

**PUBLIC SERVICE COMMISSION
OF WEST VIRGINIA
CHARLESTON**

Case No. 07-0508-E-CN

TRANS-ALLEGHENY INTERSTATE LINE COMPANY

**Application of Trans-Allegheny Interstate Line
Company for a certificate of public convenience
and necessity under W. Va. Code § 24-2-11a
authorizing the construction and operation of the
West Virginia segments of a 500 kV electric
transmission line and related facilities in Monongalia,
Preston, Tucker, Grant, Hardy, and Hampshire
Counties, and for related relief**

**REBUTTAL TESTIMONY OF
STEVEN R. HERLING**

January 4, 2008

1 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

2 A. My name is Steven R. Herling and my business address is 955 Jefferson Avenue,
3 Valley Forge Corporate Center, Norristown, Pennsylvania 19403-2497.

4 Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS PROCEEDING?

5 A. Yes. I have filed written direct testimony on behalf of Trans-Allegheny Interstate
6 Line Company (“TrAILCo”).

7 Q. PLEASE DESCRIBE THE PURPOSE OF YOUR REBUTTAL TESTIMONY.

8 A. This rebuttal testimony addresses various assertions concerning PJM and the
9 regional transmission planning process, presented in the direct testimony of
10 Halleck-Triune Community and Laurel Run Community witness Ronald Klein,
11 CPV Warren witnesses Sharon Kay Segner and James Bouford, and Commission
12 Staff witnesses Michael Ileo and Michael Lewis.

13 Q. WILL YOU BE USING THE SAME TERMS IN YOUR REBUTTAL
14 TESTIMONY AS SET FORTH IN THE TABLE OF NOMENCLATURE
15 ATTACHED TO THE APPLICATION?

16 A. Yes. In addition, I may define other specific terms in my rebuttal testimony.

17 Q. WHAT IS THE PURPOSE OF THIS REBUTTAL TESTIMONY?

18 A. Broadly stated, I would like to explain that PJM is a Federally-approved Regional
19 Transmission Organization (“RTO”), and as such PJM is responsible to ensure the
20 reliability of the transmission grid in the PJM territory. PJM applies the criteria of

1 the North American Electric Reliability Corporation (“NERC”) to evaluate the
2 reliability of the transmission system, and then PJM determines the transmission
3 upgrades that are needed to ensure NERC reliability standards are met. Although
4 PJM is authorized by FERC to compel the building of new transmission projects
5 for grid reliability, it does not operate in a vacuum. The PJM planning process is
6 open and dynamic, and all decisions and analysis are subject to stakeholder review
7 and participation. The entire process is on file with FERC and detailed in the PJM
8 Operating Agreement.

9 As I will discuss in more detail in this testimony, the need for the TrAIL line was
10 determined through this process. PJM’s evaluation of the transmission system and
11 the need for TrAIL was accomplished in an open and transparent forum. Sound
12 planning principles were applied and PJM provided every opportunity to consider
13 alternative solutions for TrAIL. No alternative solution, including demand-side
14 management (“DSM”), additional generation, and alternative technologies has
15 been identified to obviate the need for this line, either during the PJM planning
16 process or, as I will discuss below, during this proceeding. Further, the need for
17 TrAIL is significant and urgent. PJM forecasts reliability violations as early as
18 2011 if the line is not completed on schedule.

19 Intervenors have filed testimony in this case suggesting that alternatives were not
20 properly considered, that other solutions are available and even that PJM’s

1 transmission system planning is inadequate. These assertions are untrue and are
2 generally based on misconceptions about the PJM planning process and the
3 criteria used to determine transmission system reliability. I will address these
4 assertions in my testimony and further explain why they are false.

5 My rebuttal testimony is organized in several sections.

- 6 • In Section I, I show that the need for TrAIL is grounded in specific
7 transmission system reliability violations that PJM, in its role as an
8 RTO, was obligated to investigate and identify.
9
- 10 • Section II addresses PJM's assessment of suggested "alternatives" to
11 the construction of the TrAIL line, including alternatives involving
12 new generation and DSM. In this section, I explain that although
13 PJM's planning process incorporates identified new generation and
14 DSM resources, it properly does not include the mere possibility of
15 future impacts of these resources when analyzing transmission
16 system reliability.
17
- 18 • Section III explains why PJM determined that other transmission
19 enhancements and modifications – including reconductoring and
20 double-circuiting – were not feasible alternatives to TrAIL.
21
- 22 • In Section IV, I demonstrate that intervenor concerns that TrAIL will
23 undermine system reliability are unwarranted.
24
- 25 • Finally, in Section V, I show that PJM's reliability planning process
26 is necessarily a regional one that must take into account system
27 reliability issues across the PJM region, and I explain the
28 significance of this fact to the Commission's consideration of
29 TrAIL.
30
31
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33

1 Pursuant to the PJM Operating Agreement, PJM documents all these assumptions,
2 which are then thoroughly reviewed with stakeholders in the course of each cycle
3 of the planning process. For example, PJM must apply initial assumptions
4 regarding load forecasts, the development or retirement of generation and demand
5 response resources, and electricity transfer levels between portions of the grid.
6 Forecasting future events requires PJM to make assumptions about those events,
7 but the need to make assumptions does not impair the validity of the planning
8 process or the results it produces, as some witnesses have suggested. Stated
9 differently, if one were to eliminate all forecasting of load growth and new
10 generation or retirements from the transmission reliability processes, then planning
11 for transmission system adequacy would be impossible. It is our experience that
12 the use of projections in electric system planning is an integral, well-accepted and
13 necessary practice for both electric utilities and the agencies that regulate them.

14 If PJM identifies NERC criteria violations at the conclusion of the RTEP process,
15 the NERC standards require that solutions be developed and implemented to
16 mitigate those violations. This was the outcome of PJM's 2006 RTEP process,
17 and is the fundamental reason for PJM's direction to Allegheny Power and
18 Dominion Virginia Power to undertake transmission system reinforcements. In
19 other words, the TrAILCo application is the result of PJM's Federally-mandated

1 efforts as an RTO to identify and attempt to resolve transmission reliability issues
2 within its control area.

