APPALACHIAN POWER COMPANY
BEFORE THE
VIRGINIA STATE CORPORATION COMMISSION
CASE NO. PUR-2021-00001

APPLICATION FOR APPROVAL AND CERTIFICATION OF ELECTRICAL TRANSMISSION LINE

Central Virginia Transmission Reliability Project

VOLUME 1 OF 4

Application, Testimony, Response to Guidelines & Exhibits

January 2021

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138 kV Siting Study	The siting study for the proposed new transmission lines from Joshua Falls to Gladstone.
ACSR	Aluminum Conductor Steel Reinforced
AEP	American Electric Power Company, Inc.(parent company of Appalachian)
AEP Criteria	The transmission reliability criteria defined in AEP's FERC Form 715 filing.
AEPSC	American Electric Power Service Corporation
APCo	Appalachian Power Company (a unit of AEP)
Appalachian	Appalachian Power Company (a unit of AEP)
Application	Collectively refers to the application requesting Commission approval for the proposed Project, together with all of the supporting testimony, Response to Guidelines, Siting Studies, VDEQ Supplements, tables, exhibits, attachments, figures and maps, etc.
BMP	Best Management Practice
CIR	Color Infrared aerial imagery
CMI	Customer Minutes of Interruptions
Company	Appalachian Power Company (a unit of AEP)
CPCN	Certificate of Public Convenience and Necessity
CR	County Road
CVEC	Central Virginia Electric Cooperative
CVTRP	Central Virginia Transmission Reliability Project
DCR	Virginia Department of Conservation and Recreation
DEM	Digital Elevation Model
DICM	Drop-In Control Module
DNH	Virginia Division of Natural Heritage
DOF	Virginia Department of Forestry (VDOF)
EMF	Electric and Magnetic Fields
EMF RAPID	Electric and Magnetic Fields Research and Public Information Dissemination
EPRI	Electric Power Research Institute
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHA	Federal Highway Administration of the United States Department of Transportation
GIS	Geographic Information System
GOAB	Gang Operated Air Brake
Hz	Herz
IARC	International Agency for Research on Cancer
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
kV	Kilovolt (1,000 volts)
kV/m	Kilovolt/Meter (a unit of measurement for electric fields)
LiDAR	Light Detection and Ranging imagery
Line	Transmission Line or Power Line

Load Area	The load area depicted on Figure 1 in Section I of the Response to Guidelines representing an aggregate load of approximately 40 MW and comprising parts of Amherst, Nelson and Albemarle Counties.
mG	Milligauss (a unit of measurement for magnetic fields)
MOAB	Motor-operated air-breaker (switches)
MVA	mega volt ampere
MVAr	mega volt amps reactive
MW	Milliwatt
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHD	National Hydrography Dataset
NHP	Natural Heritage Program of the VDCR
NIEHS	National Institute of Environmental Health Services
NLCD	National Land Cover Database
NPL	National Priority List (maintained by USEPA)
NRCS	National Resources Conservation Service of the United States Department of Agriculture
NRHP	National Register of Historic Places
NUG	Non-Utility Generator
NWI	National Wetlands Inventory (maintained by the USFWS)
OPGW	Optical Ground Wire
PJM	PJM Interconnection, L.L.C. - the RTO that coordinates the movement of wholesale electricity in parts of the Northeast, Mid-Atlantic and Midwest.
POWER	POWER Engineers, Inc.
Project	The proposed new transmission lines, new substations, substation improvements, transmission line rebuild, and other proposed work detailed in Section I of the Response to Guidelines.
RCRA	Resource Conservation and Recovery Act Information System (maintained by USEPA)
Response to Guidelines	Response to “Guidelines of Minimum Requirements for Transmission Line Applications Filed under Title 56 of the Code of Virginia.”
Rebuild Siting Study	The Siting Study for the proposed rebuild of the Amherst – Reusens 69 kV Transmission Line
ROW	Right-of-Way
ROWs	Rights-of-Way
RTO	Regional Transmission Organization
RTEP	Regional Transmission Expansion Plan
SCC	Virginia State Corporation Commission
SCENIHR	Scientific Committee on Emerging and Newly Identified Health Risks
Siting Team	A multidisciplinary team of experts in transmission line routing, impact assessment for a wide variety of natural resources and the human environment, impact mitigation, engineering, and construction management
Supplemental Work	See page 4, Section I, Response to Guidelines
TRI	Toxics Release Inventory (maintained by USEPA)

USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
USGS	United States Geological Survey
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDEQ Supplement	The analysis included in Volume 3 of this application, which addresses the environmental and historic features associated with the Project.
VDWR	Virginia Department of Wildlife Resources
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDMME	Virginia Department of Mines, Minerals and Energy
VDOA	Virginia Department of Aviation
VDOF	Virginia Department of Forestry
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
VOF	Virginia Outdoors Foundation
VPDES	Virginia Pollutant Discharge Elimination System
VRP	VDEQ's Voluntary Remediation Program
WHO	World Health Organization

Executive Summary

In order to maintain and improve the reliability of electric service to customers in its service territory, Appalachian Power Company ("Appalachian" or "Company") is seeking permission to: (a) build a new 11.1 mile long 138 kV transmission line from the Company's Joshua Falls Substation to its Riverville Substation (the "Joshua Falls–Riverville 138 kV transmission line"); (b) build a new 6.3 mile long 138 kV transmission line from the Company's Riverville Substation to Central Virginia Electric Cooperative's ("CVEC") Gladstone Substation (the "Gladstone–Riverville 138 kV transmission line"); (c) build two new 138 kV substations (the "James River 138 kV Substation" and the "Soapstone 138 kV Substation") and associated transmission line extensions; (d) expand and/or improve the Company's Riverville, Monroe, Amherst, Boxwood, Scottsville, Clifford and Joshua Falls Substations; (e) rebuild approximately 12.2 miles of the Amherst–Reusens 69 kV transmission line; and (f) install and/or upgrade other related transmission line, substation, telecommunication, and distribution facilities (collectively, the "Project"). See Exhibit 1 for a general map of the Project components, Exhibits 4 to 7 for detailed maps of the Project components, and Section I of the Response to Guidelines for a detailed description of the Project components.

The Project will address projected winter peak 2022/23 thermal and voltage violations of applicable transmission planning criteria and will provide a reinforced power supply to support electrical demand in the load area served by the Company in Amherst, Nelson and Albemarle Counties. The Project is needed to address reliability criteria violations and asset renewal needs on the existing 46 kV and 69 kV transmission system serving the Project area, and will result in the replacement of much of the existing 46 kV transmission system (built in the 1920's) with a more robust 138 kV system to provide reliable service to customers in the area.

The proposed in-service date for the Project is December 1, 2025. If the Commission approves the Project, the Company estimates that it will need approximately four years after entry of the Commission's final approving order for engineering, design, right-of-way acquisition, permitting, material procurement and construction to place the Project in service. Operational contingencies will be used temporarily to address any potential real-time issues between projected violations and estimated in-service date.

The transmission line components of the proposed 138 kV transmission lines will be built within new 100-foot-wide rights-of-way ("ROWs"), primarily using single circuit steel H-frame and 3-pole structures. The anticipated heights of the proposed 138 kV transmission line structures range between 55 and 100 feet, with an average structure height of approximately 70 feet. The anticipated James River crossing structure heights of the proposed 138 kV transmission line range from 80 feet to 120 feet, with an average height of 100 feet. The rebuild of the 69 kV transmission line will generally be placed within an 80-foot ROW, which will follow the centerline of the existing 69 kV line ROW for most of its length. With the exception of certain structures at the James River crossing, the anticipated structure heights for the 69 kV transmission line rebuild range between 50 and 90 feet, with an average structure height of approximately 65 feet. The anticipated James River crossing structure heights range from 140 feet to 160 feet, with an average height of 150 feet. Appalachian has purchased an approximately 11.2-acre parcel for the proposed James River 138 kV Substation and an approximately 111.2-acre parcel for the proposed Soapstone 138 kV Substation.

The Company contracted POWER Engineers, Inc. ("POWER") to assist with the route development and selection process for the Joshua Falls–Riverville 138 kV transmission line, the Gladstone - Riverville 138 kV transmission line, the proposed James River 138 kV Substation,

the proposed Soapstone 138 kV Substation, and the Amherst–Reusens 69 kV transmission line rebuild. Following extensive outreach, public input and analysis, the Siting Team, consisting of representatives of the Company and POWER, considered 25 possible substation sites for the two new substations, and developed four alternative routes for the proposed Joshua Falls–Riverville 138 kV transmission line, and two alternative routes for the proposed Gladstone–Riverville 138 kV transmission line. For the rebuild of the Amherst–Reusens 69 kV transmission line, the study team developed study segments for a few minor deviations from the centerline of the existing 69 kV line ROW and for the crossing of the James River.

The Company supports the Siting Team's conclusion that the proposed routes (Alternatives D and E) for the new 138 kV transmission lines from Joshua Falls to Riverville and Riverville to Gladstone are preferable to other options, because those routes, as compared to the other alternative routes considered, are the most consistent with the siting guidelines used by the Siting Team, reasonably minimize adverse impacts on area land uses and the environment, minimize special design requirements and unreasonable costs, and can be constructed and operated in a safe, timely, and reliable manner. The Company further supports the Siting Team's conclusion that the proposed route for the rebuild of the Amherst–Reusens 69 kV transmission line, which will largely be within the existing 69 kV line ROW with a few slight deviations and which will follow Alternative Route B at the crossing of the James River, is preferable to other options because it largely uses an existing ROW, avoids the Reusens Hydroelectric Dam and has fewer impacts to residences located north of the dam. The siting studies establish that, of the alternative routes considered, the proposed routes for each of the lines best address landowner input and concerns, minimize proximity to residences and visual impacts, and are the best for construction access. The siting studies, included in Volume 2 of the Application, provide a detailed description and comparison of the alternative routes.

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF

APPALACHIAN POWER COMPANY **CASE NO. PUR-2021-00001**

for Approval and Certification of the
Central Virginia Transmission Reliability Project
under Title 56 of the Code of Virginia

APPALACHIAN POWER COMPANY ("Appalachian" or the "Company"), a corporation duly organized and existing under the laws of the Commonwealth of Virginia, represents as follows:

1. Appalachian is a Virginia public service corporation providing electric service in Virginia and West Virginia and having an address of 40 Franklin Road SW, Roanoke, Virginia 24011.

2. In order to maintain and improve the reliability of electric service to customers in its service territory Appalachian Power Company ("Appalachian" or "Company") is seeking permission to: (a) build a new 11.1 mile long 138 kV transmission line from the Company's Joshua Falls Substation to its Riverville Substation (the "Joshua Falls–Riverville 138 kV transmission line"); (b) build a new 6.3 mile long 138 kV transmission line from the Company's Riverville Substation to Central Virginia Electric Cooperative's ("CVEC") Gladstone Substation (the "Gladstone–Riverville 138 kV transmission line"); (c) build two new 138 kV substations (the "James River 138 kV Substation" and the "Soapstone 138 kV Substation") and associated transmission line extensions; (d) expand and/or improve the Company's Riverville, Monroe, Amherst, Boxwood, Scottsville, Clifford and Joshua Falls Substations; (e) rebuild approximately

12.2 miles of the Amherst–Reusens 69 kV transmission line; and (f) install and/or upgrade other related transmission line, substation, telecommunication, and distribution facilities (collectively, the "Project"). See Exhibit 1 for a general map of the Project components, Exhibits 4 to 7 for detailed maps of the Project components, and Section I of the Response to Guidelines for a detailed description of the Project components. The Project is needed to address reliability criteria violations and asset renewal needs on the existing 46 kV and 69 kV transmission system serving the Project area, and will result in the replacement of much of the existing 46 kV transmission system with a more robust 138 kV system to provide reliable service to customers in the area. Because Appalachian's Project will provide 138 kV service at CVEC's Gladstone Substation, CVEC is filing a related application with the SCC for approval of its proposed upgrades to its Gladstone Substation and a rebuild of an existing 46 kV transmission line to 138 kV standards.

3. The Project will ensure adequate and reliable electric service and accommodate future growth in Amherst, Nelson and Albemarle Counties by mitigating thermal and voltage reliability criteria violations projected to affect those areas under certain N-1 and N-1-1 outage scenarios during winter 2022-23 peak loading conditions. The Project will also enhance system reliability by replacing certain assets (largely installed in the 1920's and 1940's) that are at the end of their useful lives and which have numerous open conditions.

4. The Project will require new right-of-way ("ROW") easements for the construction of the new 138 kV transmission lines between the Joshua Falls and Riverville Substations, and between the Riverville and Gladstone Substations. The Project will also include the rebuild of an existing 69 kV transmission line mostly along the centerline of the existing 69 kV ROW that has been owned and used by Appalachian for 80 years and since the 1940's. While

it is largely located in an existing ROW, some updated and supplemental ROW easements will be necessary.

5. In support of this application, the Company is filing the testimony of:

(a) Nicolas C. Koehler, P.E. as to need for the Project;

(b) Mary Jane L. McMillen, P.E., with regard to the engineering characteristics of the transmission lines associated with the Project;

(c) J. Kelly Bledsoe, P.E., with regard to the engineering characteristics of the substations associated with the Project;

(d) Xin Liu, P.E., regarding electric and magnetic field levels associated with the Project; and

(e) Emily S. Larson as to route development and certain environmental matters associated with the Project.

6. The Company is also filing: (a) a Response to Guidelines, responding to the "Guidelines of Minimum Requirements for Transmission Line Applications Filed Under Title 56 of the Code of Virginia" issued by the Commission's Division of Public Utility Regulation on August 10, 2017; (b) one siting study, one rebuild siting study, and four VDEQ supplements prepared by the Company's siting and environmental consultant, POWER Engineers, Inc.; and (c) related tables, exhibits, attachments and maps, including a digital Geographic Information System ("GIS") constraints map and GIS shapefiles of the Project via electronic filing, through the Company's iManage site.

7. The Company's testimony, Response to Guidelines, siting studies, VDEQ supplements and related materials filed with this application establish that:

(a) The Project is needed and the public convenience and necessity require the construction of the Project by Appalachian;

(b) The proposed routes for the transmission lines included in the Project reasonably minimize adverse impact on the scenic assets, historic districts and environment of the areas in which the Project will be located; and

(c) The Project is essential to ensure continued reliable electric service to Amherst, Nelson and Albemarle Counties.

8. The proposed in-service date for the Project is December 1, 2025. If the Commission approves the Project, the Company estimates that it will need approximately four years after entry of the Commission's final approving order for engineering, design, right-of-way acquisition, permitting, material procurement and construction to place the Project in service. Accordingly, the Company asks that the Commission expedite its consideration of this application to the extent permitted under applicable law.

The Company therefore requests:

(a) That this application be filed and docketed;

(b) That the Commission cause notice of this application to be given as required by Virginia Code § 56-46.1 and the Utility Facilities Act, Virginia Code §§ 56-265.1 et seq.;

(c) That the Commission Staff undertake an investigation of this application and report its findings to the Commission;

(d) That the Commission determine, as required by Virginia Code §§ 56-46.1 and 265.2, (1) that the Project is needed and the public convenience and necessity require the construction by Appalachian of the Project; and (2) that the proposed routes for the transmission

lines included in the Project reasonably minimize adverse impact on the scenic assets, historic districts and environment of the area concerned;

(e) That the Commission approve the construction of the Project pursuant to Virginia Code § 56-46.1 and any other applicable law; and

(f) That the Commission grant Appalachian a certificate of public convenience and necessity under the Utility Facilities Act and grant such other relief as may be necessary for the construction and operation of the Project.

APPALACHIAN POWER COMPANY

By: 

Of Counsel

Matthew P. Pritts, Esq. (VSB # 34628)
J. Walton Milam, III, Esq. (VSB # 89406)
Charles J. Dickenson, Esq. (VSB # 92889)
WOODS ROGERS PLC
Wells Fargo Tower, Suite 1400
P. O. Box 14125
Roanoke, VA 24038-4125
(540) 983-7600
pritts@woodsrogers.com
wmilam@woodsrogers.com
cdickens@woodsrogers.com

Noelle J. Coates, Esq. (VSB # 73578)
American Electric Power Service Corporation
3 James Center
1051 East Cary Street, Suite 1100
Richmond, VA 23219
(804) 698-5541
njcoates@aep.com
Counsel for Appalachian Power Company

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing was served by electronic mail or by hand on this 26th day of January 2021 to:

William H. Chambliss, Esq.
Office of General Counsel
State Corporation Commission
Tyler Building – 10th Floor
1300 East Main Street
Richmond, VA 23219

C. Meade Browder, Jr., Esq.
Senior Assistant Attorney General
Division of Consumer Counsel
Office of the Attorney General
202 N. 9th Street
Richmond, VA 23219

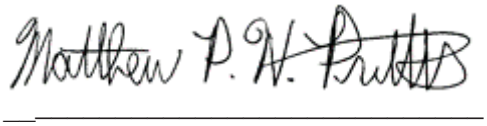


Exhibit No. ____
Witness: NCK

DIRECT TESTIMONY OF
NICOLAS C. KOEHLER, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

APCo Exhibit No. ___
Witness: NCK

SUMMARY OF DIRECT TESTIMONY OF NICOLAS C. KOEHLER, P.E.

My direct testimony supports Appalachian's Application and Response to Guidelines. I am sponsoring Exhibits 1 and 2, Section I of the Response to Guidelines (Necessity for the Project), including the associated figures and tables, and Confidential Figures 2a-C and 2b-C in Volume 4. This Project consists generally of a number of related transmission improvements that will address: (a) identified thermal and voltage violations of applicable transmission reliability criteria on the 46 kV sub-transmission facilities; and (b) certain transmission asset renewal needs, all as listed and more fully described in Section I of the Company's Response to Guidelines filed with this Application. The Project is needed to address identified voltage and thermal baseline reliability criteria violations of applicable transmission facilities associated with the Company's Clifford-Scottsville 46 kV circuit. The Project also is required to address the identified need to replace certain transmission assets due to their condition and/or performance.

The Project will move the existing load served by the 46 kV system to a more robust 138 kV system. As a result, approximately 38 miles of the 46 kV system (87% of which was originally constructed in the 1920's) will then be retired. The new 138 kV transmission line between Joshua Falls and Riverville substations will provide a new 138 kV source to the area and will loop the load at the Riverville Substation (serving the Greif Paper Mill's 45 MVA load). The Project will also add sectionalizing to the 138 kV system that will improve reliability and provide more operational flexibility for maintenance and unscheduled outages. Installing new relaying and telecommunication infrastructure will allow for better telecommunication connectivity on the transmission system to support supervisory control, data acquisition, and protection systems, resulting in improved physical security of critical assets and a reduction in Customer Minutes of Interruptions (CMI) related to transmission outages. The telecommunication system upgrades also will help the Company respond to outages faster.

The Project Alternative would be more costly and would leave in place the deteriorating 46 kV network that the Project proposes to retire. Retiring the 46 kV system reduces the number of line miles that require maintenance and inspections in the future as well as eliminating the initial capital cost of rebuilding the line as proposed in the Alternative. The proposed Project improves the ability of the transmission system in the affected load area to accommodate any potential future load growth by moving the load delivery points to 138 kV and provides the flexibility necessary to accommodate the outages needed to implement future improvements and conduct routine maintenance of transmission facilities. Section I of the Response to Guidelines provides further detail regarding the need for and benefits of the Project.

APCo Exhibit No. ___
Witness: NCK

DIRECT TESTIMONY OF
NICOLAS C. KOEHLER, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

Q: PLEASE STATE YOUR NAME, ADDRESS AND PRESENT POSITION.

A: My name is Nicolas C. Koehler. My position is Director, East Transmission Planning for American Electric Power Service Corporation ("AEPSC"). AEPSC supplies engineering, financing, accounting, planning, advisory, and other services to the subsidiaries of the American Electric Power ("AEP") system, one of which is Appalachian Power Company ("Appalachian" or "the Company"). My business address is 8600 Smiths Mill Road, New Albany, Ohio 43054.

Q: PLEASE REVIEW YOUR EDUCATIONAL BACKGROUND AND YOUR WORK EXPERIENCE.

A: I received a Bachelor of Science – Electrical Engineering degree from Ohio Northern University in Ada, Ohio. In 2008, I joined AEP as a Planning Engineer where I advanced through increasing levels of responsibility. I received my Professional Engineer license in the state of Ohio in 2012 (license number 76967). In May 2019, I assumed my current position.

Q: WHAT ARE YOUR RESPONSIBILITIES AS DIRECTOR OF EAST TRANSMISSION PLANNING?

A: My role includes organizing and managing all activities related to assessing the adequacy of AEP's transmission network to meet the needs of its customers in a reliable, cost-effective, and environmentally compatible manner. I participate in planning activities with Appalachian to address overall system performance.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support certain aspects of Appalachian's application (the "Application") to this Commission for approval and certification of the proposed Central Virginia Transmission Reliability Project, to be located in the southeastern part of Appalachian's service territory, northeast of Lynchburg, Virginia. This area encompasses transmission facilities of the Company serving industrial, commercial and residential loads in Albemarle, Nelson and Amherst Counties. This project (the "Project") consists generally of a number of related transmission improvements that will address (a) identified thermal and voltage violations of applicable transmission reliability criteria on the 46 kV sub-transmission facilities, and (b) certain transmission asset renewal needs, all as listed and more fully described in Section I of the Company's Response to Guidelines filed with the Application. In this connection, I am sponsoring a portion of the Response to Guidelines filed by Appalachian together with the Application in response to the Commission Staff's "Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia."

Q: MR. KOEHLER, SPECIFICALLY WHAT PROPOSED IMPROVEMENTS IS THE COMPANY SEEKING COMMISSION APPROVAL AND CERTIFICATION?

A: The Company is seeking approval for the baseline and supplemental work described in Section I.A of the Company's Response to Guidelines. AEP developed the Project as a comprehensive solution to address both the reliability criteria violations and the supplemental asset renewal needs. The baseline and supplemental components of the

Project (as outlined in Section I) have been presented to PJM stakeholders through PJM's Sub-Regional Regional Transmission Expansion Plan (or "RTEP") process. As part of that process, PJM presented the Project to stakeholders in an open forum to solicit comments and input. PJM has assigned project number b3208 to the baseline work and project number s2000.1 to the supplemental work.

Q: WHICH OF THE SPECIFIC MATERIALS INCLUDED IN THE RESPONSE TO GUIDELINES ARE YOU SPONSORING?

A: I am responsible for Section I, Necessity for the Proposed Project (Necessity for the Project), including the associated figures and tables and Confidential Figures 2a-C and 2b-C (included in Volume 4, the Confidential Appendix), and Exhibits 1 and 2.

Q: WERE THE PORTIONS OF APPALACHIAN'S FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE SUMMARIZE THE NEED FOR THE PROJECT.

A: AEP's comprehensive assessment of its transmission system has revealed multiple critical contingency scenarios under the projected 2022/2023 winter case from PJM's 2017 RTEP that result in thermal and voltage violations of applicable transmission reliability criteria on several transmission facilities associated with the Company's Clifford-Scottsville 46 kV circuit. The Project is required to address these identified voltage and thermal baseline reliability criteria violations as well as the identified need to replace certain transmission assets due to their condition and/or performance.

Accordingly, the Project will address Appalachian's obligation under Virginia law to provide adequate and reliable service to customers within its service territory.

Q: MR. KOEHLER, BRIEFLY DESCRIBE THE PROJECT'S PROPOSED SOLUTION?

A: As described in Section I of the Company's Response to Guidelines (Necessity for the Project), the Project as proposed addresses both baseline and supplemental needs in the area with one holistic solution. In short, the Project addresses the identified voltage and thermal violations and asset renewal needs by moving the existing load served by the 46 kV system to the more robust 138 kV system. As a result, approximately 38 miles of the 46 kV system (87% of which was originally constructed in the 1920's) will then be retired.

Q: DOES THE PROJECT PROVIDE ANY OTHER BENEFITS?

A: Yes. The new 138 kV line between Joshua Falls and Riverville Substations provides a new 138 kV source to the area and loops the load at the Riverville Substation (serving the Greif Paper Mill's 45 MVA load). Sectionalizing the 138 kV system, by adding two new 138 kV substations, improves reliability to the load area served and provides more operational flexibility for maintenance and unscheduled outages. Additionally, installing new relaying and telecommunication infrastructure allows for better connectivity on the transmission system to support supervisory control, data acquisition, and protection systems. This results in improved physical security of critical assets and a reduction in Customer Minutes of Interruptions (CMIs) related to transmission outages. Lastly, the telecommunication system upgrades and additional sectionalizing equipment help the

Company respond to outages faster by identifying problems on the system quicker and help to bring assets back online during an outage. Section I.B of the Response to Guidelines provides more detailed description of the Project benefits.

Q: HOW DOES THE PROPOSED PROJECT COMPARE TO THE PROJECT ALTERNATIVE DESCRIBED IN SECTION I.E OF THE COMPANY'S RESPONSE TO GUIDELINES?

A: The Project Alternative would be more costly and would leave in place the 46 kV network that the Project proposes to retire. Retiring the 46 kV system reduces the number of line miles that require maintenance and inspections in the future and eliminates the initial capital cost of rebuilding approximately 36 miles of transmission lines. The proposed Project improves the ability of the transmission system, in the affected load area, to accommodate any potential future load growth by moving the load delivery points to 138 kV. Upgrading and sectionalizing the 138 kV system in the Project area provides the flexibility necessary to accommodate future outages and conduct routine maintenance of transmission facilities. As described in more detail in Section I of the Response to Guidelines, the Project provides a comprehensive, holistic solution for the baseline and supplemental needs identified in the affected load area in Albemarle, Nelson, and Amherst Counties, Virginia.

Q: HAVE ANY OF THE COMPANY'S CUSTOMERS IN THE PROJECT AREA EXPRESSED SUPPORT FOR THE PROJECT?

A: Yes. The Company's two largest customers in the area are Greif, Inc. and Central Virginia Electric Cooperative ("CVEC"). CVEC serves over 35,000 customers in 14

Virginia counties, including Albemarle, Nelson, Amherst, and Appomattox Counties, and receives transmission service from Appalachian at several of CVEC's substations in the Project area. Greif, Inc. is a large industrial customer with an approximate load of 45 MVA. Both Greif, Inc. and CVEC have provided letters expressing their support for the Project (Exhibit 2).

Q: CONCERNING THE NEW 138 KV TRANSMISSION LINE TO CVEC'S GLADSTONE 46KV SUBSTATION AND THE RETIREMENT OF THE EXISTING 46 KV SOURCE, IS CVEC PREPARED TO ACCEPT AEP'S NEW 138 KV SERVICE AND WILL THERE BE ANY DISRUPTIONS TO THEIR CUSTOMERS?

A: The Company has been coordinating with CVEC and CVEC is preparing to accept 138 kV service at their Gladstone Substation in order to minimize any disruptions to their customers. Upon completion, the Company's Project will provide CVEC with a more robust and reliable 138 kV source. See attached letter of support from CVEC (Exhibit 2). CVEC plans to file a separate application with the Commission to upgrade their facilities (SCC Case No. PUR-2021-00016). See CVEC's application for more description and discussion concerning benefits to their customers.

Q: DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A: Yes.

APCo Exhibit No. __
Witness: MJM

DIRECT TESTIMONY OF
MARY JANE L. MCMILLEN, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

APCo Exhibit No. ____
Witness: MJM

SUMMARY OF DIRECT TESTIMONY OF MARY JANE L. MCMILLEN, P.E.

My direct testimony supports the transmission line engineering aspects of Appalachian's Application and Response to Guidelines in connection with the Central Virginia Transmission Reliability Project (the "Project"). I sponsor the description of the transmission lines and other transmission line engineering components of the Project in Sections II and V (but not Sections II.A.2, 3 and 9 and Section II.C) of the Response to Guidelines. I also sponsor Exhibits 8 to 23 and 35, three hard copies of the Virginia Department of Transportation General Highway Maps for Amherst, Albemarle, Appomattox, Campbell, and Nelson Counties showing the Project, and GIS shapefiles of the Project to be submitted electronically to the Commission with the Application.

The transmission line components of the Project include the following baseline work: (a) a new 11.1-mile Joshua Falls–Riverville 138 kV transmission line; (b) a new 6.3-mile Gladstone–Riverville 138 kV transmission line; (c) a new 400 foot long 138 kV double circuit transmission line from a tap point to the proposed new James River Substation; (d) a new 600 foot long 138 kV double circuit transmission line from a tap point to the proposed new Soapstone Substation; (e) a rebuild of the 4.2 miles of the 69 kV transmission line (Amherst-Reusens 69 kV circuit) between Reusens and Monroe Substations, including the relocation of approximately 0.3 miles of the Reusens-Scottville-Bremo Bluff 138 kV double-circuit transmission line spanning the James River near the Reusens Substation and approximately 0.2 miles of single circuit Reusens-Scottsville-Bremo Bluff 138kV transmission line relocated on the east side of the James River and prior to crossing; (f) a new 500 foot long 138 kV double circuit transmission line from a tap point to the Amherst Substation; and (g) construction and relocation of approximately 0.4 mile in the aggregate of several existing 138 kV single circuit transmission lines to accommodate construction of the previously noted 138 kV transmission lines serving the proposed James River and Soapstone Substations and the existing Amherst and Riverville Substations. In addition, the Project includes the rebuilding of 8.0 miles of the Amherst-Reusens 69 kV single circuit transmission line between Amherst and Monroe Substations as supplemental work.

My testimony summarizes the numbers, multiple types and height ranges of the structures that will be used to construct the foregoing transmission lines. My testimony also describes the filing corridors associated with the proposed transmission lines described above, within which the ROWs for those lines will be located. The proposed Joshua Falls-Riverville and Riverville-Gladstone 138 kV transmission lines will be constructed on new ROWs that are generally 100 feet wide. The ROW for the Amherst-Reusens 69 kV transmission line rebuild will generally be 80 feet wide, primarily following the centerline of the existing 69 kV ROW, with a few minor deviations to accommodate engineering issues at the James River crossing and several encroachments elsewhere on the existing 69 kV ROW. Upon approval of the Project, the Company estimates that it will need approximately four years for engineering, design, ROW acquisition, permitting, material procurement, outage coordination and construction to place the entire Project in service.

APCo Exhibit No. __
Witness: MJM

DIRECT TESTIMONY OF
MARY JANE L. MCMILLEN, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

Q: PLEASE STATE YOUR NAME, PRESENT POSITION AND BUSINESS ADDRESS.

A: My name is Mary Jane L. McMillen. I am the Manager of Transmission Line Engineering for American Electric Power Service Corporation ("AEPSC"). AEPSC is a subsidiary of American Electric Power Company, Inc. ("AEP") that provides corporate support services to the operating subsidiaries of AEP, including Appalachian Power Company ("Appalachian" or "Company"). My business address is 40 Franklin Road SW, Roanoke, Virginia, 24011.

Q: PLEASE REVIEW YOUR EDUCATIONAL BACKGROUND AND YOUR WORK EXPERIENCE.

A: I graduated from Purdue University with a Bachelor of Science in Civil Engineering followed by a Master of Science in Civil Engineering with an emphasis on Structural Engineering. I am a licensed professional engineer in the Commonwealth of Virginia. I worked for a number of years with an architectural and engineering firm and I joined AEP in 2006 as a consultant. In 2013, I was hired by AEP as a full-time employee and was promoted to the position of Supervisor within Transmission Engineering Standards in 2014. I was promoted to my current position in AEPSC in 2019. I am responsible for coordinating and directing the engineering for the AEP transmission line system (including transmission lines operating at voltages from 34.5 kV through 765 kV) in

Virginia, West Virginia, Tennessee, and Kentucky.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support the transmission line engineering aspects of Appalachian's Application (the "Application") to this Commission for approval and certification of the proposed Central Virginia Transmission Reliability Project (the "Project"). In this connection, I am sponsoring various sections of the Response to Guidelines (the "Response to Guidelines") filed by the Company together with the Application in response to the Commission Staff's "Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia."

Q: WHAT ARE YOUR RESPONSIBILITIES AS RELATED TO THE PROJECT?

A: As a Manager of Transmission Line Engineering at AEP, my primary duties involve the oversight of the engineering, logistical, and other technical requirements associated with the construction of the transmission lines associated with the Project.

Q: WHICH SPECIFIC MATERIALS INCLUDED IN THE RESPONSE TO GUIDELINES ARE YOU SPONSORING?

A: I am sponsoring (1) the information describing the transmission lines and other transmission line engineering components of the Project set forth in Sections II and V (excluding Section II.A.2, 3 and 9 and Section II.C) of the Response to Guidelines; (2) Exhibits 8 to 23 and Exhibit 35; (3) three hard copies of the county highway maps for Amherst, Albemarle, Appomattox, Campbell, and Nelson Counties showing the Project (and which will be submitted electronically to the Commission with the Application); and GIS shapefiles of the Project which will be submitted electronically to the Commission with the Application.

Q: WERE THE PORTIONS OF APPALACHIAN'S FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE DESCRIBE THE TRANSMISSION LINE COMPONENTS OF THE PROJECT.

A: The transmission line components of the Project include the following baseline work: (a) construction of approximately 11.1 miles of new 138 kV single circuit transmission line between the Joshua Falls Substation in Campbell County and the Riverville Substation in Amherst County; (b) construction of approximately 6.3 miles of new 138 kV single circuit transmission line between the Riverville Substation and Central Virginia Electric Cooperative's ("CVEC") Gladstone Substation in Nelson County; (c) construction of approximately 400 feet of new 138 kV double circuit transmission line from a tap point on the Company's Reusens-Scottsville-Bremo Bluff 138 kV transmission line to connect with the Company's proposed new James River Substation; (d) construction of approximately 600 feet of new 138 kV double circuit transmission line from a tap point on the Reusens-Scottsville-Bremo Bluff 138 kV transmission line to connect with the Company's proposed new Soapstone Substation; (e) rebuilding 4.2 miles of the Amherst-Reusens 69 kV single circuit transmission line between Reusens and Monroe Substations, which includes the relocation of approximately 0.3 miles of the

Reusens-Scottville-Bremo Bluff 138 kV double-circuit transmission line[1] spanning the James River near the Reusens Substation and approximately 0.2 miles of single circuit Reusens-Scottsville-Bremo Bluff 138kV transmission line that will be relocated on the east side of the James River prior to crossing; (f) construction of approximately 500 feet of new 138 kV double circuit transmission line from a tap point on the Boxwood–Riverville 138 kV transmission line to the Company's Amherst Substation in Amherst County; and (g) construction and relocation of approximately 0.4 mile in the aggregate of several 138 kV single circuit transmission lines to accommodate construction of the previously noted 138 kV transmission lines serving the proposed James River and Soapstone Substations and the existing Amherst and Riverville Substations. In addition, the Project includes the rebuilding of 8.0 miles of the Amherst-Reusens 69 kV transmission line between Amherst and Monroe Substations in Amherst County, as supplemental work. The Project's transmission line components are shown on the Geographical Components Map, which is Exhibit 3 to the Company's Response to Guidelines, and in detail on the GIS Constraints Mapping, which are Exhibits 4 – 7 to the Company's Response to Guidelines.

Q: WHAT STRUCTURE TYPES WILL BE USED IN CONNECTION WITH THE CONSTRUCTION OF THE PROPOSED TRANSMISSION LINES?

A: The Project requires multiple types of structures as described in Section II.B of the Response to Guidelines. Proposed structures will be dulled galvanized steel. Final

1 The Amherst–Reusens 69 kV circuit and existing Clifford–Reusens 138 kV circuit (proposed Boxwood–Reusens 138 kV circuit) are co-located on the existing Reusens-Scottville-Bremo Bluff 138 kV double-circuit transmission line for 0.3 miles over the James River into Reusens Substation. This span will be rebuilt, but also relocated slightly to the south to avoid spanning directly over the Reusens Hydroelectric Dam facility.

structure types will be determined during final engineering, which includes ground survey and geotechnical studies. Nevertheless, based on preliminary engineering, the Company anticipates primarily using single circuit steel H-frame and three-pole steel structures for the proposed 138 kV and 69 kV transmission lines. Double circuit steel monopoles with davit arms will be used for transmission line taps. 138 kV lattice structures are anticipated to be used only at the two James River crossings.

Q: PLEASE DESCRIBE THE HEIGHTS OF THE PROPOSED STRUCTURES.

A: The anticipated single circuit 138 kV structures have heights ranging from approximately 55 feet to 100 feet with an average height of approximately 70 feet. The anticipated single circuit 69 kV structures have heights ranging from approximately 50 feet to 90 feet with an average height of approximately 65 feet. The anticipated heights for the double circuit 138 kV monopole structures with davit arms used for transmission line taps range between approximately 100 feet and 135 feet for the Soapstone, James River, and Amherst Substations.

Q: WILL THE STRUCTURES USED FOR THE TRANSMISSION LINE CROSSINGS OVER THE JAMES RIVER REQUIRE ADDITIONAL DESIGN CONSIDERATIONS AS COMPARED TO THE STRUCTURES USED ELSEWHERE ON THE PROJECT?

A: Yes.

Q: PLEASE DESCRIBE IN DETAIL THE CROSSING OVER THE JAMES RIVER FOR THE RELOCATION OF THE REUSENS–SCOTTSVILLE–BREMO BLUFF 138 KV TRANSMISSION LINE.

A: Double circuit lattice towers are proposed to be used to support the Reusens–Scottsville–Bremo Bluff 138 kV transmission line where it crosses the James River near the Reusens Substation. Double circuit structures are necessary to support the proposed relocation of about 0.3 mile of the Reusens–Scottsville–Bremo Bluff 138 kV transmission line (proposed Boxwood-Reusens 138 kV circuit) and the proposed rebuild of the Amherst–Reusens 69 kV circuit. Lattice towers are well-suited to support long conductor spans, changing conductor and shield wire tensions, and transmission line angle locations. The James River crossing near Reusens Substation is proposed to be constructed near, but not on, the existing centerline due to right-of-way ("ROW") and outage constraints. The proposed structure heights range from 140 feet to 160 feet. These heights are necessary to meet the requirements of the terrain, avoid undercrossing transmission lines, and address the need to relocate away from the Reusens Hydroelectric Dam located beneath the existing transmission line centerline. Also, this river crossing will be filed with the Federal Aviation Administration ("FAA") to determine whether shield wire marker balls and/or structure lighting will be required. For additional details, see the Response to Guidelines, Section II.B, and Exhibit 22 filed with the Application.

Q: PLEASE DESCRIBE THE CROSSING OVER THE JAMES RIVER FOR THE JOSHUA FALLS–RIVERVILLE 138 KV TRANSMISSION LINE.

A: Single circuit lattice towers are proposed to support the Joshua Falls–Riverville 138 kV Transmission Line where it crosses the James River near the Riverville Substation and

the Greif Paper Mill. Lattice towers are well suited to support long conductor spans, changing conductor and shield wire tensions, and transmission line angle locations. The proposed heights range from 80 feet to 120 feet. This river crossing also will be filed with the FAA to determine whether shield wire marker balls and/or structure lighting will be required. For additional details, see the Response to Guidelines, Section II.B, and Exhibit 11 filed with the Application.

Q: APPROXIMATELY HOW MANY TRANSMISSION LINE STRUCTURES WILL THE PROJECT REQUIRE?

