230kV and 115kV Solutions for Portfolios

General Information

Proposing entity name	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Company proposal ID	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
PJM Proposal ID	24
Project title	230kV and 115kV Solutions for Portfolios
Project description	This proposal includes the following projects: 1. 99-3154 - Line 229 Rebuild - Remington CT to Marsh Run 2. 99-3203 - Line 2161 Uprate - Gainesville to Wheeler 3. 99-3258 - New 230 kV Line - Cloud to Raines 4. 99-3398 - New 230 kV Line - Ox to Cloverhill 5. 99-3407 - New 230 kV Line - Elmont to Ladysmith 6. 99-3412 - New 230 kV Line - Thelma - Lakeview 7. 99-3415 - Line 238 Uprate - Carson to Clubhouse 8. 99-3416 - Line 2003 Uprate - Poe to Chesterfield 9. 99-3435 - Line 119 Uprate - Elkton to AE2-029 10. 99-3444 - Line 121 Reconductoring - Poe to Prince George 11. 99-3457 - Second 230 kV - Nokesville to Hornbaker 12. 99-3460 - Line 2002 Uprate - Carson to Poe 13. 99-3461 - Line 1031 Uprate - Pantego-Terra 14. New 230kV Line Morrisville to Anderson Branch
Email	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Project in-service date	12/2029
Tie-line impact	No
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Project Components

1. Line 299 Rebuild - Marsh Run to Remington CT (99-3154)

2. Marsh Run Substation (99-3154)
3. Remington CT (99-3154)
4. Line 2161 Upgrade - Gainesville to Wheeler (99-3203)
5. Gainesville Substation Terminal Equipment Uprate (99-3203)
6. Trident Substation Relay Reset (99-3203)
7. Wheeler Substation Terminal Equipment Upgrade (99-3203)
8. Lines 213/225 Rebuild - Thelma to Lakeview (99-3412)
9. Thelma Substation Terminal Equipment Upgrade (99-3412)
10. Lakeview Substation Terminal Equipment Upgrade (99-3412)
11. Line 238 Rebuild - Carson to Clubhouse (99-3415)
12. Carson Substation Terminal Equipment Upgrade (99-3415)
13. Clubhouse Substation Terminal Equipment Upgrade (99-3415)
14. Line 2003 Reconductoring - Chesterfield to Tyler & Locks to Poe (99-3416)
15. Chesterfield Substation Relay Reset (99-3416)
16. Poe Substation Terminal Equipment Upgrade (99-3416)
17. Tyler Substation Terminal Equipment Upgrade (99-3416)
18. Line 119 Rebuild - Merck #5 to Port Republic (99-3435)
19. Merck #5 Substation Equipment Upgrade (99-3435)
20. Line 2002 Reconductoring - Carson to Poe (99-3460)
21. Carson Substation Terminal Equipment Upgrade (99-3460)
22. Poe Substation Terminal Equipment Upgrade (99-3460)
23. New 230 kV Line - Nokesville to Hornbaker (99-3457)
24. Nokesville Substation Terminal Equipment Upgrade (99-3457)
25. Hornbaker Substation Terminal Equipment Upgrade (99-3457)
26. New 230 kV Line - Elmont to Ladysmith (99-3407)
27. Elmont Substation Terminal Equipment Upgrade (99-3407)
28. Ladysmith Substation Terminal Equipment Upgrade (99-3407)
29. New 230 kV Line - Ox to Cloverhill (99-3398)
30. Ox Substation Terminal Equipment Upgrade (99-3398)

31. Cloverhill Substation Terminal Equipment Upgrade (99-3398)
32. New 230 kV Line - Raines to Cloud (99-3258)
33. Cloud Substation Terminal Equipment Upgrade (99-3258)
34. Raines Substation Terminal Equipment Upgrade (99-3258)
35. Line 121 Reconductoring - Poe to Prince George (993444)
36. Poe Substation Upgrade (99-3444)
37. Prince George Substation Upgrade (99-3444)
38. Line 1031 Rebuild - Terra to Pantego (99-3461)
39. New 230 kV Line 9491 (Temp) - Morrisville to Anderson Branch
40. Morrisville Substation Terminal Equipment Upgrade
41. Anderson Branch Substation Terminal Equipment Upgrade

Transmission Line Upgrade Component

Component title	Line 299 Rebuild - Marsh Run to Remington CT (99-3154)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	299
Point A	Marsh Run
Point B	Remington CT
Point C	
Terrain description	The project is a short span in the northern Virginia Region. The area is semi suburban. There are a few minor arterial roads, and some wetland features. There are elevation changes along the route with the highest being approximately 334 feet and the lowest being approximately 275 feet.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	2-636.0 ACSR (24/7) 150°C MOT [0.53 Miles], 2-795.0 ACSS (45/7) 175°C MOT [0.03 Miles], 2-545.6 ACAR (15/7) 90°C MOT [1.07 Miles], 2-795.0 ACSS (45/7) 150°C MOT [0.08 Miles]
Hardware plan description	New hardware will be used for line rebuild.

Tower line characteristics	Existing Structures will be removed and new structures will be used for this rebuild.	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000
Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT	
Shield wire size and type	DNO-11410 shield wire	
Rebuild line length	1.71	
Rebuild portion description	EXISTING FACILITIES TO BE REMOVED: 1. Remove two (2) existing dead-end double-circuit steel monopole structures. 2. Remove two (2) existing suspension double-circuit steel monopole structures. 3. Remove three (3) existing dead-end double-circuit steel tower structures. 4. Remove four (4) existing suspension double-circuit steel tower structures. 5. Removal of approximately 1.02 miles of 2-795 ACSS (45/7) conductor. 6. Removal of approximately 1.07 miles of 2-545.6 ACAR (15/7) conductor (Line 299). 7. Removal of approximately 0.53 miles of 2-636 ACSR (24/7) conductor (Line 299). 8. Removal of approximately 0.33 miles of 2-795 ACSR (26/7) conductor Line 280). 9. Removal of approximately 0.09 miles of 45/45MM2 OPT-GW (36) shield wire. 10. Removal of approximately 2.95 miles of DNO-10100 shield wire (Lines 299 & 280). MODIFICATIONS TO EXISTING FACILITIES: 1. Transfer the existing 3-phase conductor (one set) and shield wire (one set) on structures 299/12 and 299/13 for each structure (Line 2077) 2. Modify one structure (299/1) with the following assemblies: a. Six (6) of crossing conductor strain assemblies (32.338) b. Two (2) of OPGW strain assemblies (96.061) c. Two (2) of OPGW splices (96.601) 3. Modify two structures (280/11 and 299/17) with the following assemblies: a. Three (3) of crossing conductor strain assemblies (32.338) b. One (1) of OPGW strain assemblies (96.061) c. One 1 of OPGW splices (96.601) 4. Modify two structures (299/15 and 299/16) with the following assemblies: a. Three (3) of bundled suspension conductor assembly (32.610) b. One (1) of OPGW suspension assembly (96.010) 5. Modify two structures (299/11 and 299/14) with the following assemblies: a. Six (6) of bundled strain conductor assemblies (32.630) b. Three (3) of conductor jumper loop assemblies (39.227) c. Two (2) of OPGW strain assemblies (96.060) PERMANENT FACILITIES TO BE INSTALLED: Refer to "993154 Scope, One lines & Site Plan" for complete rebuild description.	

Right of way	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$9,222,106.00
Component cost (in-service year)	$9,876,875.53

Substation Upgrade Component

Component title	Marsh Run Substation (99-3154)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Marsh Run
Substation zone	353

Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. Four (4), 230kV, 4000A DEB Switches. 3. Three (3), 180 kV MO (S), 144 kV MCOV Surge Arrester. 4. Three (3), 230kV Capacitor Coupling Voltage Transformers. 5. Approximately 200FT of 5 in. SCH 40 AL tube bus. 6. Conductors, connectors, conduit, foundation, steel, control cables, and grounding material as needed per engineering standards. Remove Substation Material: 1. Two (2), 230kV, 50kAIC, 3000A, SF6 Circuit Breaker. 2. Four (4), 230kV, 2000A Center Break Switches. 3. Three (3), 230kV Capacitor Coupling Voltage Transformers. 4. Approximately 200 FT of 3 ½ in tube bus. 5. Conductors, connectors, conduit, foundation, steel, control cables, and grounding material as needed per engineering standards. Purchase & Install Relay Material: 1. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel. 2. Two (2), 4510 - SEL-2411 Equipment Annunciator. 3. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel. 4. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box. 5. One (1), 4506 - 3Ø CCVT Potential Makeup Box 6. Retire (3) Panels.

Transformer Information

None

New equipment description	1. Two (2), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. Four (4), 230kV, 4000A DEB Switches. 3. Three (3), 180 kV MO (S), 144 kV MCOV Surge Arrester. 4. Three (3), 230kV Capacitor Coupling Voltage Transformers. 5. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel. 6. Two (2), 4510 - SEL-2411 Equipment Annunciator. 7. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel. 8. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box. 9. One (1), 4506 - 3Ø CCVT Potential Makeup Box.
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation thus it has been omitted from the submittal.
Real-estate description	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$2,534,905.50
Component cost (in-service year)	$2,714,883.26

Substation Upgrade Component

Component title	Remington CT (99-3154)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Remington CT
Substation zone	353
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. Four (4), 230kV, 4000A DEB Switches. 3. Three (3), 180 kV MO (S), 144 kV MCOV Surge Arrester. 4. Approximately 200FT of 5 in. SCH 40 AL tube bus. 5. Conductors, connectors, conduit, foundation, steel, control cables, and grounding material as needed per engineering standards. Remove Substation Material: 1. Two (2), 230kV, 50kAIC, 3000A, SF6 Circuit Breaker. 2. Four (4), 230kV, 2000A Center Break Switches. 3. Three (3), 180kV MO (S), 144 kV MCOV Surge Arrester. 4. Approximately 200 FT of 3 ½ in tube bus. 5. Conductors, connectors, conduit, foundation, steel, control cables, and grounding material as needed per engineering standards. Purchase & Install Relay Material: 1. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel. 2. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel. 3. Two (2), 4510 - SEL-2411 Equipment Annunciator. 4. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box.

