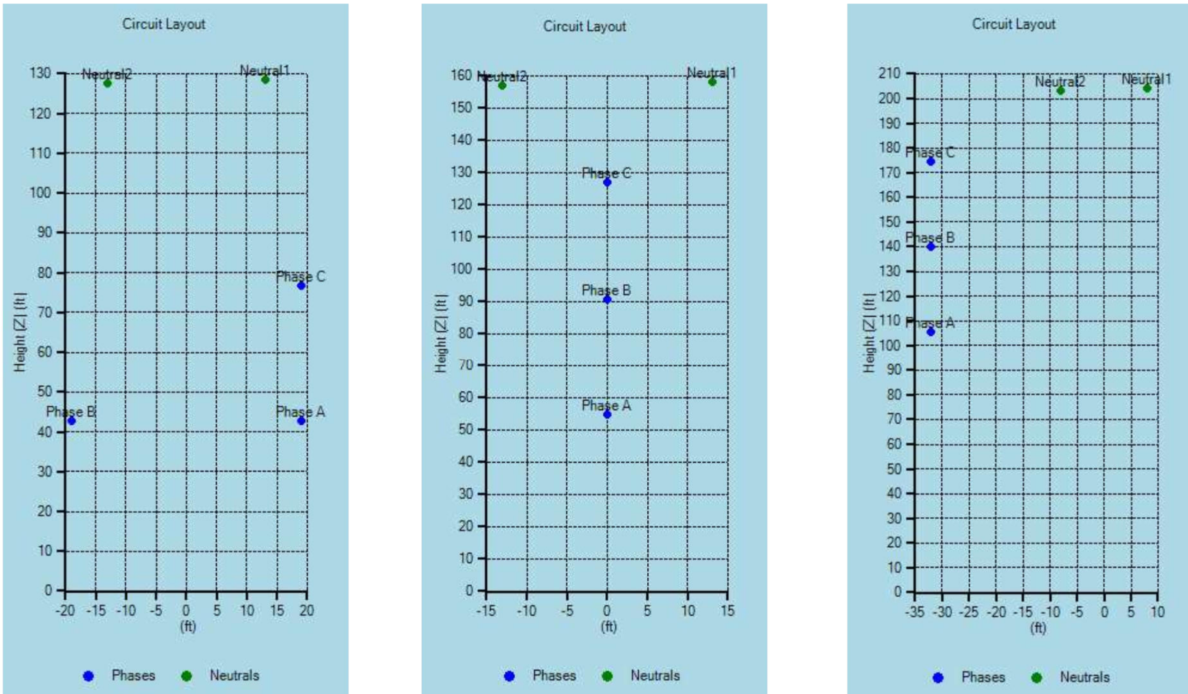

Figure 2-4: Conductors and Shield Wires Phasing for each Tower Configuration

2.5. ATMOSPHERIC CONDITIONS AND ALTITUDE

The altitude, pressure at sea level, and the temperature used to calculate the corona losses are 3010 ft, 760 mm/HG, and 21.11 °C. Heavy rain and fair weather are the two weather conditions that are used to calculate the corona losses.

3. ASSUMPTIONS

3.1. ASSUMPTIONS REQUIRING VERIFICATION

There are no assumptions that require verification.

3.2. ASSUMPTIONS/ENGINEERING JUDGMENTS NOT REQUIRING VERIFICATION

A. A uniform soil resistivities of 100 Ω-m is assumed.

4. METHODOLOGY

This corona losses are based on computations performed by SESEnviroPlus (part of CDEGS version 17.1) software program.

The methodology for determining the corona losses for each tower configuration are as follow:

A. Create the circuit/s for the tower.

B. Enter the phase conductors and shield wire characteristics and locations.

C. Choose the voltage magnitude and angle for each phase.

D. Choose the appropriate atmospheric conditions, altitude, and weather conditions.

E. Calculate corona losses for the tower using the calculation method chosen.

Computer Usage

The computer programs used to produce this calculation are Microsoft Word, and CDEGS, version 17.1 (S&L Program Number 03.7.764-17.1.9978). The main text portion of the calculation has been produced with Microsoft Word. The CDEGS program is used to calculate the corona losses.