A: We estimate that, overall, approximately 221 transmission line structures (one hundred twenty-two 138 kV structures and ninety-nine 69 kV structures) will be required for the Project. Of those 221 structures, approximately 110 will be used to replace existing structures (eleven 138 kV structures and ninety-nine 69 kV structures to be replaced). The total structure count is a rough approximation based on preliminary engineering models developed using publicly available terrain data. The final number of structures will be determined during final engineering, which includes ground survey and geotechnical studies.

Q: PLEASE DESCRIBE THE COMPANY'S ROLE IN THE ROUTE DEVELOPMENT PROCESS.

A: First, Appalachian retained POWER Engineers, Inc. ("POWER") to: (a) identify and evaluate substation sites for the proposed James River Substation and Soapstone Substation; (b) develop and evaluate study segments and route alternatives for the transmission line components of the Project; and (c) select a proposed route for each of the new transmission lines (each a "Proposed Route" and collectively, the "Proposed

Routes") that reasonably minimizes adverse impact on environmental resources and is consistent with the Project's technical requirements. Second, the Company assisted the POWER team in developing the siting criteria listed in the Siting Study included in Volume 2 of the Application (see also Section II.A.9 of the Response to Guidelines). Third, Company representatives participated in numerous stakeholder meetings with government officials, businesses, and landowners. Lastly, Company engineers conducted desktop reviews and field reviews of the Proposed Routes to validate feasibility from an engineering and constructability standpoint.

Q: DID THE COMPANY CONSIDER PUBLIC AND STAKEHOLDER INPUT DURING ROUTE DEVELOPMENT?

A: Yes. Public participation and stakeholder input were very important. Appalachian held four public open houses for the Joshua Falls–Riverville–Gladstone phase on November 6 and 7, 2019 and on February 26 and 27, 2020. Over 100 participants attended the four open houses. Additional open houses for the Project were held in a virtual format. Public input is described further in Company witness Larson's testimony. The Siting Team carefully considered public and stakeholder input during route development.

Q: WHAT IS THE COMPANY'S OPINION ON THE PROPOSED ROUTES IDENTIFIED IN THE SITING STUDIES?

A: The Company supports the Siting Team's conclusion that the Proposed Routes for the new 138 kV transmission lines and the rebuild of the existing 69 kV transmission line are the most suitable as compared to the alternative routes considered. As supported by each Siting Study, the Proposed Routes reasonably avoid or minimize adverse impacts on landowners, historic resources and environment of the area concerned. See Section II.A.9

of the Response to Guidelines, the direct testimony of Company witness Larson, and the Siting Studies, included in Volume 2 of the Application, for a detailed description and comparison of the alternative routes. The Company reasonably expects that it will be able to acquire ROW, engineer, build, operate, and maintain the proposed transmission lines included in the Project along the Proposed Routes efficiently and effectively with minimized adverse impacts on the environment.

Q: DO YOU HAVE AN OPINION ON ALTERNATIVE ROUTE A COMPARED TO THE PROPOSED ROUTE (ALTERNATIVE ROUTE D) PRESENTED IN THE SITING STUDY FOR THE JOSHUA FALLS-RIVERVILLE 138 KV TRANSMISSION LINE?

A: Yes. Based on desktop analysis, preliminary designs, and field reconnaissance by the Company's transmission line engineering team and construction management representatives, the Company has determined that Alternative Route A has additional engineering and constructability challenges when compared to the Proposed Route (Alternative Route D).

Q: PLEASE EXPLAIN.

A: Alternative Route A is located on the north side of the James River in forested, rugged and steep terrain with less access to state- or county-maintained roads (see Attachment A – Maps to the Joshua Falls – Riverville – Gladstone Siting Study). Due to the terrain, Alternative A generally follows ridgelines, where there is less flexibility to make engineering adjustments within the 500' wide filing corridor as necessary after obtaining more accurate terrain and survey data. Generally, there is higher chance of encountering rock substrate on ridgelines and where Alternative Route A is located. If rock is

encountered and a structure cannot be relocated, foundations may require a more complicated design and specialized equipment to drill foundations. Additionally, the overall steeper slopes and an additional 30 acres of forest clearing associated with Alternative Route A increase landslide risks, costs, and construction challenges associated with ROW clearing, structure crane pads, and access road construction.

In contrast, the Proposed Route (Alternative D) is located on the south side of the James River. After exiting the Joshua Falls Substation and passing Chestnut Mountain, the Proposed Route crosses more open fields and the terrain becomes rolling and gentle. As a result, the Proposed Route has more engineering flexibility to adjust the alignment within the filing corridor and is not restricted by steep slopes and rugged terrain. Further, the Proposed Route has closer access to state- or county-maintained roads for construction, less chance of encountering rock, less cut/fill disturbance for structure crane pads, less forest clearing, and less overall risk for landslides during construction, as compared to Alternative Route A.

Q: WERE ENGINEERING AND CONSTRUCTION THE ONLY FACTORS IN THE SELECTION OF ALTERNATIVE ROUTE D OVER A?

A: No. Engineering and construction were only two items considered in combination with the other environmental and land use impacts described in the siting study reports and Larson testimony.

Q: FOR THE NEW JOSHUA FALLS–RIVERVILLE 138 KV TRANSMISSION LINE AND GLADSTONE–RIVERVILLE 138 KV TRANSMISSION LINE, WHY IS

THE COMPANY SEEKING APPROVAL OF A 500-FOOT WIDE CORRIDOR, WITHIN WHICH A 100-FOOT ROW WILL BE LOCATED?

A: The Company needs flexibility to shift the centerline of the 100-foot ROW for the transmission lines up to 200 feet in either direction from the centerline shown in the Application (see the GIS Constraints Map, Exhibit 4) as necessary to address issues that become evident only after completion of ground surveys, geotechnical and environmental studies, additional interviews with landowners and final engineering. There are two locations that have been identified as having a higher risk for deviations from the proposed centerline: (a) outside Joshua Falls Substation, where the crossing under the Cloverdale-Joshua Falls 765kV line is located in difficult terrain; and (b) where the line parallels an existing Virginia Department of Forestry (DOF) conservation easement (see the GIS Constraints Map, Exhibit 4). The 500-foot-wide corridor has been expanded up to 1,400 feet in those locations to allow additional flexibility to address these concerns. Nonetheless, the Company believes the centerline shown in the Application is the most suitable alignment based upon preliminary analysis. The Company will provide notice to potentially affected landowners within the corridor as required by the Commission and applicable law.

Q: HOW WIDE IS THE PROPOSED TRANSMISSION LINE ROW FOR THE JOSHUA FALLS–RIVERVILLE 138 KV TRANSMISSION LINE AND THE GLADSTONE–RIVERVILLE 138 KV TRANSMISSION LINE?

A: Typically for 138 kV transmission lines, the ROW will be 100 feet wide. However, the ROW could be more than 100 feet wide in a few locations, as needed to ensure compliance with safety requirements or as needed for the guy wires to support certain

structures. See Section II.A.6 of the Response to Guidelines for a detailed description. The precise location and extent of the places where the ROW would need to be more than 100 feet wide cannot be determined until completion of detailed ground surveys and final engineering.

Q: ARE THERE ANY DWELLINGS IN THE PROPOSED ROW FOR THE JOSHUA FALLS–RIVERVILLE 138 KV TRANSMISSION LINE AND GLADSTONE–RIVERVILLE 138 KV TRANSMISSION LINE?

A: The proposed ROW for those transmission lines as shown on the GIS Constraint Mapping for Component 1 (Exhibit 4) filed with the application does not include any dwellings.

Q: WHY IS THE COMPANY SUBMITTING A 300-FOOT WIDE CORRIDOR IN WHICH A 100-FOOT ROW WILL BE LOCATED FOR THE 138 KV TRANSMISSION LINES THAT ARE TO BE RELOCATED AT THE RIVERVILLE SUBSTATION AND THE AMHERST SUBSTATION?

A: The Company needs flexibility to shift the centerline of the 100-foot ROW for the 138 kV transmission lines up to 100 feet in either direction from the centerline shown in the Application (see the GIS Constraints Map, Exhibits 4 and 7, and the Geographical Components Map, Exhibit 3) as necessary to address issues that become evident only after completion of ground surveys, geotechnical and environmental studies, additional interviews with landowners and final engineering. Nonetheless, the Company believes the centerline shown in the Application is the most suitable alignment based upon preliminary analysis. The Company will provide notice to potentially affected

landowners within the 300-foot-wide corridor as required by the Commission and applicable law.

Q: HOW WIDE IS THE PROPOSED TRANSMISSION LINE ROW FOR THE REMAINING 138 KV TRANSMISSION LINES THAT ARE TO BE RELOCATED AT THE RIVERVILLE SUBSTATION AND AT THE 138 KV YARD AT AMHERST SUBSTATION?

A: The ROW for the remaining 138 kV transmission line relocations will be approximately 100 feet wide.

Q: ARE THERE ANY DWELLINGS IN THE PROPOSED ROW FOR THE REMAINING 138 KV TRANSMISSION LINES THAT ARE TO BE RELOCATED AT THE RIVERVILLE SUBSTATION AND AT THE AMHERST SUBSTATION?

A: The proposed ROW for the transmission line relocations as shown on the GIS Constraint Mapping for Components 1 and 4 (Exhibits 4 and 7) filed with the application does not include any dwellings.

Q: WILL THE LINE TAPS INTO THE JAMES RIVER AND SOAPSTONE SUBSTATIONS REQUIRE THE COMPANY TO OBTAIN ANY ROW?

A: No. The line taps for the new James River and Soapstone Substations will be located entirely upon Company-owned property, so no ROW on private property will be required for those lines.

Q: FOR THE AMHERST–REUSENS 69 KV TRANSMISSION LINE REBUILD, WHY IS THE COMPANY SUBMITTING A 300-FOOT WIDE CORRIDOR IN WHICH AN 80-FOOT ROW WILL BE LOCATED?

A: The Company needs flexibility to shift the centerline of the 80-foot ROW for the transmission line up to 110 feet in either direction from the centerline shown in the Application (see the GIS Constraints Map, Exhibit 7) as necessary to address issues that become evident only after completion of ground surveys, geotechnical and environmental studies, additional interviews with landowners and final engineering. There are two locations that have been identified as having a higher risk for deviations due to engineering considerations and landowner constraints, including encroachments along the existing centerline. The 300-foot-wide corridor has been expanded by up to 700 feet in these locations to allow flexibility to address these concerns. Nonetheless, the Company believes the centerline shown in the Application is the most suitable alignment based upon preliminary analysis. The Company will provide notice to potentially affected landowners within the corridor as required by the Commission and applicable law.

Q: HOW WIDE IS THE PROPOSED TRANSMISSION LINE ROW FOR THE AMHERST–REUSENS 69 KV TRANSMISSION LINE REBUILD?

A: The ROW for the Amherst–Reusens 69 kV transmission line rebuild will follow the centerline of the existing ROW for the most part, and is anticipated to be 80 feet wide at most locations. See Section II. A.6 of the Response to Guidelines for a detailed description.

Q: MS. MCMILLEN, PLEASE COMPARE THE EXISTING AMHERST-REUSENS 69 KV TRANSMISSION LINE STRUCTURES TO THE PROPOSED REBUILD STRUCTURES.

A: The majority of the existing structures are wood H-frame structures and approximately 50 feet tall on average. The majority of the proposed structures will be dulled-galvanized-

steel H-Frame structures and generally the same character, number, and location in the existing ROW. They will be approximately 10’ to 20’ taller mostly due to the addition of shield wires on top for lightning protection, which the existing facilities do not have.

Q: WHY DID THE COMPANY CHOOSE DULLED GALVANIZED STEEL POLES FOR THE REBUILD STRUCTURES AS COMPARED TO THE WOOD USED ON THE EXISTING STRUCTURES?

A: The existing wood poles have woodpecker damage, which is typical for this area. Galvanized steel structures are a proven, durable, reliable and efficient structure in this area, and avoid woodpecker damage. A dulled finish is used to reduce the visual presence of the new structures

Q: ARE THERE ANY DWELLINGS IN THE PROPOSED ROW OF THE AMHERST–REUSENS 69 KV TRANSMISSION LINE REBUILD?

A: Several residences have encroached on the existing ROW in a few limited locations and are within an 80-foot ROW (See Exhibit 7). However, based on engineering analysis to date, the Company has preliminarily determined that the proposed line rebuild could be safely accomplished in a ROW that is narrower than 80-feet in those few locations in order to keep the affected residences out of the final ROW. Accordingly, and subject to completion of final engineering and ROW negotiations with affected landowners, the Company does not expect that any residences will need to be removed to accommodate the rebuilt line.

Q: FOR THE PROPOSED CROSSING OF THE JAMES RIVER NEAR THE REUSENS SUBSTATION, WHICH INVOLVES THE RELOCATION OF THE DOUBLE CIRCUIT SECTION OF THE REUSENS–SCOTTSVILLE–BREMO

BLUFF 138 KV TRANSMISSION LINE (CO-LOCATED BOXWOOD-REUSENS 138 KV CIRCUIT AND AMHERST-REUSENS 69 KV CIRCUIT), WHY IS THE COMPANY SUBMITTING AN APPROXIMATELY 700-FOOT WIDE CORRIDOR WITHIN WHICH A 100-FOOT ROW WILL BE LOCATED?

A: The Company needs flexibility to shift the centerline of the 100-foot ROW for the transmission line relocation as shown in the Application (see Map 1 of 10 the GIS Constraints Map, Exhibit 7) as necessary to address issues that become evident only after completion of ground surveys, geotechnical and environmental studies, additional interviews with landowners and final engineering. This corridor includes two potential options for crossing the James River that have been identified due to residential development and encroachments along the existing centerline and associated with the hydroelectric dam. Nonetheless, the Company believes the centerline shown in the Application is the most suitable alignment based upon preliminary analysis. The Company will provide notice to potentially affected landowners within the proposed corridor as required by the Commission and applicable law.

Q: HOW WIDE IS THE PROPOSED TRANSMISSION LINE ROW FOR THE RELOCATED REUSENS–SCOTTSVILLE–BREMO BLUFF 138 KV TRANSMISSION LINE?

A: The ROW for the 138 kV transmission line will be approximately 100 feet wide.

Q: ARE THERE ANY DWELLINGS IN THE PROPOSED ROW FOR THE RELOCATED DOUBLE CIRCUIT SECTION OF THE REUSENS–SCOTTSVILLE–BREMO BLUFF 138 KV TRANSMISSION LINE?

A: The proposed ROW for the transmission line as shown on Map 1 of 10 of the GIS Map

(Exhibit 7) filed with the application does not include any dwellings.

Q: PLEASE DESCRIBE ANY OTHER WORK RELATED TO THE CONSTRUCTION OF THE TRANSMISSION LINE PROJECT.

A: Temporary material laydown yards and access roads for structure erection and conductor stringing will be necessary. The final location and extent of required laydown yards and access roads cannot be determined until after completion of final line design, environmental studies and subsequent field reconnaissance by the Company's construction representatives and land agents.

Q: IS PLACING ALL OR PART OF THE TRANSMISSION LINES UNDERGROUND A REASONABLE OPTION?

A: No. The additional cost, reliability risks and environmental impacts associated with locating a line, in whole or in part, underground are not appropriate for this Project. Additionally, as supported by the siting studies, the Proposed Routes for the various transmission lines reasonably avoid or minimize adverse impacts on people and the scenic assets, historic resources and environment of the area concerned.

Q: WHAT LOW-COST AND EFFECTIVE MEANS WILL THE COMPANY EMPLOY TO IMPROVE THE AESTHETICS OF THE PROPOSED TRANSMISSION LINES IN ACCORDANCE WITH § 10 OF HOUSE BILL 1319?

A: As detailed in each Siting Study, POWER and the Company have carefully chosen the location for the Proposed Routes to avoid or minimize visibility from populated areas, scenic roadways and other scenic resources as much as possible. Proposed structures will utilize dulled galvanized steel and the conductors will be non-specular. The foregoing

measures are a low-cost and effective means of improving the aesthetics of the proposed transmission lines.

Q: PLEASE GENERALLY DESCRIBE THE CONSTRUCTION ACTIVITIES FOR THE TRANSMISSION LINE COMPONENTS OF THE PROJECT.

A: Project construction activities will include the installation and maintenance of soil erosion and sedimentation control measures; temporary access road construction; minimal grading for foundation, structure, equipment and wire installations; and the subsequent rehabilitation of all areas disturbed during construction. All required environmental compliance permits and studies will be completed and a storm water pollution prevention plan will be developed and implemented under the state's "General Permit for Discharges of Stormwater from Construction Activities."

Q: IF THE COMMISSION GRANTS THE COMPANY'S APPLICATION TO CONSTRUCT AND OPERATE THE PROJECT, HOW LONG WILL IT TAKE TO COMPLETE AND PLACE IT IN SERVICE?

A: The construction plans for the Project, including the proposed construction sequence, are detailed in Section II.A.10 of the Response to Guidelines. Upon approval of the Project, the Company estimates that it will need approximately four years for engineering, design, ROW acquisition, permitting, material procurement, outage coordination and construction to place the entire Project in service.

Q: DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A: Yes.

APCo Exhibit No. ____
Witness: JKB

DIRECT TESTIMONY OF
J. KELLY BLEDSOE, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

APCo Exhibit No. ____
Witness: JKB

SUMMARY OF DIRECT TESTIMONY OF J. KELLY BLEDSOE, P.E.

My direct testimony supports Appalachian's Application and Response to Guidelines in connection with the Central Virginia Transmission Reliability Project. I sponsor (1) the information describing the substation engineering components of the Project set forth in Section II. C. of the Response to Guidelines, (2) Exhibits 25 through 34 to the Response to Guidelines, and (3) Exhibits 25-C – 34-C in the Confidential Appendix. The substation components of the Project consist generally of (a) the proposed new James River and Soapstone 138 kV Substations, (b) the proposed new yard at the existing Riverville 138 kV Substation, (c) expansions and upgrades to existing substation yards at the Monroe Substation and Amherst Substation, (d) associated substation improvements within the existing fence at Scottsville Substation, Boxwood Substation, Joshua Falls Substation, and Clifford Substation, and (e) the proposed new Five Forks Switch Pole. The proposed James River Substation will operate at 138/12 kV with a graveled and fenced area approximately 250 feet by 250 feet. The substation will be located on an 11.2-acre parcel, which the Company has purchased. The proposed Soapstone Substation will operate at 138/12 kV with a graveled and fenced area approximately 230 feet by 220 feet. The substation will be located on a 111.2-acre parcel, which the Company has purchased. The technical features of the proposed substations are described in Section II.C of the Response to Guidelines.

APCo Exhibit No. ____
Witness: JKB

DIRECT TESTIMONY OF
J. KELLY BLEDSOE, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

Q: PLEASE STATE YOUR NAME, PRESENT POSITION AND BUSINESS ADDRESS.

A: My name is J. Kelly Bledsoe. I am Manager, Station Engineering for American Electric Power Service Corporation ("AEPSC"). AEPSC is a subsidiary of American Electric Power Company, Inc. ("AEP") that provides corporate support services to the operating subsidiaries of AEP, including Appalachian Power Company ("Appalachian" or "Company"). My business address is 40 Franklin Road SW, Roanoke, VA 24011.

Q: PLEASE REVIEW YOUR EDUCATIONAL BACKGROUND AND YOUR WORK EXPERIENCE.

A: In 1990, I received a Bachelor of Science degree in Civil Engineering from Virginia Military Institute. I am a licensed professional engineer in the Commonwealth of Virginia. I joined the Company in 1990 as a Civil Engineer. I was promoted to the position of Engineering Supervisor with AEPSC in 2010, to the position of Transmission Line Engineering Manager in 2014, and to my current position with AEPSC in 2019. I am responsible for coordinating and directing the engineering for the substations for the AEP transmission system (including substations operating at voltages from 34.5 kV through 765 kV) in Virginia, West Virginia, Tennessee, and Kentucky.

Q: MR. BLEDSOE, WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support certain aspects of Appalachian's application (the "Application") to this Commission for approval and certification of the proposed Central Virginia Transmission Reliability Project (the "Project"). In this connection, I am sponsoring various sections of the Response to Guidelines (the "Response to Guidelines") filed by the Company together with the Application in response to the Commission Staff's "Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia."

Q: WHAT ARE YOUR RESPONSIBILITIES AS RELATED TO THE PROJECT?

A: As Manager, Station Engineering, my primary duties involve the oversight of the engineering, logistical, and other technical requirements associated with the construction of the substation aspects of the Project.

Q: WHICH SPECIFIC MATERIALS INCLUDED IN THE RESPONSE TO GUIDELINES ARE YOU SPONSORING?

A: I am sponsoring (1) the information describing the substation engineering components of the Project set forth in Section II. C. of the Response to Guidelines, (2) Exhibits 25 through 34 to the Response to Guidelines, and (3) Confidential Exhibits 25-C through 34-C (included in Volume 4, Confidential Appendix).

Q: WERE THE PORTIONS OF APPALACHIAN'S FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE DESCRIBE THE SUBSTATION COMPONENTS OF THE PROJECT.

A: The substation components of the Project consist generally of the following (baseline work):

- The proposed new James River and Soapstone 138 kV Substations (approximately 250' x 250' and 230’ x 220’, respectively).
- The proposed new yard at the existing Riverville 138 kV Substation (approximately 250’ x 180’).
- Expansions and upgrades to existing substation yards at the Monroe Substation and Amherst Substation, as follows:
    - Monroe Substation yard expansion (85’ x 87’)
    - Amherst Substation yard expansion (21’ x 158’)
- Associated substation improvements within the existing fence at Scottsville Substation, Boxwood Substation, Joshua Falls Substation, and Clifford Substation.
- The proposed new Five Forks Switch Pole.

These substation components are shown on the Geographical Components Map attached as Exhibit 3 to the Company’s Response to Guidelines with more detailed information included in Exhibits 25 - 34.

Q: PLEASE DESCRIBE THE PROPOSED JAMES RIVER SUBSTATION.

A: The fenced portion of the proposed James River Substation will be approximately 250 feet by 250 feet and will be located on an 11.2-acre parcel, which the Company has purchased. The parcel is located in a rural area and the substation yard will be buffered from public roads and adjacent residences. Section II.C of the Response to Guidelines describes the technical features of the new substation in further detail.

Q: PLEASE DESCRIBE THE PROPOSED SOAPSTONE SUBSTATION.

A: The fenced portion of the proposed Soapstone Substation will be approximately 230 feet by 220 feet and will be located on a 111.2-acre parcel, which the Company has

purchased. The parcel is located in a rural area and the substation yard will be buffered from public roads and adjacent residences. Section II.C of the Response to Guidelines describes the technical features of the new substation in further detail.

Q: IS THERE ANY OTHER SUBSTATION WORK ASSOCIATED WITH THE PROJECT?

A: Yes. To accommodate the new 138 kV upgrades, there will be remote work and/or substation expansions required at Appalachian's Riverville Substation, Monroe Substation, Amherst Substation, Scottsville Substation, Boxwood Substation, Joshua Falls Substation, and Clifford Substation (See Section II. C. of the Response to Guidelines for additional details). Finally, as a result of the Project, the following 46 kV facilities will be retired: Gladstone Switching Substation, Phoenix Substation, Rockfish Substation, Schuyler Substation, Shipman Substation, and Shipman Switch will be retired.

Q: WHY DIDN'T THE COMPANY EXPAND OR USE THE EXISTING SCHUYLER SUBSTATION OR SHIPMAN SUBSTATION?

A: The existing Schuyler and Shipman 46 kV Substations are too small to accommodate the Project's required 138 kV substation facilities, which require a much larger footprint than do 46 kV facilities. Additionally, these 46 kV substations also are not located near a 138 kV transmission line source and would require the construction of three or more miles of new 138 kV transmission line in aggregate to convert them to 138 kV. The new Soapstone and James River Substations will reduce the transmission exposure for customers served by the existing Shipman, Phoenix, and Schuyler Substations. The new 138 kV substations will also provide improved voltage levels and balance and higher fault current for detecting and clearing faults on the distribution system as compared to

the existing 46 kV substations. Terrain and unfavorable site grading requirements are also factors that prevent the expansion of the existing 46 kV sites to accommodate 138 kV service. Additionally, the new James River Substation and Soapstone Substation facilities can be built "in the clear," which helps to minimize equipment outage times and allows crews to work away from energized equipment. By contrast, attempting to rebuild the 46 kV substations to 138 kV would require mobile transformers to carry the load during construction and increase outage times for installation and removal of this equipment.

Q: WHAT IS THE COMPANY'S OPINION ON THE NEW SITES FOR THE PROPOSED JAMES RIVER AND SOAPSTONE SUBSTATIONS?

A: The Company's Station Engineering group was a key member of the Siting Team that evaluated and selected the proposed James River and Soapstone Substations. As described in Company witness Larson's direct testimony and in the Project Siting Study, the Siting Team evaluated 12 and 13 sites respectively for the James River and Soapstone Substations. The Company believes the identified sites are the most suitable locations. Both sites are located adjacent to an existing 138 kV transmission line source and to the distribution system they will support and thus will meet the Project's electrical requirements. The Company will be able to efficiently and cost-effectively develop the sites and build the substations, obtain approvals, avoid non-standard designs, and operate and maintain the substations. Overall, the sites and associated transmission and distribution line routes represent a balance between impacts on the natural and human environments while meeting the engineering and operational needs of the Project in a cost-effective manner.

Q: PLEASE GENERALLY DESCRIBE THE SUBSTATION CONSTRUCTION ACTIVITIES FOR THE PROJECT.

A: Project construction activities will include the installation and maintenance of soil erosion and sedimentation control measures; temporary access road construction; minimal grading of the substation site; foundation, structure, equipment and wire installations; and the subsequent rehabilitation of all areas disturbed during construction. All required environmental compliance permits and studies will be completed, and a storm water pollution prevention plan will be developed and implemented under the state's "General Permit for Discharges of Stormwater from Construction Activities."

Q: DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A: Yes.

APCo Exhibit No. ___
Witness: XL

DIRECT TESTIMONY OF
XIN LIU, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

APCo Exhibit No. ___
Witness: XL

SUMMARY OF DIRECT TESTIMONY OF XIN LIU, P.E.

My direct testimony supports Appalachian's Application and Response to Guidelines. I sponsor Section IV of the Response to Guidelines. The maximum electric and magnetic field ("EMF") levels expected to occur at the right-of-way ("ROW") edge of the proposed 138 kV transmission line components are 0.6 kV/m and 25.5 mG, respectively (assuming a 100-foot wide ROW). Similarly, the maximum EMF levels expected to occur at the ROW edge of the proposed Amherst-Reusens 69 kV transmission line rebuild are 0.4 kV/m and 7.8 mG, respectively (assuming an 80-foot wide ROW for the existing and proposed). The existing levels for the existing Amherst-Reusens 69 kV transmission line are 0.2 kV/m and 9.8 mG. These maximum EMF levels for the proposed transmission line are typical and expected results for such transmission lines, and are well within the limits specified in IEEE Standard C95.6™-2002, which sets the safety levels with respect to human exposure to electromagnetic fields. Appalachian considered the presence and proximity of dwellings, schools, hospitals, and other community facilities as features to avoid wherever practical during its route selection process in order to minimize EMF exposure. No significant adverse health effects will result from the construction and operation of the Project. Section IV of the Response to Guidelines provides further documentation and detail regarding the absence of adverse health effects from the construction and operation of the Project.

APCo Exhibit No. ___
Witness: XL

DIRECT TESTIMONY OF
XIN LIU, P.E.
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

Q: PLEASE STATE YOUR NAME, PRESENT POSITION AND BUSINESS ADDRESS.

A: My name is Xin Liu. I am Manager, System Performance Analysis for American Electric Power Service Corporation ("AEPSC"). AEPSC is a subsidiary of American Electric Power Company, Inc. ("AEP") that provides corporate support services to the operating subsidiaries of AEP, including Appalachian Power Company ("APCo," Appalachian or "Company"). My business address is 8500 Smiths Mill Road, New Albany, OH 43054.

Q: PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A: I received a Master of Science degree and a Ph.D. degree, both in Electrical Engineering, from The Ohio State University. I am a senior member of the Institute of Electrical and Electronics Engineers ("IEEE"), and a licensed professional engineer in the State of Ohio. I joined AEPSC in 2006 as an Engineer; was promoted to Senior Engineer in 2008, was promoted to Principal Engineer in 2012 and promoted to Manager, System Performance Analysis in 2016.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support certain aspects of Appalachian's application to this Commission for approval and certification of the Central Virginia Transmission Reliability Project (the "Project"), which generally includes a 69 kV transmission line rebuild, two new substations, and two new 138 kV transmission lines (the Joshua Falls-

Riverview 138 kV transmission line and the Gladstone-Riverview 138 kV transmission line).

Q: WHICH SPECIFIC MATERIALS INCLUDED IN THE APPLICATION ARE YOU SPONSORING?

A: I am sponsoring Section IV, Health Aspects of EMF of the Response to Guidelines ("Response to Guidelines") filed by the Company in response to the Commission Staff's "Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia."

Q: WERE THE PORTIONS OF THE FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: WHAT IS EMF?

A: EMF is an acronym for electric and magnetic fields, which exist wherever there is a flow of electricity. Electric transmission and distribution lines, electrical wiring in homes, and electric appliances all have electric and magnetic fields associated with their use. Electric fields are produced by the voltage gradient between a power line and ground; their strength is dependent upon the voltage difference of the energized line to ground, the physical characteristics of the line, and the distance from the line to the observation point at which the field strength is measured. The electric field strength is commonly measured in kilovolts per meter ("kV/m"). Magnetic fields are created by the flow of electric current in a conductor. The magnetic field density generated by a transmission line varies with the load current of the line, the physical characteristics of the line, and the

distance from the line to the observation point at which the magnetic field density is measured. The magnetic field density is measured in units known as gauss, or milligauss ("mG"). The electric and magnetic fields associated with power lines and electric appliances in the United States have a frequency of 60 Hz, or 60 cycles per second.

Q: PLEASE DETAIL FOR THE COMMISSION YOUR EXPERIENCE IN CALCULATING AND ANALYZING EMF.

A: I have over 18 years of experience conducting, managing and directing the calculation and analysis of a variety of issues in power systems for safe, reliable, economic and environmentally-compatible operation of power equipment and transmission lines, for high-voltage grid development, for system voltage coordination, for power quality, and for development and implementation of advanced technologies. I have been a teaching assistant at the High Voltage Lab at The Ohio State University for six years while conducting and teaching EMF-related experiments. I also have extensive experience measuring the EMF under a transmission line through many research projects at The Ohio State University as well as field testing at AEP.

Q: MS. LIU, WHAT ARE THE CALCULATED MAXIMUM EMF LEVELS ASSOCIATED WITH THE PROPOSED TRANSMISSION LINES IN THIS PROJECT?

A: As set forth in Section IV.A of the Response to Guidelines, the maximum electric and magnetic field levels expected to occur at the ROW edge for the proposed 138 kV transmission line components are 0.6 kV/m and 25.5 mG respectively (assuming a 100-foot wide ROW). The existing levels for the existing Amherst-Reusens 69 kV

transmission line are 0.2 kV/m and 9.8 mG. The proposed Amherst-Reusens 69 kV transmission line rebuild levels are 0.4 kV/m and 7.8 mG, respectively. Both the existing and proposed levels are based on an 80-foot wide ROW. See Exhibits 4-7 for the location of the transmission lines.

Q: ARE THE CALCULATED MAXIMUM EMF LEVELS FOR THE PROPOSED TRANSMISSION LINE EXTRAORDINARY?

A: No. They are typical and expected results for such transmission lines. Both electric and magnetic field levels drop sharply from the centerline to the edge of the ROW and will continue to drop with distance from the ROW edge. These field levels are well within the limits specified in IEEE Standard C95.6™-2002, which sets the safety levels with respect to human exposure to electromagnetic fields.

Q: IS THE PROPOSED LINE CONFIGURATION FOR THE PROJECT A PRUDENT CHOICE TO REDUCE EMF LEVELS?

A: Yes. From an EMF perspective, the Company's proposed configuration is a prudent choice and consistent with the intent of both the Virginia Department of Health and World Health Organization, which promote public safety relative to EMF.

Q: WERE PRUDENT AVOIDANCE MEASURES UTILIZED DURING THE ROUTE SELECTION PROCESS IN ORDER TO MINIMIZE EMF EXPOSURE?

A: Yes. The presence and proximity of dwellings, schools, hospitals, and other community facilities were considered throughout the route selection process as features to avoid, to the extent practical, as described in the direct testimony of Company witness Larson.

Q: DOES THE COMPANY HAVE AN OPINION ON WHETHER ANY SIGNIFICANT ADVERSE HEALTH EFFECTS WILL RESULT FROM THE CONSTRUCTION AND OPERATION OF THE PROJECT?

A: Based upon the Company's ongoing review of the scientific literature on EMF, the Company's experience with its existing 69 kV and 138 kV transmission lines, and the fact that the calculated maximum EMF levels at the edges of the ROW for the proposed line are well within the limits specified in IEEE Standard C95.6™-2002, the Company is of the opinion that no significant adverse health effects will result from the construction and operation of the Project. This position is consistent with the conclusions expressed in the final report to the Virginia General Assembly, dated October 31, 2000, by Vickie L. O'Dell and Khizar Wasti, Ph.D. of the Virginia Department of Health, in association with this Commission, entitled "Monitoring of Ongoing Research on the Health Effects of High Voltage Transmission Lines (Final Report)" and subsequent assessments as listed in Section IV of the Response to Guidelines.

Q: DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A: Yes.

APCo Exhibit No. ___
Witness: ESL

DIRECT TESTIMONY OF
EMILY S. LARSON
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

APCo Exhibit No. ___
Witness: ESL

SUMMARY OF DIRECT TESTIMONY OF EMILY S. LARSON

My direct testimony supports the environmental analysis and route development components of Appalachian's Application and Response to Guidelines, including specifically:

- Exhibit 3 (the Geographical Components Map).
- Exhibits 4-7 (the GIS Constraints Maps).
- Exhibit 24 (the Visual Simulations).
- Exhibit 36 (the Open House Photographs).
- Sections II.A.2, 3, and 9, of the Response to Guidelines and the information concerning scenic, environmental, and historic features set forth in Section III of the Response to Guidelines.
- The entirety of Volumes 2 and 3 of the Application, which include the Siting Studies and VDEQ Supplements with their respective attachments, figures, tables, photographs and maps.

I also describe the methods used by Siting Team, which included representatives of the Company and POWER Engineers, Inc. ("POWER"), in conducting the route development studies submitted in support of Appalachian's Application, and discuss proposed and alternative routes considered for the Joshua Falls-Riverville-Gladstone 138 kV Transmission Lines and the Amherst-Reusens 69 kV Transmission Line rebuild. Additionally, I describe site selection for the proposed James River and Soapstone 138 kV substations. The Siting Team used a traditional and accepted methodology to identify optimal routes for the new and rebuilt overhead transmission lines. POWER's analysis, completed in conjunction with Siting Team, shows that the Proposed Route (Alternative Routes D and E) for the Joshua Falls-Riverville-Gladstone 138 kV transmission lines, as compared to other alternatives considered, is the most suitable, and minimizes overall environmental impacts. Similarly, of the routes considered for the Amherst-Reusens 69 kV Transmission Line rebuild, the Proposed Route minimizes impacts to residences and environmentally sensitive resources, while also maximizing the use of existing ROW. Although the Project is not anticipated to affect any federally- or state-protected species, habitat studies or species-specific surveys will be conducted prior to construction to ensure compliance with existing environmental regulations and laws.

APCo Exhibit No. ___
Witness: ESL

DIRECT TESTIMONY OF
EMILY S. LARSON
FOR APPALACHIAN POWER COMPANY
IN VIRGINIA S.C.C. CASE NO. PUR-2021-00001

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A: My name is Emily S. Larson. My current business address is 1051 E. Cary Street, Suite 1100, Richmond, Virginia 23219.

Q: BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A: I am employed by American Electric Power Service Corporation ("AEPSC"). AEPSC is a subsidiary of American Electric Power Company, Inc. ("AEP") where I serve as a Senior Transmission Line Siting Specialist. I previously served as a Project Manager in the Environmental Management Division at POWER Engineers, Inc. ("POWER") from 2015 until November 2020, when I assumed my current position. When I was at POWER, I was the siting lead for the Central Virginia Transmission Reliability Project ("CVTRP" or the "Project") and I have continued my responsibilities related to the siting of the CVTRP in my current position at AEPSC, with support from POWER.

Q: DOES POWER HAVE EXPERIENCE IN ENVIRONMENTAL ANALYSIS AND ROUTING TRANSMISSION LINES AND IDENTIFYING SUBSTATION SITES?

A: Yes. POWER has successfully sited and/or permitted over 400 transmission line projects covering thousands of miles of high voltage transmission lines and associated facilities. POWER has previously provided written testimony to this Commission for four Appalachian Power Company ("Appalachian" or the "Company") projects, including the Glendale Area Improvements 138 kV Transmission Project (SCC Case No. PUR-2018-

00188), the South Abingdon 138 kV Extension transmission line (SCC Case No. PUE-2016-00011), the Huntington Court-Roanoke 138 kV transmission line (SCC Case No. PUE-2008-00096), and the Matt Funk 138 kV transmission line (SCC Case No. PUE-2008-00079).

Q: HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A: Yes. While I was employed by POWER, I was the Company's siting witness and provided written testimony in the Glendale Area Improvements 138 kV Transmission Project (SCC Case No. PUR-2018-00188) and provided oral testimony at the hearing for the South Abingdon 138 kV Extension transmission line (SCC Case No. PUE-2016-00011).

Q: MS. LARSON, WHAT IS YOUR ROLE WITH APPALACHIAN'S PROPOSED PROJECT?

A: I served as the Environmental Project Manager for the Project during my time at POWER and have continued to work on the Project as the lead Siting Specialist after I joined the Company. I provided management and oversight for the Project's environmental analysis and route development components.

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A: The purpose of my testimony is to support the environmental analysis and route development components of the Company's application (the "Application") to this Commission for approval and certification of the proposed Project. In this connection, I am sponsoring various sections of the Response to Guidelines filed by Appalachian together with the Application in response to the Commission Staff's "Guidelines for

Transmission Line Applications Filed under Title 56 of the Code of Virginia," as well as the various siting studies and the Virginia Department of Environmental Quality Supplement (the "VDEQ Supplement") filed with the Application for each component of the Project.

Q: WHICH SPECIFIC MATERIALS ARE YOU SPONSORING?

A: In Volume 1 of the Application, I am sponsoring:

- Exhibit 3 (the Geographical Components Map).
- Exhibits 4-7 (the GIS Constraints Maps).
- Exhibit 24 (the Visual Simulations).
- Exhibit 36 (the Open House Photographs).
- Sections II.A.2, 3, and 9, of the Response to Guidelines and the information concerning scenic, environmental, and historic features set forth in Section III of the Response to Guidelines.
- The entirety of Volumes 2 and 3 of the Application, which include the Siting Studies and VDEQ Supplements with their respective attachments, figures, tables, photographs and maps.

Q: WERE THE PORTIONS OF APPALACHIAN'S FILING THAT YOU ARE SPONSORING PREPARED BY YOU OR UNDER YOUR SUPERVISION AND DIRECTION?

A: Yes.

