

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 STEVEN R. HERLING

Re: PJM and Regional Planning Process

March 19, 2008

REJOINDER TESTIMONY OF STEVEN R. HERLING

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.

4

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

6 A. Yes. I have filed written Direct Testimony on behalf of Trans-Allegheny
7 Interstate Line Company ("TrAILCo"), which has been designated as TrAILCo
8 Statement No. 3. I also filed written Rebuttal Testimony on behalf of TrAILCo,
9 which has been designated as TrAILCo Statement No. 3-R.

10

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

12 A. This Rejoinder Testimony addresses various assertions contained in surrebuttal
13 testimony from Energy Conservation Council ("ECC") witness George Loehr in
14 ECC Statement SR-1. The specifics are set forth below.

15

16 Q. WILL THE USE OF VARIOUS TERMS IN YOUR REJOINDER TESTIMONY
17 BE CONSISTENT WITH THE DEFINITIONS ASSIGNED TO THOSE TERMS
18 IN THE TABLE OF NOMENCLATURE ATTACHED TO TRAILCO
19 WITNESS FLITMAN'S DIRECT TESTIMONY AS TRAILCO EXHIBIT DEF-
20 1?

21 A. Yes. In addition, I may define other specific terms in my rejoinder.

1 Q. MR. LOEHR CONTINUES TO DISPUTE THAT PJM CANNOT DICTATE
2 THE LOCATION OF NEW GENERATION, ASSERTING THAT PJM'S
3 ACTIONS DEFINE AND INFLUENCE WHERE GENERATION WILL BE
4 BUILT. DO YOU HAVE A RESPONSE?

5 A. Yes. The 502 Junction – Loudoun line was proposed to resolve reliability criteria
6 violations, not to promote the development of specific types of generation or
7 generation in particular areas. PJM is required, as are all Planning Authorities
8 and Transmission Planners, through the NERC planning standards to develop a
9 plan to mitigate reliability criteria violations when they are identified. PJM
10 develops markets to provide incentives for the development of generation and
11 demand response solutions. PJM provides significant information through the
12 planning process to the market to drive the location of generation and demand
13 response solutions where they will help to resolve reliability and market
14 efficiency issues. However, where those incentives and the planning information
15 do not drive appropriate *generation* solutions the planning process must identify
16 *transmission* solutions. The market having not responded, the transmission
17 planning process cannot be criticized for impacting market decisions that might
18 be made in the future. For the transmission planning process to not respond to
19 criteria violations in the hope that the generation market might eventually provide
20 solutions would be irresponsible, would put customers at significant risk, and
21 would be in violation of NERC standards. While PJM can attempt to influence
22 decision-making by developers in the market, my point continues to be that PJM
23 cannot – and indeed does not – dictate the location of new generation or any other

1 market-based solutions.

2

3 Q. MR. LOEHR CLAIMS THAT THERE IS SIGNIFICANT UNUSED
4 GENERATION IN EASTERN PJM THAT HAS NOT BEEN CONSIDERED
5 AND THAT MANY GENERATING UNITS PLANNED FOR EASTERN PJM
6 WERE "OMITTED FROM CONSIDERATION" BY PJM. DO YOU HAVE A
7 RESPONSE?

8 A. Yes. PJM's experience over the past eight years has been that 75.8% of projects
9 involving the construction of new generation eventually withdraw from the
10 interconnection process. Of these, experience has shown that larger projects have
11 a greater drop-out rate than smaller projects, such that 86.8% of the proposed MW
12 of new generation projects do not come to fruition. While the queues over the
13 most recent 12 months have shown an influx of projects, only time will tell which
14 of those projects will ultimately get built. PJM cannot plan the transmission
15 system based on the press releases of developers who have the most to gain,
16 financially, from transmission lines failing to be built. If we look at the four
17 queues spanning the two years preceding the development of the 2006 RTEP,
18 only nine generators of greater than 100 MW were entered into the queue across
19 Maryland, New Jersey and Delaware. Of these, eight withdrew from the queue
20 after receiving their Feasibility Study results and one is under construction. There
21 was no eastern generation omitted from consideration. There was no eastern
22 generation, period. PJM has said, repeatedly, that the planning process is very
23 dynamic. If eastern generation in more recent queues moves forward, it will be

1 included in the RTEP and previously approved transmission projects will be re-
2 evaluated to determine whether they should be deferred or even removed from the
3 transmission plan.