5. RESULTS

A summary of the corona losses for each tower configuration under fair weather and heavy rain weather conditions are shown in Tables 6-1 and 6-2, respectively.

Table 5-1: Corona Losses for each Tower Configuration under Fair Weather Condition

Tower Configuration	Losses (Watts/m)			
	Line 1 Bundle 1	Line 1 Bundle 2	Line 1 Bundle 3	Total
Suspension Delta Monopole	0.213	0.142	0.165	0.52
Vertical Monopole	0.131	0.211	0.181	0.523
SCE Lattice Tower	0.229	0.412	0.272	0.913

Table 5-2: Corona Losses for each Tower Configuration under Heavy Rain Weather Condition

Tower Configuration	Losses (Watts/m)			
	Line 1 Bundle 1	Line 1 Bundle 2	Line 1 Bundle 3	Total
Suspension Delta Monopole	30.5	20.4	23.6	74.5
Vertical Monopole	18.7	30.2	25.9	74.6
SCE Lattice Tower	32.7	58.9	38.9	130.5

6. CONCLUSION

The purpose of this calculation was to calculate the corona losses for the 500kV transmission lines connecting the Prairie Song Reliability Project to an SCE substation for each tower configuration. The results showed that the total corona losses for each tower configuration (Suspension Delta Monopole, Vertical Monopole, SCE Lattice Tower) under fair weather condition were 0.52 W/m, 0.523 W/m, and 0.913 W/m, respectively. Moreover, the total losses for each tower configuration and under heavy rain weather condition were 74.5 W/m, 74.6 W/m, and 130.5 W/m, respectively.

Mitigation techniques are recommended when the corona losses are high, or when they cause other issues such as Radio & TV interference or audible noise. These losses vary with the transmission line design as shown earlier.

7. REFERENCES

7.1. EPRI AC Transmission Line Reference Book – 200 kV and Above, Third Edition, Electric Power Research Institute.

ATTACHMENTS

Attachment A – SESEnviroPlus Results

DATE OF RUN (Start)= DAY 25 / Month 3 / Year 2025
STARTING TIME= 11:57:12:17

G E N E R A T I N G   F U N C T I O N S
EPRI/GE's method
Losses W/m
AC VOLTAGE

Line No.	Bundle No.	RI (dB)	AN (dBA)	Losses (Watts/m)
1	1	NA	NA	30.5
1	2	NA	NA	20.4
1	3	NA	NA	23.6
1	901	NA	NA	0.00
1	902	NA	NA	0.00

Weather conditions: HEAVY RAIN

Total AC corona losses: 74.471 Watts/m or 18.720 dB above 1W/m

SES-ENVIRO package - PAGE 114

RUN:

G E N E R A T I N G   F U N C T I O N S
EPRI/GE's method
Losses W/m
AC VOLTAGE

Line No.	Bundle No.	RI (dB)	AN (dBA)	Losses (Watts/m)
1	1	NA	NA	0.213
1	2	NA	NA	0.142
1	3	NA	NA	0.165
1	901	NA	NA	0.00
1	902	NA	NA	0.00

Weather conditions: FAIR (dry conductors)

```
           Total AC corona losses: 0.52065      Watts/m or  -2.8345    dB above
1W/m


  SES-ENVIRO package - PAGE    115

  RUN:


                                                          END OF MODULE SES-ENVIRO
```

DATE OF RUN (Start)= DAY 25 / Month 3 / Year 2025
STARTING TIME= 12:10:07:59

G E N E R A T I N G   F U N C T I O N S
EPRI/GE's method
Losses W/m
AC VOLTAGE

Line No.	Bundle No.	RI (dB)	AN (dBA)	Losses (Watts/m)
1	1	NA	NA	18.7
1	2	NA	NA	30.2
1	3	NA	NA	25.9
1	901	NA	NA	0.00
1	902	NA	NA	0.00

Weather conditions: HEAVY RAIN

Total AC corona losses: 74.758 Watts/m or 18.737 dB above 1W/m

SES-ENVIRO package - PAGE 114

RUN:

