

**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  
SCOTT GASS**

**January 4, 2008**

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. 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. My rebuttal testimony is offered to rebut the direct testimony of James Bouford, a  
9 witness for CPV Warren, LLC (“CPV Warren”).

10 Q. WILL YOU BE USING THE SAME TERMS IN YOUR REBUTTAL  
11 TESTIMONY AS SET FORTH IN THE TABLE OF NOMENCLATURE  
12 ATTACHED TO THE APPLICATION?

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

14

15 I. SUMMARY OF REBUTTAL TESTIMONY

16 Q. PLEASE SUMMARIZE THE MAIN THEMES OF YOUR REBUTTAL  
17 TESTIMONY.

18 A. Mr. Bouford’s testimony presents the basis for CPV Warren’s contentions that  
19 PJM’s identification of transmission system reliability violations is inaccurate and  
20 that, based on a number of assumptions Mr. Bouford has elected to make

1 (including the placement into service of two announced CPV projects), those  
2 reliability violations can be addressed without the need to construct TrAIL.

3 • In Section II of my rebuttal testimony, I will prove that PJM’s identification  
4 of the transmission system reliability violations in PJM’s 2006 Regional  
5 Transmission Expansion Plan (“RTEP”) was correctly performed and  
6 continues to be valid, and was not based on “overly conservative”  
7 assumptions as Mr. Bouford suggests. I will also demonstrate that the 2006  
8 RTEP appropriately considered the availability of new generation that  
9 could reasonably be applied to the transmission system before the identified  
10 reliability violations arise.

11 • Section III of my rebuttal testimony focuses upon Mr. Bouford’s assertion  
12 that two CPV-sponsored generation projects, together with various other  
13 system modifications, could alleviate the need to construct TrAIL. I will  
14 demonstrate that (i) Mr. Bouford’s analysis relies upon assumptions that are  
15 both uncertain and, consequently, not justifiable in the context of PJM’s  
16 reliability criteria violation analysis (either in 2006 or now); and (ii) in  
17 failing to apply important system-stressing tests Mr. Bouford’s analysis is  
18 significantly less rigorous than the PJM approach. I conclude that Mr.  
19 Bouford’s analysis is not a reliable basis upon which the Commission can

1 conclude that TrAIL is not needed to address the June 2011 transmission  
2 system reliability violations that PJM has identified.

3  
4 II. THE 2006 RTEP AND PJM'S IDENTIFICATION OF  
5 NERC RELIABILITY CRITERIA VIOLATIONS

6  
7 Q. BEFORE ADDRESSING MR. BOUFORD'S LIMITED CRITICISMS OF PJM'S  
8 FINDINGS IN THE 2006 RTEP, PLEASE IDENTIFY YOUR ROLE IN THAT  
9 PROCESS.

10 A. As I indicated in my direct testimony, in my role as PJM's Manager, Transmission  
11 Planning, I supervised the creation of the 2011 base case for the 2006 RTEP as  
12 well as the power system studies that determined the need for the West Virginia  
13 Segments of TrAIL and other related components of TrAIL. Based on PJM's  
14 reliability analyses, PJM determined that there are eleven electric reliability  
15 problems that are likely to occur beginning in 2011 and one electric reliability  
16 problem that is likely to occur in 2014 (electrical occurrence #9) if the TrAIL line  
17 is not built. In Exhibit SWG-1 of my direct testimony, I identified each of these  
18 projected reliability problems, expressing them in terms of an identified "electrical  
19 occurrence" (in each case, an outage of an existing transmission facility,  
20 sometimes combined with the unavailability of a significant generator or other

1 transmission facility) and the resulting “electrical result” that would occur without  
2 the TrAIL line or an equally timely and effective solution.

3 Q. WHAT WERE THE ELECTRICAL RESULTS OF THE IDENTIFIED  
4 ELECTRICAL OCCURRENCES?

5 A. For eight of the twelve electrical occurrences (occurrences #1 through #8), a major  
6 500 kV backbone line – the Mt. Storm-Doubs line – is projected to exceed its  
7 emergency rating and overload. The Mt. Storm-Doubs line is almost entirely  
8 within West Virginia and, as the rebuttal testimony of TrAIL witness Hozempa  
9 shows, is critical to service reliability in much of the Eastern Panhandle of West  
10 Virginia as well as the mid-Atlantic region. Electrical occurrence #9 results in  
11 another West Virginia 500 kV backbone line, the Pruntytown-Mt. Storm line,  
12 exceeding its emergency rating and overloading. Electrical occurrences # 10, #11,  
13 and #12 are projected to result in voltage support problems around the Meadow  
14 Brook substation, which is approximately 11 miles from the West Virginia border.  
15 Mr. Hozempa explains in his rebuttal testimony that these reliability violations  
16 will also directly affect West Virginia retail customers. Moreover, I squarely  
17 addressed this issue at pages 21-22 of my direct testimony.

18 Q. WHAT IS THE RELATIONSHIP BETWEEN THESE FINDINGS AND NERC  
19 RELIABILITY CRITERIA?

1 A. Mandatory reliability standards developed by the North American Electric  
2 Reliability Corporation (“NERC”) and approved by the FERC, together with  
3 PJM’s reliability planning standards and those of relevant transmission owners,  
4 are the criteria that must be used – and that PJM did use – to assess the overall  
5 reliability of the transmission system and identify the system upgrades needed to  
6 prevent those problems from occurring.