Q: PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A: In 2007, I received a Bachelor of Science degree in Environmental Science from Towson University. In 2012, I completed graduate coursework in Urban Planning at George Washington University.

Prior to being recently employed by AEPSC, I was associated with POWER for five years and had technical, supervisory, and managerial roles in many of POWER's electric utility transmission siting projects. I have over 13 years of experience working on the siting and environmental permitting of electric transmission lines. I routinely oversaw and continue to oversee the work of POWER technical staff members responsible for the environmental permitting and siting aspects of the CVTRP and other transmission line siting projects. Over my career, I have supported routing, siting, planning and permitting efforts for transmission line projects in more than ten states, including Virginia, West Virginia, Kentucky, Indiana, Ohio, South Carolina, New Jersey, Pennsylvania, Kansas, Missouri, Illinois, and Florida.

Q: SPECIFICALLY, HOW IS THIS PRIOR EXPERIENCE APPLICABLE TO THE CURRENT PROJECT?

A: My prior experience siting and permitting electrical facilities across various land use types such as developed (densely populated or planned for development) and undeveloped (agricultural, forested, or mountainous) has given me extensive knowledge and understanding of routing opportunities and constraints. I aided in the route development and selection studies for transmission line projects submitted to this Commission that were located in areas similar to the CVTRP. My experience has shown me that public and agency input is important throughout the routing process. Similar to other recent SCC Applications filed by the Company, such as Glendale, South Abingdon and Wythe Area Improvements transmission line projects, public and agency input on this Project was considered during the routing process in order to better understand the

concerns about possible effects of the Project on existing and future land use, and other sensitive areas throughout the Project area. My understanding of potential landowner and stakeholder concerns with routing, construction, and operation of electrical transmission line facilities allowed me to incorporate these types of concerns into the routing and technical criteria early in the process to aid in the development of viable study segments for the Project.

This experience has equipped me to determine the types of information and analyses necessary to develop a transmission line route that best minimizes impacts to the natural environment, land use, and visual, recreational and cultural resources, while also considering engineering concerns and constructability issues. Minimizing impacts on land use, scenic assets, historic districts, and sensitive environmental areas is a primary route selection objective for the Company.

Q: PLEASE DESCRIBE FOR THE COMMISSION YOUR PRIMARY DUTIES AS RELATED TO THE PROPOSED PROJECT.

A: POWER was retained by Appalachian to develop and evaluate alternative routes and substation sites for the CVTRP beginning in 2018. I began working on the Project as an employee of POWER. POWER assisted the Company to determine the location for the approximately eleven mile long 138 kV single-circuit transmission line between the Joshua Falls and Riverville Substations ("the Joshua Falls-Riverville 138 kV Transmission Line"), the approximately six mile long 138 kV single-circuit transmission line between the Riverville Substation and Central Virginia Electric Cooperative's ("CVEC") Gladstone Substation ("the Gladstone - Riverville 138 kV Transmission

Line"), the proposed James River 138 kV Substation, the proposed Soapstone 138 kV Substation, and the Amherst-Reusens 69 kV Transmission Line rebuild. As the Environmental Project Manager at POWER, my primary duties involved planning, organizing, coordinating and controlling activities related to: (a) evaluating and selecting the proposed substation sites; (b) developing and evaluating study segments and alternative routes for the several Project components; (c) developing routing, technical, and evaluation criteria with which to develop, compare, and analyze alternative routes; and (d) selecting proposed routes for the transmission lines that reasonably avoid or minimize adverse impacts on the scenic assets, historic districts and environment of the Project area while meeting the engineering and operational needs of the Project in a cost-effective manner. When I became employed by AEPSC in November 2020, my duties continued as listed above, with support from POWER.

Q: DID POWER WORK ALONE TO DEVELOP THE STUDY SEGMENTS AND ALTERNATIVE ROUTES?

A: No. A multi-disciplinary team (the "Siting Team") assisted with the evaluation and selection of the substation sites, the development of the alternative routes, and the selection of the proposed routes for the transmission line components.

Q: WHO WAS ON THE SITING TEAM?

A: The Siting Team for the CVTRP consisted of employees of POWER, Appalachian and other consultants retained by or on behalf of the Company, who supported the substation selections, route development, and public involvement process. The Siting Team members have experience in transmission line siting, impact assessment for a wide

variety of natural resources and the human environment, and impact mitigation. Additionally, members of the Siting Team have experience in disciplines such as transmission line, substation, and distribution engineering, as well as right-of-way ("ROW"), public outreach, outage planning and construction management.

Q: BRIEFLY DESCRIBE THE COMPONENTS OF THE CVTRP THAT WERE SUBJECT TO ROUTING AND SITING OR ENVIRONMENTAL REVIEW.

A: The Project was organized into four main components based on their geographical location (see Exhibit 3, the Geographical Components Map). Natural and human environment impacts were assessed separately for each Component and include:

- Component 1: Joshua Falls-Riverville 138 kV Transmission Line and Gladstone-Riverville 138 kV Transmission Line (collectively, the "Joshua Falls-Riverville-Gladstone 138 kV Transmission Lines");
- Component 2: James River 138 kV Substation;
- Component 3: Soapstone 138 kV Substation; and
- Component 4: Amherst-Reusens 69 kV Transmission Line Rebuild.

Detailed information on what is included in each component can be found in Section I and the introduction to Section II of the Response to Guidelines. The four components are used to organize the: (i) transmission line and station engineering discussions in Section II, and (ii) the environmental and route development discussions in Section II, III, Volume 2 (Siting Reports), and Volume 3 (DEQ Supplements). They do not represent a construction sequence and are not used for any other purpose.

Q: DID THE SITING TEAM CONSIDER ISSUES AND CONCERNS ADDRESSED IN THE VIRGINIA ENVIRONMENTAL JUSTICE ACT (VIRGINIA CODE §§2.2-234 AND 235)?

A: Although the Virginia Environmental Justice Act was not enacted until April 22, 2020 and went into effect on July 1, 2020, it is the Company's long-standing practice to develop routes for its transmission lines that avoid or reasonably minimize impacts to the human environment, which includes environmental justice communities and fenceline communities within the meaning of the Act. The Company believes that the route selection process employed by the Siting Team, as described in more detail in my testimony below, is consistent with the goals of the Act.

Q: MS. LARSON, PLEASE DESCRIBE FOR THE COMMISSION THE PURPOSE OF THE SITING STUDY FOR COMPONENT 1.

A: The primary purpose of the *Joshua Falls–Riverville–Gladstone Siting Study* (the "138 kV Siting Study") is to identify routes for the proposed 138 kV transmission lines that will enable the Company to acquire the required right-of-way, engineer, build, operate, and maintain the lines and related facilities, while minimizing overall environmental and human land use impacts. Consequently, the 138 kV Siting Study discusses the definition of a study area, which encompasses the substation endpoints (Joshua Falls, Riverville, and Gladstone), and the environmental and land use constraints and opportunity features identified within a study area, documents siting methodologies and guidelines, documents public involvement, provides an evaluation of alternative routes, and aids in the selection of a proposed route for the Joshua Falls-Riverville 138 kV Transmission Line and the

Riverville-Gladstone 138 kV Transmission Line. The 138 kV Siting Study is included in Volume 2 of the Application.

Q: PLEASE DESCRIBE THE METHODOLOGY EMPLOYED TO CONDUCT THE ENVIRONMENTAL ANALYSIS AND ALTERNATIVE ROUTE DEVELOPMENT FOR THE PROPOSED JOSHUA FALLS-RIVERVILLE-GLADSTONE 138 KV TRANSMISSION LINES.

A: The methodology employed by the Siting Team is described in the 138 kV Siting Study. In general, that methodology consisted of the following steps:

(1) Study Area Definition;
(2) Data Collection and Constraint and Opportunity Mapping;
(3) Development of Routing Concepts, which adhere to a series of general siting and technical guidelines;
(4) Identification and Development of a Study Segment Network, which includes refinements and modifications as a result of public and stakeholder input;
(5) Assembly of Alternative Routes;
(6) Evaluation and Comparison of the Alternative Routes; and
(7) Identification of the Proposed Route.

Q: MS. LARSON, IS THIS METHODOLOGY SIMILAR TO THAT EMPLOYED BY POWER AND THE COMPANY IN OTHER SUCH STUDIES?

A: Yes. This is a traditional and accepted methodology employed by environmental consultants and siting professionals to identify optimal routes for new transmission lines.

Q: WHAT SOURCES WERE REVIEWED TO AVOID OR MINIMIZE ADVERSE ENVIRONMENTAL IMPACTS?

A: A range of geographic information was acquired within a study area, as described in Section 2.3 and Attachment B of the Siting Study. Data was compiled from:

- Available published sources, aerial photographs, United States Geological Survey (USGS) maps, and GIS data repositories (including data from local jurisdictions, the Virginia Base Mapping Program and the Virginia Department of Historic Resources (VDHR) database).
- Coordination with federal, state, and local regulatory agencies.
- Field reviews from public roads and other public access points. Some private property field reviews were also completed during landowner meetings.
- Light Detection and Ranging (LiDAR) imagery to verify locations of buildings and dwellings.
- Input from the public through two sets of public open houses, a Project website, and meetings with local landowners and other stakeholders.

Q: WHAT FACTORS WERE ASSESSED IN CONNECTION WITH AVOIDING OR MINIMIZING HUMAN AND NATURAL ENVIRONMENT IMPACTS?

A: The Siting Team assessed existing land use, including the presence and proximity of dwellings, schools, daycare centers, hospitals, other community facilities, businesses, commercial structures, churches, and airports, as applicable to Component 1. Future land use plans for residential, industrial, and commercial development were also considered through existing planning documents and communication with Amherst, Appomattox, Campbell, and Nelson Counties, and public involvement activities. The presence and proximity of the following natural, visual, and cultural resources were also considered: wetlands, streams, forested areas, prime farmland and farmland of statewide importance, conservation lands and easements, previously documented architectural and archaeological resources, rare or endangered species, and recreational and aesthetic resources such as the James River and scenic roadways. Lastly, engineering and constructability concerns were reviewed for each alternative route regarding terrain, construction access, and large river crossings. The siting guidelines that were developed

at the start of the Project and considered for this effort are detailed in Section 2.4 of the 138 kV Siting Study.

Q: PLEASE DESCRIBE THE CONSTRAINTS AND OPPORTUNITIES IN MORE DETAIL.

A: Using the available data collected and the routing and technical criteria, the Siting Team identified constraints and opportunities within the study area. Constraints are specific areas that should be avoided to the extent practical during the route development process. Opportunities were identified in a study area as locations where the proposed transmission line might be located while reasonably minimizing adverse impacts. Specific examples of constraints and opportunities can be found in Section 3.3 of the 138 kV Siting Study.

Q: WAS THE ENTIRE STUDY AREA AVAILABLE IN CREATING ALTERNATIVE ROUTES?

A: No. The study area for Component 1 has various constraints on either side of the James River that limited buildable space for a new transmission line ROW. North of the James River, Amherst County is forested, rugged, and mountainous with scattered pockets of residential development along ridgelines and major roadways such as Galts Mill Road, Stapleton Road, and Earley Farm Road. In Nelson County, there is a mix of open rural and timbering lands, with limited residential development located along Piedmont Road and Allens Creek Road. South of the James River, in Campbell and Appomattox Counties, the terrain is steeper near the James River and the Joshua Falls Substation, transitioning to rolling, agricultural land with scattered pockets of residential

development along major roadways such as Appomattox County Road ("CR") 605 and 611. Additionally, there are large Virginia Outdoors Foundation ("VOF") conservation easements and properties that are listed in the National Register of Historic Places that are located on the north side of the river in Amherst and Nelson counties. There also are multiple Virginia Department of Forestry ("DOF") conservation easements on the south side of the James River in Appomattox County.

Q: WAS THE JAMES RIVER CORRIDOR CONSIDERED A CONSTRAINT?

A: Yes. The Siting Team identified the James River as a constraint, as crossing the river was unavoidable and minimizing impacts on the river was an important factor during route development. The James River is a potential Virginia scenic river, with recreational uses, and historic significance. The proposed routes must cross the river at least once since the Joshua Falls Substation is located on the south side of the river and Riverville and Gladstone substations are located on the north side. Due to engineering limitations combined with visual, recreational, and historic resource issues, the number of potential crossings was limited. Ultimately two crossing were considered and incorporated into the Alternative Routes analyzed for Component 1.

Q: DID THE COMPANY CONSIDER PUBLIC AND STAKEHOLDER INPUT DURING ROUTE DEVELOPMENT?

A: Yes. Appalachian introduced the CVTRP with an announcement of Component 1 to the public on October 24, 2019, which included an extensive public notification campaign with a news release, a public advertisement, and mailings inviting landowners to public open houses to learn about the Project and provide their feedback. Additionally, a Project

website (www.AppalachianPower.com/CVTRP) went live on the same day to further encourage attendance of the local community at the public open houses. The website provided more information regarding the Project, including a public map showing the various study segment networks, which are discussed in Section 3.0 of the 138 kV Siting Study. Two rounds of public open houses were held for Component 1 in November 2019 and February 2020.

Q: DESCRIBE THE PUBLIC OPEN HOUSES CONDUCTED DURING THE SITING PROCESS FOR THE JOSHUA FALLS-RIVERVILLE-GLADSTONE 138 KV TRANSMISSION LINES.

A: Project team members conducted two sets of public open houses to gather landowner and community feedback due to the complexity and geographical range of the study segments presented. The first set of public open houses was conducted on November 6 and 7, 2019 from 5:30 p.m. to 7:30 p.m. at Appomattox County High School and Amherst County High School, respectively, and presented a study segment network (Map 4 of Attachment A to the 138 kV Siting Study). After completing route modifications from additional desktop and field reviews, as well as landowner and other stakeholder meetings, the Siting Team held a second set of open houses on February 26 and 27, 2020, at the same high schools, and presented a refined study segment network (Map 5 of Attachment A to the 138 kV Siting Study). At both sets of open houses, Siting Team representatives provided information on the Project and were available to answer questions and collect comments. Additionally, the public was able to comment electronically and obtain additional information through the Project website after the public open houses. The

majority of the comments received from the public were related to proximity to residences, historical properties, visual impacts, future plans, and property value. A total of 111 participants attended the four open houses and 46 comment cards were received for Component 1.

Q: DID THE COMPANY OBTAIN ANY ADDITIONAL STAKEHOLDER INPUT ON COMPONENT 1 BESIDES THE INPUT FROM THE FOUR OPEN HOUSES?

A: Yes. After the November 2019, and February 2020 public open houses, the Siting Team met with numerous landowners to review routes on their property and further discuss their concerns, as described in Section 3.6 and 3.7 of the 138 kV Siting Study. POWER and the Company also made contacts with federal, state and local government agency representatives to solicit input. The resulting input from interested citizens and government representatives was used by the Siting Team where appropriate during the route development process.

Q: HOW WAS PUBLIC INPUT USED DURING THE ROUTE DEVELOPMENT PROCESS?

A: Public participation and stakeholder input are very important to the route development process. Information and stakeholder input collected informed the route development process by altering study segments to minimize impacts noted in the information obtained by landowner and stakeholder input.

Q: PLEASE DESCRIBE THE RESULTING ALTERNATIVE ROUTES FOR THE JOSHUA FALLS-RIVERVILLE 138 KV TRANSMISSION LINE.

A: Four alternative routes for the Joshua Falls-Riverville 138 kV Transmission Line were

considered for the Project. Alternative Routes A-D are described in detail in Section 4.0 of the 138 kV Siting Study and are depicted in Maps 6 and 7 in Attachment A to the 138 kV Siting Study. The four alternative routes for the line can be generally described as follows:

- **Alternative Route A** is 11.6 miles long and exits the Joshua Falls Substation immediately crossing the James River to the north. Alternative Route A continues generally northeast high on the ridgeline and crosses Amherst Plantation subdivision through steep and heavily forested landscape, remaining generally north of development along Stapleton Road. Alternative Route A turns south across Stapleton Road, between a VOF easement and the Amherst–Riverville 138 kV transmission line, and enters the Riverville Substation from the west.
- **Alternative Route B** is 10.5 miles long and exits the Joshua Falls Substation to the south and travels generally northeast near the James River. Alternative Route B continues east on the south side of the Chestnut Mountain and generally remains north of major residential development along roadways like Appomattox CR 605 and Tin Top Place. Alternative Route B crosses the James River and enters the Riverville Substation from the south.
- **Alternative Route C** is 11.1 miles long and exits the Joshua Falls Substation in the same direction as Alternative Route B, but diverts south to avoid crossing Chestnut Mountain. Alternative Route C remains farther south in Appomattox County, crossing a large timbering area and Tin Top Place, remaining south of the residential development along Appomattox CR 605. Alternative Route C then follows the same route as Alternative Route B across the James River and enter the Riverville Substation.
- **Alternative Route D** is 11.1 miles long and is a combination of Alternative Routes B and C. Alternative Route D follows Alternative Route C to remain south of Chestnut Mountain and then follows the same route as Alternative Route B to the Riverville Substation to avoid crossing the residential development along Tin Top Place.

The centerline and ROW of all of the alternative routes avoid crossing any DOF and VOF easements.

Q: PLEASE DESCRIBE THE RESULTING ALTERNATIVE ROUTES FOR THE GLADSTONE-RIVERVILLE 138 KV TRANSMISSION LINE.

A: Two alternative routes for the Gladstone-Riverville 138 kV Transmission Line were considered for the Project. Alternative Routes E and F are described in detail in Section 4.0 of the 138 kV Siting Study and can be seen on Maps 8 and 9 in Attachment A to the 138 kV Siting Study. The two alternative routes for the line can be generally described as follows:

- **Alternative Route E** is 6.3 miles long and begins at the Riverville Substation and is the northernmost route to connect the Gladstone (CVEC) Substation.
- **Alternative Route F** is 5.5 miles long and begins at the Riverville Substation and is the southernmost route to connect the Gladstone (CVEC) Substation.

The centerline and ROW for both alternative routes avoid crossing any DOF and VOF easements.

Q: WHAT IS THE PROPOSED ROUTE FOR THE JOSHUA FALLS-RIVERVILLE-GLADSTONE 138 KV TRANSMISSION LINES?

A: The Siting Team identified Alternative Routes D and E as the Proposed Route for the Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines (see Map 19, Attachment A, of the 138 kV Siting Study). The entire Proposed Route is 17.4 miles long. See Exhibit 4 for detailed maps showing the Proposed Route for Component 1.

Q: MS. LARSON, WHAT IS THE BASIS FOR THE SITING TEAM'S SELECTION OF ALTERNATIVE ROUTES D AND E AS THE PROPOSED ROUTE FOR COMPONENT 1?

A: Sections 4.0 and 5.0 of the 138 kV Siting Study provide the qualitative and quantitative

analysis for the six alternative routes considered based on potential impacts to the natural and human environment, land use and local communities, constructability, engineering considerations, and cultural resources. The Siting Team recommends Alternative Routes D and E as the Proposed Route for Component 1. In summary, the Siting Team believes that the Proposed Route has fewer residential impacts, minimizes impacts on the James River, has less potential for environmental impacts by minimizing forest clearing, and has less potential for construction and engineering challenges (see Company witness McMillen direct testimony for discussion on construction and engineering challenges). Collectively, the Siting Team believes the Proposed Route: (1) is most consistent with the siting guidelines; (2) reasonably minimizes adverse impacts on area land uses and the natural and cultural environment; (3) minimizes special design requirements and unreasonable costs; and (4) can be constructed and operated in a safe, timely, and reliable manner.

Q: BRIEFLY DESCRIBE THE JAMES RIVER SUBSTATION SITE SELECTION PROCESS (COMPONENT 2).

A: POWER aided Appalachian in the identification and selection of the proposed James River 138 kV Substation site based on a desktop and field review, as applicable. The site selection process considers system planning and engineering/operations requirements and impacts to the natural and human environment. Sites were considered if they were within reasonable distance of the existing Shipman Substation and the existing distribution system, the Reusens-Scottsville-Bremo Bluff 138 kV transmission line, and the distribution load center near Craigtown Road in Shipman, Virginia. Generally, an area

within a five-mile radius around the existing Shipman Substation, to be replaced by the James River Substation, was reviewed for potential substation sites in Nelson County.

Q: HOW MANY SUBSTATION SITES WERE REVIEWED?

A: A total of 12 feasible sites for the proposed James River 138 kV Substation were considered and reviewed using desktop analysis and, when possible, field reconnaissance. Ultimately, two alternative sites were carried forward for detailed analysis for various reasons such as size, operational and engineering considerations, site development and constructability, land use compatibility, purchase availability, and potential viewshed impacts. Sites that were carried forward into the alternative analysis were crossed by or in proximity to the 138 kV source (the Reusens-Scottsville-Bremo Bluff 138 kV transmission line) and the existing distribution system, and thus would require short transmission line and distribution connections.

Q: DESCRIBE THE ALTERNATIVE SITES CARRIED FORWARD FOR THE JAMES RIVER SUBSTATION.

A: Two alternative sites were carried forward and evaluated for the proposed James River 138 kV Substation site. The proposed site is located on James River Road and the alternative site is located on Oak Ridge Road. The Oak Ridge Road site is not crossed by the 138 kV source and would require longer distribution line and transmission line connections. In addition, the Oak Ridge Road site would require significantly more land disturbance to build the necessary access road and the new transmission line connection would cross several streams or wetland features to reach the 138 kV source.

Q: PLEASE EXPLAIN WHY THE LOCATION FOR THE PROPOSED JAMES RIVER SUBSTATION SITE WAS SELECTED.

A: The proposed James River 138 kV Substation site is forested and undeveloped, which provides a vegetative screening to minimize visual impacts on nearby properties and public roads. The proposed site has existing access from James River Road via the transmission line ROW and allows for a short, direct 138 kV tap to connect the new substation with its 138 kV source, all on the same parcel. Additionally, the site topography is generally flat, minimizing the amount of land disturbance during site development. The Company purchased approximately 11.2 acres of a larger 150-acre property for the proposed James River 138 kV Substation site in August of 2020.

Q: DESCRIBE THE LOCATION OF THE PROPOSED 138 KV TRANSMISSION LINE CONNECTION.

A: The proposed 138 kV transmission line connection is entirely located on the property purchased by the Company for the James River 138 kV Substation and is approximately 400 feet in length. An extensive route development process was not necessary for Component 2 given that the proposed transmission line connection does not cross additional properties and requires fewer than two spans, therefore is considered an in-line substation connection. The location of the parcel purchased by the Company and the proposed substation location are shown on Exhibit 5.

Q: DID THE SITING TEAM OBTAIN PUBLIC INPUT ON THE PROPOSED JAMES RIVER 138 KV SUBSTATION SITE?

A: Members of the Siting Team met with Nelson County officials on July 19, 2019, as part

of the public involvement process. No major concerns were noted by Nelson County officials for the review area for potential substation sites with regard to future land use and planning. During the site selection process, members of the Siting Team contacted the owners of the potential substation sites and inquired about purchase availability and any future plans the owners had for those sites. The proposed James River 138 kV Substation site and associated 138 kV transmission line connection were included in a virtual open house on August 7, 2020, which was made available on the CVTRP website. Landowners located within 0.25-mile of the proposed James River Substation site were invited to participate in the virtual open house, which included a 30-day comment period and concluded on September 7, 2020. During the 30-day comment period, 580 visitors viewed the website, which included other CVTRP components. No comments were received during the virtual open house regarding the James River 138 kV Substation.

Q: DESCRIBE THE RESULTS OF ANY ENVIRONMENTAL SURVEYS OR STUDIES THAT WERE COMPLETED ON THE PARCEL PURCHASED BY THE COMPANY FOR THE SUBSTATION.

A: Prior to purchasing the 11.2-acre property, the Company completed wetland delineations and a cultural resources reconnaissance survey to verify potential impacts. No major concerns were noted as a result of those studies. Threatened and endangered species surveys will be completed after the SCC approval process has concluded, prior to construction of the substation.

Q: BRIEFLY DESCRIBE THE SOAPSTONE 138 KV SUBSTATION SITE SELECTION PROCESS (COMPONENT 3).

A: Similar to Component 2, POWER aided Appalachian in the identification and selection of the proposed Soapstone 138 kV Substation site using desktop analysis and, when possible, field reconnaissance. The site selection process for the Soapstone 138 kV Substation considered the system planning and engineering/operations requirements and impacts to the natural and human environment. Sites were considered if they were within reasonable distance of the existing Shipman 46 kV Substation and existing distribution system, the 138 kV source (the Reusens-Scottsville-Bremo Bluff 138 kV transmission line), and the distribution load center near Salem Road in Schuyler, Virginia. Generally, an area within a five-mile radius of the existing Schuyler Substation (to be replaced by the Soapstone Substation) was reviewed for potential substation sites primarily in Nelson County.

Q: HOW MANY SUBSTATION SITES WERE REVIEWED FOR THE SOAPSTONE SUBSTATION?

A: A total of 13 feasible sites for the proposed Soapstone 138 kV Substation were considered and reviewed using desktop analysis and, when possible, field reconnaissance. Ultimately, two alternative sites were carried forward for various reasons such as size, operational and engineering considerations, site development and constructability, land use compatibility, purchase availability, and potential viewshed impacts. Sites that were carried forward into the alternative analysis were crossed by the 138 kV source and the existing distribution system, and thus would require a short transmission line and

distribution connection.

Q: WHICH ALTERNATIVE SITES WERE CARRIED FORWARD FOR THE SOAPSTONE SUBSTATION?

A: Two alternative sites were carried forward and evaluated for the proposed Soapstone 138 kV Substation site. One alternative site, the proposed site, is located on Rockfish Crossing and the second alternative site is located on Carter Road. The proposed site on Rockfish Crossing is located on a property nearly four times the size of the Carter Road alternative site and can be screened with vegetation from any residential development in the area. The alternative site located on Carter Road is closer to residential development and would be more visible with limited vegetative screening, given the size of the parcel and proximity to Carter Road.

Q: PLEASE EXPLAIN WHY THE LOCATION FOR THE PROPOSED SOAPSTONE SUBSTATION SITE WAS SELECTED.

A: The proposed Soapstone 138 kV Substation site is located on a large 111.2-acre property consisting of rolling topography and is wooded in the central portions of the parcel and along the property boundaries. Potential viewshed impacts can be minimized by placing the substation on the southern side of the property near the 138 kV source and away from residential development along the Rockfish Crossing roadway. Access to the proposed site is feasible from Rockfish Crossing. The Reusens-Scottsville-Bremo Bluff 138 kV transmission line crosses the property allowing for a short, direct 138 kV extension ("Soapstone 138 kV Extension") to the new substation, all on the same parcel. Overall, the size constraints of the alternative site on Carter Road would result in potential impacts

to stream features and require purchase of multiple parcels from the same owners to meet the substation size requirements. The proposed site is zoned "Agricultural," which allows for public utilities as a use permitted as of right within that zoning classification. The Company purchased the proposed Soapstone 138 kV Substation site in November 2019.

Q: DESCRIBE THE LOCATION OF THE PROPOSED SOAPSTONE 138 KV EXTENSION.

A: The proposed Soapstone 138 kV Extension is located entirely on the property purchased by the Company for the proposed substation. An extensive route development process was not necessary for Component 3 given the proposed transmission line extension is short (approximately 600 feet) and does not cross additional properties. The location of the parcel purchased by the Company and the proposed substation location are shown on Exhibit 6.

Q: DID THE SITING TEAM OBTAIN PUBLIC INPUT ON THE PROPOSED SOAPSTONE 138 KV SUBSTATION SITE AND EXTENSION?

A: The meeting with Nelson County officials on July 19, 2019, as part of the public involvement process included the Soapstone 138 kV Substation. No major concerns were noted by Nelson County officials for the review area for potential substation sites with regard to future land use and planning. During the site selection process, members of the Siting Team reached out to owners of potential substation sites and inquired about purchase availability and any future plans the owners had for those sites. The location of the Company-purchased property for the proposed Soapstone 138 kV Substation and Soapstone 138 kV Extension on Rockfish Crossing was included in a virtual open house

on August 7, 2020, which was made available on the CVTRP website. Landowners located within 0.25-mile of the proposed Soapstone Substation site were invited to participate in the virtual open house, which included a 30-day comment period and concluded on September 7, 2020. During the 30-day comment period, 580 visitors viewed the website, which included other CVTRP components. No comments were received during the virtual open house regarding the Soapstone 138 kV Substation.

Q: DESCRIBE THE RESULTS OF ANY ENVIRONMENTAL SURVEYS OR STUDIES THAT WERE COMPLETED ON THE SOAPSTONE PARCEL PURCHASED BY THE COMPANY.

A: Prior to purchasing the approximately 111.2-acre property, the Company completed wetland delineations and a Phase I cultural resources reconnaissance survey. No major concerns were noted as a result of those studies. Threatened and endangered species surveys will be completed after the SCC approval process has concluded, prior to construction of the substation.

Q: PLEASE DESCRIBE FOR THE COMMISSION THE PURPOSE OF THE REBUILD SITING STUDY FOR THE AMHERST-REUSENS TRANSMISSION LINE REBUILD (COMPONENT 4).

A: The primary purpose of the *Amherst–Reusens Rebuild Siting Study* (the "Rebuild Siting Study") is to identify alternative routes around the few locations where rebuilding the transmission line in the existing ROW may not be feasible due to the presence of constraints. The Rebuild Siting Study identified a proposed centerline for the rebuild that will enable the Company to acquire the required ROW, engineer, construct, operate, and

maintain the line, while minimizing overall environmental and land use impacts. The Rebuild Siting Study discusses the definition of a study area, which encompasses the substation endpoints (Amherst, Monroe, and Reusens), and the environmental and land use constraints and opportunity, documents siting methodologies and guidelines, documents public involvement, provides an evaluation of alternative routes, and aids in the selection of a proposed route to rebuild the Amherst-Reusens 69 kV Transmission Line. The Rebuild Siting Study is included in Volume 2 of the Application.

Q: PLEASE DESCRIBE THE SITING METHODOLOGY EMPLOYED FOR THE AMHERST-REUSENS 69 KV TRANSMISSION LINE REBUILD.

A: The methodology employed by the Siting Team is similar to that used for Component 1, and is described in detail in the Rebuild Siting Study. For the rebuild, the methodology employed by the Siting Team generally consisted of the following steps:

(1) Study Area Definition and Focus Area Identification (areas where routing options outside of the existing ROW might be necessary);

(2) Data Collection and Constraint and Opportunity Mapping;

(3) Development of Routing Concepts within Focus Areas, which adhere to a series of general siting and technical guidelines;

(4) Identification and Development of a Study Segment Network, which includes refinements and modifications as a result of public and stakeholder input;

(5) Assembly of Alternative Routes;

(6) Evaluation and Comparison of the Alternative Routes; and

(7) Identification of the Proposed Rebuild Route.

Q: DID THE SITING TEAM CONSIDER ANY TECHNICAL CRITERIA FOR AN EXISTING LINE TO BE REBUILT?

A: The Siting Team considered various siting and technical guidelines during the route development process for the transmission line to be rebuilt. Using the existing Amherst-

Reusens 69 kV Transmission Line ROW, where practicable, was a primary siting criterion. The Siting Team considered slight adjustments to or deviations from the existing ROW centerline in areas where the transmission line could not be rebuilt in the existing ROW. Stakeholder and landowner input, engineering requirements, existing and future land uses, and visual impacts were reviewed by the Siting Team. The Siting Team developed a Study Segment Network, as discussed in Section 3.4 of the Rebuild Siting Study that adhered to the general and technical criteria.

Q: PLEASE DESCRIBE THE CONSTRAINTS AND OPPORTUNITIES ANALYSIS USED BY THE SITING TEAM.

A: Using the available data collected and the routing and technical criteria, the Siting Team identified constraints and opportunities within the defined study area. Constraints are specific areas that should be avoided to the extent practical during the route development process. The main opportunity feature is the existing Amherst-Reusens 69 kV Transmission Line ROW. The Siting Team identified constraints in or near the existing ROW such as existing pipelines and homes or other buildings. The James River was also considered a sensitive resource and constraint. Specific examples of constraints and opportunities can be found in Section 3.2 of the Rebuild Siting Study.

Q: MS. LARSON, PLEASE DESCRIBE ANY AREAS IDENTIFIED WHERE ROUTING OPTIONS OUTSIDE OF THE EXISTING ROW MIGHT BE NECESSARY FOR THE REBUILD ("FOCUS AREAS").

A: Three Focus Areas were identified where rebuilding in the existing ROW was constrained due to existing constraints or engineering requirements. The Focus Areas are:

the Amherst Substation Focus Area, Structures 429-47 to 76 Focus Area, and the James River crossing Focus Area. Within each focus area, the Siting Team considered the opportunities and constraints, the goal of the rebuild, and general routing and technical guidelines to develop the Routing Concepts and further refine a Study Segment Network, which is described in Section 3.4 of the Rebuild Siting Study.

Q: PLEASE DESCRIBE THE STUDY SEGMENTS DEVELOPED FOR THE TRANSMISSION LINE REBUILD.

A: The Siting Team developed a study segment network, which includes study segments where the transmission line can be rebuilt on its existing centerline and options where deviations or re-routes were considered. Re-route study segments were developed in each Focus Area to minimize engineering or residential constraints. As the siting effort progressed, the study segments were revised, removed, or added based on the Siting Team's siting methodology. Ultimately, one study segment near the Amherst Substation and a couple of minor adjustments between Structures 429-66 and 68 and between 429-47 and 51 were incorporated into the Rebuild Route. The Rebuild Route largely consists of rebuilding the Amherst-Reusens 69 kV Transmission Line on or near the centerline of the existing ROW from the Amherst Substation to a proposed double-circuit 138 kV structure just east of the James River crossing (east of the Reusens Substation). Two study segments were refined into Alternative Routes in the James River Focus Area.

Q: PLEASE DESCRIBE THE RESULTING ALTERNATIVE ROUTES FOR THE AMHERST-REUSENS 69 KV TRANSMISSION LINE REBUILD.

A: The Siting Team analyzed and compared two Alternative Routes over the James River

near the Reusens Substation to avoid the Reusens Hydroelectric Dam facilities. Alternative Routes A and B consider northern and southern off-centerline options to cross the James River and reach the Reusens Substation in the City of Lynchburg. Alternative Route A (0.7 mile) crosses the James River on the north side of the Reusens Hydroelectric Dam and Alternative Route B (0.8 mile) crosses on the south side of the Dam. The Rebuild Route and Alternative Routes A and B are described in detail in Sections 3.5 and 4.0 of the Rebuild Siting Study and are depicted in Map 4 in Attachment A of that study.

Q: WAS AN IN-PERSON OPEN HOUSE CONDUCTED FOR COMPONENT 4?

A: Because the COVID-19 virus was ongoing during the public involvement process of the Project, an in-person public open house was not advisable, given the travel restriction and social distancing recommendations and requirements of the Centers for Disease Control and Prevention and the Executive Orders issued by the Governor of the Commonwealth. In lieu of an in-person public meeting, a virtual open house was created on the CVTRP website (www.AppalachianPower.com/CVTRP). Multiple CVTRP components, including the Amherst-Reusens 69 kV Transmission Line Rebuild, were publicly announced with a virtual open house on August 7, 2020 and concluded on September 7, 2020. Landowners within 250 feet on either side of the existing transmission line's centerline were notified.

Q: DESCRIBE HOW A VIRTUAL OPEN HOUSE WAS USED TO OBTAIN PUBLIC INPUT.

A: Similar to the James River and Soapstone 138 kV Substation components, the Amherst-

Reusens 69 kV Transmission Line Rebuild Component obtained public input through a virtual open house on August 7, 2020. The same extensive public notification campaign including a news release, public advertisement, recorded automated voicemail messages, and an informational mailing for each open house to affected landowners. Landowners invited to the virtual open house for the transmission line rebuild were also mailed an individual map page identifying their property in relation to the Project. The virtual open house provided information related to need, engineering and design of the structures, ROW, and construction. In addition, the virtual open house allowed landowners and the public to submit comments to the Siting Team and identify properties through an address search tool. During the 30-day comment period, 580 visitors viewed the Project websites. Twenty-eight comment cards were mailed back to the Company regarding Component 4. The public involvement process is further discussed in Section 2.5 of the Rebuild Siting Study in Volume 2 of the Application.

Q: HOW WAS LANDOWNER AND OTHER STAKEHOLDER INPUT USED DURING THE SITING PROCESS?

A: Landowners and other stakeholders provide information and recommendations to aid the Siting Team in the development and refinement of study segments and alternative routes. In particular, the Siting Team coordinated with local officials, Colonial Pipeline Company (which owns a gas pipeline that parallels the centerline of the existing ROW for several miles), the owners of the Reusens Hydroelectric Dam facility at the James River crossing, and homeowners in certain residential areas to minimize impacts.

Q: PLEASE DESCRIBE TO THE COMMISSION THE PROPOSED ROUTE FOR

THE AMHERST-REUSENS 69 KV TRANSMISSION LINE REBUILD.

A: The Proposed Route will largely follow the centerline of the existing ROW, with slight deviations at the Amherst Substation, between structures 429-66 – 429-68, between structures 429-47 and 429-51, and at the crossing of the James River. Alternative Route B, the southern alignment at the James River Crossing, was chosen for the Proposed Route, as it avoids the Reusens Hydroelectric Dam and has fewer impacts to residences located north of the dam. The Proposed Route, including Alternative Route B, is 12.2 miles long. The Proposed Route is depicted in Exhibit 7 and in Map 6 in Attachment A of the Rebuild Siting Study (Volume 2 of the Application).

Q: MS. LARSON, PLEASE COMPARE THE EXISTING AMHERST-REUSENS 69 KV TRANSMISSION LINE TO THE PROPOSED REBUILD.

A: The Proposed Rebuild generally follows the same centerline and will be comparable in character to the existing transmission line. The majority of the existing structures are wood H-frame structures and approximately 50 feet tall on average. As described in Company witness McMillen's testimony, the majority of the proposed structures will be dulled-galvanized steel H-Frame structures, approximately 10' to 20' taller, and generally the same number and location in the existing ROW. The minor route adjustments address existing engineering and residential constraints and are not expected to result in additional environmental impacts.

Q: DOES THE COMPANY ANTICIPATE THAT THE PROJECT WILL AFFECT ANY FEDERALLY- OR STATE-PROTECTED SPECIES?

A: No. Where applicable, habitat studies or species-specific surveys will be conducted prior

to final engineering and construction to ensure protected species impacts are avoided or mitigated to the extent practicable. Compliance with existing regulations and laws relating to protected species is of high importance to Appalachian and POWER.

Q: DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A: Yes.

RESPONSE TO GUIDELINES

SECTION I. NECESSITY FOR THE PROPOSED PROJECT

A. State the primary justification for the proposed project (for example, the most critical contingency violation including the first year and season in which the violation occurs). In addition, identify each transmission planning standard(s) (of the Applicant, regional transmission organization ("RTO"), or North American Electric Reliability Corporation) projected to be violated absent construction of the facility.

