

**DIRECT TESTIMONY
OF
SCOTT GASS
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUE-2007-_____**

1 **Q. Please state your name and business address.**

2 A. My name is Scott Gass, and my business address is 15 Shannon Way, Royersford,
3 Pennsylvania 19468.

4 **Q. By whom are you employed and in what capacity?**

5 A. I am employed by PowerGEM as a Principal Consultant.

6 **Q. Please describe PowerGEM.**

7 A. PowerGEM was founded in May 2000 to provide expert advice, analysis and software
8 addressing the economic and technical impacts of transmission congestion in
9 competitive electricity markets.

10 **Q. Please describe your educational background and professional experience.**

11 A. I graduated from Pennsylvania State University in 1987 with a Bachelor of Science in
12 Electric Engineering. In addition, I completed a two-year power system operations
13 and planning course provided by Power Technologies, Inc. in 1989.

14 Upon graduation from Pennsylvania State University, I joined GPU Energy in June
15 1987. At GPU Energy, I was involved in transmission, sub-transmission and
16 distribution planning where I analyzed current and future infrastructure to optimize
17 system utilization and to ensure adequate and reliable service to customers. I also
18 completed operating studies to provide dispatchers with expected problem areas and
19 solutions. As a direct result of my work, I have extensive experience with regard to

1 Mid-Atlantic Area Council reliability criteria, transient analysis, load flow and short
2 circuit analysis.

3 In October 1998, I joined PJM Interconnection, L.L.C. ("PJM") as a Senior Engineer
4 in Transmission Planning with responsibility for coordinating all generation
5 interconnection and baseline studies, including completion of over one hundred
6 interconnection load flow and short circuit studies. In July 2003, I was promoted to
7 Manager Transmission Planning. In that position, I was responsible for all aspects of
8 the planning analysis conducted by PJM on its transmission system, including the
9 interconnection of new generation to the PJM transmission system; working with
10 transmission owners to develop system enhancements to maintain future reliability of
11 the PJM system; the integration of Allegheny Power, Commonwealth Edison
12 Company, American Electric Power Company, Dayton Power & Light Company,
13 Virginia Electric and Power Company ("Dominion Virginia Power") and Duquesne
14 Light Company into PJM; and managing and mentoring 18 transmission planning
15 engineers.

16 While at PJM, I represented PJM on numerous stakeholder committees, including the
17 Regional Planning Process Working Group, the Reliability Planning Criteria Working
18 Group, the Planning Committee, the Economic Planning Implementation Working
19 Group, the Transmission Expansion Advisory Committee and two Inter-Regional
20 Planning Stakeholder Committee efforts, one with the Independent System Operator of
21 New England ("ISO-NE") and New York Independent System Operator and the other
22 with the Midwest Independent Transmission System Operator. In addition, I was

1 involved in the development and implementation of multiple standards and procedures
2 followed by PJM, including, among others, the generation and merchant transmission
3 interconnection processes, the Generator and Load Deliverability Procedures, PJM
4 Planning Criteria and cost allocation procedures for both baseline and network
5 upgrades for interconnection projects. I was also responsible for completing the
6 studies associated with the extension of the PJM planning horizon in 2006 from five
7 years to 15 years.

8 In November 2006, I joined PowerGEM as a Principal Consultant. My work
9 responsibilities have included completion of fatal flaw studies for potential generation
10 interconnection projects and the development of a Minimum Interconnection Standard
11 test and procedure for application in the recently approved ISO-NE Forward Capacity
12 Market.

13 **Q. Please describe the purpose of your testimony.**

14 A. I am testifying on behalf of Dominion Virginia Power to demonstrate the electrical
15 need for the proposed 500 kV circuit connecting the Meadow Brook Substation in
16 Frederick County, Virginia to the Loudoun Substation in Loudoun County, Virginia,
17 which is a segment of the planned 502 Junction – Mt. Storm – Meadow Brook –
18 Loudoun 500 kV circuit (“502 Junction – Loudoun Line” or the “Project”). Trans-
19 Allegheny Interstate Line Company (“TrAILCo”), an affiliate of Allegheny Power
20 (“Allegheny”), is proposing to construct the 502 Junction – Mt. Storm – Meadow
21 Brook portion of the Project, as well as 16 miles of the Meadow Brook – Loudoun
22 portion of the line. Dominion Virginia Power is proposing to construct the remainder

1 of the line, as well as the required substation upgrades at Mt. Storm. Mr. Ronnie
2 Bailey of Dominion Virginia Power and Mr. Steven Herling of PJM also are providing
3 testimony relating to the electrical need for these transmission line segments and the
4 planning process that resulted in the determination of that need.