7 Q. HOW DOES THIS CONTEXT INFORM YOUR EVALUATION OF MR.  
8 BOUFORD’S TESTIMONY?

9 A. Reiterating PJM’s identification of these reliability standards offers a useful  
10 context of what Mr. Bouford criticized in PJM’s efforts and, significantly, what he  
11 did not criticize.

12 Q. WHAT DO YOU MEAN?

13 A. First, let me discuss what Mr. Bouford’s direct testimony did and did not address.  
14 As it relates to PJM’s identification of reliability violations in the 2006 RTEP, Mr.  
15 Bouford raised three concerns: (i) his criticism of two of the reliability violations  
16 relating to the Meadow Brook substation (electrical occurrences #11 and #12); (ii)  
17 his identification of a purportedly “inappropriate assumption” in connection with  
18 electrical occurrence #9 (involving an overload on the Pruntytown-Mt. Storm 500  
19 kV line), and (iii) more generally, his assertion that PJM’s assessment of the  
20 availability of generation was skewed in a way that overstated the identified

1 reliability violations. For this last point, Mr. Bouford did not suggest any way in  
2 which those alleged overstatements affected the outcome of PJM's efforts.

3 So, apart from his criticisms of the Meadow Brook-related reliability violations  
4 (which I will dispel below), Mr. Bouford has *not* asserted that PJM's identification  
5 of the reliability violations was incorrectly performed. This is especially relevant  
6 for the nine electrical occurrences that result in overloads of the critical Mt. Storm-  
7 Doubs and Pruntytown-Mt. Storm lines in West Virginia.

8 Q. PLEASE ADDRESS MR. BOUFORD'S CONTENTIONS RELATING TO  
9 ELECTRICAL OCCURRENCES #11 AND #12.

10 A. At page 5 of his direct testimony, Mr. Bouford contends that PJM misapplied the  
11 relevant NERC Reliability Standard, TPL-003-0. Specifically, Mr. Bouford  
12 asserts that because these two contingencies involve the simultaneous outage of  
13 separate transmission elements with no physical connection between them, they do  
14 not result in reliability violations under the relevant NERC criteria.

15 Mr. Bouford is incorrect. PJM studied electrical occurrences #11 and #12 as  
16 NERC Category C3 contingencies, and the low voltage conditions that were  
17 identified are violations of NERC reliability standards. To understand why this is  
18 so, one must appreciate that the relevant NERC criteria allows for "manual system  
19 adjustments" after the occurrence of the first Category B contingency and before  
20 the occurrence of the second Category B contingency. However, if a manual

1 system adjustment – including a re-dispatch of generation or a curtailment of firm  
2 transfer – is not sufficient to resolve the reliability problem, then the reliability  
3 standard is violated for this “n-1-1” contingency.<sup>1</sup> This is exactly the analysis that  
4 PJM performed. PJM determined that in the case of electrical occurrences #11  
5 and #12, the manual system adjustments PJM studied were not sufficient to  
6 resolve the reliability problem. Thus, even though the two identified electrical  
7 occurrences were not assumed to be caused by the same event (such as the single  
8 stuck breaker Mr. Bouford describes), PJM determined that a manual system  
9 adjustment between the two Category B contingencies would be insufficient to  
10 resolve the problem, and therefore in each situation a NERC Category C3  
11 violation was correctly identified.

12 Q. WAS A DYNAMIC REACTIVE DEVICE SUCH AS A STATIC VAR  
13 COMPENSATOR (SVC) CONSIDERED AS AN OPTION TO RESOLVE THE  
14 VOLTAGE PROBLEMS IDENTIFIED FOR ELECTRICAL OCCURRENCES  
15 #11 and #12?

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<sup>1</sup> Some clarification of the way NERC Category C3 contingencies are described is warranted. Although the term “n-2” is sometimes used to describe NERC Category C3 contingencies, that term is susceptible to misinterpretation as relating uniquely to two simultaneous contingencies without any ability for manual system adjustment. The term “n-1-1” is a better descriptor of this kind of Category C3 analysis, as it reflects the ability to apply manual system adjustments.

1 A. Yes, an SVC was considered as an option. However, the cost to interconnect the  
2 502 Junction–Mt. Storm–Loudoun 500 kV circuit into the Meadow Brook  
3 substation was estimated to cost \$20 million while the cost of an SVC was  
4 considerably more expensive. Interconnecting the new 500 kV circuit into  
5 Meadow Brook resolved the voltage problems and was less expensive than an  
6 SVC and therefore was selected as the preferred alternative.

7 Q. DO YOU AGREE WITH MR. BOUFORD’S STATEMENT ON PAGE 6 OF HIS  
8 TESTIMONY THAT ELECTRICAL OCCURRENCE #9 SHOULD NOT HAVE  
9 BEEN INCLUDED AS ONE OF THE RELIABILTY PROBLEMS IN EXHIBIT  
10 SWG-1?

11 A. No. In my view, Mr. Bouford’s testimony on this point resorts to “revisionist  
12 history” to reach his conclusion, and in any event is more remarkable for what it  
13 *doesn’t* say.

14 At page 6 of his direct testimony, Mr. Bouford contends that electric occurrence  
15 #9 in Exhibit SWG-1, which results in an overload of the Pruntytown-Mt. Storm  
16 500 kV line in West Virginia, “would only occur if the Amos to Bedington 765 kV  
17 line and the Bedington to Kemptown 500 kV line, both of which are included in  
18 PJM’s 2007 RTEP and with in-service dates of June 1, 2012, are not built.” Mr.  
19 Bouford characterizes my failure to recognize the Amos to Kemptown line as an  
20 “inappropriate assumption” that has produced an “error” in my direct testimony.