3 Q. HOW DOES PJM TAKE INTO ACCOUNT CHANGES IN THE
4 ASSUMPTIONS USED IN ITS PLANNING PROCESS OVER TIME?

5 A. Of course, planning is a dynamic process and system conditions may change.
6 PJM agrees that changing circumstances may result in the need to adjust the
7 assumptions used in the initial planning studies. For this reason, PJM tracks and
8 records changes to these assumptions, and the planning process provides
9 opportunities for past planning decisions to be adjusted as required. This is the
10 means PJM uses to ensure the planning process reflects the most current
11 conditions as effectively as possible. Faced with changing system conditions, if
12 the timing and nature of future criteria violations and the progress of construction
13 of previously identified transmission upgrades allow, such upgrades may be
14 deferred or even eliminated and the transmission plan will be adjusted
15 accordingly. PJM's planning studies demonstrate that TrAIL is needed in 2011 to
16 resolve a number of reliability criteria violations. The 2006 RTEP analysis
17 identified these NERC criteria violations, these reliability violations – the same
18 ones identified in Mr. Gass' direct testimony – were the basis for the
19 recommendation to include TrAIL in the RTEP, as well as the basis for the PJM
20 Board's approval of TrAIL.

1 Q. DID PJM EVALUATE THE DECISION TO ORDER THE CONSTRUCTION
2 OF TrAIL IN THE 2007 RTEP?

3 A. After TrAIL was approved in June 2006, changed conditions were studied in the
4 2007 RTEP analysis. These changes included updated load forecasts and load
5 models, the execution of a service agreement for a previously queued long-term
6 firm transmission service, and revised modeling parameters for the 502 Junction-
7 Loudoun line, among other things. The 2007 RTEP analysis showed that the
8 reliability criteria violations identified in the 2006 RTEP had become *more severe*
9 in the 2007 RTEP. In fact, the scope of the violations identified in the 2007 RTEP
10 indicate that TrAIL and an additional Amos-Kempton line (sometimes identified
11 as “PATH”) will now be required to address NERC criteria violations.

12 Q. HAVE CONDITIONS CONTINUED TO CHANGE SINCE THE
13 COMPLETION OF THE 2007 RTEP ANALYSIS THAT PROVIDED THE
14 JUSTIFICATION FOR THE AMOS-KEMPTOWN LINE?

15 A. Yes. As I’ve mentioned, the RTEP process is very dynamic. System conditions
16 and, therefore, study assumptions are continually changing. Since the approval of
17 the Amos-Kempton line by the PJM Board in June 2007, PJM has integrated a
18 number of changes into the RTEP analyses. For example, the revised route for the
19 502 Junction-Loudoun line has been integrated into the RTEP. The current RTEP
20 also reflects generation additions and the return to service of previously retired

1 generators. Significantly, the retirement of the Benning Road and Buzzard Point
2 generators in Washington D.C. was announced and this event was also modeled.
3 Lastly, a merchant transmission project delivering capacity and energy from New
4 Jersey to New York City has proceeded to the point of executing a Facilities Study
5 Agreement and must also be included in on-going RTEP analysis. Some of these
6 factors have a very direct impact on reliability criteria violations related to the
7 need for the 502 Junction-Loudoun line. Even when these changes are taken into
8 account, the results of on-going PJM's RTEP analyses confirm that the Amos-
9 Kemptown line is still required in 2012 and TrAIL continues to be required in
10 2011. Neither line obviates the need for the other; the 2007 RTEP demonstrates
11 both lines are required to relieve reliability violations.

12
13 II. PJM'S ASSESSMENT OF "ALTERNATIVE" SOLUTIONS
14 TO IDENTIFIED RELIABILITY VIOLATIONS

15
16 Q. SEVERAL WITNESSES HAVE ASSERTED THAT IN ORDERING TrAIL TO
17 BE CONSTRUCTED, PJM DID NOT ADEQUATELY ASSESS THE FULL
18 RANGE OF POSSIBLE SOLUTIONS TO THE TRANSMISSION
19 RELIABILITY PROBLEMS PJM IDENTIFIED IN THE 2006 RTEP. CAN
20 YOU ADDRESS SOME OF THESE CLAIMS?

- 1 A. Yes. Expressed in one way or another, this general theme permeates much of the
2 Staff and intervenor testimony offered in opposition to the asserted need for
3 TrAIL. Broadly stated, witnesses such as Hildebrand, Klein and Powell contend
4 that the Commission should deny TrAILCo's application because neither PJM nor
5 TrAILCo considered a range of "alternatives" to the construction of TrAIL. Mr.
6 Powell's testimony focuses mostly on the availability of DSM in the PJM region;
7 Mr. Klein's testimony, by comparison, advances a "totality of approaches" that he
8 asserts have the potential (but not the certainty) of addressing the identified
9 reliability concerns. Like Mr. Klein, Mr. Hildebrand asserts that TrAILCo should
10 have considered "huge region-wide initiatives" that, when taken together, would
11 reduce demand and eliminate the reliability need for TrAIL. Dr. Ileo's contends
12 that had PJM conducted "integrated resource planning" – by which Dr. Ileo means
13 a cost-based comparison of TrAIL with new generation, upgrading of existing
14 facilities, and load control programs – another "feasible option" to TrAIL may
15 have surfaced as the optimal solution. Although Dr. Ileo recognizes that the PJM
16 cannot perform IRP due to Federal energy policy, he nonetheless argues that
17 TrAILCo should have "filled the voids that exist in the planning process that gave
18 rise to TrAIL." (Ileo at 51.)
- 19 Q. WHAT DO THESE WITNESSES HAVE IN COMMON?

1 A. Each of these witnesses shares a number of incorrect basic assumptions on which
2 they base their recommendations to the Commission. First, I would like to correct
3 these assumptions and then I can explain how the correct assumptions are applied
4 to the PJM planning process. I note the following:

- 5 • PJM is not empowered to compel the siting, timing and location of new
6 generation, the design, implementation and enforcement of DSM programs,
7 and other “alternatives” that can be used to alleviate the need for
8 transmission reinforcements as a means to address identified reliability
9 violations;
- 10 • No alternatives to TrAIL have been identified that are sufficiently certain,
11 in terms of effectiveness and timeliness, to allow PJM to rely upon them in
12 lieu of TrAIL to address these reliability violations;
- 13 • PJM does not have an affirmative obligation – either through the “IRP”
14 process Dr. Ileo mentions or more generally – to study, identify, and
15 recommend one or more of these alternatives; and
- 16 • PJM’s limited authority to study, identify, and recommend a means to
17 address the reliability violations *other than* TrAIL does not indicate a flaw
18 in the justification of the “need” for TrAIL.