4

5 Q. MR. LOEHR CLAIMS THAT NO DECISION ABOUT TRAIL SHOULD BE
6 MADE WITHOUT FIRST EXAMINING THE SYSTEM WITH PATH IN
7 SERVICE AND TRAIL NOT IN SERVICE. DO YOU HAVE A RESPONSE?

8 A. Yes. I have said, clearly, in my testimony that both the 502 Junction – Loudoun
9 and Amos – Kemptown lines are required and that neither one obviates the need
10 for the other. In developing the 2007 RTEP, PJM identified significant
11 contingency violations in 2012 even with TrAIL in service. This resulted in the
12 identification of the need for the PATH and its inclusion in the RTEP. PJM tested
13 the system in 2012 with the PATH line in-service and without the TrAIL project
14 in the course of its standard RTEP analysis.

15

16 In each RTEP cycle, PJM begins its analysis assuming that all transmission
17 upgrades previously included in the RTEP continue to be required. After testing
18 for compliance with reliability criteria and identifying transmission upgrades to
19 resolve new violations, upgrades from previous RTEP cycles are removed, one at
20 a time, to determine whether they are still required. This was done in 2007,
21 removing the 502 Junction – Loudoun line after including the Amos – Kemptown
22 line. Many of the same violations were observed with the Loudoun line removed
23 from service as had been identified with the Loudoun line in service, but without

1 the Amos- Kemptown line. PJM did not specifically document the results of this
2 analysis, at that time, since the 502 Junction – Loudoun line had already been
3 justified and included in the RTEP. The analysis only confirmed what had already
4 been documented through the 2006 RTEP. That being said, at the request of the
5 Hearing Examiner in proceeding PUE-2007-00031/00033 before the Virginia
6 Corporation Commission, the above mentioned analysis was re-performed and the
7 results provided. Simulations were developed to replicate the 2007 analysis, with
8 the generation and load assumptions that were in place in that analysis. With the
9 Amos – Kemptown circuit in service and the 502 Junction – Loudoun line
10 removed from service, the Mt. Storm – Doubs line was overloaded for three
11 different contingencies in 2012 with the highest overload being 110% of its
12 emergency rating. Extending the analysis over the remaining years of the
13 planning horizon, five additional 500 kV facilities and one 230 kV facility were
14 observed to be in violation of criteria by 2018. These results recreate the analysis
15 performed in 2007, which provided the basis for my comments that both the 502
16 Junction – Loudoun and Amos – Kemptown line are required and that neither one
17 obviates the need for the other.

18
19 Q. MR. LOEHR QUESTIONS WHY THERE ARE SIGNIFICANT CHANGES IN
20 THE SYSTEM REQUIREMENTS BETWEEN THE 2006 AND 2007 RTEP
21 STUDIES. DO YOU HAVE A RESPONSE?

22 A. Yes. Planning has changed dramatically with the recent changes in the industry.
23 Today's planning process is highly dynamic, having to provide for and adapt to

1 numerous market-based drivers. Load forecasts have always been updated
2 annually, so it should not be surprising that they might change and impact
3 planning analysis results. With the status of generation additions and retirements
4 changing monthly, and sometimes more frequently, base cases must be locked
5 down at some point in order to perform planning analyses with subsequent
6 changes rolled into future analyses. Requests for long-term firm transmission
7 service are evaluated continually. When service agreements are executed, on-
8 going planning analyses must recognize and accommodate those requests. The
9 construction of new transmission can require significant time for completion,
10 from the time the need is first identified through the planning process until the
11 time the facilities are ultimately placed in service. The planning process was
12 extended to 15 years so that trends could be evaluated and transmission plans
13 identified in a timely manner. The 15-year planning horizon allows the industry
14 time to adjust to trends and changes in the market, and ensures new transmission
15 can be constructed on a timely basis.