1           What Mr. Bouford doesn't mention, however, is that my direct testimony was  
2           prepared, and the analyses it describes were performed, *before* the PJM Board  
3           considered and approved the Amos to Kemptown line (which this Commission  
4           may know as "PATH") in June 2007. Stated differently, the fact that the Amos to  
5           Kemptown line was, for the first time, included in PJM's **2007** RTEP has no  
6           bearing whatsoever on the fact that it was not included or assumed in PJM's 2006  
7           RTEP, the results of which are outlined in my direct testimony and its Exhibit  
8           SWG-1. The 2007 RTEP, as Mr. Bouford knows, had not been prepared or  
9           approved at the time my direct testimony in this case was submitted. Accordingly,  
10          there was (and is) no "error" in my testimony or Exhibit SWG-1, as Mr. Bouford  
11          asserts; furthermore, there was no logical reason for me to present any basis for  
12          assuming that Amos to Kemptown will not be built. To suggest otherwise is to  
13          invite a serious misunderstanding of the analyses described in my testimony.

14    Q.    BUT DOESN'T THE INCLUSION OF AMOS TO KEMPTOWN IN THE 2007  
15           RTEP REQUIRE YOU TO RECONSIDER YOUR SUPPORT FOR YOUR  
16           DIRECT TESTIMONY AND THE RELIABILITY VIOLATIONS IDENTIFIED  
17           IN THE 2006 RTEP?

18    A.    Not in the slightest. Although I left PJM to join PowerGEM in November 2006  
19           and was not involved in the preparation of the studies underlying PJM's 2007  
20           RTEP, the reliability violations arising from those studies do nothing to undermine

1 the analyses conducted in support of the 2006 RTEP on which the need for TrAIL  
2 in this case has been premised. PJM's analyses of the need for major transmission  
3 system improvements is a dynamic process, and as Mr. Herling observes in his  
4 rebuttal testimony in this case, there are situations in which previously-announced  
5 transmission upgrades have been determined no longer to be necessary in  
6 subsequent RTEPs. I am generally aware, however, that TrAIL remains an  
7 important and assumed component in PJM's 2007 RTEP, and that Mr. Herling has  
8 asserted that both TrAIL and Amos to Kempton are independently needed to  
9 resolve reliability violations identified in that document.

10 Q. YOU SUGGESTED THAT MR. BOUFORD'S CONTENTIONS WERE JUST  
11 AS NOTABLE FOR WHAT THEY DID NOT SAY. WHAT DO YOU MEAN?

12 A. Mr. Bouford's unwarranted criticism of the PJM 2006 RTEP was levied only at  
13 electrical occurrence #9. The Commission should note that Mr. Bouford's  
14 criticism apparently does not extend to any of the other electrical occurrences  
15 identified in my Exhibit SWG-1 – particularly the eight occurrences that result in  
16 an overload of the Mt. Storm-Doubs line.

17 Q. TO CONCLUDE THIS SECTION OF YOUR TESTIMONY, PLEASE  
18 ADDRESS MR. BOUFORD'S ASSERTION THAT PJM OVERSTATED  
19 RELIABILITY VIOLATIONS FOUND IN THE 2011 BASE CASE.

1 A. None of Mr. Bouford's contentions (at pages 6-7 of his testimony) is demonstrated  
2 to have any impact on the results of PJM's identification of reliability violations in  
3 the 2006 RTEP; indeed, Mr. Bouford does not even attempt to explain why his  
4 criticisms are relevant in that regard. In any event, however, Mr. Bouford's  
5 assertions are inaccurate.

6 Mr. Bouford first asserts that PJM inappropriately excluded generators in the  
7 eastern PJM interconnection queue without a signed interconnection services  
8 agreements ("ISA") but included two proposed generators in the western PJM  
9 interconnection queue that did not have signed ISAs at the time the 2006 RTEP  
10 was completed. He implies that among the "excluded eastern generators" that  
11 were not considered, the "CPV Warren and CPV St. Charles Projects" should have  
12 been included. (Bouford at 7.)

13 There was nothing inappropriate, however, about PJM's inclusion and exclusion  
14 of generators in the 2006 RTEP. TrAILCo has already explained in a  
15 supplemental data response (to item 11 of CPV Warren's Second Data Request)  
16 that although a number of coal-fired generation projects in Western PJM were  
17 included in the 2006 RTEP modeling, the only reliability problems in Exhibit  
18 SWG-1 to which they were assumed to contribute are those associated with the  
19 PJM generator deliverability test (discussed further in my testimony below). The  
20 incorporation of these generators in PJM's modeling had no impact on the PJM

1 Load Deliverability results for electrical occurrences 1 through 4 and also had no  
2 impact on the Dominion Virginia Power's planning criteria results for electrical  
3 occurrences 5 through 8. The PJM baseline models include all active generation  
4 projects that have proceeded beyond the System Impact Study. However, for  
5 purposes of resolving reliability problems, PJM only includes capacity resources  
6 that have executed ISAs, because as Mr. Herling's rebuttal testimony explains,  
7 PJM's experience demonstrates that projects have a high degree of cancellation  
8 prior to execution of an ISA.