19

20

1 **A. PJM Has No Power to Compel Generation- or DSM-Based Solutions to**
2 **Identified Transmission Reliability Violations**

3
4 Q. YOU HAVE INDICATED THAT PJM DOES NOT HAVE THE POWER TO
5 COMPEL “ALTERNATIVE” SOLUTIONS, AS SEVERAL OF THE
6 INTERVENORS HAVE SUGGESTED. PLEASE EXPLAIN WHAT PJM IS
7 AUTHORIZED TO DO AND NOT TO DO IN THIS REGARD.

8 A. As an RTO, PJM has a very defined role in the deregulated electric industry. Its
9 primary transmission-related responsibility is to ensure the reliability of the bulk
10 power transmission system. Although PJM has a number of important tools at its
11 disposal – including the ability to direct transmission owners to construct
12 transmission system reinforcements – its powers are not plenary. PJM is *not able*
13 to compel or otherwise control the siting, capacity, or timing of new generation in
14 high-load areas. PJM is *not able* to compel or otherwise control the design and
15 implementation of DSM efforts that might, if properly placed and of sufficient
16 dimension, delay or defer the need for transmission reinforcements. PJM can *only*
17 direct the reinforcement of transmission facilities to address reliability violations,
18 either through the modification of existing transmission facilities (which PJM
19 quite frequently directs) or the construction of new transmission facilities.

1 Q. ARE YOU SUGGESTING THAT OTHER ALTERNATIVES ARE NEVER
2 FEASIBLE, OR THAT PJM DOES NOT CONSIDER THEM IN EVALUATING
3 THE NEED FOR TRANSMISSION REINFORCEMENTS?

4 A. Absolutely not. PJM's planning processes recognize that many of the generation-
5 and DSM-based alternatives mentioned by the intervenors could, if targeted,
6 verifiable, and implemented on time and in the right areas of the PJM Region,
7 address identified system reliability issues. As I mentioned above, PJM has a very
8 specifically defined role in this de-regulated industry. Because the consequences
9 of reliability criteria violations can be severe, PJM's mandate first is to maintain
10 system reliability. That being said, however, PJM's planning process is expressly
11 designed to be responsive to solutions developed *through the marketplace*, as
12 well as transmission solutions.

13 Q. WHY IS PJM'S ROLE SO SPECIFICALLY DEFINED AND WHY IS PJM
14 EMPOWERED ONLY TO PLAN AND COMPEL TRANSMISSION
15 SOLUTIONS?

16 A. Consistent with its FERC approved tariffs, PJM, as an RTO, was delegated
17 planning responsibilities for the transmission system within PJM, as well as the
18 responsibility for the reliable interconnection of generation resources.

19 Initially, FERC's issuance in 1996 of Order No. 888 established the *pro forma*
20 tariff as the basis for a common set of rules for newly deregulated utilities. This

1 Order set forth the general principles of organization and operation for
2 Independent System Operators (“ISOs”) as control area operators. This was
3 among the first steps toward deregulation and the restructuring of the energy
4 industry. FERC recognized that larger regional organizations could operate more
5 efficiently and economically.

6 In Order No. 888, FERC initially determined that an ISO must have primary
7 responsibility for the short-term reliability of grid operations, including planning
8 and oversight of maintenance of transmission facilities under its control. The
9 concept developed further, and FERC’s Final Rule on RTOs, Order No. 2000, was
10 issued in December 1999, representing the next step in the evolution of PJM’s
11 planning processes. Order No. 2000 created the RTO concept and established the
12 rules and functions for them. Order No. 2000 also required public utilities to make
13 appropriate filings with FERC to initiate the process to place their transmission
14 facilities under the control of RTOs. FERC believed there would be widespread
15 competitive advantages resulting from RTOs, including more efficient and
16 effective transmission and generation planning. Order No. 2000 listed seven
17 minimum functions that an RTO must perform. The seventh function is to plan
18 and coordinate necessary transmission additions and upgrades. Also, Order No.
19 2000 required the RTO to perform its functions consistent with the reliability
20 standards established by NERC or its successor.

1 PJM and its transmission owners made a joint compliance filing for Order No.
2 2000 in October 2000, and FERC granted PJM provisional RTO status in July
3 2001. This initial filing included the PJM RTEP, which was subsequently
4 modified pursuant to FERC's 2001 Order. The PJM Operating Agreement, which
5 includes the PJM RTEP process, provides that expansion plans will emerge from a
6 coordinated process involving the transmission owners for the region, and that
7 these plans will be reviewed publicly through the PJM Transmission Expansion
8 Advisory Committee ("TEAC"). Also, PJM's manuals, long term planning, and
9 RTEP process must all conform to NERC standards.

10 Finally, the FERC has vested in PJM the ultimate responsibility for transmission
11 expansion planning in the PJM control area. In order to carry out this
12 responsibility, the FERC authorized PJM to compel the construction of new
13 transmission in order to ensure system reliability. PJM's planning and expansion
14 process was also specifically designed to encourage market-driven operating and
15 investment actions for preventing and relieving congestion. Hence, PJM's
16 authority today is limited to requiring new transmission facilities in accordance
17 with NERC standards, in order to allow for the continuation of open and
18 competitive markets.

19 PJM recently transitioned to a longer term RTEP process that develops a 15-year
20 plan to ensure adequate time for siting, permitting, design and construction of

1 larger high voltage projects. This process provides for major high voltage
2 transmission upgrades within PJM and also provides the proper incentive for new
3 generation. In addition, a new capacity construct called the Reliability Pricing
4 Model (“RPM”) was also implemented in 2007.

5 Q. HAVE YOU ANY COMMENT WITH RESPECT TO TESTIMONY THAT PJM,
6 IN GENERAL DOES NOT CONDUCT “INTEGRATED RESOURCE
7 PLANNING” AND THEREFORE THERE IS INSUFFICIENT PROOF THAT
8 TRAIL IS A COST-EFFECTIVE SOLUTION?

9 A. Yes. Mr. Ileo (and others) asserts that the PJM planning process does not consider
10 the viability of TrAIL in the context of traditional integrated resource planning.
11 Mr. Ileo is correct in observing that the corporate entities that own transmission
12 infrastructure also control a large portion of the existing generation. However, he
13 fails to note that FERC has mandated very specific prohibitions with respect to
14 communications between the generation and transmission functions within these
15 corporations. FERC initiated these rules when the industry was de-regulated in
16 1990. The prohibition on communications is designed to encourage competition
17 and the development of competitive markets in the energy industry; this should
18 ultimately lower prices for consumers and increase energy efficiency.