Response:

Appalachian Power Company ("Appalachian" or "Company"), an affiliate of American Electric Power Company, Inc. ("AEP"), adheres to the transmission reliability criteria defined in AEP's FERC Form 715 filing (the "AEP Criteria"), which includes the contingency categories defined in NERC Reliability Standard TPL-001-4. AEP is a member of the regional transmission organization ("RTO") PJM Interconnection L.L.C. ("PJM"). To ensure that the regional transmission system owned by its members can reliably meet the projected demand of the customers served by that system, PJM conducts an ongoing Regional Transmission Expansion Plan ("RTEP") study process. RTEP studies are conducted on a five year out "top-down" basis and involve an exhaustive review of all PJM bulk electric system facilities (including AEP's transmission facilities of 138 kV and greater) for compliance with applicable reliability criteria. AEP also conducts an exhaustive parallel "bottom-up" assessment of its entire transmission system (including sub-138 kV facilities) using PJM's RTEP models to ensure that its system continues to comply with the AEP Criteria under projected future conditions.

Using the 2022/23 winter case developed by PJM in the 2017 RTEP, AEP's assessment identified thermal and voltage violations of the AEP Criteria on several 46 kV sub-transmission facilities under certain N-1 and N-1-1 contingencies. The violations occur on facilities serving the Company's customers located in the load area shown on Figure 1 below (the "Load Area"), representing an aggregate load of approximately 40 MW and comprising parts of Amherst, Nelson and Albemarle Counties.

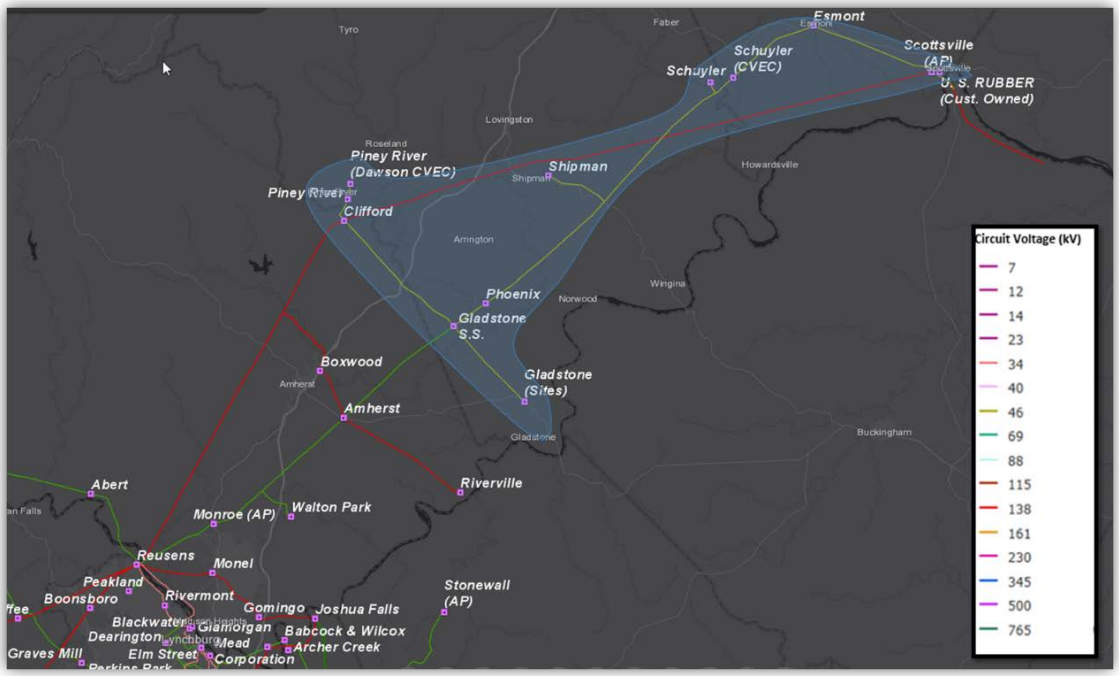


Figure 1
Central Virginia Transmission Reliability Project Load Area for Baseline Criteria Violations

AEP's assessment revealed multiple critical contingency scenarios under the projected 2022/23 winter case from the 2017 RTEP. The first is the N-1-1 contingency scenario involving the loss of the Scottsville 138/46 kV transformer #1 and #2 (connected in parallel) and the Scottsville 138/46 kV transformer #5, which causes thermal violations on the Clifford 138/69/46 kV transformer #1 and a portion of Clifford-Scottsville 46 kV transmission line. This contingency scenario also causes voltage violations on the Clifford-Scottsville 46 kV system. The 46 kV bus voltages served by the Clifford-Scottsville 46 kV transmission line, which include Scottsville, Esmont, Rockfish, Schuyler, Shipman, Phoenix, Gladstone, Clifford, and Piney River substations or switches, experienced low voltage magnitude and drop violations under this contingency scenario. The N-1 contingency involving the failure of the Scottsville 138 kV circuit breaker "T" also creates the same outage scenario and resulting violations as the above-described N-1-1 scenario at Scottsville Substation.

The second is the N-1-1 contingency scenario involving the loss of the Clifford 138/69/46 kV transformer #1 and 138/46 kV transformer #3, which causes a thermal violation on the Scottsville 138/46 kV transformer #5. That contingency scenario also causes voltage violations on the Clifford-Scottsville 46 kV system comparable to those caused by the first scenario. The N-1 contingency involving the failure of the Clifford 138 kV circuit breaker "A" also creates the same outage scenario and resulting violations as the above-described N-1-1 scenario at Clifford Substation.

The foregoing contingency scenarios and resulting violations of the AEP Criteria are described in more detail in Section I. D below. In order to address the criteria violations, the Company proposes the following improvements (collectively, the "baseline work", unless otherwise noted):

- Construction of 11.1 miles of new 138 kV transmission line between the Joshua Falls Substation and the Riverville Substation (proposed Joshua Falls–Riverville 138 kV transmission line).
- Construction of 6.3 miles of new 138 kV transmission line between the Riverville Substation and Central Virginia Electric Cooperative's ("CVEC") Gladstone Substation (proposed Gladstone–Riverville 138 kV transmission line).
- Expansion of the Riverville Substation and the installation of six new 138 kV circuit breakers and associated 138 kV bus-tie lines.
- Relocation of approximately 1,000 feet of the existing Amherst–Riverville 138 kV transmission line at the Riverville Substation.
- Installation of a new Five Forks 138 kV phase-over-phase switch pole outside CVEC's Gladstone Substation.
- Construction of a new James River 138 kV Substation, with one 138/12 kV transformer with high-side circuit switcher, two 138 kV circuit breakers, and two 12 kV feeder circuit breakers.
- Construction of approximately 400 feet of new 138 kV double circuit transmission line from a tap point on the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line to the Company's proposed new James River Substation (fewer than two spans and therefore considered an in-line substation line connection).
- Construction of a new Soapstone 138 kV Substation, with one 138/12 kV transformer with high-side circuit switcher, two 138 kV Motor Operated Air Break (MOAB) switches, two 12 kV feeder circuit breakers, and 12 kV revenue metering for CVEC.
- Construction of approximately 600 feet of new 138 kV double circuit transmission line (proposed Soapstone Extension 138 kV transmission line) from a tap point on the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line to the Company's proposed new Soapstone Substation (greater than two spans and therefore considered a transmission line extension).
- Rebuild of approximately 4.2 miles of the Amherst-Reusens 69 kV transmission line between Reusens and Monroe Substations (the rebuild includes the proposed relocation of approximately 0.3 miles of the Reusens-Scottsville-Bremo Bluff 138 kV double-circuit transmission line spanning the James River near the Reusens Substation). Additionally, approximately 0.2 mile of the Reusens-Scottsville-Bremo Bluff 138 kV single circuit transmission line on the east side of the James River will be relocated prior to crossing the river (Exhibit 7, Map Page 1).
- Expansion of the Monroe Substation yard to accommodate the installation of a new 69 kV phase-over-phase switch pole.
- Rebuild of approximately 8.0 miles of the Amherst-Reusens 69 kV transmission line between Amherst and Monroe Substations (Supplemental - PJM Project No. s2000.1)
- Expansion of the Amherst Substation yard to accommodate the installation of a new 138/69 kV, 90 MVA transformer, one 138 kV high-side breaker, two 138 kV MOABs, and two new 69 kV circuit breakers.
- Construction of approximately 500 feet of new 138 kV double circuit transmission line (proposed Amherst Extension 138 kV transmission line) to connect the existing Boxwood–Riverville 138 kV circuit to the Company's Amherst Substation. This will require the relocation of approximately 1,000 feet of the Boxwood–Riverville 138 kV transmission line and relocation of approximately 500 feet of the Amherst–Riverville 138 kV transmission line.
- Installation of two 138 kV circuit breakers, and 28.8 MVAr capacitor bank at the Scottsville Substation.
- Installation of four new 138 kV circuit breakers at Boxwood Substation.

- Installation of two new 138 kV circuit breakers at the Joshua Falls Substation.
- Installation of two 138 kV circuit breakers at the Clifford Substation.
- Installation of fiber telecommunication for communication relays.
- Upgrades to and installation of associated distribution facilities.

In addition to the need to address the foregoing reliability criteria violations on the Clifford-Scottsville 46 kV system, the Company has also identified a need to address condition, performance and risk concerns with the Amherst-Reusens 69 kV transmission line (Amherst–Reusens 69 kV circuit) and proposes to rebuild approximately 8 miles of the existing transmission line between Amherst and Monroe Substations as a supplemental asset renewal project (the "supplemental work"). The proposed supplemental work and its relationship to the proposed baseline work is discussed in more detail in Section I. B below.

The Company is seeking approval for the above-mentioned baseline and supplemental work (collectively hereinafter referred to as the "Central Virginia Transmission Reliability Project," the "CVTRP" or the "Project"). AEP developed the Project as a comprehensive solution to address both the reliability criteria violations and the supplemental asset renewal needs. The baseline and supplemental components of the Project (as outlined above) have been presented to PJM stakeholders through PJM's Sub-Regional RTEP process. As part of that process, PJM presented the Project to stakeholders in an open forum to solicit comments and input. PJM has assigned project number b3208 to the baseline work and project number s2000.1 to the supplemental work.

B. Detail the engineering justifications for the proposed project (for example, provide narrative to support whether the proposed project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Applicant's system, etc.). Describe any known future project(s), including but not limited to generation, transmission, delivery point or retail customer projects, that require the proposed project to be constructed. Verify that the planning studies used to justify the need for the proposed project considered all other generation and transmission facilities impacting the affected load area, including generation and transmission facilities that have not yet been placed into service. Provide a list of those facilities that are not yet in service.

Response:
The Project is required to address the reliability criteria violations (detailed in Sections I. A and I. D of this Response to Guidelines) and certain supplemental asset renewal needs on the Company's transmission system serving customers in Amherst, Nelson and Albemarle Counties. Reliability criteria violations are identified through the PJM RTEP process, which is governed by PJM Manual 14b. This manual describes the base case building procedure used to develop load flow models where the reliability criteria violations were identified. This procedure includes all known projects at the time of the base case build for the entire PJM region, including any such projects located in the Load Area. As of the filing date of this application, there are no future projects not already in service in the Load Area that needed to be included in the base case used to identify the reliability criteria violations detailed in Sections I. A and I. D of this Response to Guidelines.

The Project area is located in the eastern-most part of Appalachian's service territory, northeast of Lynchburg, Virginia and encompasses transmission facilities of the Company serving industrial, commercial and residential loads in Amherst, Nelson and Albemarle Counties. Major customers in the area include Greif, Inc. and CVEC. Greif, Inc. is a large industrial customer that operates a paper mill (the "Greif Paper Mill") adjacent to the Riverville Substation with an approximate load

of 45 MVA. The Greif Paper Mill is served from the Company's Riverville Substation, which is fed via an approximately nine-mile-long radial 138 kV line (the Amherst–Riverville 138 kV transmission line) extending from the Clifford-Reusens 138 kV circuit. Reliance on this radial line exposes the entire Greif, Inc. load to service interruptions due to a single contingency outage event. CVEC serves over 35,000 customers in 14 Virginia counties, including Amherst, Appomattox, Nelson and Albemarle Counties. Wholesale delivery points for CVEC are located at the following substations or switching stations in the Project area: Colleen, Scottsville, Schuyler, Gladstone and Piney River substations or switches (see Exhibit 1). Letters of support from CVEC and Greif Paper Mill are included in Exhibit 2.

The configuration of the proposed Project also requires the Amherst-Reusens 69 kV circuit to be rebuilt between Reusens and Monroe substations as part of the baseline work. Additionally, the Amherst-Monroe 69 kV section of the Amherst-Reusens 69 kV line needs to be replaced due to its condition. The Amherst–Reusens 69 kV line was constructed in 1946 using wood pole structures and lacks shielding on 98% of its length. Within the last three years, this circuit has experienced 33 momentary and three permanent outages, with an average outage duration of 78 hours. The entire 69 kV line is similar in condition and will be rebuilt as a whole addressing both baseline and supplemental needs.

The proposed comprehensive solution for the Project addresses the identified baseline and supplemental needs and offers additional benefits, all of which are described below:

a) Establishes two new 138 kV substations ("James River" and "Soapstone") in close proximity to the existing Reusens–Scottsville–Bremo Bluff 138 kV line. This allows for the transfer of load currently served from the Clifford-Scottsville 46 kV line to the more robust 138 kV system.

b) Establishes the Joshua Falls-Riverville 138 kV transmission line, creating a new 138 kV source for the Clifford-Scottsville area transmission network.

c) Provides required capacity and redundancy to the transmission network at the Riverville Substation, which is currently served via the nine mile long radial Amherst-Riverville 138 kV line and which serves approximately 45 MVA of industrial load at Greif. Inc. Today, any outage on the radial 138 kV line results in an outage of the Greif Paper Mill. Further, the load served at the end of the radial line exceeds the 75 MVA-mile threshold AEP uses to determine when to loop radial lines. The proposed Riverville Substation improvements (specifically the ring bus) will increase reliability to the Greif Paper Mill, which is very sensitive to outages.

d) Constructing the new 138 kV line and substations moves the 46 kV load to the 138 kV system and allows for the retirement of 38 miles of the Clifford-Scottsville 46 kV transmission line, which has thermal and voltage violations. Further, the Company has been eliminating 46 kV equipment where possible in order to move to more standard voltages for the transmission system.

e) Establishes the Riverville-Gladstone 138 kV transmission line to maintain service to CVEC's Gladstone Substation, which is currently served from the Clifford-Scottsville 46 kV circuit. Without the completion of the six-mile Riverville–Gladstone 138 kV transmission line, approximately 12 miles of the existing transmission line between either Amherst or Clifford and Gladstone Substations would need to be rebuilt on a new ROW due to outage constraints. The need to

maintain service to CVEC at the Gladstone Substation would prevent the reuse of the existing Gladstone Tap 46 kV ROW for such a rebuild. Additionally, the 46 kV and 69 kV transmission lines are in deteriorating condition and would otherwise need to be replaced.

f) Improves operational flexibility for scheduling maintenance outages on the area transmission network by installing appropriate sectionalizing to better withstand planned and unplanned system outages.

g) Installing new relaying and telecom infrastructure allows for better telecommunication connectivity on the transmission system to support supervisory control, data acquisition, and protection systems, which will lead to improved physical security of critical assets and a reduction in Customer Minutes of Interruptions (CMI) related to transmission outages. Additionally, telecom system upgrades help the Company respond to outages faster by identifying problems on the system more quickly and, along with the additional sectionalizing equipment, can help to bring assets back online during an outage.

C. Describe the present system and detail how the proposed project will effectively satisfy present and projected future electrical load demand requirements. Provide pertinent load growth data (at least five years of historical summer and winter peak demands and ten years of projected summer and winter peak loads where applicable). Provide all assumptions inherent within the projected data and describe why the existing system cannot adequately serve the needs of the Applicant (if that is the case). Indicate the date by which the existing system is projected to be inadequate.

Response:

The present-day Project area transmission system depends on the Clifford-Scottsville 46 kV circuit, which is supported by two primary 138 kV sources: the Clifford-Reusens 138 kV circuit and the Bremo-Scottsville 138 kV circuit. Specifically, the Clifford-Scottsville 46 kV circuit is supported by two primary sources: the Clifford Substation (138/69/46 kV transformer #1 and 138/46 kV transformer #3) and the Scottsville Substation (138/46 kV transformer #1 and #2 and 138/46 kV transformer #5). The transformers at the Clifford and Scottsville Substations are susceptible to simultaneous outages due to lack of sectionalizing, as there are no circuit breakers on the line exits or the high side of each transformer. The Clifford-Scottsville 138 kV circuit is approximately 29 miles long and the Clifford 138/46 kV transformer #1 and the Scottsville 138/46 kV transformers #1 and #2 are exposed to faults anywhere along that circuit. In other words, an outage anywhere on the Clifford-Scottsville 138 kV circuit would lead to a more widespread event than if the line had the additional sectionalizing. Adding the proposed Soapstone and James River 138 kV Substations will achieve the desired sectionalizing of the Clifford-Scottsville 138 kV circuit and reduce the exposure to outages on the circuit. Further, both the Clifford and Scottsville Substations are susceptible to losing all their transformation from the 138 kV system to the 46 kV system due to a single 138 kV circuit breaker failure contingency scenario.

Consequently, under projected winter 2022/23 peak load conditions, various combinations of outages of transmission facilities serving the Load Area will result in thermal loadings, voltage magnitudes and voltage deviations in the Load Area that violate applicable transmission reliability criteria. The existing and future system bubble diagrams are shown in Figures 2a and 2b. Also, see Volume 4, Confidential Appendix, Figures 2a-C and 2b-C for the existing and proposed one-line diagrams. By moving the majority of the load currently served by the Clifford-

Scottsville 46 kV circuit to a 138 kV circuit, by constructing the new 138 kV line from Joshua Falls to Riverville, adding two 138 kV substations, and rebuilding the Monroe-Reusens section of the Amherst-Reusens 69 kV circuit, the Project eliminates all the reliability criteria violations for the facilities serving the Load Area under projected future load conditions and allows for the retirement of the majority of the aging and obsolete 46 kV and 69 kV transmission lines in the area.

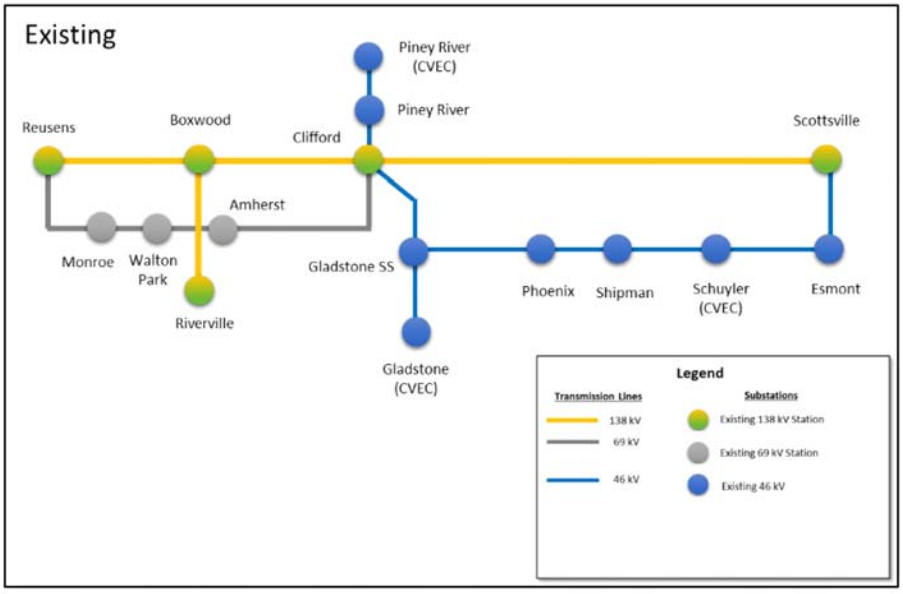


Figure 2a
Simplified Bubble Diagrams of the Existing Transmission Lines and Substations

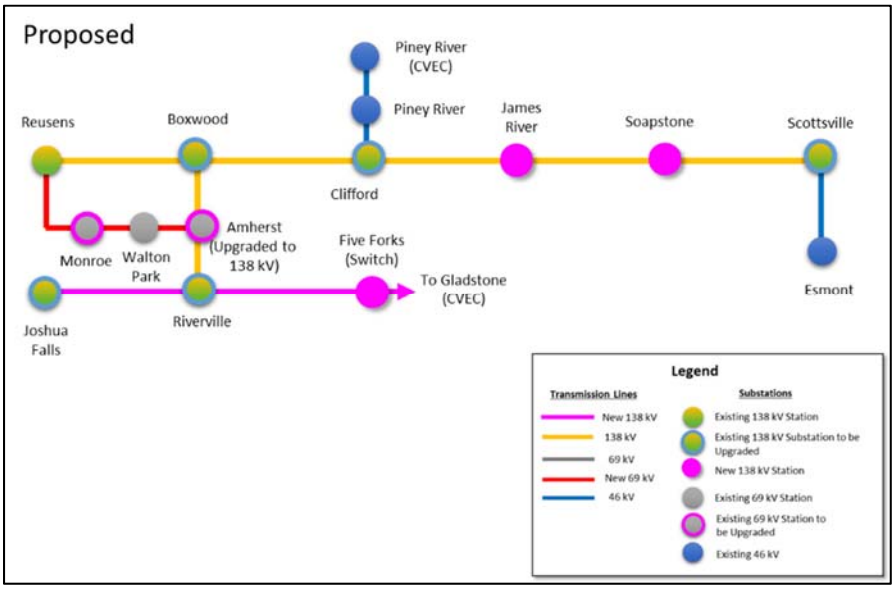


Figure 2b
Simplified Bubble Diagrams of the Proposed Transmission Lines and Substations

The Load Area covers parts of Amherst, Nelson and Albemarle Counties in Virginia. AEP developed a load forecast for the Load Area using an econometric model that forecasts peak demand. This model had explanatory variables for the gross regional product for Amherst, Nelson, and Albemarle Counties, the combined, minimum and maximum temperatures on the day of the peak and binary variables. The Load Area is winter peaking. The model used historical data for the period from the winter of 2010/11 through winter of 2019/20. Gross county product forecast data were obtained from Moody's Analytics. AEP developed forecasts of maximum and minimum temperatures on the day of the peak from an average of historical temperatures.

Tables 1 and 2 and Figures 3 and 4 show historical and projected winter peak loads for the Load Area. These figures show the actual summer and winter peak loads for the previous 10 years and the projected summer and winter peak loads for the next 10 years. Figure 1 represents the entire Load Area.

The Load Area summer and winter peak demand are anticipated to grow at an average annual rate of approximately 1.0% over the course of the next ten years, beginning in 2020. During projected winter 2022/23 peak load conditions, the load is expected to reach approximately 47.1 MW. These expected load values are built into the PJM RTEP base cases on an annual basis for future analysis as defined by PJM Manual 14b.

Clifford-Scottsville Load Area

	Actual Peak Load (MW)										Projected Peak Load (MW)									
Summer Peak	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	23.8	25.5	27.3	26.5	24.1	25.5	26.8	25.4	26.0	31.1	27.1	27.3	27.6	27.9	28.3	28.6	28.9	29.2	29.5	29.8

Table 1
Historical and Projected Summer Peak Loads for the Clifford-Scottsville Load Area

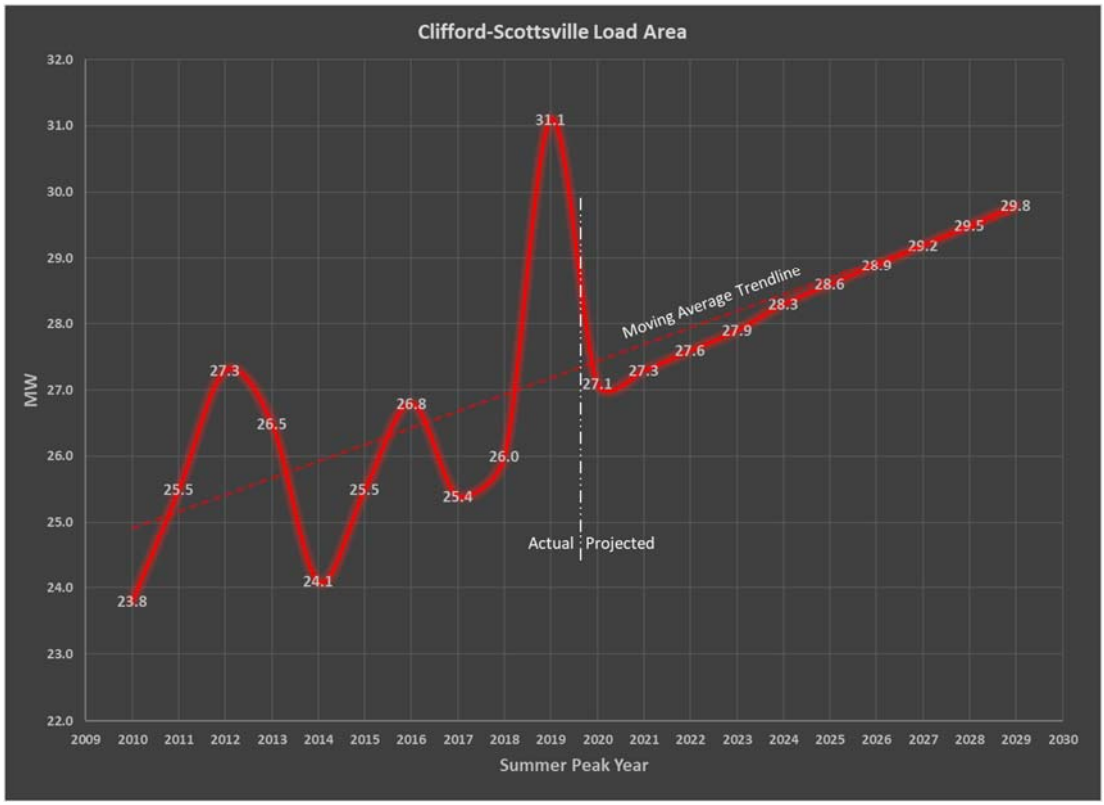


Figure 3
Historical and Projected Summer Peak Loads for the Clifford-Scottsville Load Area

Clifford-Scottsville Load Area

	Actual Peak Load (MW)									Projected Peak Load (MW)								
Winter	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Peak	41.8	39.1	42.7	45.3	43.8	50.0	44.6	39.9	44.6	39.9	46.2	46.6	47.1	47.7	48.2	48.7	49.2	49.8	50.3	50.9

Table 2
Historical and Projected Winter Peak Loads for the Clifford-Scottsville Load Area

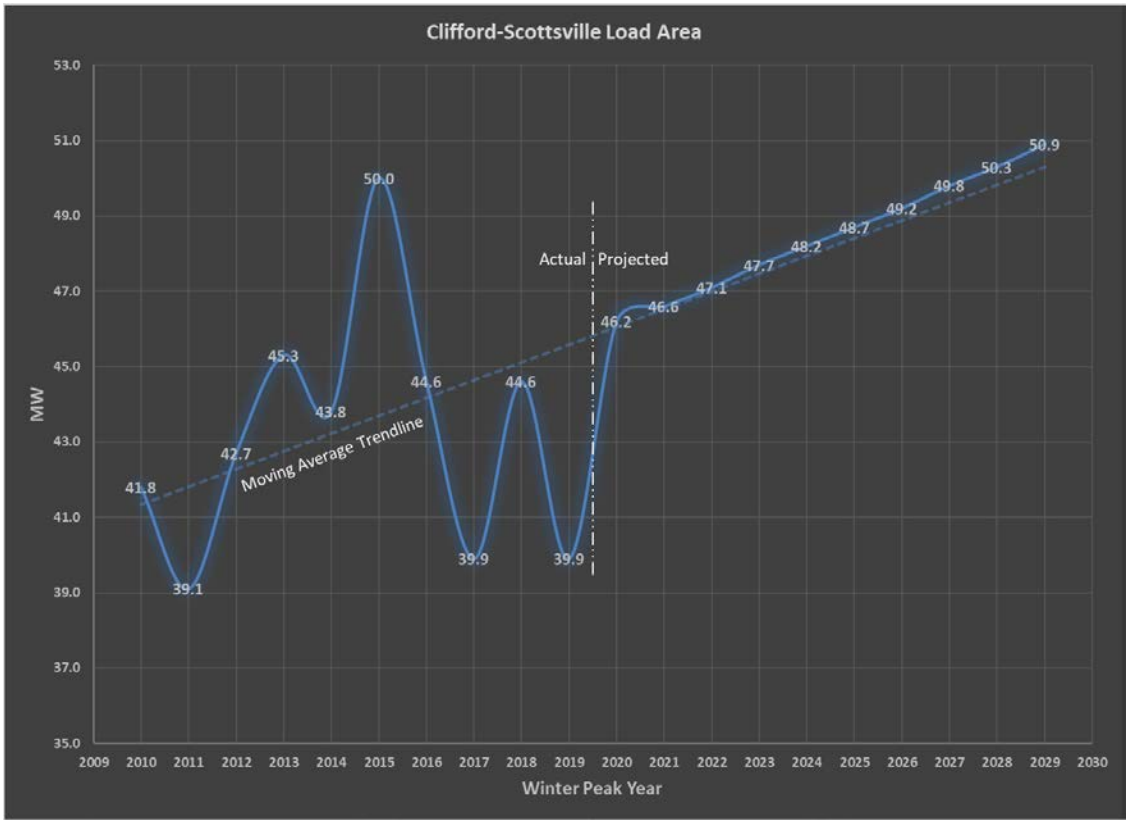


Figure 4
Historical and Projected Winter Peak Loads for the Clifford-Scottsville Load Area

D. If power flow modeling indicates that the existing system is, or will at some future time be, inadequate under certain contingency situations, provide a list of all these contingencies and the associated violations. Describe the critical contingencies including the affected elements and the year and season when the violation(s) is first noted in the planning studies. Provide the applicable computer screenshots of single-line diagrams from power flow simulations depicting the circuits and substations experiencing thermal overloads and voltage violations during the critical contingencies described above.

Response:
Using the 2022/23 winter case developed by PJM in the 2017 RTEP, AEP's assessment identified thermal and voltage violations of the AEP Criteria on several 46 kV sub-transmission facilities serving the Company's customers located in the Load Area shown on Figure 1 above, comprising parts of Amherst, Nelson and Albemarle Counties.

Two critical N-1-1 contingency scenarios cause voltage deviation violations (voltage deviations of 8% or more), low voltage magnitude violations (substation voltages lower than 0.92 per unit) and thermal loading violations (loading exceeds the facility's emergency thermal rating) in the

Load Area. AEP considers both outage scenarios to be critical as they both cause thermal and voltage violations on the 46 kV system serving the Load Area.

The N-1-1 contingency scenario involving the loss of the Scottsville 138/46 kV transformer #1 and #2 (which are connected in parallel) plus the Scottsville 138/46 kV transformer #5 creates outages of the Scottsville-Bremo 138 kV circuit, Clifford-Scottsville 138 kV circuit, and Clifford 138/46 kV transformer #3 due to the lack of sectionalizing at the Scottsville Substation. Under this scenario, the Clifford 138/69/46 kV transformer #1 46 kV winding would exceed its winter emergency rating of 26 MVA by 229%, and the Clifford-Gladstone Tap 46 kV and Gladstone Tap-Phoenix 46 kV line sections would exceed their winter emergency ratings of 42 MVA by 117% and 102% respectively (see Figure 5). As shown in Table 3, this scenario would also cause 12 load-serving buses to experience low voltage magnitude violations (below 0.92 per unit) and voltage deviation violations (8% or more). The N-1 contingency failure of the Scottsville breaker "T" also results in the same thermal and voltage violations, as it would cause the same outages as the N-1-1 loss of the transformers at Scottsville Substation described above.

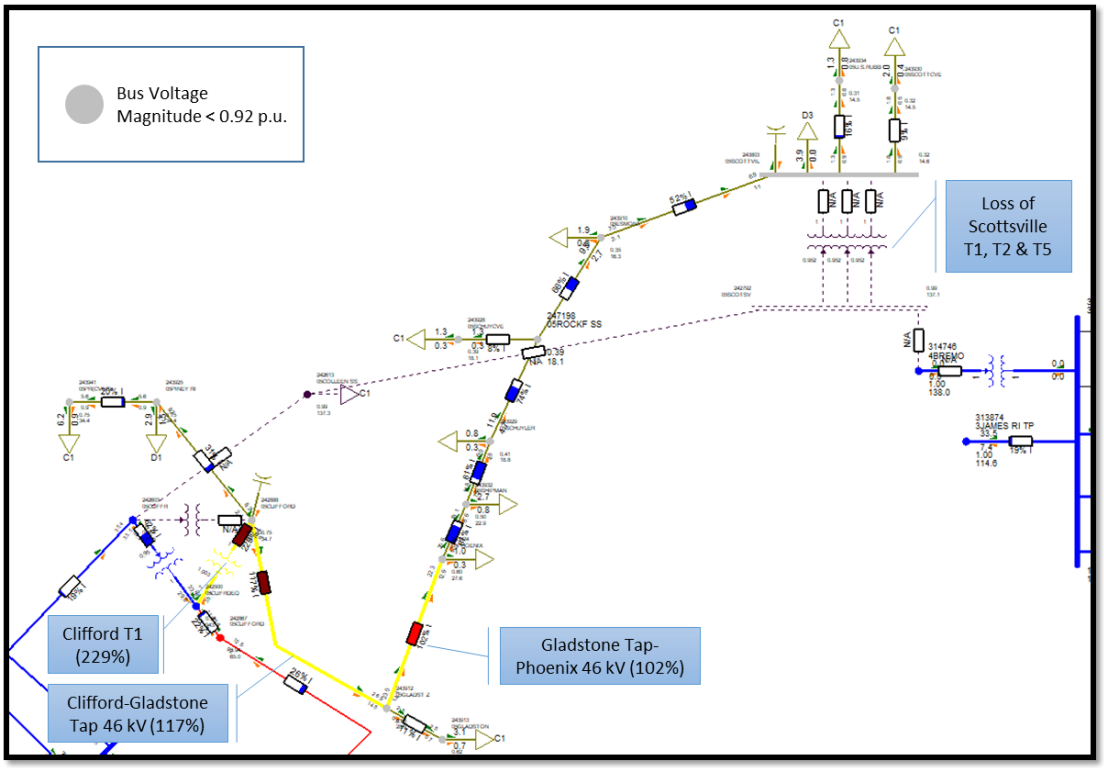


Figure 5
Loss of Scottsville 138/46 kV T1, 138/46 kV T2 & 138/46 kV T5

Loss of Scottsville T1, T2, T5			
Substation Name	Voltage (kV)	Voltage (p.u.)	Voltage Deviation (%)
Clifford	46	0.7546	27.94%
Piney River (AEP)	46	0.7485	28.08%
Piney River (CVEC)	46	0.7468	28.11%
Gladstone (CVEC)	46	0.6204	39.22%
Phoenix	46	0.6001	41.55%
Shipman	46	0.4969	51.15%
Schuyler (AEP)	46	0.409	59.97%
Schuyler (CVEC)	46	0.3929	61.65%
Esmont	46	0.3537	66.05%
Scottsville	46	0.3172	70.99%
Scottsville (Centenary CVEC)	46	0.3157	71.05%
US Rubber	46	0.3143	71.10%

Table 3
Loss of Scottsville 138/46 kV T1, 138/46 kV T2 & 138/46 kV T5

The N-1-1 contingency consisting of the loss of the Clifford 138/69/46 kV transformer #1 and Clifford 138/46 kV transformer #3 causes a thermal violation on the Scottsville 138/46 kV transformer #5 as well as voltage magnitude and voltage deviation violations at multiple substations served from the Clifford-Scottsville 46 kV circuit. As a result of a failure of the Clifford 138/69/46 kV transformer #1 and 138/46 kV transformer #3, the Clifford-Reusens 138 kV circuit, Clifford-Scottsville 138 kV circuit and Scottsville 138/46 kV transformers #1 and #2 (connected in parallel) would also be out of service during the initial circuit breaker operation. The Scottsville 138/46 kV transformer #5 would exceed its winter emergency rating of 30 MVA by 185% (see Figure 6). As shown in Table 3, 12 load-serving buses would experience low voltage magnitude violations (below 0.92 per unit) and voltage deviation violations (8% or more). The N-1 contingency failure of the Clifford 138 kV circuit breaker A also results in the same thermal and voltage violations, as it would cause the same outages as the N-1-1 loss of the transformers at Clifford Substation described above.

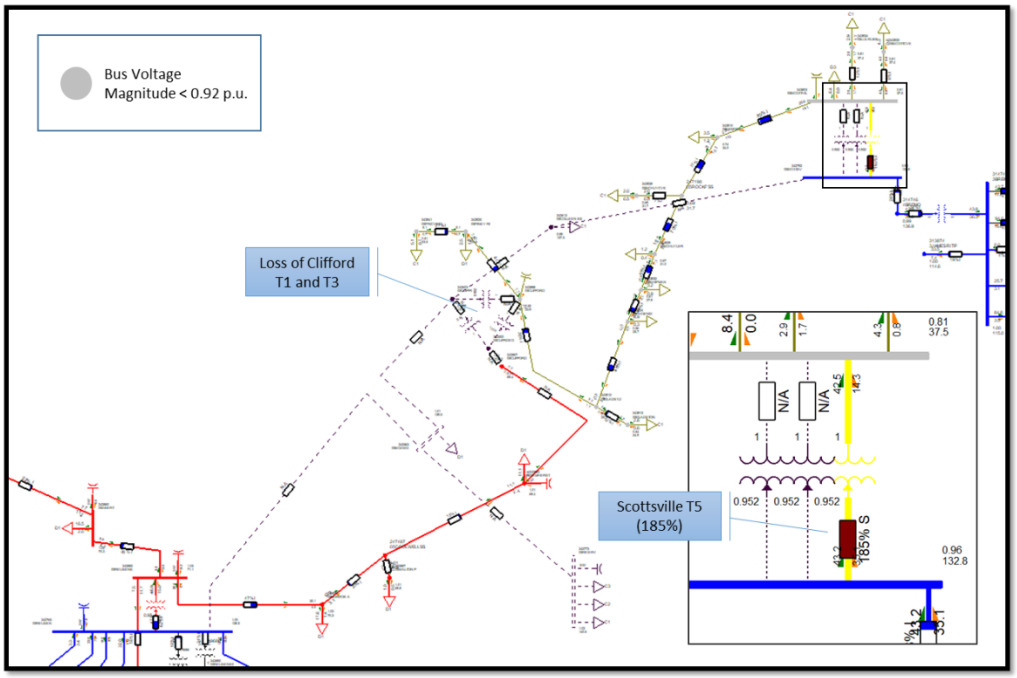


Figure 6
Loss of Clifford 138/69/46 kV T1 and 138/46 kV T3

Loss of Clifford T1, T3

Substation Name	Voltage (kV)	Voltage (p.u.)	Voltage Deviation (%)
Clifford	46	0.5206	51.34%
Piney River (AEP)	46	0.5126	51.67%
Piney River (CVEC)	46	0.5104	51.75%
Gladstone (CVEC)	46	0.5402	47.24%
Phoenix	46	0.5596	45.60%
Shipman	46	0.6072	40.12%
Schuyler (AEP)	46	0.6745	33.42%
Schuyler (CVEC)	46	0.69	31.94%
Esmont	46	0.7391	27.51%
Scottsville	46	0.8146	21.25%
Scottsville (Centenary CVEC)	46	0.8133	21.29%
US Rubber	46	0.8122	21.31%

Table 4
Loss of Clifford 138/69/46 kV T1 and 138/46 kV T3

As Figures 5 and 6 and Tables 3 and 4 show, both N-1-1 contingency scenarios cause extremely low voltages at the 46 kV substations served from the Clifford-Scottsville 46 kV circuit. In either scenario, substation bus voltages would drop well below the acceptable lower limit of 0.92 per unit, creating an area voltage range map as shown in Figures 7 and 8.