9  
10 III. MR. BOUFORD'S ASSERTIONS OF THE IMPACT OF CPV PROJECTS ON  
11 NEED ANALYSIS

12 **A. Summary of Mr. Bouford's Analyses and Underlying**  
13 **Assumptions**

14  
15 Q. MR. BOUFORD NEXT OPINES ON THE IMPACT OF THE ADDITION OF  
16 THE CPV PROJECTS ON THE NERC RELIABILITY VIOLATIONS YOU  
17 IDENTIFIED. BEFORE WE ANALYZE MR. BOUFORD'S FINDINGS,  
18 PLEASE SUMMARIZE HIS APPROACH.

19 A. As I will explain below, Mr. Bouford applies so many different assumptions and  
20 so much predicate information, and fails to use such important testing procedures,  
21 that it is difficult for me to agree that his analyses even approximate the rigor PJM

1 applied in the 2006 RTEP or, for that reason, can be meaningfully compared with  
2 PJM's analysis of the need for TrAIL. To understand my concerns, it may be  
3 helpful to provide some context for Mr. Bouford's approach.

4 First, after substituting a different "base case" for the 2011 case used in the 2006  
5 RTEP, Mr. Bouford assumed that the CPV Warren Facility will go on line by June  
6 2011 using its 138 kV interconnect. Using these data and assumptions, Mr.  
7 Bouford opined that some (but not all) of the identified reliability violations would  
8 be resolved (Bouford at 7-10 and Attachments B and C.)

9 Second, Mr. Bouford "analyzed the system for 2012" (Bouford at 10) by using the  
10 2012 base case from PJM's 2007 RTEP, in which he further assumes that the  
11 Amos to Kemptown line will be in service by June 2012. Based on these  
12 additional assumptions, Mr. Bouford asserts that none of the **2011** reliability  
13 violations expressed in my direct testimony will exist in **2012**. (Bouford at 10-11  
14 and Attachments D and E.)

15 Finally, using all of these same assumptions, Mr. Bouford further assumes that the  
16 CPV St. Charles Facility will *also* be in service by June 2011, and that this  
17 combination of assumptions addresses reliability problems in both 2011 and 2012.  
18 (Bouford at 11 and Attachments F and G.)

19

20

1                   **B. Mr. Bouford’s Assumptions and Methods are Unsupportable.**

2                   1. Mr. Bouford Failed to Apply PJM’s Load  
3                   Deliverability and Generator Deliverability Tests.  
4

5 Q. BEFORE YOU ADDRESS THE ASSUMPTIONS UNDERLYING MR.  
6 BOUFORD’S ANALYSIS, IS THERE A FUNDAMENTAL CONCERN YOU  
7 HAVE WITH HIS APPROACH?

8 A. Yes, there is. Apart from the advisability of the assumptions Mr. Bouford has  
9 used, I am most concerned by his unexplained refusal to apply the PJM “load  
10 deliverability” and “generator deliverability” tests to any of his analyses. In my  
11 view, this omission completely undermines Mr. Bouford’s opinions for five of the  
12 electrical occurrences and results identified in my Exhibit SWG-1.

13 Q. WHAT ARE THE LOAD DELIVERABILITY AND GENERATOR  
14 DELIVERABILITY TESTS, AND WHY WERE THEY IMPORTANT TO  
15 PJM’S IDENTIFICATION OF NERC RELIABILITY VIOLATIONS?

16 A. TrAILCo’s direct testimony filed in support of the Commission’s certification of  
17 TrAIL devoted significant attention to the role of these procedures. Mr. Herling’s  
18 direct testimony explained that in order to ensure compliance with NERC  
19 Category A and B reliability standards, PJM applies the “more rigorous  
20 deliverability criteria” of these two tests:  
21

1 PJM tests for both load deliverability and generator deliverability.  
2 The load deliverability test evaluates the capability of the  
3 transmission system to deliver energy from the remainder of the  
4 PJM region to a portion of the PJM region experiencing higher than  
5 normal unavailability of generating capacity. The generator  
6 deliverability test evaluates the capability of the transmission system  
7 to deliver energy from a grouping of generators experiencing higher  
8 than normal availability to the remainder of the PJM region  
9 experiencing lower than normal generator availability. The  
10 deliverability tests establish a link between generation resource  
11 adequacy for the region and the transmission adequacy necessary to  
12 deliver the generation resources to loads.

13  
14 (Herling direct testimony, attached to the Application at Appendix G, Tab 3, at  
15 12.)

16 I also discussed the importance of the load deliverability and generator  
17 deliverability tests at pages 11-12 of my direct testimony. I explained that the load  
18 deliverability test examines defined load zones within the PJM region and  
19 considers the ability of the transmission system to deliver adequate power to those  
20 zones during a generation capacity emergency. The generator deliverability test  
21 tests the system to assure that capacity resources can be delivered to the remainder  
22 of the system at peak load. Importantly, both tests are conducted by simulating the  
23 transmission system as it is expected to exist during future time periods. (See my  
24 direct testimony, attached to the Application at Appendix G, Tab 4, at 11-12.)

1 Q. IS PJM'S APPLICATION OF THE LOAD DELIVERABILITY AND  
2 GENERATOR DELIVERABILITY TESTS PERMISSIBLE UNDER THE NERC  
3 RELIABILITY STANDARDS?

4 A. Yes. PJM's generator deliverability and load deliverability tests are the accepted  
5 procedures by which PJM studies NERC Category B contingencies, including  
6 those analyzed in electrical occurrences #1 through #4 and #9 in Exhibit SWG-1.  
7 The applicable NERC standards empower the planning authority (in this case,  
8 PJM) to conduct assessments that, in order "to be valid . . . shall . . . cover critical  
9 system conditions and study years as deemed appropriate by the responsible  
10 entity."<sup>2</sup> In fulfillment of this requirement, PJM has applied the load deliverability  
11 and generator deliverability tests consistently for RTEP baseline studies,  
12 generation interconnection studies and merchant transmission interconnection  
13 studies on the PJM system for over seven years. These deliverability tests are set  
14 forth in PJM's Regional Planning Process Manual M14B, Attachment E.