G E N E R A T I N G   F U N C T I O N S
EPRI/GE's method
Losses W/m
AC VOLTAGE

Line No.	Bundle No.	RI (dB)	AN (dBA)	Losses (Watts/m)
1	1	NA	NA	0.131
1	2	NA	NA	0.211
1	3	NA	NA	0.181
1	901	NA	NA	0.00
1	902	NA	NA	0.00

Weather conditions: FAIR (dry conductors)

```
          Total AC corona losses: 0.52266      Watts/m or  -2.8178    dB above
1W/m


  SES-ENVIRO package - PAGE    115

  RUN:


                                                  END OF MODULE SES-ENVIRO
```

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DATE OF RUN (Start)= DAY 25 / Month  3 / Year 2025
STARTING TIME= 13:42:57:63
```

```
        G E N E R A T I N G   F U N C T I O N S
                 EPRI/GE's method
                    Losses W/m
                    AC VOLTAGE
  Line No.     Bundle No.     RI              AN             Losses
                             (dB)            (dBA)          (Watts/m)
      1             1         NA               NA             32.7
      1             2         NA               NA             58.9
      1             3         NA               NA             38.9
      1           901         NA               NA             0.00
      1           902         NA               NA             0.00

        Weather conditions: HEAVY RAIN


          Total AC corona losses:  130.46      Watts/m or   21.155    dB above
1W/m


  SES-ENVIRO package - PAGE    108

  RUN:
```

```
        G E N E R A T I N G   F U N C T I O N S
                 EPRI/GE's method
                    Losses W/m
                    AC VOLTAGE
  Line No.     Bundle No.     RI              AN             Losses
                             (dB)            (dBA)          (Watts/m)
      1             1         NA               NA            0.229
      1             2         NA               NA            0.412
      1             3         NA               NA            0.272
      1           901         NA               NA             0.00
      1           902         NA               NA             0.00

        Weather conditions: FAIR (dry conductors)
```

```
           Total AC corona losses: 0.91207      Watts/m or -0.39972    dB above
1W/m


  SES-ENVIRO package - PAGE    109

  RUN:


