

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

IN RE: APPLICATION OF TRANS-ALLEGHENY	:	
INTERSTATE LINE COMPANY FOR	:	
(I) A CERTIFICATE OF PUBLIC CONVENIENCE	:	
TO OFFER, RENDER, FURNISH AND/OR	:	
SUPPLY TRANSMISSION SERVICE IN THE	:	
COMMONWEALTH OF PENNSYLVANIA;	:	
(II) AUTHORIZATION AND CERTIFICATION	:	
TO LOCATE, CONSTRUCT, OPERATE AND	:	Docket Nos. A-110172
MAINTAIN CERTAIN HIGH VOLTAGE ELECTRIC	:	A-110172F0002
TRANSMISSION LINES AND RELATED ELECTRIC	:	A-110172F0003
SUBSTATION FACILITIES; (III) AUTHORITY	:	A-110172F0004
TO EXERCISE THE POWER OF EMINENT	:	G-000721229
DOMAIN FOR THE CONSTRUCTION AND	:	
INSTALLATION OF AERIAL ELECTRIC	:	
TRANSMISSION FACILITIES ALONG THE	:	
PROPOSED TRANSMISSION LINE ROUTES	:	
IN PENNSYLVANIA; (IV) APPROVAL OF AN	:	
EXEMPTION FROM MUNICIPAL ZONING	:	
REGULATION WITH RESPECT TO THE	:	
CONSTRUCTION OF BUILDINGS; AND	:	
(V) APPROVAL OF CERTAIN RELATED	:	
AFFILIATED INTEREST ARRANGEMENTS	:	

REJOINDER TESTIMONY OF MARK S. ALLEN

Re: Line Clearance and Sag Issues

March 19, 2008

REJOINDER TESTIMONY OF MARK S. ALLEN

1 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

2 A. My name is Mark S. Allen and my business address is 120 Tredegar Street
3 Richmond, VA 23219.

4

5 DUTIES AND RESPONSIBILITIES

6 Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

7 A. I am Manager of the Transmission Line Engineering Group for Virginia Electric and
8 Power Company ("Dominion Virginia Power" or "Dominion").

9

10 Q. WHAT ARE YOUR RESPONSIBILITIES AS MANAGER OF TRANSMISSION
11 LINE ENGINEERING?

12 A. I am responsible for the coordination of all high voltage transmission designs
13 (overhead and underground) on the Dominion Virginia Power system. This includes
14 all new designs as well as upgrades and relocations. I manage the engineering
15 activities for each project to ensure completion of construction specifications by the
16 established target date. I am responsible for assuring that all such
17 designs/specifications meet the established criteria for safety, reliability, and cost
18 effectiveness.

1 EDUCATION AND PROFESSIONAL EXPERIENCE

2 Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND
3 PROFESSIONAL EXPERIENCE.

4 A. I received a Bachelor of Science Degree in Civil Engineering (*magna cum laude*)
5 from West Virginia University of Technology in 1981. I am a Registered
6 Professional Engineer in the states of Arizona, Connecticut, Kentucky, Michigan,
7 Ohio, Pennsylvania, Virginia, Utah and West Virginia. I have 26 years of experience
8 with the Company in both Transmission and Distribution. I started my career with
9 Dominion as a Project Engineer in Transmission Engineering in 1981. In 1985, I
10 moved to Distribution Planning as a Planning Engineer in the Eastern Division and
11 then returned to Transmission Engineering in 1989. I have experience in both
12 overhead and underground transmission design.

13

14 PURPOSE OF REJOINDER TESTIMONY

15 Q. PLEASE DESCRIBE THE PURPOSE OF YOUR REJOINDER TESTIMONY.

16 A. The purpose of my rejoinder testimony on behalf of Trans-Allegheny Interstate Line
17 Company ("TrAILCo") is to respond to ground clearance or line sag issues regarding
18 the 500 kV Mt. Storm-Doubs transmission line raised on page 11 of the surrebuttal
19 testimony of George C. Loehr filed as Energy Conservation Council of Pennsylvania
20 Surrebuttal Statement No. 1.

1 Q. CAN YOU GENERALLY DESCRIBE GROUND CLEARANCE OR LINE SAG
2 CONDITIONS IN CONNECTION WITH ELECTRIC TRANSMISSION LINES
3 AND HOW LINE SAG IMPACTS THOSE FACILITIES?

4 A. The National Electrical Safety Code ("NESC) establishes minimum requirements for
5 ground clearance, meaning the distance between the conductor (wire) and the
6 ground, that must be maintained at all times. Ground clearance for a line is
7 determined by how much the conductor sags between towers. As the temperature of
8 the conductor rises, the metal expands and the sag increases, reducing the ground
9 clearance. The wire temperature is a function of the ambient weather conditions and
10 the amount of current flowing in the conductor.