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<sup>2</sup> See NERC Standard TPL-002-0 (governing Category B contingencies) at Section R1.3.2 and prefatory text, a copy of which is attached to this rebuttal testimony as Exhibit SWG-4. See also the NERC Planning Committee's 10-12-07 interpretation of Section R1.3.2, which confirms that "[t]he selection of the credible critical generation dispatch for modeling of critical system conditions is within the discretion of the Planning Authority/Transmission Planner." A copy of this document is as Exhibit SWG-5 to this rebuttal testimony.

1 Q. WHY IS PJM'S APPLICATION OF THESE TWO TESTS SO CRITICAL??

2 A. The generator and load deliverability tests are PJM's method to stress the PJM  
3 transmission system to assure reliability under "critical system conditions" as  
4 provided for in NERC Standard TPL-002-0 Section R1.3.2. Any analysis of  
5 NERC reliability violations within PJM that does not apply the load deliverability  
6 and generator deliverability tests cannot be said adequately to have studied the  
7 required critical system conditions, and therefore any such analysis is invalid.

8 Q. DID MR. BOUFORD APPLY EITHER THE LOAD DELIVERABILITY TEST  
9 OR THE GENERATOR DELIVERABILITY TEST TO HIS ANALYSIS OF  
10 ANY OF THE NERC RELIABILITY VIOLATIONS YOU IDENTIFIED?

11 A. Not only did he fail to identify them, his testimony does not even acknowledge  
12 their existence or the importance of PJM's application of them in the 2006 RTEP  
13 process.

14 Q. DO YOU KNOW WHY MR. BOUFORD DID NOT ATTEMPT TO APPLY  
15 THE LOAD DELIVERABILITY AND GENERATOR DELIVERABILITY  
16 TESTS IN THE CONTEXT OF HIS ANALYSIS?

17 A. In his response to a TrAILCo data request, Mr. Bouford admitted that he did not  
18 apply either of these tests, asserting that they contain "extensive data about each

1 individual component in the PJM system and rather extensive processing of that  
2 data.”<sup>3</sup>

3 Q. BUT COULDN'T MR. BOUFORD HAVE USED THE 2006 RTEP  
4 GENERATOR AND LOAD DELIVERABILITY BASE CASES THAT  
5 TRAILCO PROVIDED IN DISCOVERY IN THIS CASE?

6 A. Yes, Mr. Bouford could have accessed the base cases TrAILCo provided in  
7 discovery, and then could have modified those cases to account for any  
8 sensitivities he wanted to study. For reasons that are not apparent in his testimony,  
9 Mr. Bouford elected not to undertake this effort.

10 Q. IN YOUR VIEW, MR. GASS, HOW DOES MR. BOUFORD'S FAILURE TO  
11 APPLY THE LOAD DELIVERABILITY AND GENERATOR  
12 DELIVERABILITY TESTS AFFECT THE USEFULNESS OF HIS ANALYSIS?

13 A. Even without considering the other assumptions Mr. Bouford made, I believe that  
14 his failure to apply these two important tests renders invalid – and thus of no  
15 benefit to the Commission – all of his analyses relating to electrical occurrences  
16 #1 through #4 and #9 of my Exhibit SWG-1. This applies to Mr. Bouford's  
17 opinions expressed for these electrical occurrences as they appear in Attachments  
18 B through G of Mr. Bouford's direct testimony. The Commission will recall that

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<sup>3</sup> See CPV Warren's response to question 55 in TrAILCo's Fourth Set of Data Requests, a copy of which is attached to this rebuttal testimony as Exhibit SWG-6.

1 each of these electrical occurrences involves the electrical result of a 500 kV back  
2 bone line located either entirely or primarily in West Virginia: the Mt. Storm-  
3 Doubs line (in the case of electrical occurrences #1 through #4) and the  
4 Pruntytown-Mt. Storm line (in the case of electrical occurrence #9). It is worth  
5 noting, however, that even without applying these tests and the critical system  
6 conditions they model, Mr. Bouford's Attachment B results – those that purport to  
7 identify system reliability problems using a different, 2007 case – *still* indicate  
8 loadings above 92% of Mt. Storm-Doubs 500 kV line's emergency rating for  
9 electrical occurrences 1, 2 and 4.

10 2. Mr. Bouford Used a Different Base Case than the Base  
11 Case PJM Prepared for the Assessment of Reliability  
12 Violations.  
13

14 Q. WHAT IS THE NEXT OF MR. BOUFORD'S ASSUMPTIONS YOU WISH TO  
15 DISCUSS?

16 A. My direct testimony indicates that PJM used a 2011 base case in the 2006 RTEP.  
17 Each year PJM develops a "baseline" RTEP case that is used to look at system  
18 reliability five years into the future. The baseline RTEP case includes load  
19 profiles based on the latest available PJM load forecast, updates transmission  
20 topology based on the latest information available, and models all generators and  
21 merchant transmission projects that have proceeded beyond the System Impact  
22 Study. PJM uses this baseline RTEP case to determine any future reliability

1 problems and to evaluate and recommend solutions to all identified problems. The  
2 ‘baseline’ analysis and the resulting solutions to any reliability problems then  
3 serve as the base system for conducting Feasibility Studies and System Impact  
4 Studies for generation and merchant transmission interconnection projects. For  
5 the Commission to properly evaluate PJM’s identification of the reliability criteria  
6 violations, the 2011 ‘baseline’ case from the 2006 RTEP is the appropriate base  
7 case to use.