5 **Q. Did you have a role in determining the electrical need for the 502 Junction -**
6 **Loudoun Line while working for PJM?**

7 A. Yes. In my role as PJM's Manager Transmission Planning, I supervised the creation
8 of the base case for the 2011 Regional Transmission Expansion Plan and the power
9 system studies that determined the need for the Project.

10 **Q. What studies did you perform or supervise as Manager Transmission Planning**
11 **that determined the need for the 502 Junction – Loudoun Line?**

12 A. I supervised all of the analyses conducted with the 2011 RTEP case, including model
13 adjustments, identifying reliability criteria violations and formulating solutions to the
14 violations. Specifically with regard to the electrical need for the 502 Junction –
15 Loudoun Line, I supervised the Generator Deliverability, Load Deliverability and
16 NERC Category C studies.

17 **Q. What role did Dominion Virginia Power and Allegheny have with regard to these**
18 **studies?**

19 A. Dominion Virginia Power provided the electrical model data for the Dominion
20 Virginia Power zone of PJM and the contingency files used in the analyses. Allegheny
21 provided the electrical model data for the Allegheny zone of PJM and the contingency
22 files used in the analyses. In addition, both Dominion Virginia Power and Allegheny
23 reviewed the model once it was created by PJM. Both companies' transmission

1 planning groups worked closely with my staff at PJM in validating reliability criteria
2 violations and formulating the 502 Junction - Loudoun Line as the solution to the
3 identified violations.

4 **Q. What conclusions were reached as a result of those studies?**

5 A. Based on the studies performed by PJM, Dominion Virginia Power and Allegheny,
6 PJM concluded that there are 11 electric reliability problems that will occur beginning
7 in Summer 2011 and one electric reliability problem that will occur beginning in
8 Summer 2014 if the Project is not constructed.

9 **Q. What are those electric reliability problems?**

10 A. The problems are described in Attachment SG-1. Attachment SG-2 identifies current
11 ownership of the facilities referred to in Attachment SG-1.

12 **Q. Please explain Attachment SG-1.**

13 A. The left column identifies possible electric occurrences or “contingencies” and the
14 right column identifies the electrical result of the occurrence if the occurrence occurs
15 any time after June 2011 (June 2014 for item 9). Using #1 as an example, if there is an
16 outage on Line #572A (e.g., unscheduled due to a storm or equipment malfunction, or
17 scheduled due to the need for maintenance), Line #551 (designated as Line #512 by
18 Allegheny) will be called upon to provide back-up transmission capacity. However,
19 due to the growing consumer loads served by these lines, it is projected that by
20 Summer 2011, Line #551 will not have enough capacity to deliver all of the electricity
21 needed by the consumers ordinarily served by the two lines together. As a
22 consequence, while Line #572A is not operational due to the outage, Line #551 will
23 overload. As another example using #10 on Attachment SG-1, outages on Line #580

1 and Line #572B at the same time will cause the 138 kV system voltage level around
2 Meadow Brook Substation to drop below acceptable voltage limits that are applied in
3 the planning and operation of the PJM system, which also could lead to a voltage
4 collapse in the area.

5 **Q. What does “electric reliability” mean?**

6 A. “Electric reliability” or “reliability,” as used by industry experts, refers to the delivery
7 of electricity to customers in the amounts desired and within accepted standards for the
8 frequency, duration and magnitude of outages and other adverse conditions or events.
9 “Load pockets” are created when a major electric load center (i.e., an area where there
10 is a highly concentrated use of electricity) must import much of its electricity via
11 transmission lines from neighboring regions with available generation. As a result,
12 transmission lines delivering electricity into the load pocket from external generating
13 plants will often experience reliability problems. In other words, these lines do not
14 have the capacity to deliver to the load pocket as much electricity as is needed to meet
15 consumer demand and become overloaded. Reliability problems occur when the lines
16 become overloaded.