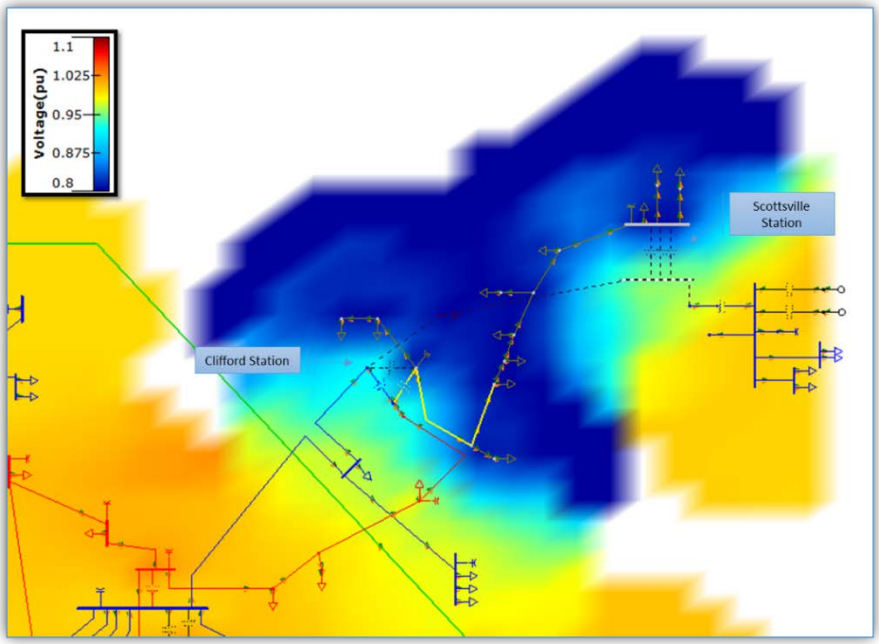


Figure 7
Outage of Scottsville 138/46 kV T1, T2 & T5 Resulting Area Low Voltage Violations

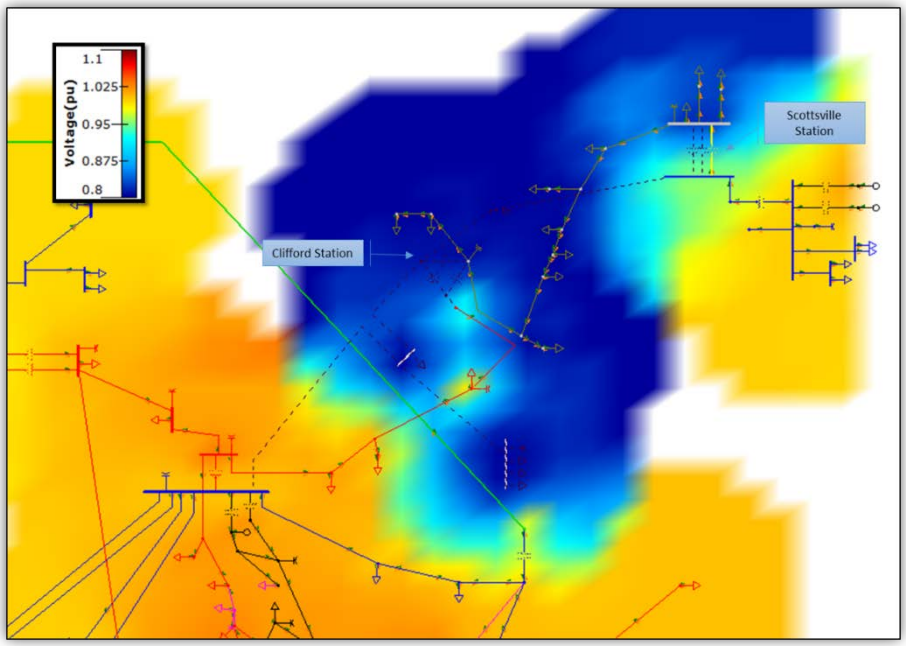


Figure 8
Outage of Clifford 138/69/46 kV T1, 138/46 T3 Resulting Area Low Voltage Violations

E. Describe the feasible project alternatives, if any, considered for meeting the identified need including any associated studies conducted by the Applicant or analysis provided to the RTO. Explain why each alternative was rejected.

Response:
As an alternative solution to address the identified reliability criteria violations, the Company considered the following: (1) rebuild approximately 36 miles of the 44 mile Clifford-Scottsville 46 kV circuit to 69 kV standards (operated at 46 kV) utilizing 795 ACSR overhead conductor (including the portion of the Amherst-Clifford 69 kV line that is double circuited with the 46 kV line), (2) install a 138 kV circuit breaker at Clifford Substation towards Scottsville Substation, (3) replace the Scottsville 138/46 kV transformer #5 with a 75 MVA unit, and (4) increase the size of the capacitor banks at the Clifford Substation from 3.6 MVAr to 9.6 MVAr and at the Scottsville Substation from 3.6 MVAr to 5.4 MVAr.

Once the above is complete, the alternative would also need to include the following additional supplemental work in order to be comparable to the proposed Project: rebuild the approximately 12 mile-long Amherst-Reusens 69 kV circuit; rebuild the remaining 7 miles of the Amherst-Clifford 69 kV circuit between the Amherst Substation and the Gladstone Switch; construct a new 138 kV line from the Joshua Falls Substation to the Riverville Substation (11.1 miles long); and install required substation upgrades at the Joshua Falls and Riverville Substations to accommodate the new 138 kV circuit.

Although the alternative solution would address the identified reliability criteria violations on transmission system serving the Load Area and the identified supplemental needs, AEP rejected this alternative because it would leave in place 38 miles of 46 kV network that is proposed to be removed by the Project. As mentioned previously, leaving the non-standard 46 kV network in place is inconsistent with the Company's standards. Substantial cost savings are realized by constructing the Project rather than rebuilding the 46 kV line in place along with the other supplemental work described above as would be required for the alternative solution. The total estimated cost for this alternative is $190 M.

F. Describe any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project, including the number of circuits and normal and emergency ratings of the facilities.

Response:
Upon completion of the proposed Project, the following lines and facilities will be taken out of service (Exhibit 1):

1. Approximately 7 miles of double circuit 69 kV transmission line (one side operated at 46 kV) between Clifford Substation and Gladstone Switch. The winter normal and emergency rating of this line is 42 MVA for the 46 kV and 63 MVA for the 69 kV.
2. Approximately 7 miles of single circuit 69 kV transmission line between Gladstone Switch and Amherst Substation. The winter normal and emergency rating of this line is 63 MVA.
3. Approximately 5 miles of single circuit 46 kV transmission line between Gladstone Switch and CVEC's Gladstone Substation. The winter normal and emergency rating of this line is 42 MVA.
4. Approximately 1.8 miles of single circuit 46 kV transmission line between Gladstone Switch and Phoenix Substation. The winter normal and emergency rating of this line is 42 MVA.

5. Approximately 7.3 miles of single circuit 46 kV transmission line between Phoenix Substation and Shipman Switch. The winter normal and emergency rating of this line is 42 MVA.
6. Approximately 3 miles of single circuit 46 kV transmission line between Shipman Switch and Shipman Substation. The winter normal and emergency rating of this line is 42 MVA.
7. Approximately 7.8 miles of single circuit 46 kV transmission line between Shipman Switch and Schuyler Substation. The winter normal and emergency rating of this line is 42 MVA.
8. Approximately 1.6 miles of single circuit 46 kV transmission line between Schuyler Substation and Rockfish Switch which serves CVEC's Schuyler Substation. The winter normal and emergency rating of this line is 42 MVA.
9. Approximately 4.5 miles of single circuit 46 kV transmission line between Rockfish Switch and Esmont Substation. The winter normal and emergency rating of this line is 42 MVA.
10. Gladstone Switch, Phoenix Substation, Shipman Switch, Schuyler Substation and Rockfish Switch.

As part of the proposed Project, approximately 12 miles of the existing single circuit 69 kV transmission line between Amherst Substation and Reusens Substation will be rebuilt at 69 kV. The winter normal and emergency rating of this line before the rebuild is 63 MVA, and after the rebuild will be 107 MVA and 113 MVA respectively.

G. Provide a system map, in color and of suitable scale, showing the location and voltage of the Applicant's transmission lines, substations, generating facilities, etc., that would affect or be affected by the new transmission line and are relevant to the necessity for the proposed line. Clearly label on this map all points referenced in the necessity statement.

Response:
See Exhibit 1.

H. Provide the desired in-service date of the proposed project and the estimated construction time.

Response:
The proposed in-service date for the Project is December 1, 2025. The reliability criteria violations described above are required under applicable PJM rules to be addressed by December 2022. After the Commission's issuance of an order approving the Project, the Company estimates that it will need approximately four years for engineering, design, right-of-way acquisition, permitting, material procurement and construction to place the entire Project in service. As a result, the Project may not be in service by the required December 2022 date. AEP Transmission Operations will make temporary system adjustments as necessary to prevent any identified thermal or voltage violations in anticipation of the next outage based on real-time loading scenarios.

I. Provide the estimated total cost of the project as well as total transmission-related costs and total substation-related costs. Provide the total estimated cost for each feasible alternative considered. Identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.) for each cost provided.

Response:
Functional estimated total cost of the Project: $147.7 M

Functional estimated transmission line-related cost of the Project: $95.1 M
Functional estimated substation-related cost: $52.6 M

Conceptual estimated total cost of alternative described in Section I E: $190 M

Functional estimates are based on project scopes developed by AEP transmission line and substation engineering using information obtained from tabletop studies and design criteria. Conceptual estimates are high-level estimates based on a conceptual scope of work without input from transmission line and substation engineering.

J. If the proposed project has been approved by the RTO, provide the line number, regional transmission expansion plan number, cost responsibility assignments, and cost allocation methodology. State whether the proposed project is considered to be a baseline or supplemental project.

Response:
The baseline work included in the Project has been assigned the PJM baseline number b3208. The supplemental work included in the Project has been assigned the PJM supplemental number s2000.1. The baseline work was reviewed in the PJM Sub-Regional RTEP (Western) committee meeting on 2/20/2019 and 5/20/2019. The supplemental work was presented in the PJM Sub-Regional RTEP (Western) committee meeting on 2/20/2019, 3/25/2019, and 5/20/2019. Both the baseline and supplemental portions of the Project are 100% allocated to the AEP Zone.

K. If the need for the proposed project is due in part to reliability issues and the proposed project is a rebuild of an existing transmission line(s), provide five years of outage history for the line(s), including for each outage the cause, duration and number of customers affected. Include a summary of the average annual number and duration of outages. Provide the average annual number and duration of outages on all Applicant circuits of the same voltage, as well as the total number of such circuits. In addition to outage history, provide five years of maintenance history on the line(s) to be rebuilt including a description of the work performed as well as the cost to complete the maintenance. Describe any system work already undertaken to address this outage history.

Response:
See Tables 5 through 7.

Circuit Outage Cause Summary			
Amherst – Reusens 69kV Circuit (01/01/2015 – 12/31/2017)			
Date	Cause	Duration (Hours)	CI
5/18/15	Weather - Lightning/Tstorm	0	0
6/18/15	Vegetation Fall-In (Outside R/W)	168.67	0
6/29/15	Weather - Lightning/Tstorm	0	0
8/19/15	Weather - Lightning/Tstorm	0	0
10/3/15	Weather - Lightning/Tstorm	0	0
4/3/16	Weather - Lightning/Tstorm	0	0
6/3/16	Weather - Lightning/Tstorm	0	0
12/15/16	Weather - Wind	0	0
12/15/16	Weather - Wind	0	0
1/23/17	Unknown	0	0
1/23/17	Unknown	0	0
1/23/17	Unknown*	34.07	0
1/23/17	Unknown	0	0
2/9/17	Weather - Wind	0	0
2/9/17	Weather - Wind	0	0
2/9/17	Weather - Wind	0	0
2/9/17	Weather - Wind	0	0
2/13/17	Weather - Wind	0	0
6/19/17	Weather - Lightning/Tstorm	0	0
*This outage is believed to be due to Equip-Station-Breaker based on a review of the outage response.			

Circuit Outage Cause Summary			
Amherst – Reusens 69kV Circuit (01/01/2018 – 12/31/2019)			
Date	Cause	Duration (Hours)	CI
1/4/18	Weather - Wind	0	0
1/4/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	0	0
3/2/18	Weather - Wind	32.58	0
4/15/18	Weather - Lightning/Tstorm	0	0
7/17/18	Weather - Lightning/Tstorm	0	0
8/30/18	Weather - Lightning/Tstorm	0	0
9/2/18	Weather - Lightning/Tstorm	0	0
7/21/19	Weather - Lightning/Tstorm	7.6	3,083

Table 5
Amherst-Reusens 69 kV Circuit Outage History

APCo VA 69kV Circuits Annual Outage Averages		
5 Years (2015-2019)		
# of 69kV Circuits	Frequency	Duration (Hours)
85	1.75	0.11

Circuit Annual Outage Averages		
5 Years (2015-2019)		
Circuit Name	Frequency	Duration (Hours)
Amherst – Reusens 69kV	7.8	9.29

Table 6
69 kV Circuit Outage Information

Line Maintenance History		
5 Years (2015-2019)		
Year	Work Performed	Cost ($)
2015	Str. 429-32 Rehab	80,487.22
2015	Str. 429-29 Broken Insulators Maintenance	2,119.23
2015	Str. 429-60 Replaced Due to Woodpecker Damage	100,028.49
2015	Replace Rotted Structures	98,042.68
2015	Str. 429-22 Broken Crossarm Rehab	52,301.36
2015	Structure Conditions Maintenance	9,573.05
2015	ROW Widening	4,064.58
2019	Str. 429-22 Repair	15,490.28

Table 7
Amherst-Reusens 69 kV Circuit 5 Year Maintenance History

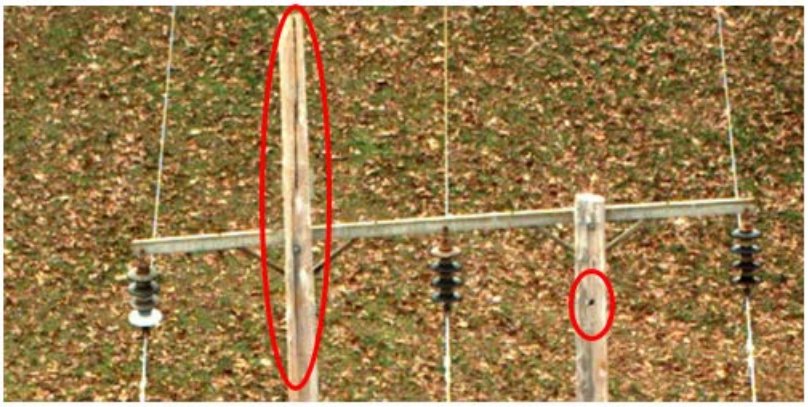
L. If the need for the proposed project is due in part to deterioration of structures and associated equipment, provide representative photographs and inspection records detailing their condition.

Response:
The Amherst–Reusens 69 kV transmission line, between the Amherst and Monroe Substations, is being rebuilt to address the deterioration of structures and associated equipment. Based on the most recent Amherst–Reusens 69 kV transmission line inspection report that was updated on January 16, 2020, there are 23 structures with at least one open structural condition, which is 21% of the structures on the line. There are 25 open structural conditions which include woodpecker holes (19), rot top (3), rot heart (1), rot shell (1), and damaged (1) conditions impacting poles on this line. There is one open conductor condition related to broken strands. There is one open forestry condition related to brush clearance.

See Figures 9 – 13 showing representative photographs regarding the condition of the existing Amherst–Reusens 69 kV transmission line.

STR. 429-6
- Woodpecker Holes
- Vertical Pole Cracking at Woodpecker Holes

Figure 9
Structure 429-6



STR. 429-33
- Woodpecker Hole
- Vertical Pole Cracking

Figure 10
Structure 429-33

STR. 429-41
- Pole Top Weathering
- Vertical Pole Cracking

Figure 11
Structure 429-41

STR. 429-69
- Woodpecker Holes
- Pole Top Weathering
- Vertical Pole Cracking

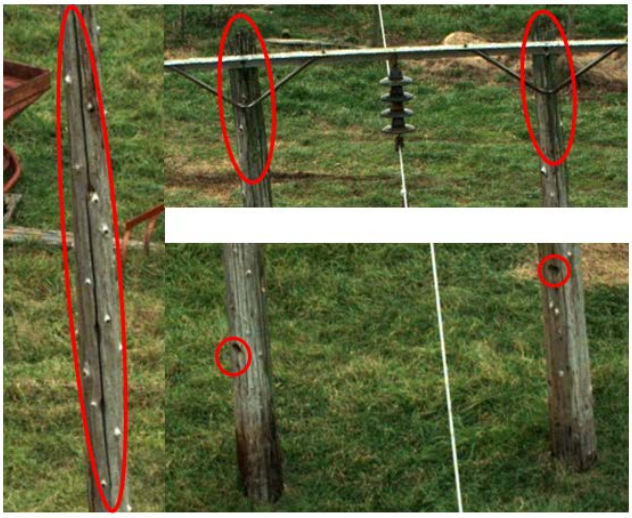


Figure 12
Structure 429-69

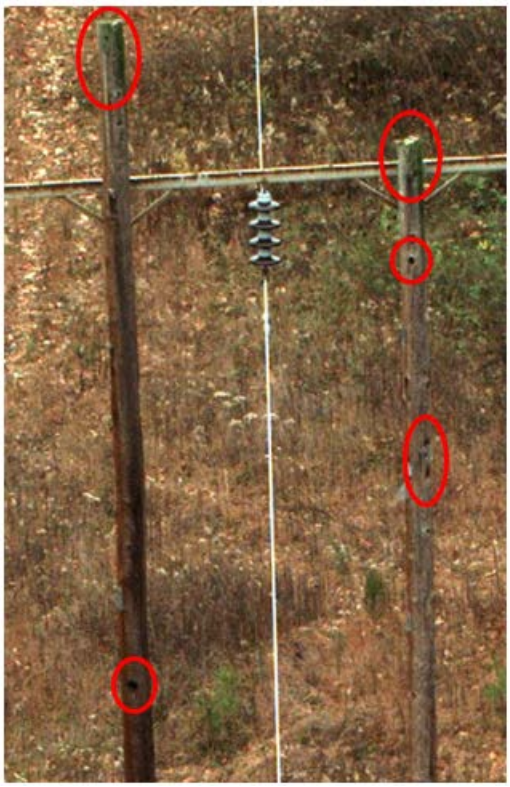


Figure 13
Structure
429-96

M. In addition to all other information required by these guidelines, applications for approval to construct facilities and transmission lines inter-connecting a Non-Utility Generator (NUG) and a utility shall include the following information.

1. The full name of the NUG as it appears in its contract with the utility and the dates of the initial contract and any amendments;

2. A description of the arrangements for financing the facilities, including information on the allocation of costs between the utility and the NUG;

3. For Qualifying Facilities (QFs) certificated by Federal Energy Regulatory Commission (FERC) order, provide the QF or docket number, the dates of all

certification or recertification orders, and the citation to FERC Reports, if available;

b. For self-certified QFs, provide a copy of the notice filed with the FERC;

4. In addition to the information required in 3a or 3b, provide the project number and project name used by the FERC in licensing hydro-electric projects, also provide the dates of all orders and citations to FERC Reports, if available; and

5. If the name provided in 1 above differs from the name provided in 3 above, give a full explanation.

Response:
Not applicable.

N. Describe the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations and other ground facilities associated with the proposed project.

Response:
The new James River Substation will be fed from the existing Clifford-Scottsville 138 kV circuit and will serve distribution load formerly served from Phoenix and Shipman Substations, which will be retired along with the Clifford-Scottsville 46 kV circuit from which they were served.

The new Soapstone Substation will also be fed from the existing Clifford-Scottsville 138 kV circuit and will serve distribution load formerly served from Schuyler Substation and Rockfish Switch (CVEC), which will be retired along with the Clifford-Scottsville 46 kV circuit from which they were served.

The new 138 kV yard at the Riverville Substation will provide a second 138 kV source at that substation (from the proposed Joshua Falls-Riverville 138 kV transmission line), and will serve primarily the load of the existing Greif Paper Plant at Riverville.

SECTION II. DESCRIPTION OF THE PROPOSED PROJECT

Introduction

The Project consists of multiple parts that will be sited at several locations throughout a large geographical footprint. Therefore, in order to efficiently present the engineering and environmental information required in Sections II and III of this Response to Guidelines, the Project's various parts have been organized into four main component groups based on their geographical locations, and a fifth catchall component group for other associated Project improvements. Environmental impacts were not detailed for those other associated Project improvements, as they largely consist of work inside existing substations.

The grouping into components is geographically-based and does not represent any order of construction phasing or sequencing for the Project. A Geographical Project Components Map showing the location of the various components throughout the Project area is attached as Exhibit 3. Additionally, the GIS Constraints Maps, Exhibits 4-7, show the location of the proposed transmission improvements in more detail. Detailed descriptions of each Project component are as follows (except where noted, components are all baseline components of PJM Project No. b3208):

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines (Exhibit 4)

- Construction of 11.1 miles of new 138 kV transmission line between the Joshua Falls Substation and the Riverville Substation (proposed Joshua Falls–Riverville 138 kV transmission line).
- Construction of 6.3 miles of new 138 kV transmission line between the Riverville Substation and CVEC's Gladstone Substation (proposed Gladstone–Riverville 138 kV transmission line).
- Expansion of the Riverville Substation and the installation of six new 138 kV circuit breakers and associated 138 kV bus-tie lines.
- Relocation of approximately 1,000 feet of the existing Amherst–Riverville 138 kV transmission line at the Riverville Substation.
- Installation of a new Five Forks 138 kV phase-over-phase switch pole outside CVEC's Gladstone Substation.

Component 2: James River 138 kV Substation (Exhibit 5)

- Construction of a new James River 138 kV Substation, with one 138/12 kV transformer with high-side circuit switcher, two 138 kV circuit breakers, and two 12 kV feeder circuit breakers.
- Construction of approximately 400 feet of new 138 kV double circuit transmission line from a tap point on the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line to the Company's proposed new James River Substation (fewer than two spans and therefore considered an in-line substation line connection).

Component 3: Soapstone 138 kV Substation (Exhibit 6)

- Construction of a new Soapstone 138 kV Substation, with one 138/12 kV transformer with high-side circuit switcher, two 138 kV MOAB switches, two 12 kV feeder circuit breakers, and 12 kV revenue metering for CVEC.
- Construction of approximately 600 feet of new 138 kV double circuit transmission line (proposed Soapstone Extension 138 kV transmission line) from a tap point on the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line to the Company's

proposed new Soapstone Substation (greater than two spans and therefore considered a transmission line extension).

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild (Exhibit 7)

- Rebuild of approximately 4.2 miles of the Amherst-Reusens 69 kV transmission line between Reusens and Monroe Substations (the rebuild includes the proposed relocation of approximately 0.3 miles of the Reusens-Scottsville-Bremo Bluff 138 kV double-circuit transmission line spanning the James River near the Reusens Substation). Additionally, approximately 0.2 mile of the Reusens-Scottsville-Bremo Bluff 138 kV single circuit transmission line on the east side of the James River will be relocated prior to crossing the river (Exhibit 7, Map Page 1).
- Expansion of the Monroe Substation yard to accommodate the installation of a new 69 kV phase-over-phase switch pole.
- Rebuild of approximately 8.0 miles of the Amherst-Reusens 69 kV transmission line between Amherst and Monroe Substations (Supplemental - PJM Project No. s2000.1)
- Expansion of the Amherst Substation yard to accommodate the installation of a new 138/69 kV, 90 MVA transformer, one 138 kV high-side breaker, two 138 kV MOABs, and two new 69 kV circuit breakers.
- Construction of approximately 500 feet of new 138 kV double circuit transmission line (proposed Amherst Extension 138 kV transmission line) to connect the existing Boxwood–Riverville 138 kV circuit to the Company's Amherst Substation. This will require the relocation of approximately 1,000 feet of the Boxwood–Riverville 138 kV transmission line and relocation of approximately 500 feet of the Amherst–Riverville 138 kV transmission line.

Other Associated Project Improvements

- Installation of two 138 kV circuit breakers, and 28.8 MVAr capacitor bank at the Scottsville Substation.
- Installation of four new 138 kV circuit breakers at Boxwood Substation.
- Installation of two new 138 kV circuit breakers at the Joshua Falls Substation.
- Installation of two 138 kV circuit breakers at the Clifford Substation.
- Installation of fiber telecommunication for communication relays.
- Upgrades to and installation of associated distribution facilities.

A. Right-of-Way ("ROW")

1. Provide the length of the proposed corridor and viable alternatives.

Response:
Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
The Joshua Falls to Riverville segment of the proposed route is 11.1 miles long and the Gladstone to Riverville segment of the proposed route is 6.3 miles long. No viable alternative routes were identified for Component 1. See the Siting Study for this component in Volume 2 of this application for further discussion on the alternative routes considered.

Component 2: James River 138 kV Substation
The new 138 kV double circuit transmission line from a tap point on the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line to the Company's proposed new James River 138 kV Substation is approximately 400 feet long and located entirely on Company-owned property. No alternative routes or viable alternatives were identified for Component 2.

Component 3: Soapstone 138 kV Substation
The proposed double circuit Soapstone 138 kV Extension between the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line and the proposed Soapstone 138 kV Substation is approximately 600 feet long and located entirely on Company-owned property. No alternative routes or viable alternatives were identified for Component 3.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
The proposed route for the rebuild of the Amherst–Reusens 69 kV transmission line is approximately 12.2 miles long and includes 0.3 mile of double circuit transmission line over the James River. Although the proposed route does include several minor deviations from the centerline of the ROW of the existing 69 kV line, no viable alternative routes were identified for Component 4. See the Siting Study for this component in Volume 2 of this application for further discussion on the alternative routes considered.

2. Provide color maps of suitable scale (including both general location mapping and more detailed GIS-based constraints mapping) showing the route of the proposed line and its relation to: the facilities of other public utilities that could influence the route selection, highways, streets, parks and recreational areas, scenic and historic areas, open space and conservation easements, schools, convalescent centers, churches, hospitals, burial grounds/cemeteries, airports and other notable structures close to the proposed project. Indicate the existing linear utility facilities that the line is proposed to parallel, such as electric transmission lines, natural gas transmission lines, pipelines, highways, and railroads. Indicate any existing transmission ROW sections that are to be quitclaimed or otherwise relinquished. Additionally, identify the manner in which the Applicant will make available to interested persons, including state and local governmental entities, the digital GIS shape file for the route of the proposed line.

Response:
A general location map of the Project is attached as Exhibit 1. More detailed GIS constraints mapping illustrating the four Project Components and various resources and sensitive features in the vicinity of the Project is attached as Exhibits 4–7. The shapefiles for the proposed line routes are also provided electronically. Furthermore, the siting studies for the Joshua Falls–Riverville–

Gladstone 138 kV transmission lines and Amherst–Reusens 69 kV transmission line rebuild (located in Volume 2 of the Application) include additional GIS maps and descriptions.

The proposed route for the Joshua Falls–Riverville 138 kV transmission line will parallel the Company's existing Cloverdale-Joshua Falls 765 kV transmission line for a short distance (approximately 0.3 mile) as it exits the Joshua Falls Substation. The proposed route for the rebuild of the Amherst–Reusens 69 kV transmission line is in or near its existing right-of-way for most of its length (approximately 12 miles). An existing gas pipeline parallels the existing line for approximately 2.2 miles.

Thirty-eight miles of the Clifford–Scottsville 46 kV transmission line and seven miles of the Amherst-Clifford 69 kV line (between Clifford Substation and Gladstone Switch) will be retired and removed after the Project is complete. The Company will evaluate future use of the ROWs of the retired lines, but the ROWs will not be quitclaimed or otherwise relinquished.

3. Provide a separate color map of a suitable scale showing all the Applicant's transmission line ROWs, either existing or proposed, in the vicinity of the proposed project.

Response:
See Exhibit 1.

4. To the extent the proposed route is not entirely within existing ROW, explain why existing ROW cannot adequately service the needs of the Applicant.

Response:
Component 1: Joshua Falls– Riverville–Gladstone 138 kV Transmission Lines
The Joshua Falls–Riverville–Gladstone 138 kV transmission lines are not rebuilds of existing transmission lines and all new ROW is required, as existing ROWs were not available for use.

Components 2 and 3: Soapstone and James River 138 kV Substations
The transmission line extensions and associated ROWs are short in length and will be completely located on property owned by the Company. Using existing ROW is not feasible.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
The majority of the Amherst–Reusens 69 kV Transmission Line will be rebuilt within the existing ROW. The ROW easements for the existing line were obtained in the 1940s and are of varying width, generally ranging between 60 and 100 feet wide. The Company plans to supplement most of those easements in order to obtain a ROW of 80 feet, wherever possible to meet current standards. In a few places, deviations from the existing centerline are necessary due to routing constraints or encroachments along the existing ROW.

5. Provide drawings of the ROW cross section showing typical transmission line structure placements referenced to the edge of the ROW. These drawings should include:

a) ROW width for each cross section drawing;

b) Lateral distance between the conductors and edge of ROW;

c) Existing utility facilities on the ROW; and

d) For lines being rebuilt in existing ROW, provide all of the above (i) as it currently exists, and (ii) as it will exist at the conclusion of the proposed project.

Response:
Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
See Exhibits 9-14.

Component 2: James River 138 kV Substation
The proposed short transmission line extension associated with Component 2 is located on the Company's property and a ROW easement is not required.

Component 3: Soapstone 138 kV Substation
The proposed short transmission line extension associated with Component 3 is located on the Company's property and a ROW easement is not required.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
See Exhibit 15 for the typical existing ROW cross section. See Exhibits 16-22 for the proposed ROW cross sections.

6. Detail what portions of the ROW are subject to existing easements and over what portions new easements will be needed.

Response:
Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
The proposed route for the new transmission lines from Joshua Falls to Riverville and from Riverville to Gladstone will require new ROW easements. The ROW easement will typically be approximately 100 feet wide and will be located within a 500-foot filing corridor. In certain limited locations, the ROW may be more than 100 feet wide as needed to ensure compliance with safety requirements. Locations requiring a wider ROW are typically located in long spans between structures, where the conductors can sway out sideways during extreme weather conditions. The ROW in those locations typically would not be more than 140 feet wide. Guy wires are needed to support certain angle structures to be used for the Project. Although, in most instances, the guy wires will not extend more than 80 feet from the ROW centerline, the guy wires could extend up to 120 feet from the ROW centerline in a very few instances involving unusually steep terrain. The precise location and extent of the places where the ROW would need to be more than 100 feet wide to accommodate conductor sway issues and guy wires cannot be determined until completion of detailed ground surveys and final engineering. The proposed relocation of the existing Amherst–Riverville 138 kV transmission line at the Riverville Substation will be located on new 100-foot wide ROW on the Greif Paper Mill property.

Component 2: James River 138 kV Substation
The new 138 kV double circuit transmission line from a tap point on the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line to the Company's proposed new James River 138 kV Substation is approximately 400 feet long and located entirely on property owned by the Company. New ROW will not be necessary.

Component 3: Soapstone 138 kV Substation
The proposed double circuit Soapstone 138 kV Extension between the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line and the proposed Soapstone 138 kV Substation is approximately 600 feet long and located entirely on property owned by the Company. New ROW will not be necessary.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

After preliminary engineering, the Company expects that the ROW of the rebuilt line will be 80 feet wide and will follow the centerline of the existing ROW for most of its length. The ROW easements for the existing line (dating from the 1940s) are of varying width, generally ranging between 60 and 100 feet wide. The Company plans to supplement most easements to be 80 feet wide wherever possible and to meet current standards. Several residences have encroached on the existing ROW in a few limited locations. Based on its engineering analysis to date, the Company has preliminarily determined that the ROW for the rebuilt line could be narrower than 80 feet in select locations in order to keep the affected residences out of the final ROW. Accordingly, and subject to completion of final engineering and ROW negotiations with affected landowners, the Company does not expect that any residences will need to be removed to accommodate the rebuilt line. In addition, there may be minor deviations from the existing ROW centerline based upon the results of ground survey, geotechnical and environmental surveys, landowner input and ROW negotiations and final line design.

At the James River crossing, the existing Amherst–Reusens 69 kV circuit and existing Clifford–Reusens 138 kV circuit (proposed Boxwood–Reusens 138 kV circuit) are co-located on the existing Reusens-Scottsville-Bremo Bluff 138 kV double-circuit transmission line for approximately 0.3 mile crossing the James River into Reusens Substation. This river crossing will be rebuilt, but also relocated slightly south to avoid spanning directly over the Reusens Hydroelectric Dam facility. Before it crosses the river, the relocated double circuit line requires a new 100-foot-wide ROW. Additionally, 0.2 mile of single circuit Reusens-Scottsville-Bremo Bluff 138 kV Transmission line will be slightly relocated in or near existing ROW east of the James River and prior to crossing (See Exhibit 7, Map Page 1).

At Amherst Substation, Appalachian has purchased 4.8 acres to accommodate the proposed expansion of the existing yard. The proposed new 500-foot-long Amherst Extension 138 kV transmission line from the Boxwood–Riverville 138 kV transmission line to the Amherst Substation will be located on new 100-foot wide ROW.

7. Detail the proposed ROW clearing methods to be used and the ROW restoration and maintenance practices planned for the proposed project.

Response:

The following are Appalachian's typical transmission ROW clearing, restoration and maintenance practices. Case-by-case exceptions are considered to address sensitive environmental areas/features and/or property owner requests while maintaining Appalachian and NESC safety clearances.

ROW Clearing

a. In areas with 100 feet or more conductor-to-ground design clearance, the ROW is typically not cleared, except in the following instances:

    - Trees with less than 25 feet clearance from the conductor (at maximum sag conditions) will be removed.
    - Where a conductor stringing path is specified.
    - Where wire setup areas and other work areas are required.

b. In locations with less than 100' vertical clearance from conductor (at maximum sag conditions) to ground, all woody stemmed vegetation will be removed to the appropriate

ROW width, leaving the cleared area of the ROW populated with grasses and herbaceous growth.

c. Cutting vegetation will be done by either manual or mechanical methods. Worker safety is first and foremost in determining a method; land use and landowner preference may influence the method utilized. Factors influencing safety include terrain, access, tree height, etc. Manual clearing involves the use of contract personnel using chain saws to cut vegetation. Mechanical clearing includes mowers, feller-bunchers, and other heavy operator-run equipment. Mechanical pruning operations employ a variety of configurations of boom-mounted saws mounted on vehicles capable of traversing the ROW. In very difficult terrain or inaccessible areas (high safety risk areas), an aerial saw may be employed for side trimming the ROW.

d. Where reasonable and practical, Appalachian will utilize selective clearing methods to retain low-growth shrubs and other compatible vegetation within:

- 50 feet of all year-round streams, ponds or wetlands and will undertake erosion control measures where necessary.
- 50 feet of road crossings.
- 100 feet of water supply wells.
- 25 feet of karst features and outcrops of limestone or dolomite rock.

e. Trees will be felled in a manner to minimize damage to crops, fences and other facilities.

f. Where tree pruning is required, best management practices and standards established by the International Society of Arboriculture, the American Standards Institute, and the Tree Care Industry Association will be used together with best management practices.

g. Logs, including fallen timber, may be left in tree lengths, log lengths or as otherwise designated by the property owner. The property owner will retain ownership of all logs and may dispose of them by commercial sale, use them as firewood or provide them for use as firewood by others. If the property owner does not want to retain ownership and wants the logs removed, Appalachian will dispose of them in a suitable location.

h. The disposal by Appalachian of all trees, brush and slash will, where possible, be consistent with property owner preferences, wildlife values and particular site conditions. Typical disposal methods consist of one or more of the following:

- Windrowing - the cut material will be windrowed at either or both sides of the ROW. This is the preferred method where slopes are 30% or less.

- Chipping - woody vegetation will be chipped and either scattered over the ROW area or disposed of in a suitable location. Logs will be windrowed on either or both sides of the ROW, as designated. The ROW must be accessible to chipping equipment for this option to be viable.

- Let Lay - the cut material will be left in a scattered manner over the ROW area. This is recommended where slopes exceed 30% in order to reduce erosion and otherwise minimize impact on soils. All woody vegetation will be lopped and scattered so that it lays as close to the ground as practical, but not

to exceed two feet in height. This will accelerate the decomposition of this material and will improve the aesthetic impact by allowing more rapid vegetation coverage of the cut material.

i. All clearing debris will be kept out of streams, ponds and other water areas, wetlands, pastures, and fields.

ROW Restoration

a. Where stream banks are disturbed, they will be restored (by planting of low-growing species, where necessary) in order to prevent bank erosion.

b. Appalachian will take measures to drain and stabilize the surfaces of all construction roads both during construction and during future line maintenance phases.

c. Restoration, including temporary and permanent seeding, will be coordinated with the construction activities to ensure that revegetation and soil stabilization are achieved at the earliest practical time. Following construction, all structure sites, construction sites and access roads will be seeded with a suitable grass seed mixture.

d. Revegetation techniques will, where possible, seek to enhance the ROW for wildlife food and habitat.

e. Qualified personnel will perform all permanent reseeding and revegetation.

f. After restoration is complete, Appalachian will periodically inspect the ROW to discover areas of erosion, sedimentation and inadequate revegetation conditions. Upon discovery of such conditions, prompt efforts will be taken to correct them.

g. Fences and gates will be kept in sufficient state of repair to confine livestock satisfactorily and gates will be kept closed when not in immediate use. All fences cut or damaged will be restored to a condition as good as, or better than, the condition as found. Where frequent access is required, gates will be installed at no cost to the property owner.

ROW Maintenance

a. All herbicides used will be applied in accordance with applicable state and federal laws and regulations.

b. All herbicides used shall be registered with the Environmental Protection Agency and with the Virginia Department of Agriculture and Consumer Services. Herbicides will be used in accordance with label and manufacturer directions.

c. All herbicide applications will be performed under the direct supervision of certified applicators.

d. Regarding herbicide applications:

- Herbicides will not be applied when rainfall is imminent, during rainfall or within one day of large rain events (usually greater than 1cm) that result in soil moisture capacity occurring above field capacity.

- Buffer zones will be maintained around streams, ponds, karst features, springs, wetlands, and water supply wells in accordance and compliance with herbicide label directions.
- In areas within the boundaries of any karst feature and any channelized drainage way (perennial or intermittent) draining to a karst feature, wetland-approved herbicides shall be used in accordance with label and manufacturer directions.

Long-term Right-of-Way Maintenance Plan

Appalachian will periodically inspect the ROW for areas of erosion, sedimentation and inadequate revegetation conditions. Upon discovery of such conditions, prompt efforts will be taken to correct them. Any property owner concerns will also be investigated. Additionally, Appalachian will implement a comprehensive vegetation management program designed to ensure that vegetation along each transmission line is managed at the proper time, and in the most cost-effective, environmentally sound manner. The plan will be reviewed periodically to ensure that the goals and objectives are being addressed.