8 Mr. Bouford, on the other hand, elected to ignore the 2011 base case, instead  
9 choosing to use what he describes repeatedly in his direct testimony as the “2011  
10 case from the PJM 2007 RTEP.” He contended that he used “the PJM 2007 RTEP  
11 base case” because it provides, in his view, a “more current and accurate”  
12 representation of the transmission system. (Bouford at 8.)

13 Q. MR. BOUFORD’S IDENTIFICATION OF THIS CASE SUGGESTS THAT IT  
14 IS THE PRIMARY “BASE CASE” THAT PJM USED IN THE 2007 RTEP. IS  
15 THIS ACCURATE?

16 A. No. Although one cannot discern this from Mr. Bouford’s testimony, PJM’s 2007  
17 RTEP is intended to look at system reliability on a five-year horizon, and focuses  
18 primarily on the 2012 timeframe. It does not include or reference a 2011 base case  
19 to reach its conclusions. In reviewing Mr. Bouford’s testimony, this fact left me  
20 wondering exactly what base case Mr. Bouford was referencing. Had TrAILCo

1 not asked Mr. Bouford this question in a data request, it would have been  
2 impossible to identify the base case Mr. Bouford used.

3 Q. HOW DID MR. BOUFORD RESPOND TO THIS DATA REQUEST?

4 A. Mr. Bouford identified this case as “RTEP 2011 BASECASE 2<sup>nd</sup> Rev. on  
5 02/07/06, 2011 NON\_DIVERSIFIED 50/50 LOAD MODEL” that was last  
6 modified on June 25, 2007. Mr. Bouford explained that this case is not publicly  
7 available, but he was able to access it through CPV Warren, which is a member of  
8 PJM.<sup>4</sup>

9 Q. DID MR. BOUFORD DEFEND HIS ASSERTION THAT THE BASE CASE HE  
10 USED IS MORE ACCURATE THAN PJM’S 2011 BASE CASE USED IN THE  
11 RTEP?

12 A. No, he did not, and I cannot confirm his assertions in this regard. However, there  
13 is a serious reason to question the applicability and relevance of the base case Mr.  
14 Bouford used. Simply put, the base case Mr. Bouford refers to as the 2011 case  
15 from the PJM 2007 RTEP (Bouford at 8) used *was not updated* to reflect the most  
16 recent PJM 2007 load forecast. Updating the case to include the PJM 2007 load  
17 forecast would result in increased loadings on Mt. Storm-Doubs 500 kV in 2011  
18 due to the increased load growth projections for Allegheny Power, Dominion and

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<sup>4</sup> See CPV Warren’s response to question 54 in TrAILCo’s Fourth Set of Data Requests, a copy of which is attached to this rebuttal testimony as Exhibit SWG-7.

1 the Mid-Atlantic Region as compared to the PJM 2006 load forecast. In other  
2 words, while the base case Mr. Bouford used may have been updated to reflect  
3 changes in generation as compared with the ‘baseline’ case PJM used in the 2006  
4 RTEP, it does *not* include updated load growth projections based on the PJM 2007  
5 load forecast. This fact undermines Mr. Bouford’s assertion, stated at page 8 of  
6 his testimony, that his base case correctly incorporates, among other things,  
7 “updated load projections.”

8 Q. ARE THERE ANY OTHER RELEVANT CONCERNS YOU HAVE ABOUT  
9 THE BASE CASE MR. BOUFORD USED?

10 A. Another concern is apparent from the description of Mr. Bouford’s case: the  
11 nature of the load model incorporated into it. The case Mr. Bouford selected  
12 assumed a “50/50” load model, which means that the actual peak load that will  
13 occur in 2011 has a 50% chance of being greater than the forecasted peak and a  
14 50% chance of being less than the forecasted peak. By contrast, when PJM  
15 analyzes the system for the load deliverability test PJM uses a “90/10” load model  
16 which means that the actual peak load that will occur in 2011 has only a 10%  
17 chance of being greater than the forecasted peak. Consequently, Mr. Bouford’s  
18 base case applies significantly less stress to the transmission system than did the  
19 load deliverability case PJM used.

1 Q. IN HIS TESTIMONY, DID MR. BOUFORD IDENTIFY OR CONTROL FOR  
2 DIFFERENCES IN THE TYPE OF LOAD MODEL USED?

3 A. No; to the contrary, his testimony states that the base case he used was, to quote  
4 his language, “from the PJM 2007 RTEP.” It is not surprising, then, that Mr.  
5 Bouford’s testimony does not attempt to identify or account for these differences.

6 Q. WHAT SHOULD THE COMMISSION TAKE AWAY FROM THIS  
7 DISCUSSION?

8 A. The Commission should recognize that no matter what other assumptions Mr.  
9 Bouford incorporated into his analysis, the use of the base case Mr. Bouford  
10 selected tended to *minimize* the existence and extent of reliability violations as  
11 compared with the ‘baseline’ cases PJM uses in the RTEP process. In this sense,  
12 Mr. Bouford’s approach has the same weakness inherent in his failure to apply the  
13 load deliverability and generator deliverability tests: all else equal, it applies less  
14 stress on the transmission system than does PJM in its analyses. However, the  
15 ramifications of Mr. Bouford’s selection of a base case are felt not only in the case  
16 of the NERC Category B violations shown in Exhibit SWG-1 for electrical  
17 occurrences #1 through #4 and #9 – they apply equally to Mr. Bouford’s opinions  
18 on all of the electrical occurrences identified in Exhibit SWG-1.