Transformer Information

None

New equipment description	1. Two (2), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. Four (4), 230kV, 4000A DEB Switches. 3. Three (3), 180 kV MO (S), 144 kV MCOV Surge Arrester. 4. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel. 5. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel. 6. Two (2), 4510 - SEL-2411 Equipment Annunciator. 7. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box.
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation thus it has been omitted from the submittal.
Real-estate description	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$2,439,971.80
Component cost (in-service year)	$2,613,210.01

Transmission Line Upgrade Component

Component title	Line 2161 Upgrade - Gainesville to Wheeler (99-3203)

Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Line 2161
Point A	Gainesville
Point B	Wheeler
Point C	
Terrain description	This project is in the piedmont region of Virginia. It crosses Fauquier and Prince William Counties. These areas range from heavily treed to dense residential. There is a slope change of approximately 100 feet. The line also crosses Lake Manassas.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	1272 ACSR (45/7) 150°C MOT
Hardware plan description	Existing hardware for the reconductoring portion will be reused. Hardware being reused assumed to be in good condition. New hardware will be used for the rebuild portion.
Tower line characteristics	Existing structures will remain for the reconductoring portion. Structures are assumed to be in good condition.
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000

Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT
Shield wire size and type	(2) DNO-10410 shield wire

Rebuild line length	6.11 Miles
Rebuild portion description	EXISTING FACILITIES TO BE REMOVED: 1. Remove (4) existing single circuit galvanized steel suspension monopole structures. 2. Remove (15) existing single circuit concrete suspension monopole structures. 3. Remove (9) existing single circuit galvanized steel double deadend monopole structures. 4. Remove (1) existing single circuit 3 pole galvanized steel switch structure. 5. Remove (3) existing single circuit 2 pole galvanized steel switch structures. 6. Remove approx. 2.04 miles of 2-636 ACSR (24/7) conductor from structures 2161/1 to 2161/19. 7. Remove approx. 4.07 miles of 1-1272 ACSR (45/7) conductor from structures 2161/19 to 2161/56. 8. Remove approx. 2.80 miles of (1) DNO-10585 from structure 2161/19 to 2161/45. MODIFICATIONS TO EXISTING FACILITIES: 1. Remove and replace (6) 230kV strain conductor assemblies per structure with new 230kV strain assemblies. a. Structures 2161/2, 3, 5-8, 13-15, and 19 2. Remove and replace (3) 230kV suspension conductor assemblies per structure with new 230kV suspension assemblies. 3. Remove and replace (3) 230kV strain conductor assemblies per structure with new 230kV strain assemblies. 4. Remove and replace (4) existing switches. 5. Cut and transfer the existing (2) DNO-10585 OPGW conductor on ahead side of structure 2161/46 onto the ahead side of new structure 2161/46. PERMANENT FACILITIES TO BE INSTALLED: 1. Install (18) 230 kV double circuit engineered steel suspension structures on foundations as follows: a. Structures 2161/20-28, 30-33, and 39-43 2. Install (4) 230 kV double circuit engineered steel double deadend structures on foundations as follows: a. Structures 2161/29, 34, 35 and 55 3. Install (1) 230kV double circuit steel engineered double deadend 2 pole structures on foundations as follows: a. Structures 2161/49 4. Install (6) 230kV double circuit engineered steel H-frame structures on foundations as follows: a. Structures 2161/36-38, 44-46 i. Structures 2161/37 and 2161/45 will need provisions for the in-service pole to tap into Linton Hall DP and Atlantic DP. 5. Install (4) 230kV single circuit self-supporting switch structures on foundations as follows: a. Structures 2161/36A, 38A, 44A, and 45B 6. Install approx. 6.11 miles of single circuit 3-phase 2-768.2 ACSS/TW/HS conductor from structure 2161/1 inside of Wheeler Substation to 2161/56 inside of Gainesville Substation. 7. Install approx. 2.8 miles of two (2) DNO-11410 OPGW from structure 2161/19 to 2161/46.
Right of way	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$29,099,220.00
Component cost (in-service year)	$31,165,264.62

Substation Upgrade Component

Component title	Gainesville Substation Terminal Equipment Uprate (99-3203)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Gainesville
Substation zone	353
Substation upgrade scope	Purchase & Install Substation Material: 1. One (1), 230kV, 4000A, 80kAIC, SF6 Circuit Breaker 2. Two (2), 230kV, 4000A Center Break Switches 3. One (1), 230kV Capacitively Coupled Voltage Transformers 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards Remove Substation Material: 1. One (1), 230kV, 3000A, 63kAIC, SF6 Circuit Breaker 2. Two (2), 230kV, 3000A Center Break Switches 3. One (1), 230kV, Capacitively Coupled Voltage Transformers 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards Purchase & Install Relay Material 1. One (1), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 2. One (1), 4510 – SEL-2411 Equipment Annunciator 3. One (1), 4526_A – Circuit Breaker Fiber Optic Makeup Box 4. One (1), 4507 - 1Ø CCVT MU Box

Transformer Information

None

New equipment description	1. One (1), 230kV, 4000A, 80kAIC, SF6 Circuit Breaker 2. Two (2), 230kV, 4000A Center Break Switches 3. One (1), 230kV Capacitively Coupled Voltage Transformers 4. One (1), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 5. One (1), 4510 – SEL-2411 Equipment Annunciator 6. One (1), 4526_A – Circuit Breaker Fiber Optic Makeup Box 7. One (1), 4507 - 1Ø CCVT MU Box
Substation assumptions	1. The scope of work depicted on the drawings assumes no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the feasibility of the scope was reasonable, thus the GA has been omitted from the submittal.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$1,779,500.00
Component cost (in-service year)	$1,905,844.50

Substation Upgrade Component

Component title	Trident Substation Relay Reset (99-3203)

Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Trident
Substation zone	353
Substation upgrade scope	Purchase & Install Substation Material: None Purchase & Install Relay Material: 1. (2), Relay Reset

Transformer Information

None

New equipment description	NA
Substation assumptions	1. The scope of work depicted on the drawings assumes no overlap with other designs and construction activities, except as mentioned in this Project Summary.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$33,576.40
Component cost (in-service year)	$35,959.90

Substation Upgrade Component

Component title	Wheeler Substation Terminal Equipment Upgrade (99-3203)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Wheeler
Substation zone	353
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 4000A, 80kAIC, SF6 Circuit Breaker 2. Five (5), 230kV, 4000A Center Break Switches 3. One (1), 230kV, 4000A Wave Trap 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards Remove Substation Material: 1. Two (2), 230kV, 3000A, 63kAIC, SF6 Circuit Breaker 2. Five (5), 230kV, 3000A Center Break Switches 3. One (1), 230kV, 3000A Wave Trap 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards Purchase & Install Relay Material 1. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 2. Two (2), 4510 – SEL-2411 Equipment Annunciator 3. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A, 80kAIC, SF6 Circuit Breaker 2. Five (5), 230kV, 4000A Center Break Switches 3. One (1), 230kV, 4000A Wave Trap 4. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 5. Two (2), 4510 – SEL-2411 Equipment Annunciator 6. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box
Substation assumptions	1. The scope of work depicted on the drawings assumes no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation thus it has been omitted from the submittal.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$2,248,333.60
Component cost (in-service year)	$2,407,965.71

Transmission Line Upgrade Component

Component title	Lines 213/225 Rebuild - Thelma to Lakeview (99-3412)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Lines 213 & 225
Point A	Thelma
Point B	Lakeview
Point C	
Terrain description	The project area is in Halifax, NC in the Northern Coastal Plains region with elevations ranging from approximately 80 to 225 feet. The terrain is predominately vegetated existing right-of-way and urban development consisting of moderate slopes. The double-circuit line will cross no primary roads, 2 sections of railroad tracks, 1 creek crossing, and 7 crossings of inlets of the Roanoke River.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	1033 ACSR (45/7) 90°C MOT

Hardware plan description	New hardware will be used for line rebuild.
Tower line characteristics	Existing Structures will be removed and new structures will be used for this rebuild.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000

Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT
Shield wire size and type	(2) DNO-10410 shield wire
Rebuild line length	8.62 Miles
Rebuild portion description	EXISTING FACILITIES TO BE REMOVED: 1. Remove fifty-six (56) existing double circuit steellattice tower structures as follows: a. Structure 213/1-35 and 213/38-58 2. Remove two (2) existing double circuit steel monopole structures as follows: a. Structures 213/36 and 213/37 3. Remove approximately 8.62 miles of 1033 ACSR (45/7) 90 MOT conductor from structure 213/1 to 213/58 4. Remove approximately 8.62 miles of two (2) 3#6 Alumoweld shield wire from structure 213/1 to 213/58 PERMANENT FACILITIES TO BE INSTALLED: 1. Install forty-seven (46) 230 kV steel tangent monopole structures [Reference Drawing 12.610] on foundations as follows: a. Structures 213/2, 4, 6-17, 19-28, 30-32, 34-37, 39-49, 51-52, and 54-55 2. Install seven (7) 230 kV steel deadend monopole structures [Reference Drawing 12.614] on foundations as follows: a. Structures 213/1, 18, 33, 50, 53, and 57-58 3. Install four (4) 230 kV steel two-pole deadend structures [Reference Drawing 12.235] on foundations as follows: a. Structures 213/3, 5, 29, and 56 4. Install approximately 8.62 miles of 2-set 3-phase 2-768.2 ACCS/TW/HS 250 MOT conductor from structure 213/1A to 213/58 5. Install approximately 8.62 miles of two (2) DNO-11410 shield wire from structure 213/1A to 213/58 a. This includes splices on structures 213/19, 33, 50
Right of way	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$44,688,380.00
Component cost (in-service year)	$47,861,254.98

Substation Upgrade Component

Component title	Thelma Substation Terminal Equipment Upgrade (99-3412)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Thelma
Substation zone	362
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 4000A Wave Traps 2. Four (4), 230kV, 4000A Double End Break Switches 3. Three (3), 230kV Capacitively Coupled Voltage Transformers 4. Approximately 100 FT of 5” SCH 40 bus. 5. Foundation and Steel Structures as required. 6. Conductors connectors, conduit, control cables, and grounding material as necessary per engineering standards. Remove Substation Material: 1. One (1), 230kV, 1600A Wave Trap 2. One (1), 230kV, 2000A Wave Trap 3. Four (4), 230kV, 3000A Center Break Switches 7. Three (3), 230kV Capacitively Coupled Voltage Transformers 4. Foundations and steel Structures as required. 5. Conductors connectors, conduit, control cables, and grounding material as necessary per engineering standards. Purchase & Install Relay Material: 1. One (1), 1340 – 24” Dual SEL 411L DCB/PLC Line Pnl 2. One (1), 4506 – 3Ø CCVT Potential Makeup Box