17 **Q. How are reliability problems avoided?**

18 A. New or upgraded transmission lines must be constructed before the reliability
19 problems occur. Alternatively, new generating plants can be constructed within the
20 load pocket, or consumers can reduce their demand. However, as demonstrated by Mr.
21 Jeffrey Palermo’s testimony, an unrealistic amount of new generation generally is
22 required to address transmission problems in a load pocket such as northern Virginia.
23 Because demand reduction initiatives are largely voluntary, they cannot guarantee the

1 mitigation of the relevant reliability risks. Thus, even if demand reduction is being
2 encouraged and new generation is being explored, construction of new or upgraded
3 transmission lines is often essential to prevent identified reliability problems from
4 occurring while those alternatives are pursued and in case those alternatives do not
5 materialize in sufficient quantity to eliminate the reliability problem. However,
6 transmission planning is not a “one time” activity. Instead, it is dynamic and involves
7 ongoing review of changes in the transmission system that result from the
8 decommissioning of existing plants, the addition of new plants, changes in load
9 patterns and other events that affect the topology of the transmission system.

10 **Q. How do transmission planners determine if and when reliability problems will**
11 **occur if corrective action on the transmission system is not taken?**

12 A. The North American Electric Reliability Corporation (“NERC”) has been designated
13 by the Federal Energy Regulatory Commission (“FERC”) as the Electric Reliability
14 Organization for the United States. Mandatory reliability standards developed by
15 NERC and approved by FERC are used by transmission planners to measure the need
16 for new transmission lines or upgrades to existing lines. In addition, transmission
17 owners and PJM have developed planning reliability standards to supplement the
18 NERC reliability standards. The FERC, transmission owner and PJM planning
19 reliability standards (collectively, “Reliability Standards”) were the criteria used to
20 determine that the 502 Junction – Loudoun Line is needed to prevent these electric
21 reliability problems from occurring.

1 **Q. How are the Reliability Standards used to determine when new transmission**
2 **lines or upgrades to existing lines are needed?**

3 A. PJM, in conjunction with transmission owners such as Dominion Virginia Power and
4 Allegheny, conducts studies of the PJM transmission system that apply the Reliability
5 Standards to specific conditions on the transmission system. When the studies show
6 an inability of the transmission system to meet a specific Reliability Standard under
7 these conditions, construction of one or more new transmission lines or one or more
8 enhancements to existing transmission facilities is necessary.

9 **Q. What types of studies are used to determine if transmission system upgrades are**
10 **necessary?**

11 One type of study is a Load Deliverability study. This study examines defined load
12 zones within the PJM region and considers the ability of the transmission system to
13 deliver adequate power to the load zone during a generation capacity emergency. A
14 generation capacity emergency occurs when there is high load (i.e., high consumer
15 demand) on the electric system and insufficient generation capacity within the load
16 zone. PJM uses its "Load Deliverability Procedure" to conduct such a Load
17 Deliverability study.

18 A Generator Deliverability study is also conducted. This study tests the system to
19 assure that capacity resources can be delivered to the remainder of the PJM system at
20 peak load. PJM uses its "Generator Deliverability Procedure" to conduct such a
21 Generator Deliverability study.

1 Both types of studies are conducted by simulating the transmission system as it is
2 expected to exist during future time periods. The simulation includes expected load
3 growth (for the Load Deliverability test this includes the anticipated benefits of
4 demand side management and conservation activities), the addition of new generating
5 plants and the retirement of existing generation plants and planned transmission
6 construction projects.

7 **Q. What time period was considered for purposes of the Load Deliverability and**
8 **Generator Deliverability studies associated with the 502 Junction – Loudoun**
9 **Line?**

10 A. The studies supporting the need for these line segments were based on a five-year
11 timeframe, thereby making it critical that the line comprised of these segments be
12 constructed and placed into service by June 2011.

13 **Q. What happens when a transmission line overloads or exceeds its loading**
14 **capability?**

15 A. When a transmission line overloads, the conductor, the conductor clamps and the line
16 terminal equipment begin to overheat. Overheating the conductor may cause the line
17 to sag low enough to bring the line into contact with whatever is underneath it. Under
18 these conditions, the metal in the conductor may become brittle, rendering the line
19 useless. In addition, the line may break and fall to the ground. Overheating of the
20 conductor clamps and line terminal equipment may cause similar results. In short,
21 overloading transmission lines may cause permanent damage to transmission
22 infrastructure and catastrophic power outages.