19



1 service by June 2011. While I am not in a position to evaluate the factual basis for  
2 these assumptions today, I do wish to comment on the value of these assumptions  
3 in the context of PJM's 2006 RTEP.

4 PJM's exclusion of each of these projects from the 2006 RTEP was entirely  
5 justified. PJM's baseline models include all active generation projects that have  
6 proceeded beyond the System Impact Study. However, for purposes of resolving  
7 reliability problems, PJM only includes capacity resources with an executed  
8 Interconnection Services Agreement ("ISA"). As Mr. Herling explains in his  
9 rebuttal testimony, PJM's experience demonstrates that projects have a high  
10 probability of cancellation prior to execution of an ISA. Therefore, prior to the  
11 signing of an ISA, PJM does not include that generation in its analysis to  
12 determine the appropriate resolution of system reliability problems.

13 For these reasons, neither CPV project was included in the 2006 RTEP. Neither  
14 had an executed ISA as a PJM capacity resource at the time the 2006 RTEP was  
15 prepared, and the CPV St. Charles project had not even been announced at that  
16 time.

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1                   **C. Summary of Analysis of Mr. Bouford's Opinions**

2 Q. PLEASE SUMMARIZE YOUR RESPONSE TO MR. BOUFORD'S  
3 TESTIMONY.

4 A. I strongly disagree with most of Mr. Bouford's contentions, and stand behind  
5 PJM's identification of transmission system reliability violations in the 2006  
6 RTEP. Not only are his criticisms of that work unjustified, but his own  
7 conclusions about the ability of the proposed CPV facilities to address those  
8 problems are plagued with unrealistic assumptions and incomplete analyses which,  
9 taken together, inappropriately tend to minimize the reliability violations PJM  
10 identified in 2006 and, according to Mr. Herling, the 2007 RTEP continues to  
11 support.

12 In my view, the Commission should be very concerned about the identified  
13 reliability problems that directly affect major transmission lines in West Virginia  
14 and, as Mr. Hozempa's rebuttal testimony shows, a significant number of West  
15 Virginia electric customers. PJM's 2006 RTEP showed an overload on the Mt.  
16 Storm-Doubs 500 kV circuit under *three* separate planning tests: PJM's load  
17 deliverability and generator deliverability tests and Dominion Virginia Power's  
18 planning criteria. Additionally, Mt. Storm-Doubs 500 kV was identified as being  
19 overloaded for four different contingencies. These results overwhelmingly  
20 indicate a reliability problem in 2011 for a number of system conditions and

1 various contingencies. While all these results indicate a reliability problem, the  
2 test resulting in the most severe (highest % loading) on Mt. Storm-Doubs 500 kV  
3 was the PJM load deliverability procedure for an outage of either Mt. Storm-  
4 Greenland Gap 500 kV (electrical occurrence #1) or Greenland Gap-  
5 Meadowbrook 500 kV (electrical occurrence #2). In either contingency, the Mt.  
6 Storm-Doubs 500 kV line is loaded to **106%** of the emergency rating, or 156  
7 MVA above the 2598 MVA conductor rating, a very significant violation. Even  
8 when Mr. Bouford's many unjustified assumptions are indulged, and when CPV  
9 Warren is assumed to be available by June 2011, Mr. Bouford *still* projects (in  
10 Attachment C to his testimony) an overload on the Mt. Storm-Doubs line unless  
11 further system improvements are made. (Bouford at 9-10.) Notwithstanding Mr.  
12 Bouford's testimony, it is my view that PJM and TrAILCo have effectively  
13 demonstrated that serious reliability issues exist affecting major transmission lines  
14 in West Virginia, and the Commission should act affirmatively to address them.

15 Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

16 A. Yes, it does.

**A. Introduction**

- 1. Title:** System Performance Following Loss of a Single Bulk Electric System Element (Category B)
- 2. Number:** TPL-002-0
- 3. Purpose:** System simulations and associated assessments are needed periodically to ensure that reliable systems are developed that meet specified performance requirements with sufficient lead time, and continue to be modified or upgraded as necessary to meet present and future system needs.
- 4. Applicability:**
  - 4.1.** Planning Authority
  - 4.2.** Transmission Planner
- 5. Effective Date:** April 1, 2005

**B. Requirements**

- R1.** The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is planned such that the Network can be operated to supply projected customer demands and projected Firm (non-recallable reserved) Transmission Services, at all demand levels over the range of forecast system demands, under the contingency conditions as defined in Category B of Table I. To be valid, the Planning Authority and Transmission Planner assessments shall:
- R1.1.** Be made annually.
  - R1.2.** Be conducted for near-term (years one through five) and longer-term (years six through ten) planning horizons.
  - R1.3.** Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Category B of Table 1 (single contingencies). The specific elements selected (from each of the following categories) for inclusion in these studies and simulations shall be acceptable to the associated Regional Reliability Organization(s).
    - R1.3.1.** Be performed and evaluated only for those Category B contingencies that would produce the more severe System results or impacts. The rationale for the contingencies selected for evaluation shall be available as supporting information. An explanation of why the remaining simulations would produce less severe system results shall be available as supporting information.
    - R1.3.2.** Cover critical system conditions and study years as deemed appropriate by the responsible entity.
    - R1.3.3.** Be conducted annually unless changes to system conditions do not warrant such analyses.
    - R1.3.4.** Be conducted beyond the five-year horizon only as needed to address identified marginal conditions that may have longer lead-time solutions.
    - R1.3.5.** Have all projected firm transfers modeled.