16
17 To emphasize this point, an additional analysis was requested by the Hearing
18 Examiner in proceeding PUE-2007-00031/00033 before the Virginia Corporation
19 Commission to evaluate the impact of the most up to date assumptions related to
20 load and generation in PJM. The analysis is not intended to be a substitute for the
21 normal RTEP planning effort which will evaluate a much wider range of criteria
22 and will take place over a number of months. However, as discussed below, the
23 results confirm the original documented need for the 502 Junction – Loudoun

1 line. The analysis evaluated only Mid-Atlantic Load Deliverability, updating
2 previous simulations for 2012 with the latest load forecasts from the 2008 PJM
3 Load Forecast Report and with the most current generation assumptions based on
4 retirements and queue status, as of February 29, 2008. Four scenarios were
5 examined, looking at the 2012 system with neither of the 502 Junction – Loudoun
6 lines and Amos – Kemptown lines in service, with both lines in service, and with
7 each of the lines individually in service. The simulation results demonstrate
8 significantly more severe violations than were identified, originally, in the 2006
9 RTEP, but somewhat less severe results than were identified in the 2007 RTEP.
10 With neither of the new lines in service, overloads on the Mt. Storm – Doubs line
11 range from 112-121% for the contingency loss of other 500 kV lines in the same
12 corridor. A number of additional violations were identified during the 2012-2022
13 timeframe. The magnitude of the violations identified for 2012 indicates the
14 continued existence of violations in 2011 and confirms the urgent need for the
15 502 Junction – Loudoun line.

16
17 With both the 502 Junction – Loudoun and Amos – Kemptown lines in service,
18 no criteria violations are projected through 2022. Both scenarios involving only
19 one line in service identify future criteria violations during the planning horizon.
20 The analysis that includes the 502 Junction – Loudoun line confirms the
21 conclusions in the 2007 RTEP regarding the need for the Amos – Kemptown line
22 in 2012. Overloads of 104% are projected for the Mt. Storm – Doubs line in 2012
23 with additional violations identified in the 2016-2022 timeframe. The analysis

1 that includes the Amos – Kemptown line identifies overloads on 500 kV facilities
2 in the 2016-2022 timeframe, but does not address the 2011 criteria violations. In
3 addition, this limited analysis does not address criteria violations that are expected
4 in northern Virginia if the first line built connects at Kemptown rather than
5 Loudoun. An analysis performed by Dominion Virginia Power identifies a
6 number of potential criteria violations related to the addition of new generation, if
7 the Loudoun line is not built. These projects were all initially evaluated based on
8 a system model that included the 502 Junction – Loudoun line. Overall, even
9 with all of these changed system conditions, the analysis continues to support the
10 results of the 2006 and 2007 RTEPs and the conclusion that the two lines are
11 needed.

12
13 Q. MR. LOEHR DISPUTES THAT THE RFC TRANSMISSION SYSTEM
14 PERFORMANCE ASSESSMENT WAS AN INTERREGIONAL STUDY. DO
15 YOU HAVE A RESPONSE?

16 A. Yes. Mr. Loehr seems to believe that the term “interregional” applies only with
17 respect to the defined NERC regions. The former VEM (VACAR-ECAR-
18 MAAC) studies were considered interregional studies. Today, the primary area
19 evaluated within the scope of the VEM studies lies entirely within PJM. RFC has
20 a forecasted peak load of approximately 180,000 MW. Only a short while ago,
21 the current RFC footprint was all or part of three regions, MAAC, ECAR, and
22 MAIN. Does the formation of RFC make a study involving these areas any less
23 interregional? If the NERC regions in the eastern interconnection merged into

1 one, would it no longer be possible to perform interregional studies? FERC's
2 Order 890 clearly views interregional planning from a much different context than
3 that of Mr. Loehr, encompassing control area to control area and RTO to RTO
4 planning regardless of NERC regional affiliations.