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A Wave Traps 2. Four (4), 230kV, 4000A Double End Break Switches 3. Three (3), 230kV Capacitively Coupled Voltage Transformers 4. One (1), 1340 – 24” Dual SEL 411L DCB/PLC Line Pnl 5. One (1), 4506 – 3Ø CCVT Potential Makeup Box
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. 4-hole pad connections must be replaced with 6-hole pad connections to maintain 4000A ratings. 3. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$2,297,148.20
Component cost (in-service year)	$2,460,245.51

Substation Upgrade Component

Component title	Lakeview Substation Terminal Equipment Upgrade (99-3412)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Lakeview
Substation zone	362
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 4000A, Wave Traps 2. Two (2), 230kV, 4000A Double End Break Switches 3. Three (3), 180 kV MO (S), 144 kV MCOV Station Class Surge Arresters 4. Three (3), 230kV Capacitively Coupled Voltage Transformers 5. Approximately 500 FT of 5” SCH 40 bus. 6. Foundation and Steel Structures as required. 7. Conductors connectors, conduit, control cables, and grounding material as necessary perengineering standards. Remove Substation Material: 1. One (1), 230kV, 1600A Wave Trap 2. One (1), 230kV, 3000A Wave Trap 3. Two (2), 230kV, 2000A Center Break Switches 4. Three (3), 230kV Capacitively Coupled Voltage Transformers 5. Approximately 500 FT of 3.5” SCH 40 bus. 6. Foundations and steel Structures as required. 7. Conductors connectors, conduit, control cables, and grounding material as necessary perengineering standards. Purchase & Install Relay Material: 1. One (1), 4506 – 3Ø CCVT Potential Makeup Box

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A, Wave Traps 2. Two (2), 230kV, 4000A Double End Break Switches 3. Three (3), 180 kV MO (S), 144 kV MCOV Station Class Surge Arresters 4. Three (3), 230kV Capacitively Coupled Voltage Transformers 5. One (1), 4506 – 3Ø CCVT Potential Makeup Box
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. 4-hole pad connections must be replaced with 6-hole pad connections to maintain 4000A ratings. 3. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$1,724,857.30
Component cost (in-service year)	$1,847,321.85

Transmission Line Upgrade Component

Component title	Line 238 Rebuild - Carson to Clubhouse (99-3415)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Line 238
Point A	Carson
Point B	Sapony
Point C	Clubhouse
Terrain description	The project area is in the central Virginia Piedmont region with elevations ranging from approximately 90 to 220 feet. The terrain is predominately vegetated existing right-of-way with several areas of dense residential development consisting of minimal slopes. The line will include new crossings of Norfolk Southern railroad, Route 58, Rowanty Creek, Stony Creek, Sappony Creek, Harris Swamp, Three Creek, Maclins Creek, and the Nottoway River within existing right-of-way.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	2-721 ACAR (18/19) 90°C MOT

Hardware plan description	New hardware will be used for line rebuild.
Tower line characteristics	Existing Structures will be removed and new structures will be used for this rebuild.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000
Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT	
Shield wire size and type	(2) DNO-10410 shield wire	
Rebuild line length	28.51 Miles	

Rebuild portion description	EXISTING FACILITIES TO BE REMOVED: 1. Remove two hundred thirty-seven (237) existing single circuit wood 2-pole H-frame suspension structures. 2. Remove three (3) existing wood 3-pole double deadend structures. 3. Remove one (1) existing wood 2-pole H-frame double deadend structure. 4. Remove two (2) existing wood 2-pole H-Frame running angle structures. 5. Remove one (1) concrete 2-pole H-frame deadend structure. 6. Remove one (10) steel 2-pole H-frame structures. 7. Remove approx. 1.25 miles of 636 2-ACSR (24/7) “Rook” conductor from structure 238/01A to 238/09. 8. Remove approx. 27.5 miles of 721 1-ACAR (18/19) conductor from structure 238/09- 238/263A. 9. Remove approx. 27.5 miles of existing (1) MM2 (26/39) 555 fiber optic cable from structure 238/09-238/263A. 10. Remove approx. 27.5 miles of existing (1) 3 no.6 Alumoweld shield wire from structures 238/09-238/263A. 11. (11) additional structures not shown in the PLS model. See conceptual design note 7. MODIFICATIONS TO EXISTING FACILITIES: 1. Install approx. 1.25 miles of new 2-768 ACSS/TW/HS (20/7) “Maumee” conductor from existing structures 238/01A to 238/09. PERMANENT FACILITIES TO BE INSTALLED: 1. Install two hundred forty-six (238) 230 kV steel tangent H-Frame with crossbrace structures [Reference Drawing 12.160] on foundations as follows: a. Structures 238/11-32, 34-56, 58-79, 81-102, 104-105, 107-109, 112-129, 131-155, 157177, 179-199, 201-220, 222-243, and 245-261 2. Install fifteen (15) 230kV steel H-frame (0-15°) deadend structures [Reference Drawing 12.165] on foundations as follows: a. Structures 238/10, 57, 80, 103, 106, 110, 111, 130, 156, 178, 200, 221, 244, 262, and 263 3. Install one (1) 3-pole (0-90°) deadend structure [Reference Drawing 12.158] on foundations as follows: a. Structure 238/33 4. Install approximately 27.5 miles of 2-768 ACSS/TW/HS (20/7) “Maumee” conductor from structures 238/09-238/263A. 5. Install approximately 27.5 miles of two (2) DNO-11410 OPGW from structure 238/09 to 238/263A. 6. 11 additional structures not shown in the PLS model. See conceptual design note 7.
Right of way	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$113,454,460.00
Component cost (in-service year)	$121,509,726.66

Substation Upgrade Component

Component title	Carson Substation Terminal Equipment Upgrade (99-3415)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Carson
Substation zone	357
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker 2. Four (4), 230kV, 4000A Center Break Switches 3. One (1), 230kV, 4000A Wave Trap 4. Bus, foundations, steel, conductors, connectors, conduit, control cables, and grounding material as necessary per engineering standards Remove Substation Material: 1. Two (2), 230kV, 40kAIC, 3000A, SF6 Circuit Breaker 2. One (1), 230kV, 2000A Wave Trap 3. Four (4), 230kV, 3000A, Center Break Switches 4. Bus, foundations, steel, conductors, connectors, conduit, control cables, and grounding material as necessary per engineering standards Purchase & Install Relay Material: 1. Two (2), 4510 – SEL-2411 Equipment Annunciator 2. Two (2), 1511 – 24” Dual SEL-351 Transmission Breaker w/o Reclosing Panel 3. One (1), 1340 – 24” Dual SEL-411L DCB/PLC Line Panel 4. Two (2), 4526_D – C.B. w/ BCM Fiber Optic Makeup Box 5. Three (3), Panel Retirements

Transformer Information

None

New equipment description	1. Two (2), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker 2. Four (4), 230kV, 4000A Center Break Switches 3. One (1), 230kV, 4000A Wave Trap 4. Two (2), 4510 – SEL-2411 Equipment Annunciator 5. Two (2), 1511 – 24” Dual SEL-351 Transmission Breaker w/o Reclosing Panel 6. One (1), 1340 – 24” Dual SEL-411L DCB/PLC Line Panel 7. Two (2), 4526_D – C.B. w/ BCM Fiber Optic Makeup Box
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation thus it has been omitted from the submittal.

Real-estate description	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$2,367,849.10
Component cost (in-service year)	$2,535,966.28

Substation Upgrade Component

Component title	Clubhouse Substation Terminal Equipment Upgrade (99-3415)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Clubhouse
Substation zone	362

Substation upgrade scope	Purchase & Install Substation Material: 1. One (1), 230kV, 80kA, 4000A SF6 Circuit Breaker 2. One (1), 230kV, 4000A Wave Trap 3. Two (2), 230kV, 4000A Center Break Switches 4. Three (3), 230kV Capacitively Coupled Voltage Transformers 5. Approximately 650 FT of 5” SCH 40 bus 6. Conductors, connectors, foundation, steel, conduit, control cables, and grounding material as necessary per engineering standards. Remove Substation Material: 1. One (1), 230kV, 40kA, 3000A SF6 Circuit Breaker 2. One (1), 230kV, 3000A Wave Trap 3. Two (2), 230kV, 3000A Center Break Switches 4. Three (3), 230kV Capacitively Coupled Voltage Transformers 5. Approximately 650 FT of 3.5” SCH 40 bus 6. Conductors, connectors, foundation, steel, conduit, control cables, and grounding material as necessary per engineering standards. Purchase & Install Relay Material: 1. One (1), 4510 – SEL-2411 Equipment Annunciator 2. One (1), 1511 – 24” Dual SEL-351 Transmission Breaker w/o Reclosing Panel 3. One (1), 4526_D – C.B. w/ BCM Fiber Optic Makeup Box 4. One (1), 4506 – 3 PH CCVT MU Box 5. One (1), Panel Retirement

Transformer Information

None

New equipment description	1. One (1), 230kV, 80kA, 4000A SF6 Circuit Breaker 2. One (1), 230kV, 4000A Wave Trap 3. Two (2), 230kV, 4000A Center Break Switches 4. Three (3), 230kV Capacitively Coupled Voltage Transformers 5. One (1), 4510 – SEL-2411 Equipment Annunciator 6. One (1), 1511 – 24” Dual SEL-351 Transmission Breaker w/o Reclosing Panel 7. One (1), 4526_D – C.B. w/ BCM Fiber Optic Makeup Box 8. One (1), 4506 – 3 PH CCVT MU Box
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation, thus it has been omitted from the submittal.
Real-estate description	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$1,779,500.00
Component cost (in-service year)	$1,905,844.50