1 **Q. What action is required to prevent these results?**

2 A. To prevent the consequences of a potential transmission line overload, immediate
3 action must be taken by system operators before the line or related equipment fails or
4 is permanently damaged. The action may include turning specific generating plants
5 off or on, opening or closing specific transmission lines or discontinuing electric
6 service to certain customers or groups of customers in specific areas. However, these
7 are emergency and temporary measures only. They prevent a specific breakdown on
8 that occasion, but do not solve the underlying problem. On a long-term basis,
9 construction of one or more new transmission lines or one or more enhancements to
10 existing transmission lines is necessary.

11 **Q. What happens when the voltage drops at a substation?**

12 A. The severity of the consequences depends on the severity of the voltage drop at the
13 substation. Voltage drops can occur when large loads are turned on and when faults or
14 short circuits occur on the system. Voltage drops of less than 3% are usually not
15 significant. However, when the voltage drop at a substation exceeds 3%, the
16 consequences can range from annoying dimming of lights in homes and businesses to
17 a voltage collapse.

18 **Q. What happens when there is a voltage collapse on the transmission system?**

19 A. A voltage collapse occurs when the voltage on the system drops to a critically low
20 level and the system is unable to support power transfers across the system and
21 customers' load connected to the system. This condition usually results in a blackout
22 or a brownout. The area affected could be a single community or several

1 communities, or the blackout or brownout could be much more widespread and
2 encompass an entire region.

3 **Q. Can the reliability problems you've described result in a blackout like the one**
4 **experienced in a large part of the eastern United States and eastern Canada in**
5 **August 2003?**

6 A. Yes, that is possible. Just before that massive blackout occurred, several transmission
7 lines began to overload due to system conditions. As the overloaded transmission
8 lines were disconnected from the grid, voltage on parts of the transmission system in
9 the eastern United States and eastern Canada began to collapse, causing generating
10 plants to automatically shut down and additional transmission lines to overload and
11 subsequently disconnect from the grid. This process, often called "cascading,"
12 continued until over 50 million people from the east coast to Ohio and north into
13 Canada were without power.

14 **Q. Are there comparable risks to reliable electric service in northern Virginia if the**
15 **502 Junction – Loudoun Line is not built?**

16 A. Yes. As I will describe in more detail, PJM has identified a number of Reliability
17 Standards that will be violated beginning in Summer 2011 if the Project is not built.
18 These reliability violations indicate a risk of transmission line overloads, voltage drops
19 at substations, voltage collapses and blackouts affecting the northern Virginia region
20 unless the Project is in service by June 2011.

1 **Q. Please identify and describe the Reliability Standards that will be violated by**
2 **each of the reliability problems identified in Attachment SG-1 if the Project is not**
3 **constructed.**

4 A. Electrical occurrences 1 through 9 are violations of NERC Reliability Standard TPL-
5 002-0. This is the standard that states the bulk electric system must be able to meet
6 customer demands and be able to maintain firm transmission with the loss of a single
7 bulk electric system element. Electrical occurrences 1 through 3 also are violations of
8 the PJM Generator and Load Deliverability Procedures, while electrical occurrence 4
9 is a violation of the PJM Load Deliverability Procedure and electrical occurrence 9 is a
10 violation of the PJM Generator Deliverability Procedure. Electrical occurrences 5
11 through 8 are violations of Dominion Virginia Power's planning criteria. Electrical
12 occurrences 10 through 12 are violations of NERC Reliability Standard TPL-003-0,
13 which is the loss of two or more bulk electric system elements. This standard requires
14 the bulk electric system to be able to meet customer demand under these conditions
15 without cascading outages; however, controlled load loss or reduction of transfers is
16 permitted. If the Project is not constructed, PJM, as the regional planning authority,
17 and Allegheny and Dominion Virginia Power will be in violation of these Reliability
18 Standards.

19 **Q. Did these studies identify any load zones affected by these reliability problems?**

20 A. Yes. The studies indicate that the loads (i.e., consumer demand) in the mid-Atlantic
21 and northern Virginia areas within the PJM region will reach a high enough level by
22 Summer 2011 that electric reliability to these areas will be significantly jeopardized if
23 the 502 Junction – Loudoun Line is not constructed. For study purposes, the mid-

1 Atlantic area consists of the area along the Atlantic seaboard from the District of
2 Columbia to northern New Jersey and includes the metropolitan areas of Washington,
3 Baltimore, Philadelphia and Newark. The northern Virginia area consists of the
4 service territories of both Dominion Virginia Power and Allegheny. The mid-Atlantic
5 and northern Virginia areas were identified by the U. S. Department of Energy in its
6 National Electric Transmission Congestion Study issued in August 2006 as parts of a
7 “Critical Congestion Area” and in need of immediate attention through the
8 construction of new transmission facilities. The 502 Junction – Loudoun Line has
9 been identified by PJM as the most viable solution to this problem.