5

6 Q. MR. LOEHR CLAIMS CERTAIN OPTIONS TO TRAIL, SUCH AS AN HVDC
7 LINE WERE NOT STUDIED. DO YOU HAVE A RESPONSE?

8 A. Yes. The potential merit of Mr. Loehr's concept of an eastern interconnection
9 comprised of a number of islands connected through an HVDC overlay is far
10 from clear. What is clear, however, is that such a radically different approach to a
11 transmission system cannot be implemented by simply building individually
12 required transmission facilities as DC rather than AC lines. Such a dramatic
13 overhaul of the grid would require significant time and analysis to determine,
14 first, its worth and, then, to establish a workable plan for what would certainly
15 take decades to implement. The need for the 502 Junction – Loudoun line has
16 been demonstrated to be urgent and it should proceed as an AC line.

17

18 Q. MR. LOEHR CLAIMS THAT THE OPTION OF FIXING THE SAG ON THE
19 MT. STORM-DOUBS LINE WAS NOT CONSIDERED AND THAT FIXING
20 THE GROUND CLEARANCE ISSUE ELIMINATES 8 OF THE 12
21 RELIABILITY PROBLEMS. DO YOU HAVE A RESPONSE?

22 A. Yes. There is no basis to suggest that the ground clearance issues with the Mt.
23 Storm – Doubs line can be remedied short of a complete tear down and re-build of

1 a significant portion of the circuit. Dominion had completed an analysis of the
2 effort required to increase the rating on the Mt. Storm – Doubs circuit and
3 implemented required improvements prior to the 2006 summer period. Through
4 their efforts, they identified improvements that were readily able to be
5 implemented and achieved the current emergency rating of 2598 MW for the
6 facility. Dominion has recently confirmed that further upgrades will require
7 significantly more effort to achieve a rating of 2910 MW, involving grading in 40
8 spans of the circuit and an additional 50 spans that will require modifications to
9 towers or additional towers. Such an effort would require an extended outage of
10 the circuit or a number of shorter outages, imposing significant reliability risk and
11 economic congestion cost on load customers for a limited improvement in the
12 capability of the circuit. TrAILCo witness Mark Allen has described this
13 difficulty in separate rejoinder testimony submitted in this proceeding.

14
15 It can be very difficult to schedule even short outages on the critical 500 kV
16 facilities through this corridor. The corridor is constrained every month of the
17 year, experiencing tens of millions of dollars in congestion per month in non-
18 summer months. Removing the Mt. Storm – Doubs circuit from service would
19 substantially increase congestion levels during the period of an outage and would
20 seriously degrade the reliability of the system. More importantly, the results of
21 the 2012 analysis indicate that a 2910 MW rating on the Mt. Storm – Doubs line
22 would not be sufficient to resolve the projected overloads. There is, therefore,
23 absolutely no merit to undertaking such an upgrade and imposing the significant

1 reliability and economic risks associated with the required outages.

2

3 Q. MR. LOEHR CHALLENGES YOUR CHARACTERIZATION THAT THE
4 FIRST CONTINGENCY OF AN N-1-1 EVENT "CAN REMOVE FROM
5 SERVICE ONE OR MORE TRANSMISSION FACILITIES AND/OR
6 GENERATION FACILITIES, DEPENDING ON THE SYSTEM
7 CONFIGURATION." MR. LOEHR CLAIMS THAT THERE ARE NO MULTI-
8 ELEMENT CONTINGENCIES IN CATEGORY B. DO YOU HAVE A
9 RESPONSE?

10 A. Yes. Category B single contingency events can remove more than one
11 transmission element from service. Table 1 attached to TPL standards 001
12 through 004 describes Category B as including events resulting in the loss of a
13 single element, but goes on to describe the relevant contingencies as single line-
14 to-ground or three phase faults with normal clearing. My testimony clearly states
15 that a fault with normal clearing can remove from service one or more
16 transmission facilities and/or generation facilities, **depending on the system**
17 **configuration** (emphasis added). There are numerous locations on the
18 transmission grid at all voltage levels where circuit breaker configurations will
19 result in the loss of two lines, a line and a transformer, or some other combination
20 of facilities following a fault with normal clearing. Significantly, Category C of
21 the NERC planning standards does not include faults on transmission lines or
22 transformers that result in the loss of additional facilities as a result of system
23 configuration. It is standard practice to treat such faults, and the resulting loss of

1 multiple facilities, as single-contingency events evaluated under Category B of
2 the standards.