Transmission Line Upgrade Component

Component title	Line 2003 Reconductoring - Chesterfield to Tyler & Locks to Poe (99-3416)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Line 2003
Point A	Chesterfield
Point B	Poe
Point C	
Terrain description	Refer to "993416 Real Estate and Permitting summary" for Terrain description.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	2-636 ACSR (24/7) 150°C MOT [2.58 miles], 2-721 ACAR (18/19) 90°C MOT [7 miles]
Hardware plan description	The Existing 230kV Line 2003 consists of single circuit monopoles, as well as double circuit monopole and tower structures. Between Locks Substation and structure 2003/108 (2002/74) junction, Line 2003 occupies one side of the double circuit tower structures, while the other side remains vacant. Line 2003 shares structures with Line 205 from Chesterfield Substation to Locks Substation, and with Line 2002 from the structure 2003/108 (2002/74) junction to Poe Substation.
Tower line characteristics	Existing structures will be reused.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000
Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT	
Shield wire size and type	DNO-11410 shield wire & 7#7 Alumoweld	
Rebuild line length	9.58 Miles	
Rebuild portion description	Refer to "993416_Scope & One line" for complete conceptual scope of work.	
Right of way	Existing Right-of-Way shall be used.	
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Component Cost Details - In Current Year $		
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	

Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$23,772,250.01
Component cost (in-service year)	$25,460,079.75

Substation Upgrade Component

Component title	Chesterfield Substation Relay Reset (99-3416)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Chesterfield
Substation zone	357
Substation upgrade scope	Relay Reset Only

Transformer Information

None

New equipment description	NA
Substation assumptions	1. Relay Settings and protection & control design will be revised as part of the SPE scope of work. 2. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$19,210.00
Component cost (in-service year)	$20,573.91

Substation Upgrade Component

Component title	Poe Substation Terminal Equipment Upgrade (99-3416)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Poe
Substation zone	357
Substation upgrade scope	Purchase and install substation material: 1. Two (2), 230kV, 4000A Double End Break Switches 2. One (1), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker 3. One (1), 230kV, 4000A, Vertical Break Motor Operated Line Switch with Interrupter 4. One (1), 230kV, 4000A, Wave Trap 5. Four (4), 230kV Coupling Capacitor Voltage Transformer 6. Approximately 500 FT. of 5 in. Sch. 40 AL tube and connectors. 7. Foundations and steel structures as required. 8. Conductor and connectors as necessary per engineering standards. Remove substation material: 1. One (1), 230kV, 2000A Center Break Switch 2. One (1), 230kV, 3000A Center Break Switch 3. One (1), 230kV, 50kAIC, 2000A, SF6 Circuit Breaker 4. One (1), 230kV, 2000A, Vertical Break Motor Operated Line Switch with Interrupter 5. One (1), 230kV, 3000A Wave Trap 6. Four (4), 230kV Coupling Capacitor Voltage Transformer 7. Approximately 500 FT. of 3-1/2 in. Sch. 40 AL tube and connectors. 8. Foundations and steel structures as required. 9. Existing conductor and connectors as required. Reuse relay material: 1. One (1), 1511 – 24” Dual SEL-351 Transmission Breaker w/o Reclosing Panel Purchase and install relay material: 1. One (1), 4506 – 3Ø CCVT Potential Makeup Box 2. One (1), 4507 – 1Ø CCVT Potential Makeup Box 3. One (1), 4510 – SEL-2411 Equipment Annunciator 4. One (1), 4526_A – Circuit Breaker Fiber Optic Makeup Box 5. One (1), 4548 – Non-Earthing Switch MOAB Control Box

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A Double End Break Switches 2. One (1), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker 3. One (1), 230kV, 4000A, Vertical Break Motor Operated Line Switch with Interrupter 4. One (1), 230kV, 4000A, Wave Trap 5. Four (4), 230kV Coupling Capacitor Voltage Transformer
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$1,786,839.10
Component cost (in-service year)	$1,913,704.57

Substation Upgrade Component

Component title	Tyler Substation Terminal Equipment Upgrade (99-3416)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Substation name	Tyler
Substation zone	357
Substation upgrade scope	Purchase and install substation material: 1. Two (2), 230kV, 4000A, Vertical Break Line Switches with interrupter 2. Conductor and connectors as necessary per engineering standards. Remove substation material: 1. Two (2), 230kV, 3000A, Vertical Break Line Switches with interrupter 2. Existing conductor and connectors as required. Purchase and install relay material: 1. None

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A, Vertical Break Line Switches with interrupter
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$537,458.20

Component cost (in-service year)	$575,617.52

Transmission Line Upgrade Component

Component title	Line 119 Rebuild - Merck #5 to Port Republic (99-3435)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Line 119
Point A	Merck #5
Point B	Port Republic
Point C	
Terrain description	Refer to section A.5 of 993435 Real Estate and Permitting Summary.
Existing Line Physical Characteristics	
Operating voltage	115
Conductor size and type	477 ACSR (26/7) 150°C MOT
Hardware plan description	New hardware will be used for line rebuild.
Tower line characteristics	Existing Structures will be removed and new structures will be used for this rebuild.
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	115.000000	115.000000
	Normal ratings	Emergency ratings
Summer (MVA)	393.000000	393.000000
Winter (MVA)	412.000000	412.000000
Conductor size and type	1-768.2 ACSS/TW/HS (20/7) 250°C MOT	

Shield wire size and type	(2) DNO-10410 shield wire
Rebuild line length	7.59 Miles
Rebuild portion description	EXISTING FACILITIES TO BE REMOVED: 1. Remove (89) existing single circuit steel monopole suspension structures. 2. Remove (3) existing single circuit steel monopole running angle structures. 3. Remove (2) existing single circuit steel monopole deadend structures. 4. Remove (5) existing single circuit steel 2 pole h-frame suspension structures. 5. Remove (3) existing single circuit steel 2 pole h-frame DDE structures. 6. Remove (1) existing single circuit steel 3 pole running angle structures. 7. Remove (1) existing single circuit steel 3 pole dead end structures. 8. Remove approx. 7.69 miles of 477 ACSR (26/7) 150 MOT conductor from structure 119/305 to 119/411A. 9. Remove approx. 7.69 miles of two (2) 3#6 Alumoweld shield wire from structure 119/305 to 119/411A. MODIFICATIONS TO EXISTING FACILITIES: 1. Replace six (6) existing 115kV conductor strain insulator assemblies with six (6) 115kV bundled conductor crossing strain assemblies as follows: a. Three (3) per structure at structures 119/305, 306 2. Replace thirty (30) existing 115kV conductor strain insulator assemblies with thirty (30) 115kV bundled conductor strain assemblies as follows: a. (6) per structure at structures 119/338C, 339, 340, 340B b. (3) per structure at structures 119/306, 411A 3. Replace (30) existing shield wire strain insulator assemblies with thirty (30) OPGW strain assemblies as follows: a. (2) per structure at structures 119/305, 338A, 339A, 340A, 411A b. (4) per structure at structures 119/306, 338C, 339, 340, 340B 4. Replace all jumpers and risers attached to the conductor spans between existing switch structures 119/338C to 119/340B with 1-768.2 ACSS/TW/HS (20/7) 250 MOT "Maumee". PERMANENT FACILITIES TO BE INSTALLED: 1. Install (93) double circuit 115 kV steel monopole tangent structures on foundations as follows: a. Structures 119/307, 310-313, 315-335, 337-338, 342-346, 348-372, 374-386, 388-397, 399-410 2. Install (7) double circuit 115 kV steel monopole DDE structures on foundations as follows: a. Structures 119/307, 310-313, 315-335, 337-338, 342-346, 348-372, 374-386, 388-397, 399-410 3. Install (4) double circuit steel 2 pole deadend structures on foundations with standard 115kV phase spacing as follows: a. Structures 119/308, 309, 314, 398 4. Install approx. 7.69 miles of 3-phase 1-768.2 ACSS/TW/HS (20/7) 250 MOT conductor from structure 119/305 to 119/411A. 5. Install approx. 7.69miles of two (2) DNO-11410 OPGW from structure 119/305 to 119/411A.
Right of way	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$41,871,590.00
Component cost (in-service year)	$44,844,472.89

Substation Upgrade Component

Component title	Merck #5 Substation Equipment Upgrade (99-3435)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Merck #5
Substation zone	DOM
Substation upgrade scope	Purchase & Install Substation Material: 1. One (1), 115V, 2000A, Wave Trap 2. Two (2), 115kV, 2000A Center Break Switches 3. Foundation and Steel Structures as required. 4. Conductors, connectors, conduit, control cables, and grounding material as necessary per engineering standards. Remove Substation Material: 1. One (1), 115kV, 1600A Wave Trap 2. Two (2), 115kV, 1200A Center Break Switches 3. Foundations and steel Structures as required. 4. Conductors, connectors, conduit, control cables, and grounding material as necessary per engineering standards. Purchase & Install Relay Material 1. Relay Reset Only

Transformer Information

None

New equipment description	1. One (1), 115V, 2000A, Wave Trap 2. Two (2), 115kV, 2000A Center Break Switches

Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation thus it has been omitted from the submittal.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$458,688.20
Component cost (in-service year)	$491,254.85

Transmission Line Upgrade Component

Component title	Line 2002 Reconductoring - Carson to Poe (99-3460)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Line 2002
Point A	Carson

Point B	Poe
Point C	
Terrain description	The project area is in the central Virginia Piedmont region with elevations ranging from approximately 145 to 175 feet. The terrain is predominately vegetated existing right-of-way with several areas of dense residential development consisting of minimal to moderate slopes. The line will include new crossings of Interstate 95, Arthur Swamp, Blackwater Swamp, and Blackwater Creek, and three new crossings of CSX railroad, within existing right-of-way.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	2-721 ACAR (18/19) 90°C MOT [11.53], 2-636 ACSR (24/7) 150°C MOT [1.15]
Hardware plan description	Existing hardware will be reuses, and are assumed to be in good condition.
Tower line characteristics	Existing Structures will be reused.
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000

Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT
Shield wire size and type	Existing Shield Wire
Rebuild line length	12.68 Miles
Rebuild portion description	Refer to "993460_Scope & One Line" for complete description.
Right of way	Existing Right-of-Way shall be used.

Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$30,294,280.01
Component cost (in-service year)	$32,445,173.88

Substation Upgrade Component

Component title	Carson Substation Terminal Equipment Upgrade (99-3460)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Carson
Substation zone	357

Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 4000A Center Break Switches. 2. One (1), 230kV, 4000A Wave Trap. 3. Three (3), 230kV, Capacitively Coupled Voltage Transformers 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards. Remove Substation Material: 1. Two (2), 230kV, 3000A Center Break Switches. 2. One (1), 230kV, 2000A Wave Trap. 3. Three (3), 230kV, Capacitively Coupled Voltage Transformers 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards. Purchase & Install Relay Material 1. One (1), Relay Reset.

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A Center Break Switches. 2. One (1), 230kV, 4000A Wave Trap. 3. Three (3), 230kV, Capacitively Coupled Voltage Transformers
Substation assumptions	1. The scope of work depicted on the drawings assumes no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation thus it has been omitted from the submittal.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Total component cost	$892,240.90
Component cost (in-service year)	$955,590.11

Substation Upgrade Component

Component title	Poe Substation Terminal Equipment Upgrade (99-3460)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Poe
Substation zone	357
Substation upgrade scope	Purchase & Install Substation Material 1. One (1), 230kV, 4000A Wave Trap 2. One (1), 230kV, 4000A Vertical Break Line Switch with Motor Operator 3. Four (4), 230kV, Capacitively Coupled Voltage Transformers 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards. Remove Substation Material 1. One (1), 230kV, 3000A Wave Trap 2. One (1), 230kV, 2000A Vertical Break Line Switch with Motor Operator 3. Four (4), 230kV, Capacitively Coupled Voltage Transformers 4. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards. Purchase & Install Relay Material 1. One (1) - (4506) - 3Ø CCVT MU Box 2. One (1) - (4507) - 1Ø CCVT MU Box 3. One (1) - (4548) - Non-Earthing Switch MOAB Control Box 4. One (1) - Relay reset

Transformer Information

None

New equipment description	1. One (1), 230kV, 4000A Wave Trap 2. One (1), 230kV, 4000A Vertical Break Line Switch with Motor Operator 3. Four (4), 230kV, Capacitively Coupled Voltage Transformers
Substation assumptions	1. The scope of work depicted on the drawings assumes no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any additional equipment or equipment relocation thus it has been omitted from the submittal.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$814,665.50
Component cost (in-service year)	$872,506.22

Greenfield Transmission Line Component

Component title	New 230 kV Line - Nokesville to Hornbaker (99-3457)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Point A	Nokesville
Point B	Hornbaker
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000
Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT	

Nominal voltage	AC
Nominal voltage	230
Line construction type	Overhead
General route description	The proposed project includes the addition of a 230kV transmission line on existing structures on Dominion Energy owned property located in Prince William County Virginia. Depending on the final route, the line will cross multiple roadways and possibly one highway, however, as the property is still under routing review, conditions are not yet available.
Terrain description	The terrain is predominately forested/vegetated with little to no slope with palustrine wetlands depending on final route.
Right-of-way width by segment	The line addition will take place within approximately 7.6 miles of a Dominion Energy owned right of way. The structures leading from Nokesville to Hornbaker substation is in a predominantly rural area but may be near a small residential neighborhood. The project area is in the Piedmont region with elevations ranging from approximately 200 to 1500 feet about sea level. The region is characterized by rolling hills that slope eastward from the Blue Ridge to the Fall Line.
Electrical transmission infrastructure crossings	NA
Civil infrastructure/major waterway facility crossing plan	Refer to section A.5 of 993457 Real Estate and Permitting Summary.
Environmental impacts	Refer to section A.4 of 993457 Real Estate and Permitting Summary.
Tower characteristics	MODIFICATIONS TO EXISTING FACILITIES: 1. Install six (6) 230kV bundled conductor strain insulator assemblies [32.630] on the vacant arm side only on approximately twenty-seven (27) structures. 2. Install three (3) 230kV bundled conductor strain insulator assemblies [32.630] and three (3) 230kV bundled conductor crossing strain insulator assemblies [32.338] on the vacant arm side only on two (2) structures. 3. Install three (3) 230kV bundled conductor crossing strain insulator assemblies [32.338] on two (2) backbone structures. 4. Install three (3) 230kV bundled conductor I-string suspension assemblies [32.610] on the vacant arm side only on approximately thirty-five (35) structures. PERMANENT FACILITIES TO BE INSTALLED: 1. Install approximately 7.5 miles of 3-phase twin bundled (2) 768.2 ACSS/TW/HS (20/7) “Maumee” conductor from Nokesville Substation to Hornbaker Substation on the vacant arms of the structures installed as part of Project 993027.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$15,283,540.00
Component cost (in-service year)	$16,368,671.34

Substation Upgrade Component

Component title	Nokesville Substation Terminal Equipment Upgrade (99-3457)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Nokesville
Substation zone	353
Substation upgrade scope	Purchase & Install Substation Material: 1. Three (3), 230kV Capacitively Coupled Voltage Transformers 2. Three (3), 180kV MO (S), 144kV MCOV, Surge Arrestors 3. Two (2), 230kV, 4000A, Double End Break Switches 4. One (1), 230kV, 4000A, 80kA, SF6 Circuit Breaker 5. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards. Purchase & Install Relay Material: 1. One (1), 4510 - SEL-2411 Equipment Annunciator 2. One (1), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 3. One (1), 1340 – 24” Dual SEL-411L DCB/PLC Line Panel 4. One (1), 4526_A - Circuit Breaker Fiber Optic Makeup Box 5. One (1), 4506 – 3Ø CCVT Potential Makeup Box

Transformer Information

None

New equipment description	1. Three (3), 230kV Capacitively Coupled Voltage Transformers 2. Three (3), 180kV MO (S), 144kV MCOV, Surge Arrestors 3. Two (2), 230kV, 4000A, Double End Break Switches 4. One (1), 230kV, 4000A, 80kA, SF6 Circuit Breaker
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$1,426,157.30
Component cost (in-service year)	$1,527,414.15

Substation Upgrade Component

Component title	Hornbaker Substation Terminal Equipment Upgrade (99-3457)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Substation name	Hornbaker
Substation zone	353
Substation upgrade scope	Purchase & Install Substation Material: 1. Three (3), 230kV Capacitively Coupled Voltage Transformers 2. Three (3), 180kV MO (S), 144kV MCOV, Surge Arresters 3. Two (2), 230kV, 4000A, Double End Break Switches. 4. One (1), 230kV, 4000A, 80kA, SF6 Circuit Breaker. 5. Conductor, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards. Purchase & Install Relay Material: 1. One (1), 4510 - SEL-2411 Equipment Annunciator 2. One (1), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 3. One (1), 1340 – 24” Dual SEL-411L DCB/PLC Line Panel 4. One (1), 4526_A — Circuit Breaker Fiber Optic Makeup Box 5. One (1), 4506 – 3Ø CCVT Potential Makeup Box

Transformer Information

None

New equipment description	1. Three (3), 230kV Capacitively Coupled Voltage Transformers 2. Three (3), 180kV MO (S), 144kV MCOV, Surge Arresters 3. Two (2), 230kV, 4000A, Double End Break Switches. 4. One (1), 230kV, 4000A, 80kA, SF6 Circuit Breaker.
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$1,426,157.30
Component cost (in-service year)	$1,527,414.15

Greenfield Transmission Line Component

Component title	New 230 kV Line - Elmont to Ladysmith (99-3407)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Point A	Elmont
Point B	Ladysmith
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000

Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT
Nominal voltage	AC
Nominal voltage	230
Line construction type	Overhead
General route description	The new 230 kV line will share the same 5-2 structures and route as existing Line 574. The line will come into Elmont Substation by connecting to the open arms on the 2075 structure outside the fence and connecting to the open bay on the existing backbone. The line will be routed to the open side of the line 2089 backbone within Ladysmith Substation.

Terrain description	The project is located just west of I-95 near the Fall Line between the Piedmont region and the Coastal Plain, specifically in western Caroline and western Hanover Counties. The land is mostly a mix of rural and suburban residential but as it moves south towards Elmont, the suburban areas increase and it becomes less rural. There are numerous stream and wetlands crossings, minor arterial road crossings, and two railroad crossings as well. There are elevation changes along the route with the highest being approximately 320 feet and the lowest being approximately 180 feet.
Right-of-way width by segment	Existing Right-of-Way will be used.
Electrical transmission infrastructure crossings	To be determined in detailed design.
Civil infrastructure/major waterway facility crossing plan	Refer to section A.5 of 993407 Real Estate and Permitting Summary.
Environmental impacts	Refer to section A.4 of 993407 Real Estate and Permitting Summary.
Tower characteristics	EXISTING FACILITIES TO BE REMOVED: 1. Remove (1) steel static pole structure 2089/1A. 2. Remove approx. 0.15 miles of 7#7 Alumoweld shield wire. a. 0.05 miles from structure 568/258 to structure 2089/1A. b. 0.04 miles from structure 2089/1A to structure 2089/1 (2XXX/128). c. 0.06 miles from structure 2089/1 (2XXX/128) to structure 568/258. MODIFICATIONS TO EXISTING FACILITIES: 1. Transfer (1) existing shield wire span from the left davit arm on structure 2075/2 (2XXX/2) to the pole shaft. 2. Install (6) strain conductor assemblies, three (3) post insulators (32.645) and three (3) jumper loops on 18 structures. 3. Install (3) strain conductor assemblies, three (3) strain conductor crossing assemblies, three (3) post insulators (32.645), and three (3) jumper loops (39.227) on 3 structures. 4. Install three (3) strain conductor crossing assemblies on existing backbones 2075/1 (2XXX/1) and 2089/1 (2XXX/128). 5. Install three (3) suspension v-string conductor assemblies 101 on structures. 6.Install three (3) shield wire uninsulated DE assemblies. 7. Install (4) shield wire insulated DE assemblies. 8. Install (2) pole bands. PERMANENT FACILITIES TO BE INSTALLED: 1. Install three (3) 230kV single circuit engineered steel double deadend 3-pole structures (12.159) as follows: a. Structures 2XXX/4, 2XXX/5 and 2XXX/127. 2. Install one (1) 230 kV single circuit engineered steel double deadend monopole structure (12.425) as follows: a. Structure 2XXX/3 3. Install approximately 26.38 miles of double bundled 768.2 ACSS/TW/HS “Maumee” from structure 2075/1 (2XXX/1) to structure 2089/1 (2XXX/128). 4. Install approximately 0.31 miles of single 7#7 Alumoweld shield wire. 5. Install approximately 0.18 miles of double 7#7 Alumoweld shield wire. a. Install 0.18 miles from structure 2075/1 (2XXX/1) to structure 2XXX/4. b. Install 0.13 miles from structure 2XXX/5 to structure 574/2 (2XXX/6). 5. Install approximately 0.18 miles of double 7#7 Alumoweld shield wire. a. Install 0.12 miles from structure 2XXX/4 to structure 2XXX/5. b. Install 0.06 miles from structure 2XXX/127 to structure 2089/1 (2XXX/128).
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$26,085,270.00
Component cost (in-service year)	$27,937,324.17