1 Q. IS PJM POSITIONED TO CONSIDER DSM AND NEW GENERATION AS
2 VIABLE ALTERNATIVES TO TRAIL WHEN CONSIDERING THE NEED
3 FOR TRAIL?

4 A. The PJM planning process is highly integrated with a range of wholesale markets
5 related to the provision of generation and demand response services. Both the
6 planning process and these markets are designed to provide signals to developers
7 as to where their resources will be most valuable and where they will be most
8 effective with respect to the resolution of reliability and transmission congestion
9 related problems. However, the planning process does not identify or in any way
10 select, nor does PJM have authority to select, the most effective generation or
11 demand response solutions. Market participants develop and provide generation
12 and demand response solutions. PJM has no authority to mandate demand
13 response or generation solutions.

14 Q. CAN YOU PROVIDE SOME EXAMPLES OF HOW PJM SEEKS TO INCENT
15 GENERATION-BASED SOLUTIONS?

16 A. Although PJM does not have any mechanism by which to require or insist on the
17 installation of new generation within PJM, it does have methods it can and does
18 use to incent generation-based solutions. PJM can provide “Reliability-Must-
19 Run” contracts to encourage existing generation that has requested deactivation to
20 continue to operate until planned transmission lines are in service (but has no

1 authority to require such generators to remain in service). Also, through the
2 generation interconnection process, PJM can work with generation developers to
3 expedite the construction of required interconnection facilities and to ensure that
4 new generation projects are completed on or ahead of schedule, if possible. In
5 addition, PJM's RPM allows PJM to procure needed generation, as a back-stop, in
6 the event insufficient generation clears over a series of RPM auctions, in
7 accordance with Attachment DD, Section 16 of the PJM Tariff. The standards for
8 prompting the triggering of such authority, however, are set quite high, and this
9 feature of the RPM is probably best construed by planning authorities and
10 regulators as more in the nature of a "last resort" rather than as an integral tool to
11 integrate new generation into the system through the planning process.

12 Q. HOW DOES PJM DETERMINE WHAT GENERATION MIGHT BE
13 SUFFICIENT TO ADDRESS AN IDENTIFIED RELIABILITY VIOLATION?

14 A. PJM utilizes specific rules concerning the inclusion of potential generation
15 projects in the planning process. These rules are based on the need to provide
16 certainty. In PJM's planning process, new generation can be relied on to resolve
17 reliability criteria violations after the developer executes an Interconnection
18 Service Agreement ("ISA"). Before this point, the dropout rate for generation
19 projects is just too high – and the likelihood of timely construction too remote – to
20 justify forestalling other, more certain solutions. In fact, PJM's generation

1 interconnection queue has experienced approximately a 70% dropout rate based on
2 all projects initially submitted for consideration. Ignoring interconnection projects
3 that involve upgrades to existing generation, which have a high completion rate,
4 over 75% of interconnection requests involving new generation plant are
5 eventually withdrawn.

6 At the time PJM studied TrAIL, PJM considered new generation in the queue if an
7 executed ISA was in place. Even today, if PJM considered all the generation in
8 the queue with an executed ISA, TrAIL would still be needed. It would be
9 imprudent to depend on generation projects, such as CPV Warren for example, at
10 earlier stages of the interconnection process when, statistically, they have a
11 reasonable probability of being withdrawn rather than placed into service.

12 As ISAs are executed by generation projects, they are included in RTEP analyses,
13 not as alternatives to other solutions, but as an integrated component of the
14 baseline system. As these generators are added to the baseline system, previously
15 identified transmission solutions are re-evaluated to determine whether they are
16 still required.

17 Q. HOW ARE NEW GENERATION SOLUTIONS INTEGRATED INTO THE
18 RTEP?

19 A. As new generators execute ISAs, they are included in RTEP analyses in the same
20 manner as existing, in-service generators. With respect to load deliverability, new

1 generators in an otherwise constrained area will reduce the amount of energy that
2 area must be able to import under the criteria, reducing the amount of transmission
3 transfer capability required into that area. With respect to generator deliverability,
4 new generators in an otherwise constrained area will tend to balance and,
5 therefore, reduce the flow of energy on critical transmission facilities from
6 generators in other portions of the system. New generators are similarly modeled
7 with respect to all other reliability criteria tests, such as NERC Category C3 and,
8 when located in otherwise constrained areas, can have beneficial impacts on
9 compliance with those criteria and reduce the transmission transfer capability
10 required to achieve compliance with those criteria.

11 Q. WHAT ABOUT DSM-BASED SOLUTIONS – HOW DOES PJM SEEK TO
12 ENCOURAGE THESE?

13 A. PJM's regional planning process encompasses available alternatives to new
14 transmission, including demand side response, by incorporating openly and on a
15 non-discriminatory basis the development of market-based generation and demand
16 response capability to resolve economic and reliability issues that otherwise could
17 be resolved through transmission enhancements.

18 PJM accounts for demand response solutions in two ways. Conservation efforts
19 and other purely voluntary activities will reduce load levels and will be factored
20 into future load forecasts and, therefore, integrated into analyses of compliance

1 with all reliability criteria. Contractually interruptible loads and directly
2 controlled loads, including load response committed as Demand Resources (DR)
3 in RPM auctions and Interruptible Load for Reliability (ILR) committed as
4 emergency reducible load and receiving RPM credit as a result, are modeled as a
5 resource in load deliverability analyses. Such loads are not expected to be served
6 under the conditions represented in load deliverability analyses, *i.e.*, high loads
7 and reduced availability of generation, and are, therefore, interrupted in
8 simulations to evaluate compliance with the load deliverability criteria.

9 Therefore, though PJM may prescribe only transmission solutions through the
10 RTEP, the RTEP process allows market forces to provide for the most efficient
11 solutions to transmission constraints, whether such solutions are generation,
12 demand side resources, transmission, or some combination of all three.

13 In addition, interested parties can propose alternative solutions for study during the
14 planning process. RPM will also serve to encourage local generation development,
15 by facilitating a market solution to potential problems.

16 Q. ARE THERE INSTANCES IN WHICH MARKET-BASED EFFORTS, SUCH
17 AS NEW GENERATION AND DSM, CANNOT BE CONSIDERED AS
18 ADEQUATE SOLUTIONS TO IDENTIFIED RELIABILITY PROBLEMS?