10 **Q. Do you have any exhibits that demonstrate this load growth?**

11 A. Yes. Attachment SG-3 shows the 2006 through 2015 projected summer peak loads for
12 the mid-Atlantic and northern Virginia areas based on the 2006 PJM load forecast.
13 The mid-Atlantic area 2011 peak summer load is 63,777 MW. The northern Virginia
14 area 2011 peak summer load for the Dominion Virginia Power zone is 6,532 MW and
15 the northern Virginia area 2011 peak summer load for the Allegheny zone is 693 MW.
16 These load forecasts formed the basis of the load models that were applied to the
17 RTEP 2011 power system studies that identified the need for the 502 Junction –
18 Loudoun Line.

19 **Q. Please identify the major utilities in the mid-Atlantic and northern Virginia areas**
20 **that provide electric service to customers in those areas.**

21 A. The major utility service areas constituting the mid-Atlantic area for the purposes of
22 my direct testimony are Rockland Electric Company; Public Service Electric & Gas
23 Company; Jersey Central Power & Light Company; Atlantic City Electric Company;

1 Delmarva Power & Light Company; PECO Energy Company; PPL Energy Plus, LLC;
2 Metropolitan Edison Company; Pennsylvania Electric Company; Baltimore Gas and
3 Electric Company; Potomac Electric Power Company and UGI Utilities. The major
4 utilities in the northern Virginia area are Dominion Virginia Power and Allegheny.
5 The Dominion Virginia Power area consists of Arlington, Fairfax, Fauquier, Loudoun,
6 Prince William, Spotsylvania and Stafford Counties and the cities of Alexandria, Falls
7 Church, Vienna, Fairfax, Leesburg, Manassas and Warrenton. The Allegheny service
8 territory in northern Virginia includes Clarke, Fauquier, Frederick, Greene, Madison,
9 Page, Rappahannock, Shenandoah and Warren Counties.

10 **Q. What is the primary factor causing the electrical need for the 502 Junction –**
11 **Loudoun Line?**

12 A. Consumer demand in the mid-Atlantic and northern Virginia areas is the main factor
13 causing the electrical need for the Project. There are primarily two components to
14 consumer demand: the increase in the number of consumers using electricity and the
15 increase in the amount of electricity each consumer uses. Naturally as the population
16 increases, the demand for electricity increases as well. Also, consumers are adding
17 more equipment that uses electricity, thereby increasing the amount that each
18 consumer uses.

19 **Q. How has consumer demand in the mid-Atlantic and northern Virginia areas**
20 **increased during the past 10 years?**

21 A. Attachment SG-4 contains the mid-Atlantic area and northern Virginia area historical
22 summer peak loads for 1995 through 2005. During this period, the mid-Atlantic area

1 load grew by over 20% while the northern Virginia area load grew by over 40% in
2 Dominion Virginia Power and 60% in Allegheny.

3 **Q. What are PJM's projections for consumer demand in the mid-Atlantic and**
4 **northern Virginia areas for the five-year period of 2007 through 2011?**

5 A. Attachment SG-3 shows the mid-Atlantic area and northern Virginia area projected
6 summer peak loads for 2006 through 2015. The projections for consumer demand in
7 the mid-Atlantic area for 2007 to 2011 are 59,611 MW; 60,965 MW; 61,966 MW;
8 62,850 MW; and 63,777 MW, respectively, for each of these five years. These
9 projections are based on the 2006 PJM Load Forecast Report that was used as the basis
10 for the load flow models that identified the need for the 502 Junction – Loudoun Line.
11 The projections for consumer demand in Dominion Virginia Power's portion of the
12 northern Virginia area for 2007 through 2011 are 6,038 MW; 6,205 MW; 6,316 MW;
13 6,411 MW; and 6,532 MW, respectively, for each of the five years. The projections
14 for consumer demand in the Allegheny portion of the northern Virginia area for 2007
15 through 2011 are 721 MW, 646 MW, 661 MW, 678 MW and 693 MW, respectively,
16 for each of the five years.