                                                    END OF MODULE SES-ENVIRO
```

Appendix 2F

Decommissioning Plan

DRAFT

Draft Decommissioning Plan

Prairie Song Reliability Project

JUNE 2025

Prepared for:

PRAIRIE SONG RELIABILITY PROJECT LLC
Project Applicant

CALIFORNIA ENERGY COMMISSION
Lead Agency

715 P Street,
Sacramento, California 95814

Prepared by:

DUDEK

225 South Lake Avenue
Suite M210
Pasadena, California 91101

Printed on 30% post-consumer recycled material.

Table of Contents

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
Applicant	Prairie Song Reliability Project LLC
BESS	battery energy storage system
gen-tie	generation interconnection
LFP	lithium iron phosphate
LORS	laws, ordinances, regulations, or standards
POI	Point of Connection
Project	Prairie Song Reliability Project
SCE	Southern California Edison

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1 Introduction

This Draft Decommissioning Plan establishes the framework to conduct decommissioning activities for the permanent closure of all or a portion of the Project. This Draft Decommissioning Plan describes the approach for removal and/or proper abandonment of facilities and equipment associated with the Project and describes potential land restoration activities. In the event of unexpected, or planned, permanent cessation of operations, the Applicant will submit a Final Decommissioning Plan to the California Energy Commission for approval prior to planned decommissioning activities that will incorporate then-applicable laws, ordinances, regulations, and standards (LORS).

1.1 Project Overview and Location

Prairie Song Reliability Project LLC, a Delaware limited liability company (Applicant), a subsidiary of Coval Infrastructure DevCo LLC, a Delaware limited liability company, proposes to construct, operate, and eventually repower or decommission the up to 1,150-megawatt Prairie Song Reliability Project (Project) located on up to approximately 100 acres in unincorporated Los Angeles County. The primary components of the Project include a containerized battery energy storage system (BESS) facility utilizing lithium-iron phosphate cells, or similar technology, operations and maintenance (O&M) buildings, an on-site Project substation, a 500-kilovolt (kV) overhead generation interconnection (gen-tie) transmission line, and interconnection facilities within the existing Southern California Edison (SCE) owned and operated Vincent Substation.

Electrical energy will be transferred from the existing power grid to the Project for storage and from the Project to the power grid when additional electricity is needed. The Project will provide additional capacity to the electrical grid to assist with serving load during periods of peak demand by charging when demand is low and discharging when demand is high. This operating principle increases the integration of additional intermittent renewable energy, such as wind and solar, in California's energy mix and reduces the need to operate natural gas power plants. The Project will also serve as an additional local/regional capacity resource that will enhance grid reliability, particularly to the Los Angeles Basin local reliability area and may allow for the deferral or avoidance of regional transmission facilities.

The Project will be remotely operated and monitored year-round as well as supported by on-site O&M staff seven (7) days a week. The Project will be available to receive or deliver energy 24 hours a day and 365 days a year. During the operational life of the Project, qualified technicians will inspect the Project facilities and conduct necessary maintenance to ensure reliable and safe operational readiness.

The Project will be located in unincorporated Los Angeles County (County), California, south of State Route 14, approximately three (3) miles northeast of the unincorporated community of Acton. The Project is within the U.S. Geological Survey 7.5-minute Acton and Pacifico Mountain Quadrangles, Township 5N, Range 12W, Sections 27, 28, 33 and 34. The BESS site is comprised of Assessor's Parcel Numbers 3056-017-007, 3056-017-020, 3056-017-021, 3056-019-013, 3056-019-026, 3056-019-037, and 3056-019-040. Development of the BESS facility will occur on an area of land situated between two existing transportation corridors, the Antelope Valley Freeway (State Route 14) to the north and Southern Pacific Railroad lines and Carson Mesa Road to the south, that are approximately 1,200 feet apart.

The Project will utilize one (1) of two (2) potential gen-tie routes. Either route will extend south and east from the Project substation, crossing Southern Pacific Railroad tracks and West Carson Mesa Road, and then proceed northeast to the Point of Interconnection (POI) at the Vincent Substation. The Northern Gen-Tie Route is approximately 1.1 miles long, and will be sited on Assessor's Parcel Numbers 3056-015-008, 3056-015-023, 3056-017-026, 3056-017-904, and 3056-017-905, 3056-005-816, 3056-005-817, 3056-005-818, 3056-015-801, and 3056-015-802. The Southern Gen-Tie Route is approximately 1.8 miles long, and will be sited on Assessor's Parcel Numbers 3056-015-008, 3056-015-023, 3056-017-016, 3056-017-022, 3056-017-026, 3056-017-027, 3056-017-028, 3056-027-007, 3056-027-031, 3056-005-816, 3056-005-817, 3056-005-818, 3056-015-801, and 3056-015-802. The Project will also include three (3) fiber optic telecommunications lines: one will be installed aboveground on the gen-tie structures (along whichever gen-tie route is ultimately selected), and the other two will be installed underground within the Southern Gen-Tie Route corridor. The two other fiber optic lines will be installed underground within the Southern Gen-Tie Route corridor regardless of which Gen-Tie Route corridor option is selected. The Project's interconnection facilities will be located within the SCE Vincent Substation. Land uses in the immediate vicinity of the Project include undeveloped and rural lands, multiple high-voltage transmission lines and an electrical substation, paved and rural roads, State Route 14, and railroad lines.