1 A. Yes, indeed – the circumstances presented in this case are a good example. When
2 reliability needs are not addressed through the marketplace, PJM must act to
3 address those needs through the planning process by providing new transmission.

4 Q. WHAT FACTORS ASSOCIATED WITH MARKET-BASED SOLUTIONS
5 TEND IN SOME CASES TO MAKE THEM UNRELIABLE ALTERNATIVES
6 TO NEW TRANSMISSION FACILITIES?

7 A. PJM requires a high degree of certainty before it can rely on developing market-
8 based efforts to replace transmission in order to resolve reliability violations.
9 Those efforts, however, sometimes lack the certainty needed for PJM to be able to
10 rely upon them as a dependable solution to identified transmission reliability
11 violations. Simply put, PJM cannot speculate when planning for grid reliability
12 and PJM must plan with a certainty that expected solutions to reliability problems
13 will be in place when they are needed.

14 As I've mentioned above, there are distinct difficulties in relying on the
15 availability of new generation projects, and PJM has a defined process (expressed
16 in PJM's FERC-approved tariff) that attempts to take these uncertainties into
17 account. Additionally, as Mr. Lewis correctly notes (pages 15-17 of his direct
18 testimony), in order for DSM efforts and new generation to be relevant to
19 addressing the reliability violations PJM has identified, they must be (i) targeted in
20 the precise location needed (in this case, directly east of the Doubs substation), not

1 placed generally within the PJM Region, and (ii) sufficiently predictable
2 (especially in the case of DSM programs) to be relied upon.

3 Moreover, timing is also critical when PJM identifies transmission solutions.
4 PJM's ability to further consider developing market solutions is dependent on the
5 timing of the initial reliability need and the time required to implement the
6 transmission solution. If PJM can identify reliability violations sufficiently far
7 into the future, PJM will still plan appropriate transmission solutions, but time will
8 remain for market-based solutions to develop to a point where these solutions
9 could delay or even eliminate the need for a transmission solution.

10 In this case, there are no market-based solutions in place, or in development, that
11 will eliminate the need for TrAIL. Other than in the testimony of CPV Warren
12 witness Mr. Bouford in this case (which TrAILCo witness Mr. Gass will refute),
13 no witness or party in this case has attempted to identify a market-based solution
14 that will address the reliability violations PJM has identified, and no other party
15 has suggested that these efforts will be in place by June 2011, when the reliability
16 issues are projected to arise. Therefore, there is no choice but to proceed with
17 TrAIL.

18 Q. IS PJM PERMITTED TO WAIT FOR THE DEVELOPMENT OF MARKET-
19 BASED EFFORTS TO ARISE, IN THE HOPE THAT THEY WILL

1 FORESTALL OR OBVIATE THE NEED FOR A TRANSMISSION-BASED
2 SOLUTION?

3 A. No. It would be imprudent to delay or eliminate TrAIL based on a hope that
4 market-based generation or demand response solutions will be effectively
5 implemented to resolve known impending reliability criteria violations. The need
6 for TrAIL is too immediate and the violations too significant to justify waiting for
7 market solutions.

8 I can summarize these points with the general statement I made at the beginning of
9 this section of my testimony. PJM is not able to compel the siting, timing and
10 location of new generation or the implementation or effect of DSM programs – a
11 fact that no party in this case has contested. Consequently, although PJM fosters
12 market-based efforts, its ability to assume their existence as a means to address
13 identified reliability violations is severely – and appropriately – constrained. I
14 think it is important to recognize that much of the intervenors’ testimony on
15 “alternatives” to TrAIL is, as I’ll explain below, based on this flawed premise.

16 **B. There Have Been No Specific Generation- or DSM-Based Efforts**
17 **Identified as Feasible Alternatives to TrAIL**

18
19 Q. YOU INDICATED THAT A SECOND FUNDAMENTAL ASSUMPTION
20 MADE BY THE INTERVENORS IS THAT A NON-TRANSMISSION

1 SOLUTION EXISTS TO THE RELIABILITY VIOLATIONS PJM HAS
2 IDENTIFIED. PLEASE EXPLAIN WHAT YOU MEAN.

3 A. The intervenors explicitly assert that alternatives to TrAIL that will address the
4 identified reliability violations do in fact exist. Stated generally, the intervenors
5 contend that suitable alternatives to TrAIL exist, but PJM did not consider them.
6 The problem is that no party has identified any specific generation- or DSM-based
7 efforts that they can demonstrate will address the specific transmission reliability
8 violations PJM has identified. So, even if one were to assume for purposes of this
9 discussion that PJM had the authority to compel the targeted and timely
10 construction of new generation and/or the implementation of predictable and
11 adequate DSM efforts, no intervenor has shown that any such generation or DSM
12 efforts will conclusively and effectively address those violations.

13 Q. WHAT ABOUT MR. BOUFORD'S TESTIMONY – DOES HE NOT CONTEND
14 THAT THE CPV PROJECTS WILL ADDRESS THE IDENTIFIED
15 RELIABILITY VIOLATIONS AND MAKE TRAIL UNNECESSARY?

16 A. This is certainly what Mr. Bouford attempts to do. Yet as Mr. Gass indicates in
17 his rebuttal testimony, Mr. Bouford's position depends completely on his
18 willingness to make assumptions that PJM, in its planning processes, determined
19 are unsupportable. None of these assumptions, as Mr. Gass notes, was a part of
20 PJM's 2006 RTEP; nor is any of them warranted now. The uncertainty attendant

1 to the construction, timing, and availability of new generation – reflected in PJM’s
2 interconnection queue experience and discussed above – apply to both of the CPV
3 projects.

4 Q. CAN YOU SUMMARIZE YOUR THOUGHTS ON THIS POINT?

5 A. As I noted above, PJM’s planning process actively considers the availability of
6 market-based efforts, including new generation and DSM, to alleviate the need for
7 a transmission investment as the solution to identified reliability violations. PJM
8 concluded in the 2006 RTEP that no such solutions exist, and that the construction
9 of new transmission was the only option likely to be effective on a timely basis.
10 The testimony presented by the intervenors – and specifically that of Mr.
11 Hildebrand, Dr. Ileo, Mr. Powell, Mr. Klein, and even Mr. Bouford – offer no
12 tangible, reliable solutions other than new transmission. .