Compatible Tree Species

Where reasonable and practical, Appalachian will utilize selective clearing methods to retain low-growth shrubs and other compatible vegetation. The following is a partial list of compatible tree species that may be allowed within Appalachian's transmission line ROW, depending upon the particular line and circumstances and subject to the approval of the Company's forestry staff:

COMMON NAME	**BOTANICAL NAME**
Trident Maple	*Acer buergeranum*
Amur Maple	*Acer ginnala*
Japanese Maple	*Acer palmatum*
Serviceberry	*Amelanchier arborea or canadensis*
Redbud	*Cercis canadensis*
Fringetree	*Chionanthus retusus or viginicus*
Pink Dogwood	*Cornus florida "Rubra"*
Dogwood	*Cornus florida "White"*
Kousa Dogwood	*Cornus kousa*
Washington Hawthorn	*Crataegus phaenopyrum*
Golden Raintree	*Koelreuteria paniculata*
Crape Myrtle	*Lagerstroemia indica*
Galaxy Magnolia	*Magnolia "Galaxy"*
Star Magnolia	*Magnolia stellata*
Saucer Magnolia	*Magnolia x soulangeana*
Flowering Crabapple	*Malus spp.*
Kwansan Cherry	*Prunus serrulata*
Japanese Weeping Cherry	*Prunus subhirtella*
Purple-leaf Plum	*Prunus x accolade*
Cleveland Select Flowering Pear	*Pyrus x blireiana*
Japanese Tree Lilac	*Syringa reticulate*
Pyramidal Arborvitae	*Thuja occidentalis pyrimidalis*
Littleleaf Linden	*Tilia cordata*
Leatherleaf Viburnum	*Viburnum rhytidophyllum*

8. Indicate the permitted uses of the proposed ROW by the easement landowner and the Applicant.

Response:

For new transmission line easements, the property owner will retain the right to use the easement area for grazing, pasture lands, gardens, cultivated fields, driveways, parking, and bike and walking paths or any other use that is consistent with the Company's right to construct, operate, maintain or remove its electric transmission line. The Company will retain the right to clear and keep the easement clear of buildings and/or other obstructions together with the right to clear any woody vegetation within the ROW or which is adjacent to the ROW but which may endanger the safe operation of the electric transmission line.

Generally, the same can be stated with respect to the existing easements and new or supplemental easements to be acquired for the rebuild of the Amherst–Reusens 69 kV Transmission Line.

9. Describe the Applicant's route selection procedures. Detail the feasible alternative routes considered. For each such route, provide the estimated cost and identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.). Describe the Applicant's efforts in considering these feasible alternatives. Detail why the proposed route was selected and other feasible alternatives were rejected. In the event that the proposed route crosses, or one of the feasible routes was rejected in part due to the need to cross, land managed by federal, state, or local agencies or conservation easements or open space easements qualifying under §§ 10.1-1009 – 1016 or §§ 10.1-1700 – 1705 of the Code (or a comparable prior or subsequent provision of the Code), describe the Applicant's efforts to secure the necessary ROW.

Response:

The Company's siting procedures for the primary transmission line components of the Project are described in detail in the associated Siting Studies included in Volume 2 of this Application. POWER Engineers, Inc. (POWER) prepared siting studies for the new Joshua Falls–Riverville and Gladstone-Riverville 138 kV transmission lines and the Amherst–Reusens 69 kV Transmission Line rebuild components of the Project. Siting studies for the 138 kV transmission line extensions associated with the proposed 138 kV substations (James River 138 kV Substation and Soapstone 138 kV Substation) were not necessary because those extensions are wholly located on Company-owned property. A summary of the analysis to determine most suitable sites for the James River and Soapstone Substations is described in Company witness Larson's direct testimony included in this Application.

Based on the best information available, the proposed routes for the Joshua Falls–Riverville and Gladstone-Riverville 138 kV transmission lines and the Amherst–Reusens 69 kV Transmission Line rebuild do not cross any land managed by federal, state, or local agencies or conservation easements or open space easements qualifying under §§ 10.1-1009 – 1016 or §§ 10.1-1700 – 1705 of the Code (or a comparable prior or subsequent provision of the Code).

<u>Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines</u>
In summary, representatives of POWER, the Company, and other Company consultants (collectively, the "Siting Team") considered four alternative routes for the Joshua Falls–Riverville 138 kV Transmission Line (Alternative Routes A, B, C, and D) and two alternative routes for the Gladstone–Riverville 138 kV Transmission Line (Alternative Routes E and F).

Alternative Route A is located on the north side of the James River, largely in Amherst County. Alternative Routes B, C, and D are located on the south side of the river largely in Campbell and Appomattox counties. Alternative Route A is the longest route (11.6 miles) and crosses the James River north of the Joshua Falls Substation, and continues northeast across the Amherst Plantation neighborhood and a private retreat property to reach the Riverville Substation. Alternative Routes B, C, and D exit the Joshua Falls Substation to the south and continue generally northeast to cross the James River south of the Riverville Substation. Alternative Route B is 10.5 miles in length and is closer to the James River, crossing the south side of the Chestnut Mountain ridgeline and north of major residential roadways. Alternative Route C is 11.1 miles in length and avoids the Chestnut Mountain ridgeline, crossing timbering areas and Tin Top Place. Alternative Route D is also 11.1 miles in length and is a combination of Alternative Routes B and C. Alternative Route D avoids the Chestnut Mountain ridgeline and remains north of residential roadways, such as Tin Top Place. Alternative Routes E and F are located on the north side of the James River in Amherst and Nelson counties. Alternative Route E is 6.3 miles long and is the northernmost route crossing agricultural or forested lands, while avoiding largely residential areas. Alternative Route F is 5.5 miles in length and is the southernmost route near the James River and residential areas.

The respective alternative routes for the Joshua Falls–Riverville and Gladstone-Riverville 138 kV transmission lines are relatively similar in length with inherent tradeoffs for each one. As such, the Company expects that the cost of the respective alternative routes for each of the new lines would be comparable. The alternative routes were evaluated in detail and documented in the *Joshua Falls–Riverville–Gladstone Siting Study* included in Volume 2 of this Application. For additional information regarding siting methodology and proposed route evaluation, see Volume 2.

The Siting Team concluded that Alternative Route D (for the Joshua Falls–Riverville 138 kV transmission line) and Alternative Route E (for the Gladstone – Riverville 138 kV transmission line) are the proposed routes for Component 1. Collectively, the Siting Team believes that, as compared to the other alternative routes considered, the proposed routes for the Joshua Falls–Riverville and Gladstone-Riverville 138 kV transmission lines: (1) are most consistent with the Siting Team's siting guidelines; (2) reasonably minimize adverse impacts on area land uses and the natural and cultural environment; (3) minimize special design requirements and unreasonable costs; and (4) can be constructed and operated in a safe, timely, and reliable manner.

<u>Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild</u>

Generally, the Siting Team selected a route for the rebuild of the Amherst–Reusens 69 kV Transmission Line that follows the centerline of the existing ROW of the line for most of its length, to the extent practical and possible. There are a few locations where the proposed route deviates briefly from the existing centerline, largely in order to avoid residences currently encroaching upon and located in the existing ROW. The Siting Team considered two alternative route options deviating from the existing centerline for the 69 kV/138 kV double circuit transmission line span across the James River near the Reusens Substation (Alternative Routes A and B). Alternative Routes A and B consider northern and southern off-centerline options to cross the James River and reach the Reusens Substation. Alternative Route A crosses the James River on the north side of the Reusens Hydroelectric Dam and in close proximity to several residences (0.7 mile). Alternative Route B crosses south of the dam and over the existing substation, thereby avoiding residential development (0.8 mile). The alternative routes are relatively similar in length with inherent tradeoffs for each one, and the Company expects that the cost of each alternative would be essentially the same.

The Siting Team selected the existing 69 kV ROW centerline with minor deviations and Alternative Route B (for the James River crossing near the Reusens Substation) as the proposed route for the rebuild of the Amherst–Reusens 69 kV transmission line. Alternative B was selected as part of the proposed route at the James River crossing, as it avoids impacts to residential development.

10. Describe the Applicant's construction plans for the project, including how the Applicant will minimize service disruption to the affected load area. Include requested and approved line outage schedules for affected lines as appropriate.

Response:

Project construction activities will include the installation and maintenance of soil erosion and sedimentation control measures; access road construction; foundation, structure, and wire installation; and the subsequent rehabilitation of all areas disturbed during construction. All required environmental compliance permits and studies will be completed and a storm water pollution prevention plan will be developed and implemented under the state's "General Permit for Discharges of Stormwater from Construction Activities."

The proposed Project includes many components, as described in Section I and in the Introduction to this Section I. To minimize service disruptions, the Project will be built in a specific sequence with close coordination required with regard to Greif, Inc.'s scheduled seasonal outages at the Greif Paper Mill. As a result, the Company estimates that it will take approximately four years after a final order authorizing the Project is entered to engineer, coordinate outages for, and build the Project in its entirety.

The proposed Project can be constructed largely in the clear with outages needed for work inside existing substations and the final connection of transmission lines and substations to the existing system. An outage is needed on the Amherst–Reusens 69 kV transmission line in order to rebuild on the existing centerline, but that line is not outage constrained and can be taken out of service at any time and in sections. The Reusens-Monroe section of the Amherst–Reusens 69 kV transmission line will be rebuilt first followed by the Amherst-Monroe section of that line. Following SCC approval, engineering, RTO outage approvals, and ROW acquisition, the estimated construction sequence can be summarized briefly as follows:

1. Begin the "in the clear" work on the Joshua Falls–Riverville 138 kV transmission line and Gladstone-Riverville 138 kV transmission line. Begin work at the Riverville 138 kV Substation and Joshua Falls 138 kV Substation yard.
2. Take the Reusens-Monroe section of the Amherst–Reusens 69 kV transmission line out of service and begin the rebuild of that section.
3. Energize the expansion of the Riverville Substation in a way that minimizes service disruptions to the Greif Paper Mill (final plan is dependent on further coordination with the Greif Paper Mill).
4. Energize the new Joshua Falls–Riverville 138 kV transmission line.
5. Once the Joshua Falls-Riverville 138 kV transmission line is energized, begin the work inside the Amherst and Boxwood Substations. A temporary mobile transformer will be needed at the Amherst Substation to support customer load due to the length of the outage of the Amherst Substation necessary to complete the scope of work inside the substation.

6. Begin the "in the clear" work on the proposed James River and Soapstone 138 kV Substations and the expansions at the Riverville and Amherst Substations.
7. Once the Reusens-Monroe section of the Amherst–Reusens 69 kV transmission line rebuild (including the relocation of the Reusens-Scottsville-Bremo Bluff 138 kV double-circuit transmission line over the James River[1]) is in service, place the Amherst Substation back in service.
8. A four-month outage is needed for some work required inside the existing Boxwood Substation.
9. Take the Amherst-Monroe section of the Amherst–Reusens 69 kV transmission line out of service and begin the rebuild of that section.
10. Begin Scottsville Substation work within the existing substation footprint. To complete the substation reconfiguration, long outages will be needed. Two outage seasons (spring and fall during low load demand) are needed to energize the substation, as outages cannot be taken in summer or winter without service disruptions.
11. During the first Scottsville Substation outage season, James River and Soapstone 138 kV Substations can be energized.
12. Once the James River and the Soapstone 138 kV substations are energized, begin the work at the Clifford Substation. Work at the Clifford Substation is within the existing substation footprint and will require an outage of at least four months to complete.

11. Indicate how the construction of this transmission line follows the provisions discussed in Attachment 1 of these Guidelines.

Response:
Protecting environmental resources such as natural, historic, scenic, and recreation values is of high importance to the Company. The siting and construction of the Project will generally follow the above-referenced guidelines to the extent practical. For a detailed discussion of the attention given to environmental resources and siting procedures used for this Project, see the siting studies and the VDEQ Supplements prepared by the Company's environmental and routing consultant, POWER, included in Volume 2 of this Application. Additionally, see Section III of this Response to Guidelines. For a summary of the route development process, see Section II.A.9 above.

12. a. Detail counties and localities through which the line will pass. If any portion of the line will be located outside of the Applicant's certificated service area: (1) identify each electric utility affected; (2) state whether any affected electric utility objects to such construction; and (3) identify the length of line(s) proposed to be located in the service area of an electric utility other than the Applicant; and

Response:
<u>Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines</u>
The proposed route for the Joshua Falls–Riverville 138 kV transmission line is 11.1 miles long and crosses Campbell County (1.3 miles), Appomattox County (9.2 miles), and Amherst County (0.6 mile). The proposed route for the Gladstone–Riverville 138 kV transmission line is 6.3 miles long and crosses Amherst County (3.2 miles) and Nelson County (3.1 miles).

[1] The Amherst–Reusens 69 kV circuit and existing Clifford–Reusens 138 kV circuit (proposed Boxwood-Reusens 138 kV circuit) are co-located on the existing Reusens-Scottsville-Bremo Bluff 138 kV double-circuit transmission line for 0.3 miles crossing the James River into the Reusens Substation. This span will be rebuilt, but also relocated slightly to the south to avoid spanning directly over the Reusens Hydroelectric Dam facility.

The proposed Joshua Falls–Riverville 138 kV transmission line crosses 9.4 miles of CVEC's service territory and the proposed Riverville–Gladstone 138 kV transmission line crosses 5.6 miles of CVEC's service territory. The Company has coordinated with CVEC on the Project and CVEC does not object to construction of the Project in its service territory (see Exhibit 8, Virginia Department of Transportation (VDOT) map signed by CVEC and Exhibit 2, CVEC Letter of Support).

Component 2: James River 138 kV Substation
The proposed in-line substation line connection to the proposed James River 138 kV Substation (fewer than two spans and approximately 400 feet) is located in Nelson County. No portion of the James River 138 kV Substation Component will be located outside of the Company's certificated service territory. See Exhibit 8, VDOT map.

Component 3: Soapstone 138 kV Substation
The proposed Soapstone 138 kV Extension (greater than two spans and approximately 600 feet) will be located in Nelson County. No portion of the Soapstone 138 kV Substation Component will be located outside of the Company's certificated service territory. See Exhibit 8, VDOT map.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
The proposed route for the rebuild of the Amherst–Reusens 69 kV transmission line is 12.2 miles long and crosses Amherst County (12.1 miles) and the City of Lynchburg (approximately 1,000 feet). No portion of the Amherst–Reusens 69 kV transmission line rebuild will be located outside of the Company's certificated service territory. See Exhibit 8, VDOT map.

b. Provide three (3) color copies of the Virginia Department of Transportation "General Highway Map" for each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the Applicant. Also, where the line will be located outside of the Applicant's certificated service area, show the boundaries between the Applicant and each affected electric utility. On each map where the proposed line would be outside of the Applicant's certificated service area, the map must include a signature of an appropriate representative of the affected electric utility indicating that the affected utility is not opposed to the proposed construction within its service area.

Response:

Three (3) copies of the VDOT General Highway Maps for Albemarle, Amherst, Appomattox, Campbell, and Nelson Counties are being provided separately to the Commission Staff with this application. Reduced copies of these maps are included as Exhibit 8 to this Application. The maps include the proposed Project and the Company's existing transmission facilities. The mapping included in Exhibit 8 has the signature of an authorized representative of CVEC indicating that CVEC is not opposed to the proposed construction within its service territory.

B. Line Design and Operational Features

1. Detail the number of circuits and their design voltage, initial operational voltage, any anticipated voltage upgrade, and transfer capabilities.

Response:
All transmission lines discussed below will have three phases per circuit.

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
The proposed Joshua Falls–Riverville 138 kV transmission line and the Gladstone-Riverville–138 kV transmission line will each be a single circuit transmission line (Joshua Falls–Riverville 138 kV circuit and Gladstone–Riverville 138 kV circuit). Each circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuit is 360 MVA (summer emergency rating) and 404 MVA (winter emergency rating).

The proposed relocated section of the Amherst–Riverville 138 kV transmission line, which is adjacent to the Riverville Substation (see Exhibits 4-7), will be a single circuit transmission line (Boxwood–Riverville 138 kV circuit). Each circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuit is 251 MVA (summer emergency rating) and 317 MVA (winter emergency rating).

Component 2: James River 138 kV Substation
The proposed line tap of the Reusens–Scottsville–Bremo Bluff 138 kV transmission line to serve the proposed James River 138 kV Substation will be a double circuit transmission line (Clifford–James River 138 kV circuit and James River–Scottsville 138 kV circuit). Each circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuits is 167 MVA (summer emergency rating) and 210 MVA (winter emergency rating).

Component 3: Soapstone 138 kV Substation
The proposed line tap of the Reusens–Scottsville–Bremo Bluff 138 kV transmission line for the Soapstone Extension 138 kV transmission line to serve the proposed Soapstone 138 kV Substation will be a double circuit transmission line (loop in/out of the James River–Scottsville 138 kV circuit). Each circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuit is 167 MVA (summer emergency rating) and 210 MVA (winter emergency rating).

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
The proposed rebuild of the Amherst–Reusens 69 kV transmission line will be a single circuit transmission line (Amherst-Reusens 69 kV circuit). Except as noted below for the portion of this line that is double circuited with the Reusens-Scottsville-Bremo Bluff 138 kV transmission line for a short distance at the James River crossing, each circuit has a nominal phase-to-phase design voltage of 69 kV and will be operated at 69 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuit is 142 MVA (summer emergency rating) and 159 MVA (winter emergency rating).

The proposed relocation of the Reusens–Scottsville-Bremo Bluff 138 kV transmission line, near the Reusens Substation and in connection with the proposed rebuild of the Amherst Reusens 69 kV transmission line (see Exhibits 4-7), will be a double circuit transmission line (Boxwood-Reusens 138 kV circuit and Amherst–Reusens 69 kV circuit) . The Boxwood-Reusens 138 kV circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. This short portion of the Amherst–Reusens 69 kV circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 69 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the Boxwood-Reusens 138 kV circuit is 167 MVA (summer emergency rating) and 210 MVA (winter emergency rating). The overall maximum load transfer capability of the Amherst-Reusens 69 kV circuit is 142 MVA (summer emergency rating) and 159 MVA (winter emergency rating).

The proposed transmission line tap of the Boxwood–Riverville 138 kV transmission line for the Amherst Extension 138 kV transmission line serving the Amherst Substation (see Exhibits 4-7), will be a double circuit transmission line (loop in/out of the Boxwood–Riverville 138 kV circuit) . Each circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuit is 251 MVA (summer emergency rating) and 317 MVA (winter emergency rating).

The proposed relocated section of the Boxwood–Riverville 138 kV transmission line, adjacent to the Amherst Substation (see Exhibits 4-7), will be a single circuit transmission line (Boxwood–Riverville 138 kV circuit). Each circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuit is 251 MVA (summer emergency rating) and 317 MVA (winter emergency rating).

The proposed relocated section of the Amherst–Riverville 138 kV transmission line, adjacent to the Amherst Substation (see Exhibits 4-7), will be a single circuit transmission line (Boxwood–Riverville 138 kV circuit). Each circuit has a nominal phase-to-phase design voltage of 138 kV and will be operated at 138 kV. No voltage upgrade is anticipated at this time. The overall maximum load transfer capability of the circuit is 251 MVA (summer emergency rating) and 317 MVA (winter emergency rating).

2. Detail the number, size(s), type(s), coating and typical configurations of conductors. Provide the rationale for the type(s) of conductor(s) to be used.

Response:

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines

Each of the proposed three-phase single 138 kV circuits (Joshua Falls–Riverville 138 kV circuit and Gladstone–Riverville 138 kV circuit) will consist of three 795,000 cmil Aluminum Conductors Steel Reinforced (“ACSR”) “Drake” conductors with 26/7 stranding (1.108-inch diameter). The circuit will typically be arranged in a horizontal configuration with one conductor per phase.

The proposed relocated section of the three-phase single 138 kV circuit (Boxwood–Riverville 138 kV circuit) will consist of three 795,000 cmil ACSR “Drake” conductors with 26/7 stranding (1.108-inch diameter) and three 795,000 cmil (ACSR) “Tern” conductors with 45/7 stranding (1.063-inch diameter). The relocated portion of the circuit will typically be arranged in a vertical configuration with one conductor per phase.

The proposed single circuit transmission lines will typically use one Alumoweld ground wire and/or one 0.646-inch diameter optical ground wire ("OPGW") for lightning protection. The OPGW is composed of aluminum clad steel strands surrounding a stainless-steel tube containing fiber optic strands used for utility operations and communication.

The proposed conductors and ground wires were selected to meet the electrical requirements of the Project including load capacity, system stability, and efficiency. The mechanical strength and impacts on constructability are also considered in the selection process.

Component 2: James River 138 kV Substation

The proposed three-phase 138 kV circuits (Clifford–James River 138 kV circuit and James River–Scottsville 138 kV circuit) will consist of three 795,000 cmil ACSR "Drake" conductors with 26/7 stranding (1.108-inch diameter). The circuit will typically be arranged in a vertical configuration with one conductor per phase.

The proposed double circuit transmission line tap will typically use two Alumoweld ground wires and/or one 0.646-inch diameter OPGW for lightning protection. The OPGW is composed of aluminum clad steel strands surrounding a stainless-steel tube containing fiber optic strands used for utility operations and communication.

The proposed conductors and ground wires were selected to meet the electrical requirements of the Project including load capacity, system stability, and efficiency. The mechanical strength and impacts on constructability are also considered in the selection process.

Component 3: Soapstone 138 kV Substation

The proposed three-phase 138 kV circuit (loop in/out of the James River–Scottsville 138 kV circuit) will consist of three 795,000 cmil ACSR "Drake" conductors with 26/7 stranding (1.108-inch diameter). The circuit will typically be arranged in a vertical configuration with one conductor per phase.

The proposed double circuit transmission line will typically use two Alumoweld ground wires and/or one 0.646-inch diameter OPGW for lightning protection. The OPGW is composed of aluminum clad steel strands surrounding a stainless-steel tube containing fiber optic strands used for utility operations and communication.

The proposed conductors and ground wires were selected to meet the electrical requirements of the Project including load capacity, system stability, and efficiency. The mechanical strength and impacts on constructability are also considered in the selection process.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

The proposed three-phase 69 kV and 138 kV circuits for the rebuild of the existing Amherst-Reusens 69 kV transmission and the relocation of the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line will consist of three 556,500 cmil ACSR "Dove" conductors with 26/7 stranding (0.927-inch diameter). The double circuit section of this component will typically be arranged in a vertical configuration with one conductor per phase and the single circuit section of this component will typically be arranged in a horizontal configuration with one conductor per phase.

The proposed three-phase 138 kV circuit (loop in/out of the Boxwood–Riverville 138 kV circuit) to accommodate the 138 kV yard expansion at Amherst Substation will consist of three 795,000 cmil ACSR "Drake" conductors with 26/7 stranding (1.108-inch diameter). The double

circuit section will typically be arranged in a vertical configuration with one conductor per phase and the single circuit sections will be arranged in a vertical configuration with one conductor per phase.

The proposed double circuit and single circuit transmission lines will typically use one Alumoweld ground wire and/or one 0.646-inch diameter OPGW for lightning protection. The OPGW is composed of aluminum clad steel strands surrounding a stainless-steel tube containing fiber optic strands used for utility operations and communication.

The proposed conductors and ground wires were selected to meet the electrical requirements of the Project including load capacity, system stability, and efficiency. The mechanical strength and impacts on constructability are also considered in the selection process.

See Exhibits 9 through 22 for the proposed structure configurations and phase separations. Additionally, further detail and descriptions of the proposed structures are included in the following Section II.B.3.

3. With regard to the proposed supporting structures over each portion of the ROW for the preferred route, provide diagrams (including foundation reveal) and descriptions of all the structure types, to include:

(1) mapping that identifies each portion of the preferred route;

(2) the rationale for the selection of the structure type;

(3) the number of each type of structure and the length of each portion of the ROW;

(4) the structure material and rationale for the selection of such material;

(5) the foundation material;

(6) the average width at cross arms;

(7) the average width at the base;

(8) the maximum, minimum and average structure heights;

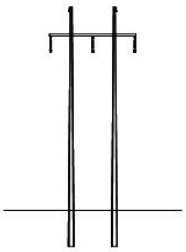
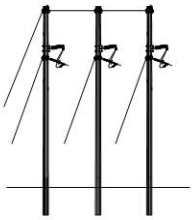
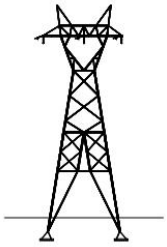
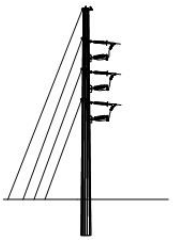
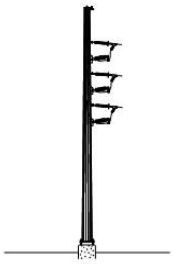
(9) the average span length; and

(10) the minimum conductor-to-ground clearances under maximum operating conditions.

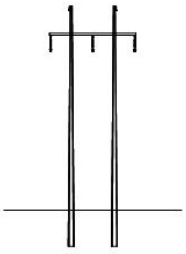
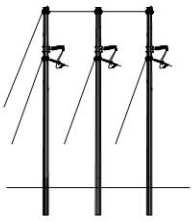
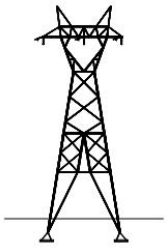
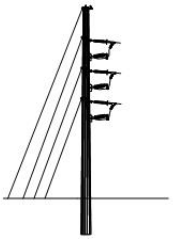
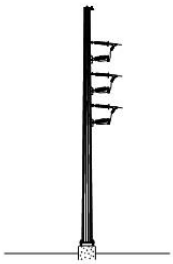
Response:
Structure types will be determined during final engineering, which includes ground surveys and geotechnical studies. Nevertheless, based on preliminary engineering, the Company anticipates primarily using single circuit steel H-frame and 3 pole structures for the proposed 138 kV and 69 kV transmission lines. Double circuit steel monopoles with davit arms will be used for line taps. Double circuit 138 kV steel lattice structures will be used for the James River crossing near Reusens Substation and single circuit 138 kV steel lattice towers will be used for the James River crossing near Riverville Substation. All totals and figures in the below tables are approximations based on best available data until a detailed design has been finalized.

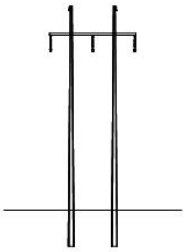
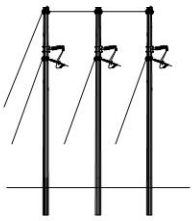
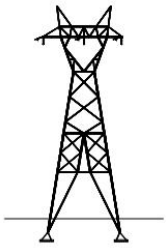
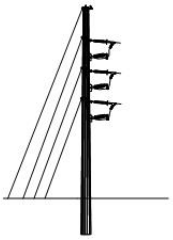
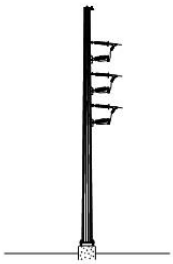
a. through j. descriptions of proposed structure types:

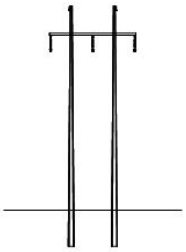
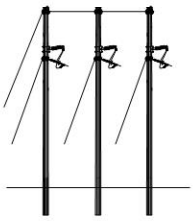
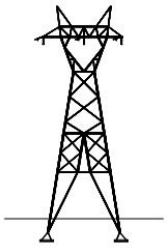
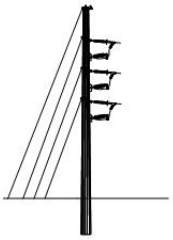
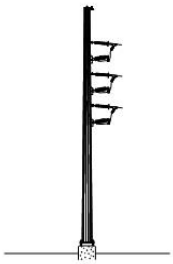
Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
Joshua Falls–Riverville 138 kV Transmission Line and Gladstone – Riverville 138 kV Transmission Line

Structure Type	 **138 kV H-Frame Single Circuit** See Exhibit 9	 **138 kV Three Pole Structure Single Circuit** See Exhibit 10	 **138 kV Lattice Tower Single Circuit (James River Crossing only for the Joshua Falls-Riverville Line)** See Exhibit 11	 **138 kV Monopole Direct Embedded Single Circuit** See Exhibit 12 [2]	 **138 kV Monopole on Pier Foundation Single Circuit** See Exhibit 13
a. mapping that identifies each portion of the preferred route;	See Exhibit 4	See Exhibit 4	See Exhibit 4	See Exhibit 4	See Exhibit 4
b. rationale for the selection of the structure type;	The proposed 138 kV H-Frame is best suited for medium-to-long spans and reduces visual impacts due to its low profile.	The proposed 138 kV three pole structure is best suited for light to heavy angles and reduces visual impacts due to its low profile.	The proposed 138 kV lattice tower structure is best suited for long spans such as the James River crossing and heavy angles.	The proposed 138 kV monopole dead-end structure is best suited for heavy line angle locations.	The proposed 138 kV monopole dead-end structure is best suited for heavy line angle locations, breaking wire tension, and provides a condensed structure footprint.
c-1. estimated number of each type of structure;	57 (Joshua Falls–Riverville)	9 (Joshua Falls–Riverville) 7 (Gladstone–Riverville)	2 (Joshua Falls–Riverville) NA (Gladstone–Riverville)	Optional dead-end structure type	2 (Joshua Falls–Riverville)

[2] 138 kV Single Circuit Monopole Deadend with Guys (Direct Embed) could be used instead of Exhibits 10 & 13. See Exhibit 12.

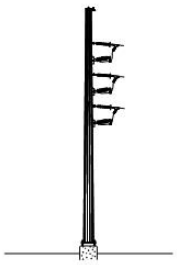
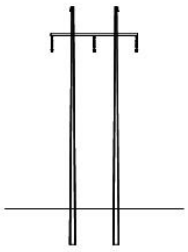
Structure Type	 **138 kV H-Frame Single Circuit** See Exhibit 9	 **138 kV Three Pole Structure Single Circuit** See Exhibit 10	 **138 kV Lattice Tower Single Circuit (James River Crossing only for the Joshua Falls-Riverville Line)** See Exhibit 11	 **138 kV Monopole Direct Embedded Single Circuit** See Exhibit 12 [2]	 **138 kV Monopole on Pier Foundation Single Circuit** See Exhibit 13
	30 (Gladstone–Riverville)				1 (Gladstone–Riverville)
c-2. estimated length of each portion of the ROW;	8.9 miles (Joshua Falls–Riverville) 5.0 miles (Gladstone–Riverville)	1.4 miles (Joshua Falls–Riverville) 1.2 miles (Gladstone–Riverville)	0.6 mile (Joshua Falls–Riverville) NA (Gladstone–Riverville)	NA	0.2 mile (Joshua Falls–Riverville) 0.1 mile (Gladstone–Riverville)
d-1. structure material;	Dulled galvanized steel	Dulled galvanized steel	Dulled galvanized steel	Dulled galvanized steel	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Steel poles will be direct embedded to an average depth of 15'	Steel poles will be direct embedded to an average depth of 15'	Steel grillage with an average depth of 12’	Steel poles will be direct embedded to an average depth of 15'	Drilled concrete pier with an average depth of 25’. The typical concrete pier

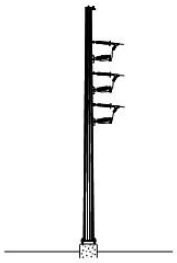
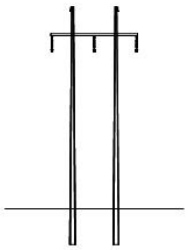
Structure Type	 **138 kV H-Frame Single Circuit** See Exhibit 9	 **138 kV Three Pole Structure Single Circuit** See Exhibit 10	 **138 kV Lattice Tower Single Circuit (James River Crossing only for the Joshua Falls-Riverville Line)** See Exhibit 11	 **138 kV Monopole Direct Embedded Single Circuit** See Exhibit 12 [2]	 **138 kV Monopole on Pier Foundation Single Circuit** See Exhibit 13
					reveal height will be 1' above grade.
f. average width at cross arms;	Approximately 32' to 40'	Approximately 32' to 50'	Approximately 42'	NA	NA
g. average width at the base;	3'-0" Diameter Pole	3'-0" Diameter Pole	30'	3'-0" Diameter Pole	Average 6'-0" Diameter Pole Average 7'0" Diameter Concrete Pier
h-1. approximate average height of structures (above ground);	70'	70'	100'	90'	90'
h-2. approximate typical structure height range (above ground);	60' to 100'	55' to 80'	80' to 120'	80' to 100'	80' to 100'
i. average span length;	Approximately 800' (Joshua Falls-Gladstone) Approximately 900'	Approximately 900' (Joshua Falls-Riverville) Approximately 600' (Gladstone-Riverville)	Approximately 1,300' (Joshua Falls-Riverville) NA (Gladstone-Riverville)	Approximately 500' to 900'	Approximately 500'

Structure Type	 **138 kV H-Frame Single Circuit** See Exhibit 9	 **138 kV Three Pole Structure Single Circuit** See Exhibit 10	 **138 kV Lattice Tower Single Circuit (James River Crossing only for the Joshua Falls-Riverville Line)** See Exhibit 11	 **138 kV Monopole Direct Embedded Single Circuit** See Exhibit 12 [2]	 **138 kV Monopole on Pier Foundation Single Circuit** See Exhibit 13
	(Gladstone-Riverville)				
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"	22'-7"	22'-7"	22'-7"	22'-7"

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines

Amherst–Riverville 138 kV Transmission Line (minor relocation at Riverville Substation, see Exhibit 4, Map 11)

Structure Type	 **138 kV Monopole Dead-End Single Circuit** See Exhibit 13	 **138 kV H-Frame Single Circuit** See Exhibit 9
a. mapping that identifies each portion of the preferred route;	See Exhibit 4	See Exhibit 4
b. rationale for the selection of the structure type;	The proposed 138 kV monopole dead-end structure is best suited for heavy line angle locations, breaking wire tension, and provides a condensed structure footprint.	The proposed 138 kV H-frame is best suited for medium-to-long spans and reduces visual impacts due to its low profile.
c-1. estimated number of each type of structure;	2	1
c-2. estimated length of each portion of the ROW;	0.1 mile	0.1 mile
d-1. structure material;	Dulled galvanized steel	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Drilled concrete pier with an average depth of 25’. The typical concrete pier reveal height will be 1’ above grade.	Steel poles will be direct embedded to an average depth of 15'
f. average width at cross arms;	Approximately 2'	Approximately 32’ to 40’
g. average width at the base;	6'-0” Diameter Pole 7'-0" Diameter Concrete Pier	3’-0” Diameter Pole
h-1. approximate average height of structures (above ground);	100’	70'
h-2. approximate typical structure height range (above ground);	80’ to 110’	55' to 80'
i. average span length;	700'	800’

Structure Type	 **138 kV Monopole Dead-End Single Circuit** See Exhibit 13	 **138 kV H-Frame Single Circuit** See Exhibit 9
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"	22'-7"

Component 2: James River 138 kV Substation

Tap of the existing Reusens–Scottsville–Bremo Bluff 138 kV Transmission Line to serve James River Substation (see Exhibit 5)

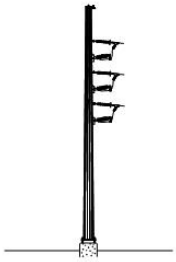
Structure Type	 **138 kV Monopole with Davit Arms Double Circuit** See Exhibit 14
a. mapping that identifies each portion of the preferred route;	See Exhibit 5
b. rationale for the selection of the structure type;	The proposed 138 kV monopole deadend with davit arms is best suited for short-to-medium spans as well as tap locations for new feeds. Reduces impacts on existing land use due to the condensed structure footprint.
c-1. estimated number of each type of structure;	1
c-2. estimated length of each portion of the ROW;	400 Feet (entirely on Company property)
d-1. structure material;	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Drilled concrete pier with an average depth of 30’. The typical concrete pier reveal height will be 1’ above grade.
f. average width at cross arms;	22'
g. average width at the base;	6'-0" Diameter Pole 7'-0" Diameter Concrete Pier
h-1. approximate average height of structures (above ground);	120'
h-2. approximate typical structure height range (above ground);	100' to 125'
i. average span length;	300’
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"

Component 3: Soapstone 138 kV Substation

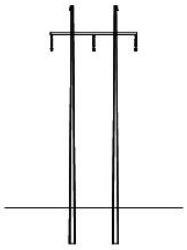
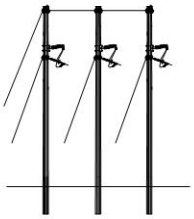
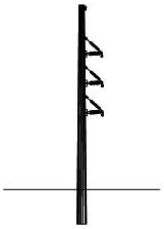
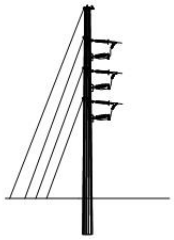
Tap of the existing Reusens–Scottsville–Bremo Bluff 138 kV Transmission Line to serve the Soapstone Extension and Substation (see Exhibit 6)

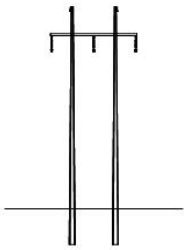
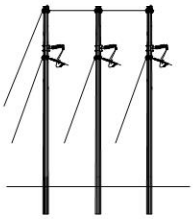
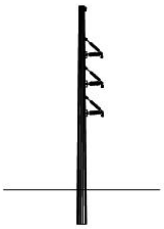
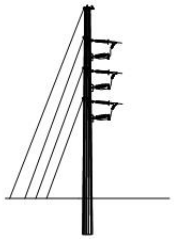
Structure Type	 **138 kV Monopole with Davit Arms** **Double Circuit** See Exhibit 14
a. mapping that identifies each portion of the preferred route;	See Exhibit 6
b. rationale for the selection of the structure type;	The proposed 138 kV monopole deadend with davit arms is best suited for short-to-medium spans as well as tap locations for new feeds. Reduces impacts on existing land use due to the condensed structure footprint.
c-1. estimated number of each type of structure;	1
c-2. estimated length of each portion of the ROW;	0.3 mile (no new ROW needed, minor conductor shift for tap structure installation)
d-1. structure material;	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Drilled concrete pier with an average depth of 30'. The typical concrete pier reveal height will be 1’ above grade.
f. average width at cross arms;	26'
g. average width at the base;	6'-0" Diameter Pole 7'-0" Diameter Concrete Pier
h-1. approximate average height of structures (above ground);	125'
h-2. approximate typical structure height range (above ground);	120’ to 130’
i. average span length;	800'
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"

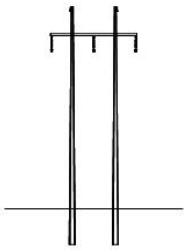
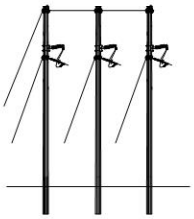
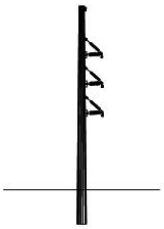
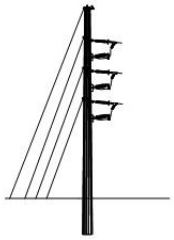
Component 3: Soapstone 138 kV Substation
Soapstone Extension 138 kV Transmission Line