2 Plan Purpose and Objectives

The purpose of this Draft Decommissioning Plan is to provide an initial framework for decommissioning activities for the permanent closure of all or a portion of the Project. This Draft Decommissioning Plan describes the approach for removal and/or proper abandonment of facilities and equipment associated with the Project and describes anticipated land restoration activities in accordance with applicable regulatory codes and mitigation commitments.

The decommissioning phase of the project will include an Emergency Response Plan. The Emergency Response Plan includes the plan development as well as regular training and updates. The Emergency Response Plan takes into account common items, including a description of the equipment; procedures on how to safely shutdown, de-energize, or isolate the equipment to reduce the risk of fire, electric shock, and personal injuries; emergency procedures to be followed in case of fire, explosion, release of vapors, or other emergency; safety data sheet procedures and schedules for on-site training; and any other procedures or critical safety issues specific to the BESS installation. The Applicant will submit a Final Decommissioning Plan to the California Energy Commission for approval prior to planned decommissioning activities that will incorporate then-applicable LORS.

This Draft Decommissioning Plan identifies the following:

1. Components involved with the construction of the Project.
2. Decommissioning activities for the Project, which may include removal of industrial facilities and compliance with then-applicable LORS, including recycling of equipment, hazardous waste, and sampling and cleanup issues; and disposal of all solid and hazardous waste.

Laws, Ordinances, Regulations, and Standards Related to Decommissioning

There are no federal, state, or local LORS specific to standalone BESS. Decommissioning of the Project would be completed in conformance with the LORS that are in effect at the time of decommissioning, and/or conditions of compliance from the California Energy Commission.

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3 Project Components

The Project will include construction, O&M, and eventual decommissioning of an up to 1,150-megawatt BESS. A 500kV gen-tie connecting the Project substation to the POI within the existing SCE Vincent Substation, will facilitate charging and discharging to the electrical grid. The BESS Facility will include the following primary components:

- BESS Enclosures
- Power Conversion Systems
- Medium Voltage Collection System
- Project Substation, Control Building, and Telecommunications Facilities
- Access Roads
- Laydown Yards
- Stormwater Detention Facilities
- Site Security
- Fire Detection and Suppression System
- O&M Buildings

The Project's components that are anticipated to be subject to decommissioning are summarized below.

3.1 Grading and Civil Work

Following site preparation activities, grading and civil work would commence. Construction activities during this phase would include excavation and grading of the Project site.

Conventional grading would be performed throughout the Project site but minimized to the maximum extent feasible to reduce unnecessary soil movement that may result in dust. Land-leveling equipment, such as a smooth steel drum roller, would be used to even the ground surface and compact the upper layer of soil to a value recommended by a geotechnical engineer for structural support. Following major civil work within the BESS facility site, site access roads and driveways, the perimeter and substation access roads, and interior roadways to access the laydown areas and BESS yards would be graded, compacted, and surfaced with gravel or aggregate. Suitable base material would be imported to create necessary compaction under the equipment, as determined by geotechnical testing and Project specifications. Once the roadways have been constructed, the Project perimeter wall and access gates would be constructed.

3.2 Battery Energy Storage System Facility

The energy storage facility will utilize a modular and containerized BESS. There are several battery cell technologies commercially available, with one of the most common presently being lithium iron phosphate (LFP) cells, or similar. LFP technology is considered one of the safest, most efficient, and commercially financeable energy storage technologies available on the market. The initial Project concept has been developed assuming an LFP technology. By the time the Project reaches the procurement stage, it is possible for other battery cell technology with proven safety and performance records to be suitable for the Project. Although the number and dimensions of the containers may change (as it does between LFP technology providers), the technology ultimately procured will result in potential environmental impacts substantially similar to, or less than, those analyzed based on this Project Description. The Project will provide defensible space by setting back all BESS enclosures at least 100 feet from the property boundary.

The BESS enclosures will be prefabricated off site and arrive at the site ready to be installed and commissioned. Each modular BESS enclosure will include battery packs on racks, a battery management system, fire detection systems, and ancillary power electronics within a specialized steel-framed, non-occupiable container. The BESS enclosures will not exceed 15 feet in height.

Over the life of the project the storage capacity of the battery cells will naturally degrade. The project will implement an augmentation strategy to maintain the contractually required capacity of the system. Augmentation will entail either a capacity maintenance approach of adding/replacing individual battery modules in the existing BESS yard or designing the BESS system to incorporate space for additional BESS enclosures for later augmentation.