13 C. **PJM Has No Affirmative Obligation or Authority – Either Through an**
14 **“IRP” Process or More Generally – to Study, Identify, and**
15 **Recommend a Non-Transmission Alternative.**
16

17 Q. WHAT IS THE THIRD FUNDAMENTAL ASSUMPTION THAT UNDERLIES
18 THE INTERVENOR TESTIMONY?

19 A. The third assumption is that PJM had an obligation to consider, study, identify,
20 and recommend a “non-transmission” alternative (and by that, I mean one relying
21 upon either DSM or new generation) to TrAIL. In some ways, this incorrect
22 assumption is an extension of the first one described above; that is, if one assumes

1 that PJM has the authority to compel a non-transmission alternative as a means to
2 address an identified reliability violation, then it follows that the failure to conduct
3 a study that includes non-transmission alternatives as “feasible” ones is not
4 acceptable. But, as I’ve explained above, PJM has no authority to compel a new
5 generation- or DSM-based solution.

6 Q. HOW DOES THIS ERRONEOUS ASSUMPTION APPEAR IN THE
7 INTERVENORS TESTIMONY?

8 A. It is either explicit or implicit in the testimony of most of the intervenor witnesses
9 on the need issue. Mr. Klein, for example, argues that TrAILCo’s application
10 “does not comprehensively list many alternatives that could ameliorate or obviate
11 the need for the proposed TrAIL line.” (Klein at 8.) Mr. Hildebrand contends that
12 “adequate planning consideration” was not given to “alternatives” that could use
13 new technology, and that “huge region-wide initiatives that stand to diminish or
14 eliminate any stated reliability need for TrAIL . . . have not been factored.”
15 (Hildebrand at 3.) And, Mr. Powell suggests that TrAILCo’s application provides
16 “insufficient analysis of the potential benefits and comparative costs of alternative
17 investments in the demand side electric resources.” (Powell at 4).

18 No witness addresses this issue more directly, however, than Dr. Ileo. Dr. Ileo
19 contends that the process by which TrAIL was identified as the solution to the
20 identified reliability violations lacks the hallmarks of “rationale economic

1 decision-making.” More specifically, Dr. Ileo states that “unlike in the normal
2 process of integrated resource planning where economic trade-offs among feasible
3 electric project alternatives are evaluated, such analyses are largely missing in the
4 PJM planning underlying TrAIL.” (Ileo at 9). As an economist, Dr. Ileo appears
5 most concerned that, all things considered, new generation and DSM programs
6 might prove to be the more “cost-effective” approach to addressing the identified
7 reliability violations. (Ileo at 22.) Although it is clearly Dr. Ileo’s preference for a
8 traditional “least-cost IRP” analysis in which all possible approaches are
9 considered, his testimony, in my view, illustrates why PJM’s identification of
10 TrAIL as the appropriate solution should be considered sufficient.

11 Q. WHAT DO YOU MEAN?

12 A. In his testimony, Dr. Ileo recognizes exactly what I’ve tried to make clear in this
13 rebuttal testimony – that PJM does not have the authority to address identified
14 transmission reliability violations through options other than transmission. In
15 Section 7.0 of his testimony, captioned “Causes and Implications of Planning
16 Deficiencies,” Dr. Ileo allows that what he has learned about PJM in the case
17 suggests that PJM has “little ability to require PJMRTO members to add
18 generation (as opposed to transmission) facilities in meeting load growth or
19 system reliability requirements.” Additionally, Dr. Ileo states that “[m]uch the
20 same appears to be true for DSM programs.” (Ileo at 24.) Dr. Ileo even devotes

1 several pages of his testimony to explaining his view that federal energy policy
2 issues – including the separation of “generation and transmission decision-
3 making” and the fact that DSM programs are “subject to state jurisdictional
4 authority” – explain the “lack of a least-cost IRP by the PJM and related federal
5 agencies.” (Ileo at 24-25.) After summarizing the FERC’s recent dismissals of
6 challenges to TrAIL based on the asserted lack of IRP planning, Dr. Ileo
7 concludes that, at least in part, “current federal policies” cause what he describes
8 as the “unusual” planning circumstances confronted in this case:

9 Put otherwise, since federal policy neither requires the DOE or PJM to
10 consider alternatives other than transmission, nor permits parties to raise
11 IRP issues in FERC proceedings, the information and data necessary to
12 evaluate whether TrAIL is truly an economical (cost-effective) solution to
13 the East Cost power problem are missing.

14
15 (Ileo at 29.)

16 Q. SO DR. ILEO ACKNOWLEDGES THE LIMITATIONS IMPOSED BY
17 FEDERAL ENERGY POLICY ON THE RANGE OF ALTERNATIVES
18 AVAILABLE TO PJM TO RESOLVE IDENTIFIED TRANSMISSION
19 RELIABILITY VIOLATIONS?

20 A. Yes, he does. Where Dr. Ileo and I differ, however, is that his testimony does not
21 acknowledge the effect on PJM of those same limitations in his ultimate
22 recommendations.

1 The fact is that PJM’s conclusion that TrAIL is the best solution to address the
2 identified transmission system reliability violations *must* be viewed in the context
3 of what potential solutions are within PJM’s authority to compel. To conclude
4 otherwise would yield a recommendation that does nothing to preserve system
5 reliability. Even if PJM had the authority and resources to conduct a least-cost
6 IRP, the identification of a non-transmission solution serves no useful purpose, as
7 neither PJM nor the transmission owner in the affected area (that is, Allegheny
8 Power) has any power to “make it all happen.”

9 **D. PJM’s Failure to Identify and Recommend a Solution Other Than**
10 **TrAIL Does Not Mean that TrAILCo Has Failed to Justify the “Need”**
11 **for TrAIL.**

12
13 Q. WHAT IS THE FINAL ERRONEOUS ASSUMPTION SHARED BY THE
14 INTERVENOR WITNESSES OPPOSING THE NEED FOR TRAIL?

15 A. Each witness suggests that TrAILCo’s demonstration of “need” in this case is
16 insufficient because non-transmission alternatives have not been assessed and
17 recommended as a means to address the identified reliability violations. I
18 absolutely do not agree that PJM’s analysis of the need for TrAIL was insufficient
19 in any way, contrary to the testimony of Dr. Ileo.