Structure Type	 **138 kV Monopole Dead-End** **Single Circuit** See Exhibit 13
a. mapping that identifies each portion of the preferred route;	See Exhibit 6
b. rationale for the selection of the structure type;	The proposed 138 kV monopole dead-end structure is best suited for heavy line angle locations, breaking wire tensions and provides a condensed structure footprint.
c-1. estimated number of each type of structure;	2
c-2. estimated length of each portion of the ROW;	600 Feet (entirely on Company property)
d-1. structure material;	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Drilled concrete pier with an average depth of 30’. The typical concrete pier reveal height will be 1’ above grade.
f. average width at cross arms;	NA
g. average width at the base;	6'-0” Diameter Pole 7'-0" Diameter Concrete Pier
h-1. approximate average height of structures (above ground);	110'
h-2. approximate typical structure height range (above ground);	100’ to 120’
i. average span length;	300'
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"

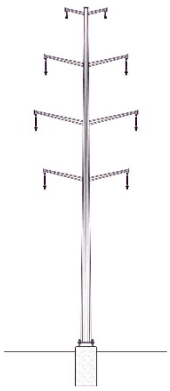
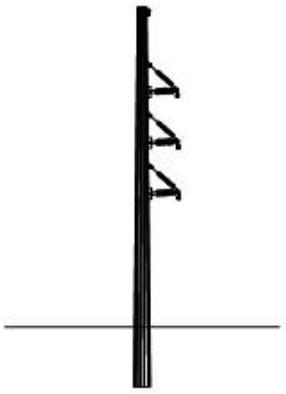
Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Amherst–Reusens 69 kV Transmission Line Rebuild

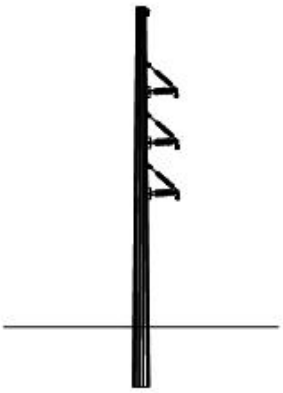
Structure Type	 **69 kV H-Frame Single Circuit** See Exhibit 16	 **69 kV Three Pole Structure Single Circuit** See Exhibit 17	 **69 kV Braced Monopole Single Circuit** See Exhibit 18	 **69 kV Monopole Single Circuit** See Exhibit 19	 **69 kV Monopole Single Circuit** See Exhibit 20
a. mapping that identifies each portion of the preferred route;	See Exhibit 7	See Exhibit 7	See Exhibit 7	See Exhibit 7	See Exhibit 7
b. rationale for the selection of the structure type;	The proposed 69 kV H-frame is best suited for medium-to-long spans and reduces visual impacts due to its low profile.	The proposed 69 kV three pole structure is best suited for light to heavy angles and reduces visual impacts due to its low profile.	The proposed 69 kV braced-post structure is best suited for short-to-medium spans and provides a condensed structure footprint.	The proposed 69 kV monopole dead-end and running angle guyed structure is best suited for heavy line angle locations.	The proposed 69 kV monopole dead-end structure is best suited for heavy line angle locations, breaking wire tension, and provides a condensed structure footprint.
c-1. estimated number of each type of structure;	76	4	7	7	5
c-2. estimated length of each portion of the ROW;	9.3 miles	0.6 mile	0.7 mile	0.9 mile	0.5 mile
d-1. structure material;	Dulled galvanized steel	Dulled galvanized steel	Dulled galvanized steel	Dulled galvanized steel	Dulled galvanized steel

Structure Type	 **69 kV H-Frame Single Circuit** See Exhibit 16	 **69 kV Three Pole Structure Single Circuit** See Exhibit 17	 **69 kV Braced Monopole Single Circuit** See Exhibit 18	 **69 kV Monopole Single Circuit** See Exhibit 19	 **69 kV Monopole Single Circuit** See Exhibit 20
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Steel poles will be direct embedded to an average depth of 11'	Steel poles will be direct embedded to an average depth of 11’	Steel poles will be direct embedded to an average depth of 12’	Steel poles will be direct embedded to an average depth of 12’	Drilled concrete pier with an average depth of 25’. The typical concrete pier reveal height will be 1’ above grade.
f. average width at cross arms;	25’	24’ to 31’	5'	2'	2'
g. average width at the base;	3’-0" Diameter Pole	3’-0" Diameter Pole	3’-0" Diameter Pole	3’-0" Diameter Pole	6'-0” Diameter Pole 7'0" Diameter Concrete Pier
h-1. approximate average height of structures (above ground);	60'	65'	70'	70'	70'

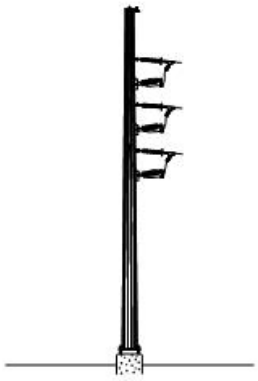
Structure Type	 **69 kV H-Frame Single Circuit** See Exhibit 16	 **69 kV Three Pole Structure Single Circuit** See Exhibit 17	 **69 kV Braced Monopole Single Circuit** See Exhibit 18	 **69 kV Monopole Single Circuit** See Exhibit 19	 **69 kV Monopole Single Circuit** See Exhibit 20
h-2. approximate typical structure height range (above ground);	55' to 90'	65' to 80'	65’ to 70’	60’ to 75’	50’ to 90’
i. average span length;	800’	800'	600’	600’	400’
j. minimum conductor-to-ground clearances under maximum operating conditions.	21-2"	21’-2"	21’-2"	21'-2"	21'-2"

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Boxwood–Riverville 138 kV Transmission Line (near Amherst Substation, see Exhibit 7, Map 10)

Structure Type	 **138 kV Monopole with Davit Arms Double Circuit** See Exhibit 14	 **138 kV Monopole with Braced Posts Single Circuit** See Exhibit 21
a. mapping that identifies each portion of the preferred route;	See Exhibit 7	See Exhibit 7
b. rationale for the selection of the structure type;	The proposed 138 kV monopole deadend with davit arms is best suited for short- to -medium spans as well as tap locations for new feeds. Reduces impacts on existing land use due to the condensed structure footprint.	The proposed 138 kV monopole with braced posts is best suited for short-to-medium spans and provides a condensed structure footprint.
c-1. estimated number of each type of structure;	1	1
c-2. estimated length of each portion of the ROW;	0.1 mile	0.1 mile
d-1. structure material;	Dulled galvanized steel	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Drilled concrete pier with an average depth of 30'. The typical concrete pier reveal height will be 1’ above grade.	Steel poles will be direct embedded to an average depth of 15'
f. average width at cross arms;	22'	NA
g. average width at the base;	6'-0" Diameter Pole 7'-0" Diameter Concrete Pier	3’-0” Diameter Pole
h-1. approximate average height of structures (above ground);	90’	90'

Structure Type	 **138 kV Monopole with Davit Arms Double Circuit** See Exhibit 14	 **138 kV Monopole with Braced Posts Single Circuit** See Exhibit 21
h-2. approximate typical structure height range (above ground);	85’ to 95’	Approximately 80’ to 95’
i. average span length;	Approximately 400’	Approximately 500'
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"	22'-7"

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Amherst–Riverville 138 kV Transmission Line (near Amherst Substation, see Exhibit 7, Map 10)

Structure Type	 **138 kV Monopole** **Deadend** **Single Circuit** See Exhibit 13
a. mapping that identifies each portion of the preferred route;	See Exhibit 7
b. rationale for the selection of the structure type;	The proposed 138 kV monopole dead-end structure is best suited for heavy line angle locations, breaking tension, and provides a condensed structure footprint.
c-1. estimated number of each type of structure;	1
c-2. estimated length of each portion of the ROW;	0.1 mile
d-1. structure material;	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Drilled concrete pier with an average depth of 25’. The typical concrete pier reveal height will be 1’ above grade.
f. average width at cross arms;	NA
g. average width at the base;	Average 6'-0” Diameter Pole Average 7'0" Diameter Concrete Pier
h-1. approximate average height of structures (above ground);	90'
h-2. approximate typical structure height range (above ground);	80’ to 100'
i. average span length;	500'
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"

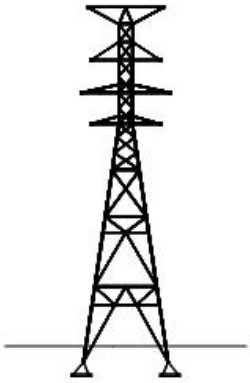
Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

Amherst Extension 138 kV Transmission Line (near Amherst Substation, see Exhibit 7, Map 10)

Structure Type	 **138 kV Monopole with Davit Arms** **Double Circuit** See Exhibit 14
a. mapping that identifies each portion of the preferred route;	See Exhibit 7
b. rationale for the selection of the structure type;	The proposed 138 kV monopole deadend with davit arms is best suited for short-to-medium spans as well as tap locations for new feeds. Reduces impacts on existing land use due to the condensed structure footprint.
c-1. estimated number of each type of structure;	1
c-2. estimated length of each portion of the ROW;	Approximately 0.3 mile
d-1. structure material;	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Drilled concrete pier with an average depth of 30'. The typical concrete pier reveal height will be 1’ above grade.
f. average width at cross arms;	22'
g. average width at the base;	Average 6'-0" Diameter Pole Average 7'-0" Diameter Concrete Pier
h-1. approximate average height of structures (above ground);	125'
h-2. approximate typical structure height range (above ground);	120’ to 130’
i. average span length;	800'
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

Reusens–Scottsville–Bremo Bluff 69/138 kV Double Circuit Transmission Line. (James River Crossing only, see Exhibit 7, Map 1)

Structure Type	 **138 kV Lattice Tower** **Double Circuit (James River Crossing Only)** See Exhibit 22
a. mapping that identifies each portion of the preferred route;	See Exhibit 7
b. rationale for the selection of the structure type;	The proposed 138 kV lattice tower structure is best suited for long spans such as the James River crossing and heavy angles.
c-1. estimated number of each type of structure;	3
c-2. estimated length of each portion of the ROW;	0.3 mile (double circuit), 0.2 mile (single circuit)
d-1. structure material;	Dulled galvanized steel
d-2. rationale for the selection of such material;	Galvanized steel was chosen for its durability and proven reliability in this region. A dulled finish was selected to minimize visual impacts.
e. foundation material;	Steel Grillage with an average depth of 14’ or concrete pier foundations with an average 6’ diameter and approximately 30’ deep
f. average width at cross arms;	35’
g. average width at the base;	35’
h-1. approximate average height of structures (above ground);	150’
h-2. approximate typical structure height range (above ground);	140’ to 160’
i. average span length;	1,300’
j. minimum conductor-to-ground clearances under maximum operating conditions.	22'-7"

4. With regard to the proposed supporting structures for all feasible alternate routes, provide the maximum, minimum and average structure heights with respect to the whole route.

***Response**:*
The below structure heights are applicable to the proposed routes associated with each Project Component.

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
Joshua Falls–Riverville 138 kV Transmission Line
The anticipated structure heights of the proposed 138 kV transmission line range from 55 feet to 100 feet tall with an average structure height of approximately 70 feet. The anticipated river crossing structure heights of the proposed 138 kV transmission line range from 80 feet to 120 feet, with an average height of 100 feet.

Gladstone–Riverville 138 kV Transmission Line
The anticipated structure heights of the proposed 138 kV transmission line range from 55 feet to 100 feet tall with an average structure height of approximately 70 feet.

Amherst–Riverville 138 kV Transmission Line (Relocation at the Riverville Substation)
The anticipated structure heights for the relocated portion of the 138 kV transmission line range from 55 feet to 110 feet tall with an average structure height of approximately 90 feet.

Component 2: James River 138 kV Substation
Reusens–Scottsville–Bremo Bluff 138 kV Transmission Line (tap)
The anticipated structure heights for the proposed line tap on the 138 kV transmission line range from 100 feet to 125 feet tall with an average structure height of approximately 120 feet.

Component 3: Soapstone 138 kV Substation
Reusens–Scottsville–Bremo Bluff 138 kV Transmission Line (tap)
The anticipated structure heights for the proposed line tap on the 138 kV transmission line range from 120 feet to 130 feet tall with an average structure height of approximately 125 feet.

Soapstone Extension 138 kV Transmission Line (connection to substation)
The anticipated structure heights of the proposed 138 kV transmission line range from 100 feet to 120 feet tall with an average structure height of approximately 110 feet.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Amherst–Reusens 69 kV Transmission Line Rebuild
The anticipated structure heights of the proposed 69 kV transmission line range from 50 feet to 90 feet tall with an average structure height of approximately 65 feet.

Reusens-Scottsville-Bremo Bluff 138 kV Line (James River Crossing)
The anticipated structure heights for the relocated portion of the 138 kV transmission line range from 140 feet to 160 feet tall with an average structure height of approximately 150 feet.

Boxwood–Riverville 138 kV Transmission Line (near Amherst Substation)
The anticipated structure heights for the relocated portion of the 138 kV transmission line range from 80 feet to 95 feet tall with an average structure height of approximately 90 feet.

Amherst–Riverville 138 kV Transmission Line (near Amherst Substation)
The anticipated structure heights for the relocated portion of the 138 kV transmission line range from 80 feet to 100 feet tall with an average structure height of approximately 90 feet.

Amherst Extension 138 kV Transmission Line (near Amherst Substation)
The anticipated structure heights of the proposed 138 kV transmission line range from 120 feet to 130 feet tall with an average structure height of approximately 125 feet.

5. For lines being rebuilt, provide mapping showing existing and proposed structure heights for each individual structure within the ROW, as proposed in the application.

Response:
See Exhibit 7, GIS Constraints Map for Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

6. Provide photographs for typical existing facilities to be removed, comparable photographs or representations for proposed structures, and visual simulations showing the appearance of all planned transmission structures at identified historic locations within one mile of the proposed centerline and in key locations identified by the Applicant.

Response:
See Exhibit 23 for photographs of existing structures and Exhibits 9–22 for representations of proposed structures. For visual simulations showing the appearance of all planned transmission structures at identified historic locations within one mile of the proposed centerline see Attachment 2.I.1 in each VDEQ Supplement in Volume 3 of the Application. For visual simulations, see Exhibit 24.

C. Describe and furnish plan drawings of all new substations, switching stations, and other ground facilities associated with the proposed project. Include size, acreage, and bus configurations. Describe substation expansion capability and plans. Provide one-line diagrams for each.

Response:
As part of the Project, the Company proposes improvements to the Riverville Substation, installation of a 138 kV Phase-Over-Phase Switch Pole (Five Forks), and construction of two new 138 kV substations (James River and Soapstone). The Project also includes improvements to the Monroe, Amherst, Scottsville, Boxwood, Joshua Falls and Clifford Substations. The proposed substation work is described in more detail as follows and is broken down by project component. One-lines for each substation referenced below can be found in Volume 4, Confidential Appendix.

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
Proposed Improvements at the Existing Riverville 138 kV Substation:
The existing Riverville Substation will be expanded with the addition of a new fenced yard adjacent to the existing 240' x 190' fenced yard. The new yard will be approximately 250' x 180' and will be constructed in a 3.93 acre area pursuant to an easement from the owner, Greif, Inc.

The Riverville Substation improvements include:

- Installation of a six circuit breaker 138 kV ring bus in the new yard.
- Installation of three 138 kV bus tie lines connecting the existing yard and the new yard.
- Installation of line termination equipment for three 138 kV line exits (Joshua Falls, Boxwood, and Gladstone) in the new yard.
- Installation of one 16' x 36' base Drop-In Control Module ("DICM") in the new yard.
- Replacement of three sets of 12 kV customer metering in the existing yard.

See Exhibit 25 for the layout, substation location, representative photographs, and one-line diagram.

Proposed Construction of the Five Forks 138 kV Transmission Line Pole with Switch:
No fence for the proposed switch pole will be required, as the switch will be located on a transmission line structure. The new switch pole will be located outside the CVEC Gladstone Substation and will include one phase-over-phase 1-way Gang Operated Air Break (GOAB) switch. See Exhibit 26 for the layout, representative photographs and one-line diagram.

Component 2: James River 138 kV Substation
Proposed Construction of the James River 138 kV Substation:
The fenced portion of the proposed James River 138 kV Substation will be approximately 250' x 250' on an 11.2 acre parcel, which the Company has purchased.

The new substation will include the installation of:

- Two circuit breaker 138 kV in-and-out bus.
- One 138/12 kV transformer to pick up the distribution load from the Shipman and Phoenix Substations, which will be retired as part of the Project.
- Line termination equipment for two 138 kV line exits (Clifford, Scottsville).
- One 138 kV circuit switcher.
- Three 12 kV circuit breakers with two 12 kV line exits.
- One 16' x 27' base DICM.

See Exhibit 27 for the layout, substation location, representative photographs, and one-line diagram.

Component 3: The Soapstone 138 kV Substation
Proposed Construction of the Soapstone 138 kV Substation
The fenced portion of the proposed Soapstone 138 kV Substation will be approximately 230' x 220' on a 111.2 acre parcel, which the Company has purchased.

The new substation includes the installation of:

- Two 138 kV line sectionalizing MOABs with in-and-out bus.

- One 138/12 kV transformer to pick up the distribution load from the Schuyler Substation, which will be retired as part of the Project.
- Line termination equipment for two 138 kV line exits (Scottsville, James River).
- One 138 kV circuit switcher.
- Three 12 kV circuit breakers with two 12 kV line exits.
- One 16’ x 18’ base DICM.

See Exhibit 28 for the layout, substation location, representative photographs, and one-line diagram.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

Proposed Improvements at the Existing Monroe 69 kV Substation:

The fenced portion of the existing Monroe Substation will be expanded to approximately 85’ x 87’ on a 0.17 acre parcel owned by the Company. The Monroe Substation improvements include replacement of one phase-over-phase 3-way switch, to accommodate the Amherst–Reusens 69 kV line rebuild.

See Exhibit 29 for the layout, substation location, photograph, and one-line diagram.

Proposed Improvements at the Existing Amherst 69 kV Substation:

The existing 129’ x 147’ fenced portion of the Amherst Substation will be expanded to approximately 305’ x 150’. Appalachian has purchased an additional 4.8 acres adjacent to the existing 0.7 acre substation parcel to accommodate the expansion.

The Amherst Substation improvements include:

- Installation of two 138 kV line sectionalizing MOABs.
- Installation of two 138/69/12 kV autotransformer.
- Installation of two 138 kV transformer high-side circuit breakers.
- Installation of line termination equipment for two 138 kV line exits (Boxwood, Riverville).
- Replacement and relocation of one 69 kV circuit breaker and reuse of line termination equipment for one 69 kV line exit (Reusens).
- Installation of a 69 kV transformer low-side circuit breaker feeding a 69 kV bus.
- Replacement of the existing control building with one 16’ x 27’ base DICM.

See Exhibit 30 for the layout, substation location, representative photographs, and one-line diagram.

Other Associated Project Improvements

Proposed Improvements at the Existing Scottsville 138 kV Substation:

The Scottsville Substation improvements for which the Company is seeking approval include the following, all of which will be located on the existing substation parcel:

- Replacement of two 138 kV line sectionalizing MOABs and one 138 kV bus tie circuit breaker with two 138 kV circuit breakers (Bremo Bluff and James River lines).
- Replacement of the138 kV & 46 kV bus.
- Installation of one 138 kV 28.8 MVAr capacitor bank.
- Replacement of one 20' x 28' control house with a 24' x 32' control house.

See Exhibit 31 for the layout, representative photographs, and one-line diagram.

Proposed Improvements at the Existing Boxwood 138 kV Substation:
The improvements at the Boxwood Substation will be entirely contained within the existing fence line of the substation.

The Boxwood Substation improvements include:

- Installation of a four circuit breaker 138 kV ring bus.
- Replacement of one 138 kV line sectionalizing MOAB on the Clifford line.
- Replacement of one 138 kV transformer high-side MOAB.
- Replacement of one 138/12 kV transformer to serve distribution load.
- Replacement of three 12 kV circuit breakers with four 12 kV circuit breakers and installation of three 12 kV line exits.
- Replacement of existing control building with one 16’ x 27’ base DICM.

See Exhibit 32 for the substation layout, representative photographs, and one-line diagram.

Proposed Improvements at the Existing Joshua Falls 138 kV Substation:
The improvements at the Joshua Falls 138 kV Substation will be entirely contained within the existing fence line of the substation.

The Joshua Falls Substation improvements include:

- Addition of one new line terminal to the existing 138 kV breaker and a half configuration.
- Installation of two 138 kV circuit breakers.
- Installation of line termination equipment for two 138 kV line exits (one for the 138 kV Riverville circuit, the other for a future 138 kV circuit).
- Installation of one 16’ x 12’ expansion for the existing DICM.

See Exhibit 33 for the substation layout, representative photographs, and one-line diagram.

Proposed Improvements at the Existing Clifford 138 kV Substation:
The improvements at the Clifford Substation will be entirely contained within the existing fence line of the substation.

The Clifford Substation improvements include:

- Replacement of one 138 kV circuit breaker with two 138 kV circuit breakers (Boxwood and James River lines)
- Replace the 20' x 28' control building with a 16' x 27' base DICM

See Exhibit 34 for the substation layout, representative photographs, and one-line diagram.

SECTION III. IMPACT TO THE LINE ON SCENIC, ENVIRONMENTAL, AND HISTORIC FEATURES

The Siting Studies and the VDEQ Supplements included in Volumes 2 and 3 of this Application address scenic, environmental, and historic features associated with the Project. Brief responses to the Section III guideline questions are provided below, but for in-depth discussion of these issues, please refer to the *Joshua Falls–Riverville–Gladstone Siting Study* for Component 1, the *Amherst–Reusens Rebuild Siting Study* for Component 4, and the VDEQ Supplements completed for Components 1 through 4 in Volume 3. The Project Area Map and Geographical Components Map for the CVTRP are included as Exhibits 1 and 3, respectively. More detailed GIS constraints maps, which illustrate the various resources and sensitive features relative to each Component, are included as Exhibits 4-7. Furthermore, the Siting Studies (included in Volume 2) include additional Project maps.

A. Describe the character of the area that will be traversed by this line, including land use, wetlands, etc. Provide the number of dwellings within 500 feet, 250 feet and 100 feet of the centerline, and within the ROW for each route considered. Provide the estimated amount of farmland and forestland within the ROW that the proposed project would impact.

Response:

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines

The new 138 kV transmission lines will connect the Company's existing Joshua Falls and Riverville Substations and CVEC's Gladstone Substation. The Joshua Falls-Riverville 138 kV transmission line must cross the James River, which is a dominant landscape feature in the area traversed by Component 1. The character of that area is generally divided between the north and south sides of the James River. The north side of the river is more mountainous, forested, and rugged while the south side of the river has more rolling hillsides with agricultural uses. Major land uses in the area include timbering/forest lands, residential, agricultural, and industrial uses. Scattered residential development exists on both sides of the river and is located on local, county or state-maintained roadways. These areas include residential development on Earley Farm Road, Galts Mill Road, and Stapleton Road on the north side, and Appomattox CR 611 and CR 605 on the south side of the James River. Additionally, a large residential neighborhood, Amherst Plantation, is located on the north side of the river and has roads maintained by the local homeowners' association. In addition, industrial development (Greif Paper Mill) is located near the Riverville Substation.

The Siting Team evaluated four alternative routes for the Joshua Falls-Riverville line and two alternative routes for the Gladstone-Riverville line. The estimates provided below of the residences, cropland and forest for each alternative route are based on a 100' wide ROW on the alternative route centerline.

Joshua Falls-Riverville 138 kV Transmission Line

- *Alternative Route A (11.6 miles):* There are 12 dwellings within 500 feet, 7 dwellings within 250 feet, and no known dwellings between zero and 250 feet of the Alternative Route A centerline. Alternative Route A has approximately 25.6 acres of cropland within the ROW based on National Land Cover Database ("NLCD") data and 122.7 acres of forest based on digitized aerial photography.

- *Alternative Route B (10.5 miles):* There are 8 dwellings within 500 feet, 3 dwellings within 250 feet and no dwellings between zero and 250 feet of the Alternative Route B centerline. Alternative Route B has approximately 54.8 acres of cropland within the ROW based on NLCD data and 103.5 acres of forest based on digitized aerial photography.

- *Alternative Route C (11.1 miles):* There are 11 dwellings within 500 feet, 2 dwellings within 250 feet, and no dwellings between zero and 250 feet of the Alternative Route C centerline. Alternative Route C has approximately 79.2 acres of cropland within the ROW based on NLCD data and 96.5 acres of forest based on digitized aerial photography.

- *Alternative Route D (11.1 miles, Proposed Route):* There are 8 dwellings within 500 feet, 2 dwellings within 250 feet, and no dwellings between zero and 250 feet of Alternative Route D (Proposed Route) centerline. Alternative Route D (Proposed Route) has approximately 68.2 acres of cropland within the ROW based on NLCD data and 93.8 acres of forest based on digitized aerial photography.

- The approximately 1,000-foot relocation of the existing Amherst–Riverville 138 kV transmission line at the Riverville Substation is located on Greif's industrial property and no dwellings are in proximity to the relocation.

Riverville–Gladstone 138 kV Transmission Line

- *Alternative Route E (6.3 miles, Proposed Route):* There are 14 dwellings within 500 feet, 3 dwellings within 250 feet, and no dwellings between zero and 250 feet of Alternative E (Proposed Route) centerline. Alternative E (Proposed Route) has approximately 40.6 acres of cropland within the ROW based on NLCD data and 66.3 acres of forest based on digitized aerial photography.

- *Alternative Route F (5.5 miles):* There are 28 dwellings within 500 feet, 8 dwellings within 250 feet, and no dwellings between zero and 250 feet of the Alternative Route F centerline. Alternative Route F has approximately 31 acres of cropland within the ROW based on NLCD data and 52.8 acres of forest based on digitized aerial photography.

See Exhibit 4 for aerial constraint mapping of the Proposed Routes.

Component 2: James River 138 kV Substation

The proposed James River 138 kV Substation and associated 138 kV transmission line connection are located in Nelson County on an approximately 11.2-acre property, which is owned by the Company. Approximately 400 feet of new 138 kV double circuit transmission line ROW will run from a tap point on the Company's existing Reusens–Scottsville–Bremo Bluff 138 kV transmission line to the new James River 138 kV Substation, and will be located entirely on property owned by the Company. Accordingly, the Siting Team considered no alternative routes for this transmission line. The areas adjacent to the substation property are forested with some open agricultural fields and moderate residential development along major roadways, including Craigtown Road and James River Road. One dwelling is located within 150 feet of the new monopole 138 kV tap structure on the existing Reusens–Scottsville–Bremo Bluff 138 kV

transmission line, but the ROW centerline of the existing transmission line will remain unchanged (See Exhibit 5).

Component 3: Soapstone 138 kV Substation

The proposed Soapstone 138 kV Substation and Soapstone 138 kV Extension are located in Nelson County on an approximately 111.2-acre property, which is owned by the Company. Approximately 600 feet of new 138 kV double circuit transmission line ROW for the extension will run from a tap point on the existing Reusens–Scottsville–Bremo Bluff 138 kV transmission line to the Company's new Soapstone 138 kV Substation, and will be located entirely on property owned by the Company. Accordingly, the Siting Team considered no alternative routes for this transmission line. The areas adjacent to the substation property are forested with some open agricultural fields on the property and moderate residential development along Carter Road to the west and Rockfish Crossing to the north. No dwellings are located within 500 feet of the Soapstone 138 kV Extension (See Exhibit 6).

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

The estimates provided below of the residences, cropland and forest for each alternative route are based on a conservative 100' wide ROW on the alternative route centerline; however, the proposed rebuild ROW is expected to be 80-foot wide as described in Section II.

The existing Amherst–Reusens 69 kV transmission line is primarily located in the southern part of Amherst County, with approximately 1,000 feet being located on the northeastern side of the City of Lynchburg. The area surrounding the Amherst–Reusens 69 kV transmission line consists of residential development near local roads and undeveloped forestland or pastureland. Residential areas are located predominantly along state-maintained county roads and highways such as U.S. Route 29, Burks Road, Bobwhite Road, and South Coolwell Road in Amherst County, and Old Trents Ferry Road in the City of Lynchburg. The proposed rebuild is approximately 12.2 miles in length and follows the centerline of the existing ROW for most of its length. In a few places, deviations from the existing centerline are necessary due to routing constraints or encroachments along the existing ROW. The existing Amherst-Reusens 69 kV transmission line, built in the 1940s, predates the existing residential development. Moderate residential development along the ROW edges has occurred over the years.

The Siting Team considered the rebuild route and two alternative routes, Alternative Route A and Alternative Route B (the Proposed Route), for a short (less than a mile) portion of the rebuild where it crosses the James River near the Reusens Substation. There are 4 dwellings within 500 feet and 2 dwellings within 250 feet and 100 feet of the Alternative Route A centerline. There are 3 dwellings within 500 feet and one dwelling within 250 and 100 feet of the Alternative Route B centerline. There are no dwellings within the ROW of either Alternative Route A or B. The ROWs of Alternative Routes A and B do not cross any NLCD-designated cropland and are anticipated to require 3.0 and 3.7 acres of tree clearing, respectively.

For the entire 12.2 mile proposed rebuild, there are 262 dwellings within 500 feet, 132 dwellings within 250 feet, and 41 dwellings within 100 feet of the Proposed Route centerline (including Alternative Route B). The existing ROW of the Amherst-Reusens 69 kV transmission line varies in width and is generally 60 feet to 100 feet wide. After completing preliminary engineering, the Company expects that the ROW of the rebuilt line will be 80 feet wide and will follow the centerline of the existing ROW for most of its length. There are 6 dwellings within the 80-foot wide ROW; however, based on engineering analysis to date, the Company has preliminarily determined that the ROW could be narrower than 80 feet in those locations in order to keep the affected residences out of the final ROW. Accordingly, and subject to completion of final

engineering and ROW negotiations with affected landowners, the Company does not expect that any residences will need to be removed to accommodate the rebuilt line. No NLCD-designated croplands are crossed by the Proposed Route. Minimal tree clearing will be required for most of the Proposed Route, where the transmission line will be rebuilt in the existing ROW. The Company anticipates that less than 20 acres of tree clearing will be required for the Proposed Route, including the minor deviations from centerline and the new ROW over the James River.

At the Amherst Substation, the proposed new transmission line extension (Amherst Extension 138 kV transmission line) will be very short (two spans) and is expected to have minimal impact on the surrounding residential or forested land use. There are 2 dwellings located within 500 feet and no dwellings located within 250 feet of the proposed Amherst Extension 138 kV transmission line centerline. There are 3 dwellings located within 500 feet, 2 dwellings within 250 feet, and no dwellings within 100 feet of the rebuilt section of the Amherst–Riverville 138 kV transmission. There are 2 dwellings located within 500 feet and no dwellings located within 250 feet of the rebuilt section of the Boxwood–Riverville 138 kV transmission line. No NLCD-designated cropland will be crossed and minimal tree clearing (less than an acre) is expected.

B. Describe any public meetings the Applicant has had with neighborhood associations and/or officials of local, state or federal governments that would have an interest or responsibility with respect to the affected area or areas.

Response:
As described in Section 2.0 of the Siting Studies (Volume 2 of the Application) for Components 1 and 4, the Siting Team initiated the Project by contacting various federal, state, and local agencies and/or officials to inform them of the Project and request data for the route planning process. Letters and maps regarding all Components of the CVTRP were sent to 47 representatives of federal, state, and local government agencies on January 30, 2020 and a total of 17 responses was received for the overall CVTRP. Agency correspondence and project reviews were used to develop, modify, and analyze study segments and alternative routes. A full list of agencies receiving a map and letter and copies of any responses received are attached to the Siting Studies in Volume 2 of the Application. The Company also met with local agencies and interested stakeholders and landowners throughout the route development process, which is described in Section 2.0 and 3.0 of the Siting Studies.

Members of the Siting Team met with representatives of local jurisdictions for each Project component to obtain input on existing and future land uses and comprehensive planning, and to identify potential stakeholder groups. In addition to county meetings, the Siting Team conducted open houses (in-person and virtual) to gather public input on the Project.

<u>Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines</u>
Component 1 of the CVTRP is located in Amherst, Appomattox, Campbell, and Nelson counties. Members of the Siting Team met with the Amherst County Administrator and Director of Planning and Zoning on June 25, 2019. Members of the Siting Team met with the Appomattox and Nelson County Administrators and members of the Board of Supervisors of those counties on July 15 and July 19, 2019, respectively. Members of the Siting Team met with the Campbell County Administrator and members of the Campbell County Board of Supervisors through a virtual meeting on July 29, 2019.

Two sets of public open houses were held for Component 1 of the Project to gather landowner and community feedback. The first set of open houses was held November 6 and 7, 2019, from 5:30–7:30 p.m. at Appomattox County High School and Amherst County High School,

respectively, to present a Study Segment Network (detailed in Section 3.5 of the *Joshua Falls-Riverville-Gladstone Siting Study*). The second set of open houses was held on February 26 and 27, 2020 to present a Refined Study Segment Network (detailed in Section 3.6 of the Siting Study) after additional desktop and field reviews, and landowner and stakeholder meetings were completed. A total of 47 people attended the first set of open houses held in November 2019, and a total of 64 people attended the second set of open houses in February 2020. A total of 46 comment cards was received from both sets of public open houses and those comments were entered into the Project public comment database. For additional information regarding the public open houses, see Section 2.5 of the *Joshua Falls-Riverville-Gladstone Siting Study* (Volume 2 of the Application).

The proposed routes for Component 1 were announced to the public on January 13, 2021 by mailing letters to landowners, publishing a news release, and updating the information on the Project website (www.appalachianpower.com/CVTRP).

Components 2 and 3: James River 138 kV Substation and Soapstone 138 kV Substation
Members of the Siting Team met with the Nelson County Administrator and members of the Nelson County Board of Supervisors on July 19, 2019, concurrently with the Component 1 meeting. The Siting Team members introduced Components 2 and 3 of the CVTRP and explained the need to build two new 138 kV substations and short transmission line connections on properties to be purchased by the Company. Some residential development exists near the proposed substation locations in Nelson County, but the Siting Team was unable to identify any homeowners' association groups associated with that development. Because the COVID-19 epidemic was ongoing during a portion of the public involvement process of the Project, an in-person public open house was not possible under the travel restrictions and social distancing recommendations and requirements of the Centers for Disease Control and Prevention and the Executive Orders issued by the Governor of the Commonwealth. In lieu of an in-person public meeting, a virtual open house was created on the Project website for the remaining Components 2 and 3. The virtual open house was made available on August 7, 2020. Although in a digital format, the content provided during the virtual open house was comparable to that provided at in-person public open houses. No comment cards were received for the James River 138 kV Substation and Soapstone 138 kV Substation Components.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Component 4 of the CVTRP is primarily located in Amherst County, with approximately 1,000 feet being located in the City of Lynchburg. Members of the Siting Team met with the Amherst County Administrator and Director of Planning and Zoning on November 7, 2019, to inform them of the rebuild component of the CVTRP, concurrently with the Component 1 meeting. Members of the Siting Team kept the City of Lynchburg officials informed throughout the route development process and in combination with other transmission projects in the area.

Because the COVID-19 epidemic was ongoing during a portion of the public involvement process of the Project, an in-person public open house was not advisable under the travel restrictions and social distancing recommendations and requirements of the Centers for Disease Control and Prevention and the Executive Orders issued by the Governor of the Commonwealth. In lieu of an in-person public meeting, a virtual open house was created on the Project website for Component 4. The virtual open house was made available on August 7, 2020. Although in a digital format, the content provided during the virtual open house was comparable to that provided at in-person public open houses. For additional information regarding the virtual open houses, see Section 2.5 of the *Amherst–Reusens Rebuild Siting Study* (Volume 2 of the Application). A total of 25 comment cards has been received to date in response to the Amherst–

Reusens 69 kV transmission line rebuild component. Those comments were entered into the Project public comment database, and generally related to how the rebuild will differ from the existing line and whether it will affect landowner property in the vicinity.

C. Detail the nature, location, and ownership of each building that would have to be demolished or relocated if the project is built as proposed.

Response:
Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
No demolition or relocation of any building is anticipated for Component 1.

Component 2: James River 138 kV Substation
No demolition or relocation of any building is anticipated for Component 2.

Component 3: Soapstone 138 kV Substation
There is one dilapidated dwelling and an outbuilding located on the property purchased for the Soapstone 138 kV Substation and Soapstone 138 kV Extension. The Company plans to demolish the uninhabited residence and outbuilding prior to the start of construction (Exhibit 6: GIS Constraints Map).

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Component 4 of the CVTRP is the rebuild of the existing Amherst–Reusens 69 kV transmission line, most of which will follow the centerline of the ROW of the existing line. After completion of preliminary engineering, the Company expects that the ROW for the rebuilt line will generally be 80 feet wide. Six residences have encroached on the existing ROW since the transmission line was built in the 1940s. However, subject to completion of final engineering and ROW negotiations with affected landowners, the Company has preliminarily determined that the ROW can be narrowed in those locations in order to keep those dwellings out of the ROW for the rebuilt line. Accordingly, the Company expects that no dwellings will need to be removed to rebuild the line. Additionally, the Company widened the filing corridor from 300’ to approximately 500’ between existing structures 429-52 and 429-47 to allow for additional flexibility to work with landowners and avoid or minimize impacts (Exhibit 7: GIS Constraints Map).

Approximately 21 outbuildings (including, but not limited to, barns, sheds, and garages) are located within the 80-foot ROW for the rebuild, based on the best available aerial photography and preliminary engineering. Additional field work, engineering, and discussions with landowners are needed to determine if these outbuildings will need to be removed prior to construction.

D. Identify existing physical facilities that the line will parallel, if any, such as existing transmission lines, railroad tracks, highways, pipelines, etc. Describe the current use and physical appearance and characteristics of the existing ROW that would be paralleled, as well as the length of time the transmission ROW has been in use.

Response:
Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
There are no existing transmission lines that bisect the Component 1 study area from west to east that provide a paralleling opportunity in connecting the Joshua Falls, Riverville, and Gladstone (CVEC) Substations. The Company’s Cloverdale–Joshua Falls 765 kV transmission line can be paralleled by the proposed route for a short distance (approximately 1,600 feet) outside of the

Joshua Falls Substation. The Amherst–Riverville 138 kV transmission line cannot be paralleled due to existing residential development and future landfill expansion plans at the Greif Paper Mill facility. No existing transmission lines are located between the Riverville and Gladstone (CVEC) Substations that provide a paralleling opportunity. The proposed routes (Alternative Routes D and E) parallel parcel boundaries to the extent practicable (Exhibit 4: GIS Constraints Map). After the necessary data collection and further analysis, roads, railroads, and pipelines were not considered as paralleling opportunities due to the development surrounding these areas and constructability constraints.