3

4 Q. MR. LOEHR CLAIMS THAT YOUR REBUTTAL "ADMITS" THAT THERE
5 IS SUFFICIENT GENERATION IN THE EAST TO DISPLACE WESTERN
6 GENERATION AND REDUCE THE FLOW WEST TO EAST IN THE
7 TRANSMISSION SYSTEM. DO YOU HAVE A RESPONSE?

8 A. Yes. Mr. Loehr's suggestion that the violations can be eliminated by re-dispatch
9 reveals his lack of understanding of the PJM planning process. Mr. Loehr
10 misunderstands the relationship between operational re-dispatch and the ability to
11 resolve reliability criteria violations in the context of the planning process.
12 Pointing out that significant re-dispatch is required every month in operations has
13 nothing to do with the possibility that sufficient eastern generation is available to
14 resolve the identified reliability criteria violations. The circumstances of the
15 dispatch patterns associated with the NERC criteria evaluations are fully detailed
16 in the PJM manuals. The extent to which generation is available to resolve
17 criteria violations is established in the procedures that define the criteria test.
18 Once a violation is established, the testing procedures do not allow for system
19 adjustments that would unwind the circumstances of the critical system condition
20 that are the pre-requisite for performing the criteria evaluation.

21

22 Mr. Loehr's suggestion that planning should be conducted in the same way we
23 operate the system is just wrong. You have to make decisions about how you are

1 going to test the transmission system based on how robust you want the system to
2 be. PJM's deliverability criteria were defined for that purpose. If you fail the test,
3 you don't just change the rules, you reinforce the system so that the test is passed.

4

5 Q. MR. LOEHR CLAIMS THAT NOTHING IN THE NERC STANDARDS
6 REQUIRES A SYSTEM TO USE ECONOMIC DISPATCH IN ITS PLANNING
7 STUDIES. DO YOU HAVE A RESPONSE?

8 A. Yes. Mr. Loehr is correct in that the NERC standards do not require the use of
9 economic dispatch in planning studies. PJM, in fact, does not use economic
10 dispatch in any of its evaluations of compliance with reliability criteria. Mr. Loehr
11 clearly does not understand the deliverability tests applied by PJM in order to test
12 the NERC Category B contingencies. Both the load deliverability and generator
13 deliverability tests evaluate prescribed generation patterns to determine
14 compliance. They create the critical stressed condition referred to in the NERC
15 standards. In the case of load deliverability, the generation pattern in the import
16 area is evaluated across 10,000 generation outage scenarios and a mean case is
17 established. Generation dispatch in the source areas is optimized in an attempt to
18 eliminate contingency overloads. Mr. Loehr's statement suggests that no criteria
19 violation exists as long as some combination of re-dispatch, anywhere within
20 PJM, is available to resolve a constraint. However, the whole point of planning is
21 to test the system under rigorous conditions to ensure that a robust transmission
22 system exists so that operators can deal with the wide range of conditions that
23 they face on a day to day basis. In operations, dozens of lines and generators are

1 unavailable each day. We do not run planning studies for every combination of
2 outages that may arise in operations. Rather, we define a critical system
3 condition, in PJM's case through the load and generator deliverability tests, and
4 then evaluate single contingencies. To suggest that we should then re-dispatch
5 the system, essentially unwinding the critical system condition, to resolve the
6 violation would be to put our head in the sand and invite a host of operational
7 conditions that would not be controllable without shedding customer load as a
8 result of a weakened transmission grid.

9

10 Q. DOES THIS CONCLUDE YOUR REJOINDER TESTIMONY?

11 A. Yes. However, I reserve the right to provide such additional testimony as may be
12 necessary or appropriate.