20 For example, while Dr. Ileo explains why a least-cost IRP approach has not been
21 applied and, in fact, has been determined not to be required by the FERC, he then
22 faults PJM and TrAILCo for not having provided the Commission with the same

1 analysis in this case. Noting that the federal planning process “differs from the
2 requirements of integrated resource planning,” Dr. Ileo nonetheless concludes that
3 TrAILCo “should have filled the voids that exist in the planning process that gave
4 rise to TrAIL.” (Ileo at 51.) In my view, this is unreasonable.

5 Q. RPM IS ENCOURAGING THE DEVELOPMENT OF NEW GENERATION IN
6 PJM. WILL THIS NEW GENERATION HELP TO OBTAIN THE NEED FOR
7 TRAIL?

8 A. The RPM establishes the locational capacity value of generation and demand
9 response resources. RPM auctions are used to secure installed capacity resources
10 required to satisfy the Installed Reserve Margin, the amount of generation required
11 across PJM to ensure a resource-based loss of load expectation of no more than one
12 day in ten years. Recognizing that load, generation, and transmission capability
13 must be balanced in all parts of the PJM system, RPM establishes a higher price
14 for capacity in areas where that balance is deficient. Load deliverability testing
15 serves as the basis for price separation in RPM auctions, which provide incentives
16 for the development of generation and demand response resources in constrained
17 areas of the system. Through the transparent planning process, PJM shares a wide
18 range of planning information with stakeholders, including load forecasts, the
19 identification of future potential criteria violations, and load deliverability
20 margins. Developers can utilize this information as well as other market signals

1 over the fifteen-year planning horizon, to anticipate areas where capacity prices
2 will be higher and their resources more valuable.

3 If the market provides for the development of sufficient resources to mitigate
4 future reliability criteria violations, further transmission system upgrades may
5 become unnecessary. If the signals provided through the RTEP process and
6 through the RPM auctions are ignored and reliability criteria violations develop in
7 the future, then the annual RTEP process must identify the transmission system
8 upgrades required for the system to remain compliant with reliability criteria.

9 While PJM has seen an increase in the number of generation projects proposed in
10 eastern PJM since the implementation of the RPM auctions, these projects are still
11 very early in the interconnection process. Due to the high rate of withdrawal of
12 projects from the interconnection queue (approximately 70%), these projects
13 cannot be assumed to contribute to the mitigation of reliability criteria violations
14 until they have executed an ISA. As these projects continue to move forward in
15 the queue process to the point of executing ISAs they can then, potentially, help to
16 defer or eliminate the need for baseline transmission upgrades that were otherwise
17 identified to resolve criteria violations.

18 With respect to TrAIL, there are not sufficient resources that have proceeded to
19 the point of executing an ISA to obviate a need for TrAIL. As discussed earlier,
20 while there has been an increased volume of requests entered into the

1 interconnection queue since the development of the RPM construct, these projects
2 are still in the early stages of the interconnection process. The timing and severity
3 of the reliability criteria violations underlying the need for TrAIL do not allow
4 PJM and TrAILCo to delay in the hope that some of these projects will proceed to
5 completion and help to defer or obviate the need for TrAIL.

6
7 III. OTHER TRANSMISSION ENHANCEMENTS/MODIFICATIONS AS AN
8 ALTERNATIVE TO TRAIL

9 Q. PLEASE COMMENT WITH RESPECT TO TESTIMONY THAT
10 RECONDUCTORING OF BOTH MT. STORM-DOUBS AND PRUNTYTOWN-
11 MT. STORM SHOULD HAVE BEEN MORE THOROUGHLY STUDIED BY
12 PJM AS AN ALTERNATIVE TO TRAIL.

13 A. PJM considered the option to reconductor the Mt. Storm-Doubs circuit and we
14 determined that this approach was not viable due to time constraints and financial
15 considerations. PJM and TrAILCo estimate that a reconductoring of the Mt.
16 Storm-Doubs line would require approximately five years. This estimate is based
17 on the length of the line, estimates of the duration of continuous work that would
18 be required to complete the reconductoring, and the expected inability to remove
19 the circuit from service for extended periods in order to perform the necessary
20 work, which would dramatically increase the actual construction period. The Mt.

1 Storm-Doubs 500 kV transmission line runs directly parallel to the Bedington-
2 Black Oak 500 kV transmission line, in West Virginia. The Bedington-Black Oak
3 interface is constrained every month of the year and this interface typically
4 experiences the highest monthly congestion cost of any facility on the PJM
5 transmission system. This constraint occurs because NERC standards mandate the
6 line should not exceed its emergency rating for the contingency loss of the Mt.
7 Storm-Doubs circuit. The existence of this constraint currently requires PJM to
8 apply operational restrictions in order to maintain system reliability.

9 Due to the limited transmission capability on the Bedington – Black Oak and Mt.
10 Storm-Doubs circuits, PJM must regularly run generation out of “merit order” in
11 the east. This results in reliance on more costly eastern generation, than the
12 western generation, which is generally less expensive. Eastern generation must be
13 run in order to manage the constraint by reducing the typical flow on these lines.

14 Under the present conditions, the congestion on this interface, with the Mt. Storm-
15 Doubs circuit in service, costs tens of million dollars per month in the non-summer
16 months. An extended outage of the Mt. Storm-Doubs circuit would put significant
17 additional stress on the remaining transmission facilities through this corridor. In
18 order to maintain reliable operations with the Mt. Storm-Doubs circuit removed
19 from service for this extended period, PJM would have to run significantly more
20 eastern generation, out of merit order, than it already runs. This would result in

1 significantly higher congestion costs. A five-year outage during non-summer
2 months alone could easily result in well over one billion dollars in congestion
3 costs.

4 Further, reconductoring the Pruntytown-Mt. Storm circuit at the same time would
5 require the removal of both circuits and would place additional operational stress
6 on the system. The outage of Pruntytown-Mt. Storm is even more critical than the
7 outage of Mt. Storm-Doubs and in fact, it may be impossible to take both lines at
8 the same time.

9 Another alternative option is double circuiting the Mt. Storm-Doubs and
10 Pruntytown-Mt. Storm circuits. This would be a more substantial project than
11 TrAIL or a reconductoring of those same circuits. Such a project would take as
12 long as or longer than a reconductoring project with all of the same operational
13 reliability risks and congestion costs. Further, PJM would need to perform NERC
14 Category C analyses related to the tower line outages that would now exist on the
15 two 500 kV paths. Therefore this is not a viable solution.