17 **Q. How will electric service customers within the Dominion Virginia Power and**
18 **Allegheny zones of PJM be affected if the 502 Junction – Loudoun Line is not**
19 **constructed?**

20 A. The customers served by Dominion Virginia Power and Allegheny in northern
21 Virginia will be at risk for Electrical Occurrences 1 through 8 listed in Attachment
22 SG-1. Additionally, Allegheny's customers will be at further risk for Electrical
23 Occurrences 10 through 12 listed in Attachment SG-1.

1 The load in the Allegheny and Dominion Virginia Power zones that is located to the
2 east of the overloaded transmission lines could be affected in the following ways if the
3 502 Junction – Loudoun Line is not constructed by June 2011. First, for any of
4 Electrical problems 1 through 8 listed in Attachment SG-1, load may need to be
5 disconnected in order to reduce the loading on the Mt. Storm – Doubs 500 kV line. It
6 is likely that a portion of any disconnected load would be located in the Dominion
7 Virginia Power and Allegheny zones east of the overloaded facilities since this load
8 has a direct impact on the overloaded facilities. The Allegheny zone also could be
9 impacted due to low voltages or voltage collapse resulting from Electrical Occurrences
10 10 through 12 listed in Attachment SG-1.

11 **Q. Earlier in your testimony you stated that the 502 Junction – Loudoun Line has**
12 **been identified as the most viable solution to resolve the potential reliability**
13 **problems you have identified in Attachment SG-1. Please explain why this**
14 **Project is the most viable solution to resolve these problems.**

15 A. PJM recommended the 502 Junction – Loudoun Line as the most viable solution based
16 on its review of all the alternatives considered. This solution solves multiple
17 reliability violations in a cost-effective manner with the construction of one line at an
18 estimated cost of \$850 million.

19 **Q. What specific electrical alternatives did PJM study and/or consider to the**
20 **construction of the 502 Junction – Loudoun Line?**

21 A. A second Mt. Storm to Doubs 500 kV line was considered as an alternative. This
22 alternative did not resolve the overload on the Pruntytown to Mt. Storm 500 kV line
23 and caused the overload to advance from 2014 to 2011. A new Mt. Storm to Loudoun

1 500 kV line was considered as another alternative. This alternative also did not
2 resolve the overload on the Pruntytown to Mt. Storm 500 kV line and caused the
3 overload to advance from 2014 to 2011. Allegheny's original proposal for a 502
4 Junction to Mt. Storm to Kemptown 500 kV line was considered as an alternative as
5 well. This alternative relieved the overloads; however, the ability to transfer power
6 from generation sources in PJM's Western Region was less by 750 MW and the cost
7 was \$450 million higher than the 502 Junction – Loudoun Line.

8 **Q. Were any electrical alternatives that involved upgrading or expanding existing**
9 **transmission facilities considered?**

10 A. Consideration was given to reconductoring the Mt. Storm to Doubs 500 kV line, but
11 this was not a practical alternative since the line could not be removed from service for
12 the length of time required to complete the work. Also, there would be a significant
13 risk to the reliability of the mid-Atlantic and northern Virginia areas while this line
14 was being rebuilt.

15 **Q. Why did PJM select the 502 Junction – Loudoun Line for construction over these**
16 **alternatives?**

17 A. PJM selected the Project because all of the Allegheny and Dominion Virginia Power
18 overloads identified in Attachment SG-1 were resolved with this alternative. In
19 addition, this alternative had the greatest transfer capability increase of the studied
20 alternatives, construction of the line by the 2011 timeframe is feasible and the Project
21 is the most cost effective solution to resolve all identified reliability problems.

1 **Q. What consequences will result if the Meadow Brook – Loudoun portion of the**
2 **502 Junction - Loudoun Line is not built?**

3 A. The Pruntytown to Mt. Storm overload will be resolved as well as the voltage
4 violations around the Meadow Brook Substation. However, the Mt. Storm to Doubs
5 overload will still exist.

6 **Q. Were there any additional local reliability problems identified by Dominion**
7 **Virginia Power that also impacted PJM's decision to select the 502 Junction –**
8 **Loudoun Line?**

9 A. Yes. Dominion Virginia Power's analysis identified additional reliability problems
10 other than those shown in Attachment SG-1 directly impacting the Dominion Virginia
11 Power load zone specifically in the northern Virginia and Shenandoah Valley area that
12 the 502 Junction –Loudoun Line will resolve. These are discussed in detail by Ronnie
13 Bailey in his testimony.