Components 2 and 3: James River 138 kV Substation and Soapstone 138 kV Substation
Not applicable. These transmission line connections are short and located entirely on property owned by the Company.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Component 4 of the Project involves rebuilding an existing line along or near the centerline of the existing ROW for the majority of its length. The proposed route for this rebuild includes a few minor deviations from the existing ROW centerline due to residential encroachments and engineering constraints. An existing pipeline corridor parallels the proposed route in multiple locations for approximately 2.2 miles (Exhibit 7). The transmission line pre-dates the installation of the pipeline. As the Project progresses, the Company will continue discussions with Colonial Pipeline Company to determine final centerline and structure locations within the filing corridor. Paralleling roads, highways, and/or railroads was not considered practicable as an existing transmission line ROW was available for use.

E. Indicate whether the Applicant has investigated land use plans in the areas of the proposed route and indicate how the building of the proposed line would affect any proposed land use.

Response:
The Siting Team considers impacts to existing and future land uses that may not be compatible with transmission facilities. The components of the CVTRP are located in multiple central Virginia counties and thus the various land use plans adopted in those counties were considered. At the start of the route development process, the Company met with officials from Albemarle, Amherst, Appomattox, Campbell, and Nelson Counties to discuss existing and future land use plans of the respective component areas. No localities raised any potential conflicts between the Project and any specific future land use plans in their locality and the CVTRP is not anticipated to affect any proposed land use as identified by the local jurisdictions. Additionally, during stakeholder input, information on existing and future land uses was collected and considered.

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
Various land uses exist within Amherst, Appomattox, Campbell, and Nelson counties. POWER reviewed future land uses and county-specific goals to evaluate areas of constraints and opportunities in each of the county's comprehensive planning documents. Component 1 is located in the southern parts of Amherst and Nelson Counties and the northern parts of Appomattox and Campbell Counties. The review of these plans is summarized in Section 4.2 of the *Joshua Falls–Riverville–Gladstone Siting Study* found in Volume 2 of this Application. Based on that review and discussions with county officials, the Company does not expect the proposed routes for this component to affect proposed land use in any counties crossed.

Additionally, a portion of the proposed routes crosses commercial timber land, which is a compatible land use. Another major land use crossed by the proposed routes is agricultural, which

also is a land use that is compatible with the transmission lines. One individual landowner on the proposed route indicated a potential existing and future land use conflict with their short-term rental land use. As a result, the Siting Team adjusted the route to the edge of the property to reduce impacts. Unfortunately, the property cannot be entirely avoided without additional impacts to other residences or properties.

Components 2 and 3: James River 138 kV Substation and Soapstone 138 kV Substation
The proposed routes for Components 2 and 3 are short, direct and entirely located on Company-owned property. No proposed land use plan impacts are expected.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
The proposed route for Component 4 is primarily located in the southern part of Amherst County with approximately 1,000 feet of the proposed route located on the northeastern side of the City of Lynchburg. POWER reviewed the Comprehensive Plans developed by each locality for the various land uses in the area traversed by the proposed route. The review of these plans is summarized in Section 4.2 of the *Amherst–Reusens Rebuild Siting Study* found in Volume 2 of this Application. Based on that review, the Company does not expect the proposed rebuild to affect proposed land use in any localities crossed. The transmission line is an existing land use and the line rebuild will be comparable in character and location.

F. Government Bodies

1. Indicate if the Applicant determined from the governing bodies of each county, city and town in which the proposed facilities will be located whether those bodies have designated the important farmlands within their jurisdictions, as required by § 3.2-205 B of the Code.

Response:
After inquiry by the Company's routing consultant and review of available planning documents and meetings with local staff, the Company has determined that the proposed Project ROWs do not cross any designated important farmlands in Amherst, Appomattox, Nelson or Campbell Counties, or the City of Lynchburg.

2. If so, and if any portion of the proposed facilities will be located on any such important farmland:

a) *Include maps and other evidence showing the nature and extent of the impact on such farmlands;*

Response:
N/A

b) *Describe what alternatives exist to locating the proposed facilities on the affected farmlands, and why those alternatives are not suitable; and*

Response:
N/A

c) *Describe the Applicant's proposals to minimize the impact of the facilities on the affected farmland.*

Response:
N/A

G. Identify the following that lie within or adjacent to the proposed ROW:

Per the *Guidelines for Assessing Impacts of Proposed Electric Facilities on Historic Resources in the Commonwealth of Virginia* (2008) (the "Guidelines"), issued by the Virginia Department of Historic Resources ("VDHR"), POWER contracted Dutton + Associates to complete a Pre-Application Analysis for each of the four CVTRP Components (see Attachment 2.I.1 for each VDEQ Supplement included in Volume 3 of this Application).

1. Any district, site, building, structure, or other object included in the National Register of Historic Places maintained by the U.S. Secretary of the Interior;

Response:
Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines
One NRHP-listed resource is located within a mile of the proposed routes for Component 1, but is not within or adjacent to the proposed ROW. The Edge Hill Property (VDHR# 005-0005) is located 0.7 mile from the nearest portion of the proposed routes. Based on the Pre-Application Analysis, (set forth in the VDEQ Supplement located in Volume 3 of the Application), the Edge Hill resource will not be visible from the proposed transmission line given the intervening topography and surrounding developed land uses, including the industrial Greif Paper Mill.

Component 2: James River 138 kV Substation
None.

Component 3: Soapstone 138 kV Substation
Two NRHP-listed resources are located within one mile of Component 3: the Southern Albemarle Rural Historic District (VDHR# 002-5045) and the Schuyler Historic District (VDHR# 062-5002). Based on the Pre-Application Analysis, (set forth in the VDEQ Supplement located in Volume 3 of the Application) neither the Southern Albemarle Rural Historic District nor the Schuyler Historic District will be visible from the proposed substation or transmission line associated with Component 3 given the dense wooded and the topography of the intervening landscape.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Five NRHP-listed architectural sites are located within one mile of the proposed route: the Hanshill House (VDHR# 005-5329), Oak Lawn (VDHR# 005-5029), the Bowling Eldridge House (VDHR# 009-5283); the Virginia Episcopal School (VDHR# 118-0224); and the Presbyterian Orphans Home (VDHR# 118-5240). Based on the Pre-Application Analysis (set forth in the VDEQ Supplement located in Volume 3 of the Application), the five NRHP-listed architectural sites will likely not be visible from the proposed route given the intervening topography and vegetative cover. It is Dutton + Associates' opinion that Component 4 of the CVTRP will have no impact on any NRHP-listed historic properties, besides the Hanshill House, which has a minimal impact.

2. Any historic architectural, archaeological, and cultural resources, such as historic landmarks, battlefields, sites, buildings, structures, districts or objects listed or determined eligible by the Virginia Department of Historic Resources ("DHR");

Response:
None for Components 1 to 3.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
Three NRHP-eligible sites are located within 0.5 mile of the proposed route: the Bibbie House (VDHR# 005-0223), the Lavino Furnace (VDHR# 118-0138), and the Reusens Dam (VDHR# 118-0218). Based on the Pre-Application Analysis (set forth in the VDEQ Supplement located in Volume 3 of the Application), the transmission line rebuild will have no more than a minimal impact on the three NRHP-eligible resources given the intervening vegetation and topography or adjoining developed land uses.

3. Any historic district designated by the governing body of any city or county;

Response:
None.

4. Any state archaeological site or zone designated by the Director of the DHR, or its predecessor, and any site designated by a local archaeological commission, or similar body;

Response:
None.

5. Any underwater historic assets designated by the DHR, or predecessor agency or board;

Response:
None.

6. Any National Natural Landmark designated by the U.S. Secretary of the Interior;

Response:
None.

7. Any area or feature included in the Virginia Registry of Natural Areas maintained by the Virginia Department of Conservation and Recreation ("DCR");

Response:
None.

8. **Any area accepted by the Director of the DCR for the Virginia Natural Area Preserves System**;

Response:
None.

9. Any conservation easement or open space easement qualifying under §§ 10.1-1009 – 1016, or §§ 10.1-1700 – 1705, of the Code (or a comparable prior or subsequent provision of the Code);

Response:

Component 1: Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines

No known existing or proposed conservation easements are crossed by the proposed route of the Joshua Falls-Riverville 138 kV transmission line or are crossed by the ROW for the proposed line. One Virginia Department of Forestry ("DOF") conservation easement (APP-2010-001) is located within 100 feet of the Joshua Falls-Riverville 138 kV transmission line proposed route. However, the filing corridor does not cross the DOF easement and thus the ROW cannot cross the easement.

No known existing or proposed conservation easements are crossed by the proposed route of the Gladstone–Riverville 138 kV transmission line or are crossed by the ROW for the proposed line. One approximately 201-acre Virginia Outdoors Foundation ("VOF") conservation easement (NEL-0473) is located within 500 feet of the Gladstone–Riverville 138 kV transmission line proposed route. However, the filing corridor does not cross the VOF easement and thus the ROW cannot cross the easement.

Component 2: James River 138 kV Substation

No known existing or proposed conservation easements are located on the proposed substation property. There is one approximately 221-acre VOF conservation easement (NEL-02800) east of the property purchased for Component 2. However, the proposed transmission line connection to the James River 138 kV Substation is located about 800 feet away from the easement and surrounded by a forested buffer.

Component 3: Soapstone 138 kV Substation

No known existing or proposed conservation easements are located on the proposed substation property. There is one approximately 235-acre VOF conservation easement (NEL-03880) that adjoins the eastern boundary of the property purchased for Component 3. The proposed Soapstone 138 kV Extension and substation are located approximately 0.4 mile away from the VOF easement and will not impact the easement.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild

No known existing or proposed conservation easements are located on the proposed route of the Amherst–Reusens 69 kV transmission line rebuild or crossed by the ROW for the proposed rebuild.

10. Any state scenic river;

Response:

None.

11. Any lands owned by a municipality or school district; and

Response:

None.

12. Any federal, state or local battlefield, park, forest, game or wildlife preserve, recreational area, or similar facility. Features, sites, and the like listed in 1 through 11 above need not be identified again.

Response:
None for Components 1, 2 or 3.

Component 4: Amherst–Reusens 69 kV Transmission Line Rebuild
None. However, the proposed route for the Amherst–Reusens 69 kV transmission line rebuild passes approximately 500 feet north of the Izaak Walton Park in Amherst County. The park is owned by the Izaak Walton League of Lynchburg, a local non-profit organization. The ROW for the rebuild in this location follows the centerline of the ROW of the existing Amherst–Reusens 69 kV transmission line and does not cross the park boundaries.

No other federal, state or local facilities are located within or adjacent to the proposed ROWs.

H. List any registered aeronautical facilities (airports, helipads) where the proposed route would place a structure or conductor within the federally-defined airspace of the facilities. Advise of contacts, and results of contacts, made with appropriate officials regarding the effect on the facilities' operations.

Response:
No public use airport is located within 20,000 linear feet of any Project Components according to a letter received from the Virginia Department of Aviation on February 5, 2020 (attached to the Siting Studies provided in Volume 2).

A private heliport, located at the Greif Paper Mill, is approximately 0.25 mile from the Company's existing Riverville Substation, existing Amherst-Riverville 138 kV transmission line, and the proposed route of the Joshua Falls-Riverville-Gladstone 138 kV Transmission Lines. The heliport serves as an emergency landing site for the Greif Paper Mill. The Company's engineers will include the heliport in its Federal Aviation Administration (FAA) analysis and mitigate if necessary.

I. Advise of any scenic byways that are in proximity to or that will be crossed by the proposed transmission line and describe what steps will be taken to mitigate any visual impacts on such byways. Describe typical mitigation techniques for other highways' crossings.

Response:
No scenic byways as designated by the Federal Highway Administration or the Virginia Department of Transportation ("VDoT") are crossed by the proposed route of the Joshua Falls–Riverville–Gladstone 138 kV Transmission Lines (Component 1) or are impacted by Components 2 and 3.

The proposed route of the Amherst–Reusens 69 kV Transmission Line rebuild (Component 4) crosses Elon Road, which has been designated a Virginia Byway by VDoT. In this location, the proposed centerline for the rebuild is unchanged from where the existing Amherst–Reusens 69 kV Transmission Line currently crosses Elon Road. The proposed structures will be near those of the existing structures, offset from the road, and similar character to the existing structures.

J. Identify coordination with appropriate municipal, state, and federal agencies.

Response:
The Siting Team coordinated with various federal, state, and local agencies and/or officials early in the route development process to inform them of the Project and obtain relevant information for all Project components. A full list of the agency contacts and associated responses for the CVTRP Project is included as Attachment C to the siting studies found in Volume 2 of the Application.

K. Identify coordination with any non-governmental organizations or private citizen groups.

Response:
Coordination with non-governmental organizations and private citizen groups was not necessary for the transmission lines included in Components 2 and 3. For Components 1 and 4, coordination with known non-governmental organizations and/or private citizen groups was made early and throughout the route development process to solicit information and gain feedback on the Project. The results of these meetings are summarized in the Siting Studies for Components 1 and 4 in Volume 2 of the Application.

L. Identify any environmental permits or special permissions anticipated to be needed.

Response:
The following is a list of environmental permits or special permissions that are anticipated to be needed for the various components of the Project:

- A general VPDES Permit for Discharges of Stormwater from Construction Activities from the Virginia Department of Environmental Quality.
- A Joint Permit Application for Components 1 and 4 will be submitted to the Virginia Marine Resources Commission for permission for these components to cross the James River.
- The United States Army Corp of Engineers (USACE) Nationwide 12 Permit will apply to the Project.
- The USACE Section 10 Permit in compliance with Section 404 of the Clean Water Act will apply to the Project.
- Surveys and coordination with the United States Fish and Wildlife Service and the Virginia Department of Wildlife Resources (formerly the Virginia Department of Game and Inland Fisheries) will be conducted for potential occurrence of state- and federally-protected species.
- If impacts to cultural resources occur, compliance with Section 106 of the National Historic and Preservation Act of 1966 Compliance and coordination with the VDHR will be required.

SECTION IV. HEALTH ASPECTS OF EMF

A. State the calculated maximum electric and magnetic field (EMF) levels that are expected to occur at the edge of the right-of-way. If the new transmission line is to be constructed on an existing electric transmission line right-of-way, provide the present EMF levels as well as the maximum levels calculated at the edge of right-of-way after the new line is operational.

Response:
The following is an analysis of electric and magnetic fields ("EMF") associated with the transmission line components of the Project

The new Joshua Falls-Riverville 138 kV transmission line and Gladstone-Riverville 138 kV transmission line will be built to 138 kV standards using single-circuit H-frame structures. Single-circuit lattice structures will used to span the James River.

The new 138 kV line taps of the existing Reusens-Scottsville-Bremo Bluff 138 kV transmission line to the proposed new James River and Soapstone 138 kV substations, will be built to 138 kV standards using double-circuit monopole and single-circuit monopole structures. The circuits have an optimal phase configuration, known as "super bundle" (3-2-1/3-2-1, top-to-bottom), which will minimize the combined EMF exposure from the two circuits of the new lines because these circuits normally will carry power in opposite directions.

The rebuild of the existing Amherst-Reusens 69 kV transmission line will have double and single circuit sections. The double circuit section will be built to 138 kV standards using double-circuit lattice towers with an optimal phase configuration known as "superbundle" (3-2-1/3-2-1, top-to-bottom).

EMF levels were computed at the ROW edges of the existing and proposed line configurations at the point of minimum ground clearance, where EMF is the highest. Lower EMF levels are expected beyond the ROW edges, as levels decline with distance.

Factors that affect EMF include the ROW width, operating voltage, current flow and direction, electrical unbalance, line configuration, conductor height above ground, and other nearby objects. Nominal voltages and balanced conditions are assumed, with maximum current levels and directions expected during normal system operation. No trees, shrubs, buildings or other objects that can block EMF are assumed in proximity to the existing and proposed lines.

Normal maximum loading levels, representing peak load conditions, were assumed in the analysis to maximize the calculated magnetic fields. These loading levels are based on winter 2022-2023 projected system conditions. Daily/hourly loads will fluctuate below these levels. All calculations were obtained at the height of 3.28 feet (one meter) above ground using the Electric Power Research Institute ("EPRI") EMF Workstation computer program. Based on the foregoing, the maximum electric and magnetic field levels expected to occur at the ROW edge of the new 138 kV line components are 0.6 kV/m and 25.5 milligauss ("mG"), respectively (assuming a 100-foot wide ROW).

The maximum electric and magnetic field levels expected to occur at the ROW edge of the proposed Amherst-Reusens 69 kV transmission line rebuild levels are 0.4 kV/m and 7.8 mG, respectively. The maximum existing electric and magnetic field levels for the existing Amherst-Reusens 69 kV transmission line are 0.2 kV/m and 9.8 mG, respectively. Both the existing and proposed levels are based on an 80-foot wide ROW.

B. If Company is of the opinion that no significant health effects will result from the construction and operation of the line, describe in detail the reasons for that opinion and provide references or citations to supporting documentation.

Response:

Electric and magnetic fields occur naturally in the environment. An electric field is present between the earth and its atmosphere, and can discharge as lightning during thunderstorms. The earth also has a magnetic field, which provides an operating basis for the magnetic compass. EMF exists wherever there is a flow of electricity, including electrical appliances and power equipment.

Electric fields are produced by voltage or electric charge. A lamp cord that is plugged in produces an electric field even if the lamp is turned off. These fields commonly are measured in kilovolts per meter ("kV/m"); the higher the voltage, the greater is the electric field. Magnetic fields are created by the flow of current in a wire. As current increases, the magnetic field strength also increases; these fields are measured in units known as gauss, or milligauss.

Electric fields are blocked by trees, shrubs, buildings and other objects. Magnetic fields are not easily blocked and can pass through most objects. The strength of these fields decreases rapidly with distance from the source.

EMF associated with power lines and household appliances oscillate at the power frequency (60 Hz in the U.S). When people are exposed to these fields, small electric currents are produced in their bodies. These currents are weaker than natural electric currents in the heart and nervous system.

Possible health effects from exposure to EMF have been studied for several decades. Initial research, focused on electric fields, found no evidence of biologic changes that could lead to adverse health effects. Subsequently, a large number of epidemiologic studies examined the possible role of magnetic fields in the development of cancer and other diseases in adults and children. While some studies have suggested an association between magnetic fields and certain types of cancer, researchers have been unable to consistently replicate those results in other studies. Similarly, inconclusive or inconsistent results have been reported in laboratory studies of animals exposed to magnetic fields that are representative of common human exposures. A summary of such exposures, found in residential settings, is provided in Table IV-1.

Appliance Type	Number of Devices	Magnetic Field (mG)		
		1.2" (0.1 feet)	12" (1.0 feet)	User Distance
AC Adapters	3	1.4 – 863	0 - 7.5	0 - 0.8
Blood Pressure Monitors	4	4.2 - 39.6	0 - 0.3	0 – 0.2
Bluetooth Headsets	3	0	0	0
Coffee Grinders	3	60.9 – 779	0.3 – 6.5	0.8 - 40.9
Compact Fluorescent Bulbs	15	0 – 32.8	0 - 0.1	0 - 0.6
Compact Fluorescent Bulb Ballast	1	8.5 – 23.5[1]	0 – 0.1[1]	0 - 0.1[1]
Computers, Desktop	3	3.8 – 68.9	0 -1.1	0.1 – 0.5
Computers, Laptop	4	0 – 5.1	0	0 – 0.1
Digital Cameras	3	0	0	0
Digital Photo Frames	5	0	0	0
Digital Video Recorders	4	0 – 29.6	0 – 0.2	0
Dimmer Switches	4	11.5 – 32.1	0 – 0.8	0 – 0.8
DVD Players	5	0 – 28.9	0 – 0.5	0
Electric Lawn Mower	1	1939	156	14.1
Electric Leaf Blowers	4	272 – 4642	17.1 – 155	28.3 – 61.5
Electric Toothbrushes	5	3.6 - 742	0 – 4.8	3.6 – 742
Electric Toothbrush Chargers	5	0 – 4.2	0	0
External Hard Drives	4	0.6 – 1.7	0	0
Gaming Consoles	10	0 – 215	0 – 0.5	0 – 0.6
GPS, Handheld	5	0 – 0.1	0	0
Hobby Tools	2	126 – 438	1.4 – 2.4	1.4 - 438
Hot Glue Guns	3	0 – 0.9	0	0
LCD Computer Monitors	4	0 – 4.5	0	0
LCD Televisions	4	1.1 – 3.9	0 – 2.5	0 – 0.6
Massagers/Massage Chairs	3	81.9 – 500	0.6 – 2.3	21.4 - 500
MP3 Players	5	0	0	0
Noise Cancellation Headphones	1	0	0	0
Paper Shredders	4	11.0 – 4841	0.5 – 102	0.5 – 33.4
Plasma Televisions	2	45.1 – 73.6	1.4 – 2.2	0 – 0.1
Power Tools – Corded	3	784 – 982	8.8 – 31.3	46.8 - 123
Power Tools – Cordless	6	9.0 – 227	0 – 2.2	0 – 13.7
Printers	5	0.1 – 6.2	0 – 0.3	0 – 0.3
Scanners	3	0.6 – 6.7	0 – 0.3	0
Security System Panels	3	0 – 0.3	0	0
Tankless Hot Water Heater	1	10.1 – 21.9[2]	1.2	0.2
Track Lighting	5	0.2 – 4.0	0 – 0.3	0
Vacuum Cleaners, Personal/Car	3	75.5 – 2226	0.6 – 23.3	0.1 – 23.1
Wireless Game Controllers	11	0	0	0
Wireless Routers	4	0 – 0.5	0	0-0.3

Source: Electric Power Research Institute [1]

Table IV-1

Magnetic Fields from Household Electrical Appliances and Devices

As part of the National Energy Policy Act of 1992, U.S. Congress enacted the Electric and Magnetic Fields Research and Public Information Dissemination ("EMF RAPID") program. The National Institute of Environmental Health Sciences ("NIEHS") was charged with overseeing the health research and conducting an EMF risk evaluation. In its final report to Congress, issued in 1999, NIEHS concluded that power-frequency "EMF exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard." Nonetheless, the report stated that "this finding is insufficient to warrant aggressive regulatory concern." [2]

In 2001, the Standing Committee on Epidemiology of International Commission on Non-Ionizing Radiation Protection ("ICNIRP") wrote in its review of the epidemiologic literature on EMF and health that "given the methodological uncertainties and in many cases inconsistencies of the

existing epidemiologic literature, there is no chronic disease outcome for which an etiological [causal] relation to EMF exposure can be regarded as established." [3]

Also, in 2001, International Agency for Research on Cancer ("IARC") published the results of an EMF health risk evaluation conducted by an expert scientific working group, which concluded that power-frequency "magnetic fields are 'possibly carcinogenic to humans,' based on consistent statistical associations of high level residential magnetic fields with a doubling of risk of childhood leukemia."[4] IARC assigns its 'possibly carcinogenic to humans' classification (Group 2B) if there is "limited evidence" of carcinogenicity in both humans and experimental animals, or if there is "sufficient evidence" in animals, but "inadequate evidence" in humans. Group 2B includes some 288 "agents" such as coffee, pickled vegetables, carpentry, textile manufacturing and gasoline, among others (last update: October 26, 2015).

A comprehensive assessment of the EMF health risks was published by the World Health Organization ("WHO") in 2007. In its assessment, WHO wrote: "Scientific evidence suggesting that every day, chronic, low-intensity (above 0.3-0.4 μT) [3-4 mG] power-frequency magnetic field exposure poses a possible health risk is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukemia."[5] It added, however, that "virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF [extremely low frequency] magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern."

Regarding acute effects, WHO noted, "Acute biological effects have been established for exposure to ELF electric and magnetic fields in the frequency range up to 100 kHz that may have adverse consequences on health. Therefore, exposure limits are needed. International guidelines exist that have addressed this issue. Compliance with these guidelines provides adequate protection for acute effects." [5]

In summary, some studies have reported an association between long-term magnetic field exposure and particular types of health effects, while other studies have not. The nature of the reported association remains uncertain as no known mechanism or laboratory animal data exist to support the cause-and-effect relationship.

In view of the scientific evidence, the Institute of Electrical and Electronics Engineers ("IEEE") and other organizations have established guidelines limiting EMF exposure for workers in a controlled environment and for the general public. These guidelines focus on prevention of acute neural stimulation. No limits have been established to address potential long-term EMF effects, as the guideline organizations consider the scientific evidence insufficient to form the basis for such action. For power-frequency EMF, IEEE Standard C95.6™-2002 [6] recommends the following limits:

	General Public	Controlled Environment
	---	---
Electric Field Limit (kV/m)	5.0	20.0*
Magnetic Field Limit (mG)	9,040	27,100

*10.0 kV/m within power line ROW.

To address public concerns about EMF, the Government of Canada in 2012 updated its website with the latest knowledge on the subject. It contains the following statements on the EMF health-related risks: "Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMFs at ELFs. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors." [7]

Similarly, in 2013, the updated website of the World Health Organization concluded: "to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health." [8]

Most recently, in its January 2015 report, the Scientific Committee on Emerging and Newly Identified Health Risks ("SCENIHR"), an independent advisory body to the European Commission on Public Health, issued the following opinion: "Overall, existing studies do not provide convincing evidence for a causal relationship between ELF MF [extremely low frequency magnetic field] exposure and self-reported symptoms." [9]

AEP has been following the EMF scientific developments worldwide, participating in and sponsoring EMF studies, and communicating with customers and employees on the subject. Also, AEP is a member of Electric Power Research Institute, an independent, non-profit organization sponsoring and coordinating EMF epidemiological, laboratory and exposure studies.

The new line construction proposed in this Project will be compliant with the EMF limits specified in IEEE Standard C95.6™-2002.

C. Describe any research studies the Company is aware of that meet the following criteria:

1. Became available for consideration since the completion of the Virginia Department of Health's most recent review of studies on EMF and its subsequent report to the Virginia General Assembly in compliance with 1985 Senate Joint Resolution No. 126;

2. Include findings regarding EMF that have not previously been reported and/or provide substantial additional insight into previous findings; and

3. Have been subjected to peer review.

Response:
In its report to the Virginia General Assembly, issued on October 31, 2000, the Virginia Department of Health stated the following: "the Virginia Department of Health is of the opinion that there is no conclusive and convincing evidence that exposure to extremely low frequency electromagnetic fields emanated from nearby high voltage transmission lines is causally associated with an increased incidence of cancer or other detrimental health effects in humans."[10]

Key publications on the subject, which became available after that report, are included below as references to the discussion contained in Section IV.B of this Response to Guidelines.

References

[1] "Magnetic Fields from Electrical Appliances and Devices," Electric Power Research Institute, Product ID 1021221, September 28, 2010.

[2] "NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields," National Institute of Environmental Health Sciences, National Institutes of Health, NIH Publication No. 99-4493, May 4, 1999 (http://www.niehs.nih.gov/about/materials/niehs-report.pdf).
[3] "Review of the Epidemiologic Literature on EMF and Health," International Commission for Non-Ionizing Radiation Protection (ICNIRP) Standing Committee on Epidemiology, Environmental Health Perspectives, Volume 109, Supplement 6, December 2001 (http://www.icnirp.de/documents/epireview1.pdf).
[4] "IARC Finds Limited Evidence that Residential Magnetic Fields Increase Risk of Childhood Leukemia," International Agency for Research on Cancer, Press Release No 136, June 27, 2001 (http://www.iarc.fr/en/media-centre/pr/2001/pr136.html).
[5] "Extremely Low Frequency Field (Environmental Health Criteria 238)," World Health Organization, June 1, 2007 (http://www.who.int/peh-emf/publications/Complet_DEC_2007.pdf).
[6] "C95.6™ IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0-3 kHz," IEEE Standards Coordinating Committee 28, October 23, 2002.
[7] "Electric and Magnetic Fields from Power Lines and Electrical Appliances," Healthy Canadians, November 7, 2012 (http://www.healthycanadians.gc.ca/environment-environnement/home-maison/emf-cem-eng.php).
[8] "What are Electromagnetic Fields? Summary of Health Effects," World Health Organization, 2013, (http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html)
[9] "Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF)," Scientific Committee on Emerging and Newly Identified Health Risks, SCENIHR, January 27, 2015 (http://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_041.pdf).
[10] "Monitoring of Ongoing Research on the Health Effects of High Voltage Transmission Lines (Final Report)," Virginia Department of Health, October 31, 2000 (http://www.vdh.state.va.us/Epidemiology/DEE/publichealthtoxicology/documents/pdf/highfinal.PDF).

SECTION V. NOTICE

A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project. For all routes that the Applicant proposes to be noticed, provide minimum, maximum and average structure heights.

Response:
Descriptions of the Project's proposed routes are provided below. The requested public notice map is included as Exhibit 35.

The Project includes the 11.1 mile Joshua Falls–Riverville 138 kV transmission line; the 6.3 mile Riverville-Gladstone 138 kV transmission line; the 12.2 mile Amherst–Reusens 69 kV Transmission Line rebuild; the new James River 138 kV Substation and 400 feet of new 138 kV double circuit transmission line; and the new Soapstone 138 kV Substation and 600 feet of new 138 kV double circuit transmission line.

The proposed route of the Joshua Falls–Riverville 138 kV Transmission Line begins at the Company's Joshua Falls Substation located near Mt. Athos Road in Campbell County, approximately five miles east of the City of Lynchburg, on the south side of the James River. The proposed route exits south from the Joshua Falls Substation for approximately one third of a mile, turns east, and after approximately 1 mile enters Appomattox County. The route continues in an easterly direction generally paralleling the James River corridor for approximately 2.7 miles, avoiding Chestnut Mountain. The proposed route turns northeast and continues for approximately 1.5 miles, crossing Dreaming Creek Road and a large commercial timber tract located to the northwest and parallel to Route 611 (Trinity Road). The route turns north for approximately 0.9 mile, turns northeast and continues for approximately 2.2 miles generally to the north and parallel to Route 605 (Beckham Road), and crosses Route 623. The route continues for approximately 1 mile, turns north near the community of Beckham, continues for approximately 0.9 mile, crosses the James River at Christian Island into Amherst County, and continues for approximately 0.6 mile. The route enters the expanded Riverville Substation on the Greif Paper Mill complex located adjacent to the James River, near the community of Riverville, and south of Stapleton Road.

The proposed route of the Riverville-Gladstone 138 kV Transmission Line exits the Riverville Substation, begins north on Greif Paper Mill property for approximately 1 mile and crosses Stapleton Road, continues north for approximately 0.2 mile, and crosses Riverville Road. The route continues for approximately 0.6 mile and turns northeast, continues for approximately 0.6 mile, crosses Old Galilee Road, continues for approximately 0.8 mile, and enters Nelson County. The proposed route continues northeasterly for approximately 0.8 mile parallel and to the north of Piedmont Road, turns east, continues for approximately 0.3 mile, and crosses Piedmont Road. The proposed route continues for approximately 2.0 mile parallel and to the south of US Hwy 60, crosses US Hwy 60, and ends at a switch structure adjacent to Central Virginia Electric Cooperative's Gladstone Substation located on US Hwy 60 near Spring Lane and the community of Five Forks.

The primary structure types for the Joshua Falls–Riverville–Gladstone 138 kV transmission lines will be a steel H-frame and three-pole structures. The average height will be approximately 70 feet with structure heights ranging between 55 and 100 feet. The two 138 kV lattice towers necessary to span the James River into Riverville Substation will have an average height of approximately 100 feet, with structure heights ranging between 80 and 120 feet. Additionally, approximately

1,000 feet of the existing Amherst–Riverville 138 kV transmission line will be relocated at the Riverville Substation. The primary structure type for the 138 kV relocation will be monopole with structure heights ranging between 80 and 110 feet, with an average height of 100 feet.

The Amherst–Reusens 69 kV transmission line rebuild is located on or near the existing transmission line right-of-way. The proposed route begins at the Company's Reusens Substation located in the northern portion of the City of Lynchburg and on the west side of the James River (200 Old Trents Ferry Road, Lynchburg, VA). The proposed route exits the Reusens Substation over the James River for approximately 0.1 mile, entering Amherst County, and continues for about 0.4 mile. On the east side of the James River, the route turns north for approximately 0.1 mile, turns northeast, continues approximately 0.7 mile, crosses Route 685 (River Road), continues approximately 1 mile, spans State Highway 130 (Elon Road), continues approximately 0.8 mile, and crosses Winesap Road south of the community of Winesap. The proposed route continues approximately 1.1 miles, crosses South Amherst Highway south of Monroe, and enters Monroe Substation (3389 South Amherst Highway, Madison Heights, VA). The route exits Monroe Substation, continues approximately 0.7 mile, turns more northeasterly, and generally parallels Route 604 (S. Coolwell Road) for approximately 2 miles, and crosses Izaak Walton Road. The route spans US Hwy 29 after approximately 1.4 miles, continues for approximately 1.2 miles, crosses Ebenezer Road, generally parallels the south side of Ebenezer Road for approximately 2.7 miles, and enters Amherst Substation located adjacent and south of US Highway 60 (110 Substation Lane, Amherst, VA). The Project includes the proposed Amherst Extension 138 kV transmission line which is about 500 feet in length. It exits the Amherst Substation, parallels the northwest side of the Amherst Substation, spans US Highway 60, and connects to the existing Boxwood–Amherst–Riverville 138 kV transmission line. The Amherst Extension will use double circuit monopole structures ranging in height between 120 and 130 feet. Lastly, a minor relocation of approximately 1,500 feet of the Boxwood–Amherst-Riverville 138 kV transmission line is required northeast to southeast of the Amherst Substation. The relocation of the Boxwood–Amherst-Riverville 138 kV transmission line will use monopole structures with heights between 80 and 100 feet.

The primary structure type for the Amherst–Reusens 69 kV rebuild will be a steel H-frame structure. The average height will be approximately 65 feet with structure heights ranging between 50 and 90 feet. To span the James River near Reusens Substation and existing lines, approximately three 69 kV/138 kV double circuit lattice towers will be necessary and the average height of those structures is approximately 150 feet, with structure heights ranging between 140 and 160 feet.

The proposed James River Substation and 400-foot-long transmission line are located on the Company's property in Nelson County, two miles south of Lovingston, Virginia on James River Road. One monopole double-circuit steel structure will be needed with an approximate height of 120 feet. The structure height range will be between 100 and 125 feet.

The proposed Soapstone Substation and 600-foot-long transmission line are located on the Company's property in Nelson County, approximately two miles south of the community of Schuyler, near Carter Road and Rockfish Crossing. Approximately three steel monopole structures will be needed with an approximate average height of 115 feet. The structure height range will be between 100 and 130 feet.

B. List Applicant offices where members of the public may inspect the application. If applicable, provide a link to website(s) where the application may be found.

Response:
This application and all exhibits, tables, and maps made a part hereof will be available for inspection at the following locations:

Lynchburg Public Library
2315 Memorial Avenue
Lynchburg, VA 24501

J. Robert Jamerson Memorial Library
157 Main Street
Appomattox, VA 24522

Nelson Memorial Library
8521 Thomas Nelson Highway
Lovingston, VA 22949

This application, exhibits, and maps are also available at Appalachian Power's website: www.AppalachianPower.com/CVTRP.

C. List all federal, state, and local agencies and/or officials that may reasonably be expected to have an interest in the proposed construction and to whom the Applicant has furnished or will furnish a copy of the application.

Response:
Federal
United States Army Corps of Engineers, Norfolk District
United States Environmental Protection Agency, Region 3
United States Fish and Wildlife Services, Virginia Field Office
USDOT Federal Aviation Administration, Flight Standards District Office
U.S. House of Representatives, 5th District (Bob Good) **
U.S. House of Representatives, 6th District (Ben Cline) **

State
Virginia Department of Environmental Quality**
Virginia Department of Agriculture and Consumer Services
Virginia Department of Aviation
Virginia Department of Conservation and Recreation, Division of Natural Heritage
Virginia Department of Conservation and Recreation, Karst Protection Program
Virginia Department of Conservation and Recreation, Planning and Recreation
Virginia Department of Historic Resources, Division of Review and Compliance
Virginia Department of Forestry
Virginia Department of Wildlife Resources (DWR), Environmental Services Section
Virginia Department of Health
Virginia Department of Mines, Minerals, and Energy
Virginia Department of Transportation (Central Office - Richmond)
Virginia Department of Transportation (Local District Office – Lynchburg District)
Virginia Department of Health, Danville Field Office

Virginia Marine Resources Commission
Virginia Outdoors Foundation
Senate of Virginia, 22th District (Mark J. Peake) **
Senate of Virginia, 23rd District (Stephen D. Newman) **
Senate of Virginia, 25th District (R. Creigh Deeds) **
Virginia House of Delegates (C. Matthew Fariss) **
Virginia House of Delegates (Wendell S. Walker) **
Virginia House of Delegates (Ronnie R. Campbell) **

Local
Amherst County, Board of Supervisors (Jennifer R Moore, Board Chair)
Amherst County, Board of Supervisors (David Pugh Jr., Vice Chair)
Amherst County, Administrator (Dean Rodgers)*
Amherst County, Attorney (Michael W. S. Lockaby)

Nelson County, Board of Supervisors (Ernie Reed, Board Chair)
Nelson County, Board of Supervisors (Jessie Rutherford, Vice Chair)
Nelson County, Administrator (Stephen A. Carter)*
Nelson County, Attorney (Daniel L. Rutherford)

Appomattox County, Board of Supervisors (Samuel E. Carter, Board Chair)
Appomattox County, Board of Supervisors (William H. Hogan, Vice Chair)
Appomattox County, Administrator (Susan M. Adams)*
Appomattox County, Attorney (Thomas E. Lacheney)

Campbell County, Board of Supervisors (Jon Hardie, Board Chair)
Campbell County, Board of Supervisors (Matt Cline,Vice Chair)
Campbell County, Administrator (Frank J. Rogers)*
Campbell County, Attorney (Kristin B. Wright)

Albemarle County, Board of Supervisors (Ned L. Gallaway, Board Chair)
Albemarle County, Board of Supervisors (Donna P. Price, Vice Chair)
Albemarle County, County Executive (Jeff Richardson)*
Albemarle County, Attorney (James M. Hingeley)

City of Lynchburg, Mayor (Mary Jane Dolan)
City of Lynchburg, Interim City Manager (Dr. Reid A. Wodicka)*
City of Lynchburg, Attorney (Walter C. Erwin, III)
City of Lynchburg, City Planner (Tom Martin)
City of Lynchburg, Environmental Planner (Kate Miller)

*Appalachian will distribute a hard copy of the application and related materials to these officials.
** Appalachian will provide access to an electronic copy of the application and related materials to these officials or agencies.

D. If the application is for a transmission line with a voltage of 138 kV or greater, provide a statement and any associated correspondence indicating that prior to the filing of the application with the SCC the Applicant has notified the chief administrative officer of every locality in which it plans to undertake construction of the proposed line of its intention to file such an application, and that the Applicant gave the locality a reasonable opportunity for consultation about the proposed line (similar to the requirements of § 15.2-2202 of the Code for electric transmission lines of 150 kV or more).

Response:
As detailed in Section III.B, representatives of Appalachian met with the counties and localities in the Project Area to inform them of the Project and solicit input. Additionally, representatives of Appalachian met with Appomattox County and Amherst County representatives in a virtual setting on December 15, 2020 and December 18, 2020 respectively. A meeting with Nelson County was held January 6, 2021. The purpose of the meetings was to update the counties on the Project and inform them of the proposed routes. In the above meetings, the officials were advised that the Company plans to file an application with the SCC for approval of the Project in early 2021.