Substation Upgrade Component

Component title	Elmont Substation Terminal Equipment Upgrade (99-3407)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Elmont
Substation zone	355
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 80kAIC, 4000A Circuit Breaker. 2. Four (4), 230kV, 4000A, Double End Break Switch. 3. Three (3), 180kV MO(S), 144kV MCOV Surge Arrester 4. Three (3), 230 kV, Coupling Capacitor Voltage Transformers 5. Conductors, Connectors, Control Cable, Conduit, Foundations, Steel Structures, insulators, and grounding as required per engineering standards. Remove Substation Material: 1. One (1), 230kV, 63kAIC, 3000A Circuit Breaker 2. Two (2), 230kV 3000A Center Break Switch 3. Conductors, Connectors, Control Cable, Conduit, Foundations, Steel Structures, insulators, and grounding as required per engineering standards. Purchase & Install Relay Material: 1. Two (2), 4510 - SEL-2411 Equipment Annunciator 2. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 3. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel 4. One (1), 4506 – 3Ø CCVT Potential Makeup Box 5. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box 6. One (1), Panel Retirement

Transformer Information

None

New equipment description	1. Two (2), 230kV, 80kAIC, 4000A Circuit Breaker. 2. Four (4), 230kV, 4000A, Double End Break Switch. 3. Three (3), 180kV MO(S), 144kV MCOV Surge Arrester 4. Three (3), 230 kV, Coupling Capacitor Voltage Transformers
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$2,188,500.00
Component cost (in-service year)	$2,343,884.00

Substation Upgrade Component

Component title	Ladysmith Substation Terminal Equipment Upgrade (99-3407)

Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Ladysmith
Substation zone	355
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2) 230kV, 4000A, 80kA, SF6 Circuit Breakers. 2. Four (4) 230kV, 4000A Double End Break Switches. 3. Three (3) 230kV, Capacitor Coupling Voltage Transformers. 4. Bus, fence, roadway, conductors, connectors, conduit, control cable, foundations, structures, and grounding material as per engineering standards. Relocate Substation Material: 1. Station Service 3 Purchase & Install Relay Material: 1. One (1), 1340 – 28” Dual SEL-411L DCB/Fiber Line Panel 2. One (1), 4506 – 3Ø CCVT Potential Makeup Box 3. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 4. Two (2), 4510 - SEL-2411 Equipment Annunciator 5. Two (2), 4526_D – CB w/ BCM Fiber Optic Makeup Box

Transformer Information

None

New equipment description	1. Two (2) 230kV, 4000A, 80kA, SF6 Circuit Breakers. 2. Four (4) 230kV, 4000A Double End Break Switches. 3. Three (3) 230kV, Capacitor Coupling Voltage Transformers.
Substation assumptions	1. The scope of work depicted on the drawings assumes no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Expansion will be required to accommodate a total of three (3) new 230kV strings of breaker and a half scheme.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$8,722,456.40
Component cost (in-service year)	$9,341,751.00

Greenfield Transmission Line Component

Component title	New 230 kV Line - Ox to Cloverhill (99-3398)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Point A	Ox
Point B	Cloverhill
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000

Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT
Nominal voltage	AC
Nominal voltage	230
Line construction type	Overhead

General route description	This project will be completed by: • Installing approximately 11 miles of new 230 kV line 2XXX from Cloverhill Substation to the vicinity of existing structure 183/85. Double circuit monopoles will be utilized for this portion of the project with empty davit arms on one side to support future needs of an additional circuit. • Stringing approximately 13.5 miles of conductor wire from structure 183/85 to Ox Substation for termination, using the existing Line #183 tower structures rebuilt by previously accepted project 992867. o This proposal will seek to use the empty davit arms installed along the Line #183 structures by previously accepted project 992867. • Wrecking and rebuilding approximately 6.83 miles of line 183 from structure 183/133 (near Minnieville DP) to Ox Substation. Double circuit monopoles and H-frames will be used to support lines 183 and 2XXX. Project 993398 will install 2-768.2 kcmil ACSS/TW/HS “Maumee” conductor and two (2) DNO-11410 OPGW. These distances are based on approximate linear distance between substations and will vary due to the entrance into the stations.
Terrain description	The project area is in the northern Virginia Piedmont region with elevations ranging from approximately 168 to 298 feet. The terrain is suburban with some ability to parallel existing rights of way. This will have multiple stream crossings.
Right-of-way width by segment	The existing ROW spacing is assumed to be insufficient due to blowout clearances, and 25 feet of new ROW will need to be acquired from 183/134 to Ox Substation. A 100 ft new Right-of-Way shall be acquired for 11 miles between Cloverhill Substation and Bristers Junction. A land rights review will be required for detailed engineering.
Electrical transmission infrastructure crossings	To be determined in detailed design.
Civil infrastructure/major waterway facility crossing plan	Refer to section A.5 of 993398 Real Estate and Permitting Summary.
Environmental impacts	Refer to section A.4 of 993398 Real Estate and Permitting Summary.
Tower characteristics	• Installing approximately 11 miles of new 230 kV line 2XXX from Cloverhill Substation to the vicinity of existing structure 183/85. Double circuit monopoles will be utilized for this portion of the project with empty davit arms on one side to support future needs of an additional circuit. • Stringing approximately 13.5 miles of conductor wire from structure 183/85 to Ox Substation for termination, using the existing Line #183 tower structures rebuilt by previously accepted project 992867. o This proposal will seek to use the empty davit arms installed along the Line #183 structures by previously accepted project 992867. • Wrecking and rebuilding approximately 6.83 miles of line 183 from structure 183/133 (near Minnieville DP) to Ox Substation. Double circuit monopoles and H-frames will be used to support lines 183 and 2XXX. Project 993398 will install 2-768.2 kcmil ACSS/TW/HS “Maumee” conductor and two (2) DNO-11410 OPGW. These distances are based on approximate linear distance between substations and will vary due to the entrance into the stations.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$287,543,900.00
Component cost (in-service year)	$307,959,516.90

Substation Upgrade Component

Component title	Ox Substation Terminal Equipment Upgrade (99-3398)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Ox
Substation zone	352
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 4000A, 80kAIC SF6 Circuit Breakers. 2. Three (3), 230kV Coupling Capacitor Voltage Transformers. 3. Three (3), 180kV, MO (S), 144kV MCOV Surge Arresters. 4. Four (4), 230kV, 4000A Center Break Switch. 5. Three (3), Security Level 1 Super Post Structures 6. One (1), 230kV, Heavy Duty, Double Circuit Steel Backbone (By Transmission) 7. Approximately 800 ft of 5 in. Sch 40 AL tube bus. 8. Approximately 450 ft of Security level 1 fencing. 9. Conductors, connectors, conduit, control cables, foundation, steel, and grounding as required er engineering standards. Removal Substation Material: 1. Approximately 400 ft of Security level 1 fencing. Purchase & Install Relay Material: 1. Two (2), 4510 – SEL-2411 Equipment Annunciator 2. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 3. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel 4. One (1), 4506 - 3Ø CCVT Potential Makeup Box 5. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A, 80kAIC SF6 Circuit Breakers. 2. Three (3), 230kV Coupling Capacitor Voltage Transformers. 3. Three (3), 180kV, MO (S), 144kV MCOV Surge Arresters. 4. Four (4), 230kV, 4000A Center Break Switch. 5. Three (3), Security Level 1 Super Post Structures
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$6,366,177.00
Component cost (in-service year)	$6,818,176.00

Substation Upgrade Component

Component title	Cloverhill Substation Terminal Equipment Upgrade (99-3398)

Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Cloverhill
Substation zone	353
Substation upgrade scope	Purchase & Install Substation Material: 1. Two (2), 230kV, 4000A, 80kAIC SF6 Circuit Breakers. 2. Three (3), 230kV Coupling Capacitor Voltage Transformers. 3. Three (3), 180kV, MO (S), 144kV MCOV Surge Arresters. 4. Four (4), 230kV, 4000A Center Break Switch. 5. Approximately 1,200 ft of 5 in. Sch 40 AL tube bus. 6. Approximately 250 ft gravel road. 7. Conductors, connectors, conduit, control cables, foundation, steel, and grounding as required er engineering standards. Relocate Substation Material: 1. Three (3), 100kVA Station Service Potential Voltage Transformers. 2. One (1), 230kV Coupling Capacitor Voltage Transformer Remove Substation Material: 1. Two (2), 230kV, 3000A Center Break Switches. 2. One (1), 230kV 3000A 50kAIC Circuit Breaker. 3. Approximately 300 ft of gravel road. 4. Approximately 1,200 ft of 5 in. Sch 40 AL tube bus. 5. Conductors, connectors, conduit, control cables, foundation, steel, and grounding as required er engineering standards. Purchase & Install Relay Material: 1. Two (2), 4510 – SEL-2411 Equipment Annunciator 2. Two (2), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 3. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel 4. One (1), 4506 - 3Ø CCVT Potential Makeup Box 5. Two (2), 4526_A – Circuit Breaker Fiber Optic Makeup Box 6. One (1), Panel Retirement