14 **Q. Does this conclude your prepared direct testimony?**

15 A. Yes, it does.

Attachment SG-1

**502 Junction – Loudoun Line
Electric Reliability Problems**

	Electrical Occurrence	Electrical Result
1	Outage of Mount Storm – Greenland Gap Line #572A.	Mount Storm – Doubs 500 kV Line #551 exceeds its emergency rating and overloads.
2	Outage of Meadow Brook – Greenland Gap Line #572B.	
3	Outage of Hatfield – Black Oak 500 kV Line # 542.	
4	Outage of Bedington – Black Oak 500 kV Line # 544.	
5	Outage of Mount Storm – Greenland Gap 500 kV Line # 572A while Possum Point Unit #5 is unavailable.	
6	Outage of Meadow Brook – Greenland Gap Line #572B while Possum Point Unit #5 is unavailable.	
7	Outage of Hatfield – Black Oak 500 kV Line # 542 while Possum Point Unit #5 is unavailable.	
8	Outage of Bedington – Black Oak 500 kV Line # 544 while Possum Point Unit #5 is unavailable.	
9	Outage of Hatfield – Black Oak 500 kV Line # 542.	Mount Storm – Pruntytown 500 kV Line #510 exceeds its emergency rating and overloads.
10	Outage of Morrisville – Meadow Brook 500 kV Line #580 and the Meadow Brook – Greenland Gap Line #572B.	The 138 kV system voltage level around Meadow Brook Substation drops below acceptable limits and could lead to a voltage collapse in the area.
11	Outage of the Hatfield – Black Oak 500 kV Line #542 and Mount Storm – Doubs Line #551.	The 500 kV and 138 kV system voltage levels around Meadow Brook Substation drops below acceptable limits.
12	Outage of the Black Oak – Bedington 500 kV Line #544 and Mount Storm – Doubs Line #551.	

Attachment SG-2
502 Junction – Loudoun
Facility Ownership

Facility	Owner
Line #510	Allegheny
Line #551	Dominion Virginia Power
Lines #572A and #572B	Jointly owned by Allegheny and Dominion Virginia Power
Line #542	Allegheny
Line #544	Allegheny
Line #580	Jointly owned by Allegheny and Dominion Virginia Power
Meadow Brook Substation	Allegheny
138 kV system around Meadow Brook Substation	Allegheny
500 kV system around Meadow Brook Substation	Allegheny and Dominion Virginia Power

Attachment SG-3

Projected Summer Peak Loads (MW)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Cumulative
Mid-Atlantic Region	58742	59611	60965	61966	62850	63777	64648	65798	66845	67725	
% Growth		1.5%	2.3%	1.6%	1.4%	1.5%	1.4%	1.8%	1.6%	1.3%	15.3%
Northern Virginia-Dominion Virginia Power	5936	6038	6205	6316	6411	6532	6656	6780	6911	7035	
% Growth		1.7%	2.8%	1.8%	1.5%	1.9%	1.9%	1.9%	1.9%	1.8%	18.5%
Northern Virginia – APS	711	721	646	661	678	693	710	728	748	768	
% Growth		1.4%	-10.4%	2.3%	2.6%	2.2%	2.5%	2.5%	2.7%	2.7%	8.0%

Attachment SG-4

Historical Summer Peak Loads (MW)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Cumulative
Mid-Atlantic Region	48524	44302	49406	48397	51700	49430	54072	55569	53566	52049	59042	
% Growth		-8.7%	11.5%	-2.0%	6.8%	-4.4%	9.4%	2.8%	-3.6%	-2.8%	13.4%	21.7%
Northern Virginia-Dominion Virginia Power	4321	3939	4562	4618	5022	4688	5244	5399	5323	5143	6067	
% Growth		-8.8%	15.8%	1.2%	8.7%	-6.7%	11.9%	3.0%	-1.4%	-3.4%	18.0%	40.4%
Northern Virginia – APS	406	386	429	453	469	493	554	566	564	580	654	
% Growth		-4.9%	11.1%	5.6%	3.5%	5.1%	12.4%	2.2%	-0.4%	2.8%	12.8%	61.1%