16 Q. PLEASE COMMENT WITH REGARD TO WITNESS KLEIN'S TESTIMONY
17 THAT THERE ARE NEW TECHNOLOGICAL IMPROVEMENTS THAT
18 CAN ADRESS THE RELIABILITY CONCERNS ASSERTED BY
19 TRAILCO.

1 A. PJM is actively evaluating a wide range of newer transmission technology
2 solutions. The PJM RTEP considers options based on improved conductor
3 technologies in the development of solution options. The RTEP already uses
4 devices such as Static VAR Compensators (“SVCs”). These devices are included
5 in the recent RTEP as part of the solution set for reliability criteria violations
6 related to the backbone transmission system. Other technologies, including
7 electrical storage options such as sodium-sulfur batteries, are not yet sufficiently
8 proven. These types of new technologies cannot be reliably implemented on the
9 scale required to mitigate the reliability criteria violations driving the need for
10 TrAIL at this time. Of course, there are uncertainties around the construction of
11 any major infrastructure project, but the elements of TrAIL represent proven and
12 well-understood technologies. PJM cannot implement unproven technologies like
13 sodium-sulfur batteries, where the uncertainties are far greater, in response to
14 significant reliability criteria violations such as those underlying the need for
15 TrAIL.

16
17 IV. ASSERTED ADVERSE EFFECTS OF TRAIL ON SYSTEM RELIABILITY

18 Q DO YOU HAVE ANY COMMENT ABOUT WITNESS SEGNER’S
19 ASSERTION THAT TRAIL WILL ACTUALLY WORSEN THE PROBLEM OF

1 INADEQUATE GENERATION IN EASTERN PJM, BY MAKING WESTERN
2 ENERGY APPEAR CHEAPER THAN IT IS?

3 A. The addition of transmission capability cannot make any generation “appear
4 cheaper than it is.” The security constrained economic dispatch employed by PJM
5 will continue to drive the utilization of the most cost-effective resources required
6 to serve the aggregate load within the PJM region while respecting any
7 transmission constraints on a day-ahead and real time basis.

8 TrAIL is intended to address reliability violations on the PJM grid and will ease
9 the transmission constraints that prevent western resources from helping to serve
10 the reliability needs of eastern load. TrAIL is not designed to deliver specific
11 generation from western PJM to the eastern PJM region, nor is it specifically
12 designed to carry inexpensive generation from the west. These reliability
13 problems are caused by transmission congestion, which is partly a result of
14 inadequate generation in the east. Our forecasts show that new generation is
15 continuing to be developed, but not fast enough nor in sufficient amounts to
16 obviate the need for new transmission. Continued load growth in eastern PJM
17 will, if not coupled with the development of sufficient amounts of low-priced local
18 baseload generation, result in high energy prices in eastern PJM over the long
19 term.

1 Additional transmission will allow resources outside of these eastern load centers
2 to help serve the reliability needs of the eastern load, but will not obviate the need
3 for additional eastern resources in the future. Therefore, TrAIL may temporarily
4 moderate energy prices in eastern PJM, but it will not eliminate all causes of the
5 transmission congestion faced by load customers in eastern PJM.

6 Q. HAVE YOU ANY COMMENT REGARDING WITNESS KLEIN'S
7 ASSERTION THAT TRAIL COULD DIMINISH RELIABILITY IN WEST
8 VIRGINIA AND INCREASE THE RISK OF BROWN OUTS AND BLACK
9 OUTS?

10 A. Yes. Reliability of the grid is a function of balancing load, generation, and
11 transmission capability based on, and in compliance with, accepted industry
12 standards. TrAIL is designed to provide needed reliable transmission capability in
13 response to the currently projected need for increased transmission service. The
14 addition of TrAIL will not decrease the reliability of the grid. In fact, TrAIL will
15 make the grid more reliable and reduce the risk of brown outs and black outs in
16 West Virginia.

17 Mr. Klein thinks that the use of the grid could change, following the addition of
18 TrAIL, to a point where the grid was no longer reliable. It is true that in the
19 future, uses of the grid will continue to change and that additional transmission
20 may be needed to supplement the TrAIL line. However, PJM's planning process

1 and markets will send signals to promote the development of generation and
2 demand response solutions which will be integrated in the development of future
3 transmission plans. If developers and customers are responsive to these signals,
4 reliability may be assured without the need for additional transmission facilities.
5 If not, the planning process will continue to identify the transmission solutions
6 required to reliably provide for customer needs.

7
8 V. REGIONAL ASPECTS OF PJM PLANNING PROCESS

9 Q. HAVE YOU ANY COMMENT REGARDING WITNESS KLEIN'S
10 ASSERTION THAT TRAILCO HAS MISCHARACTERIZED THE ENTIRE
11 PJM REGION AS TRAILCO'S SERVICE AREA?

12 A. PJM does not perform planning based on the service territories of its transmission
13 owners. Rather, PJM ignores the boundaries between transmission owners when
14 evaluating the reliability of the grid and when developing solutions to reliability
15 criteria violations. In all cases, the relevant "service territory" with respect to a
16 NERC criteria violation is the entire PJM system. This is implicit in the concept
17 of deliverability, which drives much of the PJM planning process. PJM utilizes
18 load and generation deliverability tests designed to ensure that the aggregate of
19 PJM generation can be delivered to the aggregate of PJM customer load under a
20 range of prescribed conditions. Through this process, PJM identifies specific

1 transmission solutions for criteria violations, based on the documented procedures
2 related to the evaluation of those criteria, not with respect to the service territories
3 of individual transmission owners.

4 Q. DO YOU HAVE A STATEMENT IN CONCLUSION OF YOUR REBUTTAL
5 TESTIMONY?

6 A. Yes. From my review of the RTEP and the filings by TrAILCo, it is my view that
7 TrAIL offers a reasonable long-term solution to anticipated reliability shortfalls
8 that will occur in the near future absent such a solution. Having reviewed the
9 testimony from parties opposing the project, I have seen nothing that offers a
10 comparable solution. It is perhaps easy to suggest short-term band-aid approaches
11 to cure isolated pockets of degrading reliability circumstances, but such short term
12 projects will not cure the long-term problems giving rise to the need for the
13 additional transmission offered by TrAIL, leading to a need for yet further
14 upgrades. In my opinion TrAIL offers the best solution to the transmission
15 reliability concerns that Allegheny and PJM will face in the near future.

16 Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

17 A. Yes, it does.