Transformer Information

None

New equipment description	1. Two (2), 230kV, 4000A, 80kAIC SF6 Circuit Breakers. 2. Three (3), 230kV Coupling Capacitor Voltage Transformers. 3. Three (3), 180kV, MO (S), 144kV MCOV Surge Arresters. 4. Four (4), 230kV, 4000A Center Break Switch.
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$2,271,798.00
Component cost (in-service year)	$2,433,096.00

Greenfield Transmission Line Component

Component title	New 230 kV Line - Raines to Cloud (99-3258)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Point A	Raines
Point B	Cloud
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000

Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT
Nominal voltage	AC
Nominal voltage	230
Line construction type	Overhead

General route description	FACILITIES TO BE INSTALLED 1. Install twenty-three (23) 230kV DC Engineered Monopole DDE Structures. (12.614) 2. Install ninety (90) 230kV DC Engineered Monopole Suspension Structures with arms. (12.610) 3. Install two (2) 230kV DC Engineered H-Frame Structures. (12.221) 4. Install four (4) 230kV DC Engineered Backbone Structures (12.901) 5. Install two (2) Engineered Static Poles (9.008) 6. Install two circuits of approximately 15.5 miles of 3-phase 2-768.2 ACSS/TW/HS “Maumee” conductor. 7. Install approximately 15.5 miles of (2) DNO-11410 fiber optic wire. 8. This estimate includes ten (12) splice points.
Terrain description	The project is in the southwest region of Virginia, specifically Mecklenburg. The eastern end is mostly suburban, but as it moves west the more rural. There are numerous stream and wetlands crossing as well as minor arterial roads. There are elevation changes along the route with the highest being approximately 400 feet and the lowest being approximately 264 feet.
Right-of-way width by segment	This project requires the acquisition of new ROW as follows: 1. Additional 100ft width required for 15.5 miles.
Electrical transmission infrastructure crossings	To be determined in detailed design.
Civil infrastructure/major waterway facility crossing plan	Refer to section A.5 of 993203 Real Estate and Permitting Summary.
Environmental impacts	Refer to section A.4 of 993203 Real Estate and Permitting Summary.
Tower characteristics	FACILITIES TO BE INSTALLED 1. Install twenty-three (23) 230kV DC Engineered Monopole DDE Structures. (12.614) 2. Install ninety (90) 230kV DC Engineered Monopole Suspension Structures with arms. (12.610) 3. Install two (2) 230kV DC Engineered H-Frame Structures. (12.221) 4. Install four (4) 230kV DC Engineered Backbone Structures (12.901) 5. Install two (2) Engineered Static Poles (9.008) 6. Install two circuits of approximately 15.5 miles of 3-phase 2-768.2 ACSS/TW/HS “Maumee” conductor. 7. Install approximately 15.5 miles of (2) DNO-11410 fiber optic wire. 8. This estimate includes ten (12) splice points.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$77,502,632.01
Component cost (in-service year)	$83,005,318.89

Substation Upgrade Component

Component title	Cloud Substation Terminal Equipment Upgrade (99-3258)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Cloud
Substation zone	358
Substation upgrade scope	Purchase & Install Substation Material: 1. One (1), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. Two (2), 230kV, 4000A, Double End Break Switches. 3. Three (3), 230kV Coupling Capacitor Voltage Transformers. 4. Three (3), 180 kV MO(s), 144 kV MCOV Surge Arrester. 5. Conductors, connectors, conduit, foundation, steel, control cables, and grounding materials as needed per engineering standards. Purchase & Install Relay Material: 1. One (1), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 2. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel 3. One (1), 4506 – 3Ø CCVT Potential Makeup Box 4. One (1), 4510 - SEL-2411 Equipment Annunciator 5. One (1), 4526_A – Circuit Breaker Fiber Optic Makeup Box

Transformer Information

None

New equipment description	1. One (1), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. Two (2), 230kV, 4000A, Double End Break Switches. 3. Three (3), 230kV Coupling Capacitor Voltage Transformers. 4. Three (3), 180 kV MO(s), 144 kV MCOV Surge Arrester.
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any equipment relocation thus it has been omitted from the submittal.

Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$1,426,157.30
Component cost (in-service year)	$1,527,414.00

Substation Upgrade Component

Component title	Raines Substation Terminal Equipment Upgrade (99-3258)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Raines
Substation zone	358

Substation upgrade scope	Purchase & Install Substation Material: 1. One (1), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. One (1), 230kV, 4000A, Center break switch. 3. Three (3), 230kV Coupling Capacitor Voltage Transformers. 4. Conductors, connectors, conduit, foundation, steel, control cables, and grounding materials as needed per engineering standards. Purchase & Install Relay Material: 1. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel 2. One (1), 1510 – 24” Dual SEL-351 Transmission Breaker w/ Reclosing Panel 3. One (1), 4510 - SEL-2411 Equipment Annunciator 4. One (1), 4506 – 3Ø CCVT Potential Makeup Box 5. One (1), 4526_A – Circuit Breaker Fiber Optic Makeup Box

Transformer Information

None

New equipment description	1. One (1), 230kV, 80kAIC, 4000A, SF6 Circuit Breaker. 2. One (1), 230kV, 4000A, Center break switch. 3. Three (3), 230kV Coupling Capacitor Voltage Transformers.
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work. 3. It was determined that the GA would not need any equipment relocation thus it has been omitted from the submittal.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Total component cost	$1,315,442.70
Component cost (in-service year)	$1,408,839.00

Transmission Line Upgrade Component

Component title	Line 121 Reconductoring - Poe to Prince George (993444)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Line 121
Point A	Poe
Point B	Prince George
Point C	
Terrain description	The project area is in the Virginia Piedmont region with elevations ranging from approximately 108 to 154 feet. The terrain is predominately vegetated and wetland existing right-of-way consisting of minimal to moderate slopes. The line will include new crossings of Interstate 295, CSX Railroad, Norfolk Southern Railroad, numerous secondary roads, Blackwater Swamp, Branch Mill Creek, and Fort Gregg-Adams.
Existing Line Physical Characteristics	
Operating voltage	115
Conductor size and type	1-636.0 ACSR (24/7) [0.31 miles], 1-336.4 ACSR (26/7) [3.14 miles], 1-571.5 ACSS/TW/HS (18/7) [2.14 miles]
Hardware plan description	Existing hardware is assumed to be in good condition.
Tower line characteristics	Existing structures are assumed to be in good condition.
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings

Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000
Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT	
Shield wire size and type	(1) DNO-10410 shield wire and (1) 7#7 Alumoweld fiber wire	
Rebuild line length	5.59 miles	
Rebuild portion description	EXISTING FACILITIES TO BE REMOVED: 1. Remove one (1) existing 115 kV 3C Mast Backbone Structure as follows: a. Structures 121/1 (106/ 1B, 15/1A) 2. Remove approximately 0.31 miles of 1-636 ACSR (24/7) conductor as follows: a. Structure 121/1 - 121/7 3. Remove approximately 3.14 miles of 1-336.4 ACSR (26/7) conductor as follows: a. 0.48 miles from structures 121/7 - 121/12 b. 0.18 miles from structures 121/12 - 121/13 c. 2.48 miles from structures 121/13 - 121/30 (97/80) 4. Remove approximately 2.14 miles of 1-571.5 ACSS/TW/HS (18/7) conductor as follows: a. 0.16 miles from structures 121/30 (97/80) - 121/31 (97/81) b. 0.75 miles from structures 121/31 (97/81) - 121/38 (97/88) c. 0.33 miles from structures 121/38 (97/88) - 121/39 (97/89) d. 0.90 miles from structures 121/39 (97/89) - 121/46 (97/96) EXISTING FACILITIES TO BE MODIFIED: 1. Install three (3) 230kV conductor strain assemblies (32.338), one (1) OPGW shield assemblies (42.011) and one (1) fiber assemblies (96.061) on the following structures: a. Structures 121/1 PERMANENT FACILITIES TO BE INSTALLED: 1. Install one (1) 230 kV steel pole double circuit DDE structure [Reference Drawing 12.425] on foundation as follows: a. Structure 121/2XX 2. Install one (1) 230 kV single circuit heavy duty backbone [Reference Drawing 12.905] with 40’-0” separation between pole on foundation as follows: a. Structure 121/1 3. Install approximately 5.6 miles of 3-phase 2-768.2 ACSS/TW (20/7) “Maumee” 250°C conductor as follows: a. Structures 121/1- 121/46A 4. Install approximately 0.10 miles of DNO-11410 shield wire as follows: a. Structures 121/1 - 121/2XX 5. Install approximately 0.10 miles of 7#7 Alumoweld fiber wire as follows: a. Structures 121/1 - 121/2XX	
Right of way	An existing right of way width of 100’ is assumed based on map viewer extents provided by Dominion. It is assumed that the right-of-way may need to be extended on the northern side.	
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Component Cost Details - In Current Year $		
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.	

ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$14,621,080.01
Component cost (in-service year)	$15,659,176.68

Substation Upgrade Component

Component title	Poe Substation Upgrade (99-3444)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Poe
Substation zone	357

Substation upgrade scope	Purchase and install substation material: 1. Approximately 61’ x 88’ 230 kV GIS building including the following: a. Five (5), 230kV, 80 kAIC, 4000A, Circuit Breakers (with provision for eight (8) additional breakers) b. Thirteen (13), 230 kV, 4000A, Group Operated Disconnect Switches w/grounding switches as required (with the provision for three (3) additional switches) c. Three (3), 230 kV, 4000A, Line Terminal equipment d. Provision for one (1) 230 kV future line terminal e. One (1), 230-115 kV, Transformer terminal equipment f. One (1), 230-36.5 kV, Transformer terminal equipment g. Gas Insulated Bus, connectors, gas to air bushings as required 2. Three (3), 230 kV, CCVT’s, Relay Accuracy 3. Three (3), 180 kV, 144 kV MCOV Surge Arresters 4. Site development and access roads as required 5. Structural steel and foundations as per Dominion Energy Standards 6. Conductor, connectors, conduits, control cables, foundations, and grounding material as per engineering standards 7. One (1), 230 kV Backbone structure (by Transmission) 8. One span of shield wires (by Transmission) Purchase and install relay material: 1. Two (2), 1110 – 24” SEL-587Z/351A Transmission Bus Panel 2. One (1), 4515 – 3Ø Transmission Bus Potential Makeup Box 3. Five (5), 1511 – 24” Single SEL-351 Transmission Breaker w/o Reclosing Panel 4. Five (5) 1516 – 24” Single SEL-351 500kV Transmission Breaker w/o Reclosing Panel 5. One (1), 1340 – 24” Dual SEL-411L CD/Fiber Line Panel 6. Three (3), 1816 – 24” SEL-787 Gas Zone Differential Panel 7. One (1), 4506 – 3Ø CCVT Potential Makeup Box w/ Metering (P4) 8. One (1), 5609 – Fiber Optic Management Panel

Transformer Information

None

New equipment description	1. Approximately 61’ x 88’ 230 kV GIS building including the following: a. Five (5), 230kV, 80 kAIC, 4000A, Circuit Breakers (with provision for eight (8) additional breakers) b. Thirteen (13), 230 kV, 4000A, Group Operated Disconnect Switches w/grounding switches as required (with the provision for three (3) additional switches) c. Three (3), 230 kV, 4000A, Line Terminal equipment d. Provision for one (1) 230 kV future line terminal e. One (1), 230-115 kV, Transformer terminal equipment f. One (1), 230-36.5 kV, Transformer terminal equipment g. Gas Insulated Bus, connectors, gas to air bushings as required 2. Three (3), 230 kV, CCVT’s, Relay Accuracy 3. Three (3), 180 kV, 144 kV MCOV Surge Arresters
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$38,280,952.15
Component cost (in-service year)	$40,998,899.59

Substation Upgrade Component

Component title	Prince George Substation Upgrade (99-3444)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Prince George
Substation zone	357
Substation upgrade scope	Refer to Scope of Work document for completed description.

Transformer Information

None

New equipment description	1. Two (2), 230kV Backbone Structures (by Transmission) 2. Six (6), 230kV, 4000A, 63 kA, SF6 Circuit Breakers 3. Thirteen (13), 230kV, 4000A, Double end break switches 4. Fourteen (14), 230kV Relay Class CCVTs 5. Twelve (12), 180kV MO, Station Class, 144kV MCOV Arresters 6. One (1), 115kV Backbone Structures (by Transmission) 7. One (1), 115kV, 3000A, 40 kA, SF6 Circuit Breakers 8. Five (5), 115kV, 2000A Center Break Switches 9. Three (3), 115kV, Relay Class CCVTs 10. One (1), 115kV, 2000A, Wave Trap 11. Six (6), 90kV MO, Station Class, 74kV MCOV Arresters 12. Four (4), 167kVA, 66.39kV-0.125/0.25kV, SSVT 13. One (1), 24'x80' Control Enclosure 14. One (1), 125VDC, 577Ah Battery 15. 230 16. Two (2), 125VDC, 50A Battery Chargers
Substation assumptions	1. The scope of work depicted on the drawings assumes that there is no overlap with other designs and construction activities, except if mentioned in this Project Summary. 2. Relay Settings and P&C design will be revised as part of the SPE Scope of Work.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$26,624,773.40
Component cost (in-service year)	$28,515,132.72

Transmission Line Upgrade Component

Component title	Line 1031 Rebuild - Terra to Pantego (99-3461)
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Impacted transmission line	Line 1031
Point A	Terra
Point B	Pantego
Point C	
Terrain description	The project area is in Beaufort County, NC in the Northern Coastal Plains region with elevations ranging from approximately 3 to 15 feet. The terrain is predominately flat farmland with the transmission line running parallel to the railroad for most of the project area. This line will cross 1 NC Highway, no railroad tracks, and 1 crossing of Pantego Creek.
Existing Line Physical Characteristics	
Operating voltage	115
Conductor size and type	768.2 ACSR/TW/HS (20/7) 250°C MOT [0.15], 4/0 ACSR (6/1) 90°C MOT [8.59]
Hardware plan description	New hardware will be used for line rebuild.
Tower line characteristics	Existing Structures will be removed and new structures will be used for this rebuild.
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	115.000000	115.000000
	Normal ratings	Emergency ratings
Summer (MVA)	393.000000	393.000000
Winter (MVA)	412.000000	412.000000
Conductor size and type	1-768.2 ACSS/TW/HS (20/7) 250°C MOT	

Shield wire size and type	DNO-11410 shield wire
Rebuild line length	8.59 Miles
Rebuild portion description	EXISTING FACILITIES TO BE REMOVED: 1. Remove one hundred ten (110) existing single circuit wood/concrete monopole structures as follows: a. Eighty-three (83) wood tangent structures 1031/220-221, 223-230, 233-253, 256-263, 265-276, 279-283, 285-295, 300, 305, 307-311, 316-320, 322-325 and 327 b. One (1) wood deadend structure 1031/303 c. Three (3) weathering steel tangent structures 1031/222, 264 and 306 d. Nine (9) concrete tangent structures 1031/232, 254-255, 277-278, 284, 312 and 314-315 e. Fourteen (14) concrete deadend structures 1031/231, 285, 296-299, 301-302, 304, 313, 321, 326, 328-329 2. Remove approximately 8.59 miles of 4/0 ACSR (6/1) conductor from structure 1031/219 to structure 1031/329. 3. Remove approximately 8.72 miles of single (1) 3#6 Alumoweld shield wire from structure 1031/217 to structure 1031/331. 4. Remove 7#7 Alumoweld shield wire as follows: a. Approximately 0.09 miles from structure 1031/217 to structure 1031/219 b. Approximately 0.05 miles from structure 1031/329 to structure 1031/331 5. Remove shield wire strain assemblies from structures as follows: a. Two (2) from structures 1031/218-219 and 330 b. One (1) from structures 1031/217 and 331 MODIFICATIONS TO EXISTING FACILITIES: 1. Transfer the existing 3-phase conductor on the ahead side of existing structure 1031/329 to the ahead side of proposed structure 1031/329. 2. Install OPGW strain assemblies on structures as follows: a. Two (2) on structures 1031/218-219 and 330 b. One (1) on structures 1031/217 and 331 PERMANENT FACILITIES TO BE INSTALLED: 1. Install ninety-four (94) 115 kV single circuit steel suspension monopole structures [Reference Drawing 11.420] on foundations as follows: a. Structures 1031/220-230, 232-251, 253-284, 286-295, 300, 305-312, 314-320, 322-325 and 327 2. Install sixteen (16) 115 kV single circuit steel DDE monopole structures [Reference Drawing 11.430] on foundations as follows: a. Structures 1031/231, 252, 285, 296-299, 301-304, 313, 321, 326 and 328-329 3. Install approximately 8.59 miles of single circuit 3-phase 768.2 ACSS/TW/HS (20/7) “Maumee” conductor from structure 1031/219 to structure 1031/329. 6. Install approximately 8.74 miles of single (1) DNO-11410 OPGW from structure 1031/217 to structure 1031/331. a. This includes splices on structures 1031/217, 219, 231, 252, 285, 299, 321, 329 and 331.
Right of way	Existing Right-of-Way shall be used.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$29,374,180.00
Component cost (in-service year)	$31,459,746.78

Greenfield Transmission Line Component

Component title	New 230 kV Line 9491 (Temp) - Morrisville to Anderson Branch
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Point A	Morrisville
Point B	Anderson Branch
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000

Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT
Nominal voltage	AC
Nominal voltage	230
Line construction type	Overhead
General route description	The existing tower structures currently supporting the Bristers to Morrisville 500 kV Line #545 will be used to support this new line as shared tower structures.

Terrain description	The project area is in the northern Virginia Piedmont region with elevations ranging from approximately 190 to 430 feet. The terrain is predominately vegetated existing right-of-way and urban development consisting of moderate slopes. The line will include a crossing of Route 17, several secondary roads, several smaller streams within the existing right-of-way.
Right-of-way width by segment	The existing tower structures currently supporting the Bristers to Morrisville 500 kV Line #545 will be used to support this new line as shared tower structures.
Electrical transmission infrastructure crossings	To be determined in detailed design.
Civil infrastructure/major waterway facility crossing plan	Similar to existing Line 545.
Environmental impacts	New line will be installed on existing structures.
Tower characteristics	The existing tower structures currently supporting the Bristers to Morrisville 500 kV Line #545 will be used to support this new line as shared tower structures. The conductor used along this path will be (2) 7687.2 ACSS/TW (20/7) “MAUMEE” @ 250C MOT.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Component Cost Details - In Current Year $	
Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$5,259,500.00
Component cost (in-service year)	$5,632,924.50

Substation Upgrade Component

Component title	Morrisville Substation Terminal Equipment Upgrade
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Morrisville
Substation zone	353
Substation upgrade scope	Install (1) 230 kV breaker 63 kA breaker with associated substation equipment rated to 4000 Amp 230 kV standards via the existing 230 kV ring configuration.

Transformer Information

None

New equipment description	(1) 230 kV, 63 kA Breaker.
Substation assumptions	1. The scope of work assumes that there is no overlap with other designs and construction activities.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$950,000.00
Component cost (in-service year)	$1,017,450.00

Substation Upgrade Component

Component title	Anderson Branch Substation Terminal Equipment Upgrade
Project description	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Substation name	Anderson Branch
Substation zone	354
Substation upgrade scope	Install (1) 230 kV breaker 63 kA breaker with associated substation equipment rated to 4000 Amp 230 kV standards via the existing 230 kV ring configuration.

Transformer Information

None

New equipment description	(1) 230 kV, 63 kA Breaker.
Substation assumptions	1. The scope of work assumes that there is no overlap with other designs and construction activities.
Real-estate description	Substation is not being expanded.
Construction responsibility	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Benefits/Comments	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Component Cost Details - In Current Year $

Engineering & design	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Permitting / routing / siting	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
ROW / land acquisition	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Materials & equipment	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Construction & commissioning	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Construction management	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Overheads & miscellaneous costs	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Contingency	The redacted information is proprietary to the Company; therefore, it is privileged and confidential.
Total component cost	$950,000.00
Component cost (in-service year)	$1,017,450.00

Congestion Drivers

None

Existing Flowgates

None

New Flowgates

The redacted information is proprietary to the Company; therefore, it is privileged and confidential.

Financial Information

Capital spend start date	02/2025
Construction start date	06/2025
Project Duration (In Months)	58

Additional Comments

None