Additional components of the BESS facility include a Project substation and O&M buildings. The on-site Project substation would include main power transformers. When the BESS facility is charging, power from the regional electric transmission grid would be stepped down from 500kV to 34.5kV and sent from the Project substation through the medium voltage collection system and Power Conversion System units into the battery packs within the BESS enclosures. When the BESS facility is discharging, power from the battery packs within the BESS enclosures would be sent to the Power Conversion System units, stepped up to 34.5kV by a medium voltage transformer, and transported to the Project substation through the medium voltage collection system before being stepped up to 500kV at the main power transformers and delivered back to the regional electric transmission grid. A control building would be installed within the Project substation area and contain an energy management system, metering, and telecommunication equipment for communication with SCE/California Independent System Operator facilities and to support remote Project operations monitoring.

The O&M buildings would be constructed concurrently with the BESS facility and would include parking, outside equipment and laydown areas, basic offices, meeting rooms, washroom facilities and climate-controlled storage for certain equipment and materials for the Project's anticipated 16 full-time staff.

3.3 Gen-Tie Line

The 500kV gen-tie line would originate at the Project substation, within the BESS facility site, and extend south and east overhead, crossing Southern Pacific Railroad tracks and West Carson Mesa Road, as close to perpendicular as possible, and then proceed northeast to the POI at the Vincent Substation. The Project proposes a Northern Gen-Tie Route and a Southern Gen-Tie Route; the selected route would be determined pending detailed project design.

The Point of Change of Ownership will be located on Assessor's Parcel Number 3056-015-023. The Point of Change Ownership is the point where the conductors of the gen-tie line are attached to the Last Structure, which will be connected on the side of the last Project owned structure (Last Structure) facing Vincent Substation. The Project will own and maintain the Last Structure, the conductors, insulators and jumper loops from such Last Structure to the Interconnection Customer's Large Generating Facility. SCE will own and maintain the Vincent Substation, as well as all towers, transmission lines, circuit breakers, disconnects, relay facilities and metering within the Vincent Substation, together with the line drop, in their entirety, from the Last Structure to Vincent Substation. SCE will own the insulators that are used to attach the Project-owned conductors to the Last Structure.

Telecommunications equipment will be installed between the control building at the Project substation and the Vincent Substation to facilitate communication with SCE/California Independent System Operator facilities. SCE interconnection policies for 500kV systems require three (3) redundant fiber optic cables to be installed on diverse paths without a single point of failure (i.e., both fiber optic lines cannot be installed on a single set of structures). Between the control building within the Project substation area and the Vincent Substation, the Applicant and SCE will install one (1) of the three (3) fiber optic lines above ground on the gen-tie structures. The two other fiber optic lines will be installed underground within the Southern Gen-Tie Route corridor and separated by 25 feet.

A transmission structure access path would be located within portions of the transmission corridor outside of the BESS facility and Vincent Substation footprints and generally follow the centerline of the gen-tie.

3.4 Security

The BESS facility site will be enclosed with an 8-foot-tall block wall topped with 1 foot of three-strand barbed wire or razor wire. The wall will be installed on the outside of the perimeter roads. The wall will be required to prevent unauthorized access and to comply with human health and safety regulations. Gates will be installed at various access points along the wall and equipped with locks and knox boxes to allow for authorized personnel (e.g., transmission service provider, O&M staff, emergency response) to access appropriate portions of the BESS facility site.

Lighting will only be in areas where it is required for safety, security, or operations. Controlled security lighting, no more than 28 feet tall, will be installed at the Project substation and around the BESS yards, in accordance with applicable requirements and regulations. Permanent motion-sensitive, directional security lights will be installed to provide adequate illumination around the substation area and points of ingress/egress. All lighting will be shielded and directed downward to minimize the potential for glare or spillover onto adjacent properties, compliant with applicable codes and regulations. Security cameras will be placed on site and monitored 24/7.

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4 Closure

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, with an intent to restart in the future. Causes for temporary closure may include equipment upgrades and repowering the project or damage to the project components from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations.

Temporary closures are not discussed in this Decommissioning Plan because it assumes that the Project will be restarted once repairs are made or the condition causing the temporary closure is corrected. As used here, “closure” is synonymous with decommissioning and includes removal of the facilities and materials that were employed to support the operation of the facility.

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5 Decommissioning and Recycling