11

12 Q. DO YOU AGREE WITH MR. LOEHR'S ASSERTION THAT GROUND
13 CLEARANCE ISSUES ON THE MT. STORM-DOUBS LINE COULD BE
14 CORRECTED MERELY BY RETENSIONING THE CONDUCTORS?

15 A. No. I would first point out that the rejoinder testimony of TrAILCo witness
16 Hozempa shows that resolving ground clearance issues on this line would not, as
17 claimed by Mr. Loehr, resolve the reliability issues on this line that have been
18 identified in the planning studies. This is because the applicable maximum operating
19 temperature of 90° for this line would only permit a maximum transfer capability of
20 2910 MVA. Moreover, Mr. Loehr incorrectly assumes that ground clearance
21 violations can be corrected simply by "tightening up" or "retensioning" the

1 conductors, which indicates that he is not familiar with this line. The Mt. Storm-
2 Doubs line was constructed in 1964 using towers of corten steel. Unfortunately, this
3 material has proven to experience inherent corrosion problems that have left the
4 towers incapable of supporting the additional load that would result from
5 retensioning. Increasing the tension of the conductors on this 44 year old line would
6 increase the mechanical load on the deadend structures, which hold the full tension
7 of the conductors, and would require that they be replaced. There are 14 such
8 structures on this line that would have to be replaced. Replacement of these towers
9 and retensioning of the conductors would require a minimum of 30 weeks of outage
10 time. Based on our experience with the heavy loading on this line, including the
11 difficulty we experienced in scheduling even a two-day outage of this line in 2006, it
12 is not reasonable to expect that Dominion would be able to schedule such lengthy
13 and multiple outages on this major 500 kV line, which is nearly fully loaded year-
14 round. Increasing the height of the conductors by retensioning is not a feasible
15 means of addressing ground clearance on this line.

16
17 **Q. HAS DOMINION INVESTIGATED THE FEASIBILITY OF INCREASING THE**
18 **GROUND CLEARANCE OF THIS LINE BY OTHER MEANS?**

19 Yes. Dominion has evaluated what it would take to achieve this maximum capacity
20 of 2910 MVA by increasing ground clearance through a combination of grading the
21 ground surface and raising the existing structures without increasing the mechanical

1 load on the structures. Dominion first conducted an aerial survey of the line by using
2 a helicopter equipped with Light Detection and Ranging ("LiDAR") to obtain
3 accurate conductor sag characteristics and accurate ground terrain data. The data
4 from this aerial survey was loaded into PLSCADD, the industry standard
5 transmission design software, and 90 locations were identified with clearance
6 violations. In 40 of these spans, the clearance violation was simply a high spot or
7 knoll under just one phase, or conductor, often on the uphill side of the right of way.
8 We determined that grading or shaving of these high spots could be done to achieve
9 the required clearance. In order to do this work, grading rights must be obtained
10 from the property owners and a grading plan must be developed to minimize the
11 effect on natural topography and to assure positive drainage. This plan, including
12 erosion and sedimentation control measures, must be submitted to the West Virginia
13 Department of Environmental Protection and the Virginia Department of
14 Conservation and Recreation for approval. In the other 50 locations, more extensive
15 violations occurred that extended across the right of way or for long longitudinal
16 runs along the span. In order to correct these violations, 49 structures must be raised
17 and 1 lift structure must be installed. Such a project would take 70 weeks to
18 complete and would require this line to be out of service for 17 weeks. Such an
19 extended outage of this critical, heavily loaded line is no more feasible than the
20 longer outage that would be required for retensioning. The only alternative to such
21 an outage would be to build at least one additional 500 kV transmission line in the

1 same West-East corridor, as is proposed in this proceeding, in order to allow the
2 required outages of the Mt. Storm–Doubs line that would be required to address the
3 ground clearance issues.

4

5 Q. WOULD THE INSTALLATION OF A NEW CONDUCTOR ON THE MT.
6 STORM-DOUBS LINE BE A FEASIBLE ALTERNATIVE TO THE
7 CONSTRUCTION OF THE 502 JUNCTION—LOUDOUN LINE?

8 A. No. The Mt. Storm-Doubs line is 44 years old and suffers from corrosion problems
9 associated with the corten steel as discussed above. While considerable maintenance
10 work has been done over years just to keep the line functional, it would be an
11 imprudent engineering decision to install new conductor on these deteriorated
12 towers. The entire line would have to be rebuilt in order to install new conductors,
13 which would require a much longer outage of the line than either of the ground
14 clearance approaches discussed above.

1 Q. DOES THIS CONCLUDE YOUR REJOINDER TESTIMONY?

2 A. Yes. However, I reserve the right to file additional testimony as may be necessary or
3 appropriate.