At the time of decommissioning, the Decommissioning Plan would be finalized and submitted to California Energy Commission for approval that describes the proposed equipment to be removed and equipment that would remain for future use, based on expected future use of the site. Decommissioning of BESS components involves dismantling the energy storage system and removing it from the site in compliance with applicable federal and local rules that govern the safe transport and disposition of used equipment or waste. Transmission interconnection facilities would remain in place for the life of the facility. At the time of full Project decommissioning, if the transmission interconnection and distribution lines and communications lines would not be further used by a public or private utility or power generator, the lines would be decommissioned. Decommissioning of the transmission and communications lines would take place only after the substation and lines are fully de-energized and made safe for removal. The above ground portion of the line would entail removal of the overhead conductors, wiring, and poles. The below ground communications lines would entail removal of the underground lines and conduit, where possible. Decommissioning would attempt to maximize recycling of all facility components. All steel and concrete would be recycled to the maximum extent possible, and the foundations would be removed to a depth of at least 3 feet below the ground surface. Aluminum, copper, and other metals from the overhead conductors would be recycled to the maximum extent possible. The key Project components to be affected by decommissioning activities are discussed below. The general decommissioning approach would be the same whether a portion of the Project or the entire Project would be decommissioned.

5.1 Decommissioning Preparation

The first step in the decommissioning process would be to assess existing site conditions and prepare the site for demolition. All site decommissioning would occur within the existing security wall; the security wall would be the last component to be removed. Preparation activities may include electrical inspections, as well as inspections of access routes, security walls/fences, and gates. Repairs or improvements may occur if inspections identify electrical, road, fencing, or gate improvements or repairs that must be made prior to decommissioning activities. Demolition debris would be placed in temporary on-site storage area(s) pending final transportation and disposal/recycling according to the procedures listed below.

5.2 BESS Removal and Recycling

During decommissioning, Project components that are no longer needed would be removed from the site and recycled. All underground cables would be excavated and removed or abandoned in place three (3) feet below grade for all underground conductors. Inverters and BESS containers would be removed from concrete foundations or piling and the foundations removed or abandoned in place 3 feet below grade. All wiring, cables, heating, cooling, and ventilation equipment would be disconnected from the BESS containers and batteries. Demolition debris and removed equipment may be cut or dismantled into pieces that can be safely lifted or carried by the on-site equipment being used.

5.2.1 Battery Recycling

Batteries would be recycled at a specialized recycling plant, and the remaining BESS components would be recycled or disposed of in accordance with the procurement documents provided by the battery manufacturer.

5.2.1.1 Battery Recycling Technology

It is anticipated that the availability of end-of-life battery recycling centers will increase along with battery production. As of late 2021, there were 32 lithium battery recycling facilities globally, with the majority located in China and four in North America. Five (5) additional plants are planned for the United States and Mexico (ACS 2022). Strategic global demand for precious metals, along with the fledgling green-energy market, continue to drive technological advances in recycling (WBUR 2022). Recycling enhancements and innovation are anticipated to continue and are anticipated to be in place by the projected end of life of the proposed BESS, estimated to be approximately 40 years after the start of operations.

5.3 Access Roads and Fencing

Access roads would be disked for decompaction purposes, and the perimeter wall would be removed, if it will not be used for a future development, using rubber tired dozers, tractors, loaders, and backhoes.

5.4 Hazardous Materials and Waste

During the decommissioning process, there is a chance that hazardous waste may be generated. In the event that decommissioning activities generate hazardous waste, it would be stored, handled, and disposed of according to local, state, and federal regulations (refer to Section 3.5, Hazardous Material Handling, for additional details).

6 Site Reclamation

The decommissioning process would remove BESS-related structures and infrastructure as described in the previous chapters. The Project owner would contract with a qualified reclamation contractor to evaluate and prescribe specific reclamation measures. The reclamation contractor would coordinate with the Project owner to ensure that the prescriptions are implemented as written.

Reclamation may restore landform features, vegetative cover, and hydrologic function after closure of the facility. The process may involve either replacement of topsoil, brush, rocks, and natural debris over disturbed areas so that the site blends with the surrounding landscape, or stabilizing the soil to prepare the site for a future use.

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7 References

ACS (American Chemical Society Publications). 2022. "Lithium-Ion Battery Recycling—Overview of Techniques and Trends." January 19, 2022. Accessed May 29, 2025. https://pubs.acs.org/doi/10.1021/acsenergylett.1c02602.

WBUR (Boston Public Radio). 2022. "Massachusetts Startup Transforms Old Electric Car Batteries into Bether-Than-New Ones." January 25, 2022. Accessed May 29, 2025. https://www.wbur.org/news/2022/01/25/lithium-ion-battery-recycling-electric-vehicles.

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