## **Standard TPL-002-0 — System Performance Following Loss of a Single BES Element**

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- R1.3.6.** Be performed and evaluated for selected demand levels over the range of forecast system Demands.
- R1.3.7.** Demonstrate that system performance meets Category B contingencies.
- R1.3.8.** Include existing and planned facilities.
- R1.3.9.** Include Reactive Power resources to ensure that adequate reactive resources are available to meet system performance.
- R1.3.10.** Include the effects of existing and planned protection systems, including any backup or redundant systems.
- R1.3.11.** Include the effects of existing and planned control devices.
- R1.3.12.** Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.
- R1.4.** Address any planned upgrades needed to meet the performance requirements of Category B of Table I.
- R1.5.** Consider all contingencies applicable to Category B.
- R2.** When System simulations indicate an inability of the systems to respond as prescribed in Reliability Standard TPL-002-0\_R1, the Planning Authority and Transmission Planner shall each:
  - R2.1.** Provide a written summary of its plans to achieve the required system performance as described above throughout the planning horizon:
    - R2.1.1.** Including a schedule for implementation.
    - R2.1.2.** Including a discussion of expected required in-service dates of facilities.
    - R2.1.3.** Consider lead times necessary to implement plans.
  - R2.2.** Review, in subsequent annual assessments, (where sufficient lead time exists), the continuing need for identified system facilities. Detailed implementation plans are not needed.
- R3.** The Planning Authority and Transmission Planner shall each document the results of its Reliability Assessments and corrective plans and shall annually provide the results to its respective Regional Reliability Organization(s), as required by the Regional Reliability Organization.

### **C. Measures**

- M1.** The Planning Authority and Transmission Planner shall have a valid assessment and corrective plans as specified in Reliability Standard TPL-002-0\_R1 and TPL-002-0\_R2.
- M2.** The Planning Authority and Transmission Planner shall have evidence it reported documentation of results of its reliability assessments and corrective plans per Reliability Standard TPL-002-0\_R3.

**D. Compliance**

**1. Compliance Monitoring Process**

**1.1. Compliance Monitoring Responsibility**

**Compliance Monitor:** Regional Reliability Organizations.  
 Each Compliance Monitor shall report compliance and violations to NERC via the NERC Compliance Reporting Process.

**1.2. Compliance Monitoring Period and Reset Timeframe**

Annually.

**1.3. Data Retention**

None specified.

**1.4. Additional Compliance Information**

None.

**2. Levels of Non-Compliance**

- 2.1. Level 1:** Not applicable.
- 2.2. Level 2:** A valid assessment and corrective plan for the longer-term planning horizon is not available.
- 2.3. Level 3:** Not applicable.
- 2.4. Level 4:** A valid assessment and corrective plan for the near-term planning horizon is not available.

**E. Regional Differences**

- 1. None identified.

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
0	April 1, 2005	Effective Date	New

**Standard TPL-002-0 — System Performance Following Loss of a Single BES Element**

**Table I. Transmission System Standards — Normal and Emergency Conditions**

Category	Contingencies	System Limits or Impacts		
	Initiating Event(s) and Contingency Element(s)	System Stable and both Thermal and Voltage Limits within Applicable Rating <sup>a</sup>	Loss of Demand or Curtailed Firm Transfers	Cascading Outages
<b>A</b> No Contingencies	All Facilities in Service	Yes	No	No
<b>B</b> Event resulting in the loss of a single element.	Single Line Ground (SLG) or 3-Phase (3Ø) Fault, with Normal Clearing: 1. Generator 2. Transmission Circuit 3. Transformer Loss of an Element without a Fault.	Yes Yes Yes Yes	No <sup>b</sup> No <sup>b</sup> No <sup>b</sup> No <sup>b</sup>	No No No No
	Single Pole Block, Normal Clearing <sup>c</sup> : 4. Single Pole (dc) Line	Yes	No <sup>b</sup>	No
<b>C</b> Event(s) resulting in the loss of two or more (multiple) elements.	SLG Fault, with Normal Clearing <sup>c</sup> : 1. Bus Section	Yes	Planned/ Controlled <sup>c</sup>	No
	2. Breaker (failure or internal Fault)	Yes	Planned/ Controlled <sup>c</sup>	No
	SLG or 3Ø Fault, with Normal Clearing <sup>c</sup> , Manual System Adjustments, followed by another SLG or 3Ø Fault, with Normal Clearing <sup>c</sup> : 3. Category B (B1, B2, B3, or B4) contingency, manual system adjustments, followed by another Category B (B1, B2, B3, or B4) contingency	Yes	Planned/ Controlled <sup>c</sup>	No
	Bipolar Block, with Normal Clearing <sup>c</sup> : 4. Bipolar (dc) Line Fault (non 3Ø), with Normal Clearing <sup>c</sup> :	Yes	Planned/ Controlled <sup>c</sup>	No
	5. Any two circuits of a multiple circuit towerline <sup>f</sup>	Yes	Planned/ Controlled <sup>c</sup>	No
	SLG Fault, with Delayed Clearing <sup>c</sup> (stuck breaker or protection system failure): 6. Generator	Yes	Planned/ Controlled <sup>c</sup>	No
7. Transformer	Yes	Planned/ Controlled <sup>c</sup>	No	
8. Transmission Circuit	Yes	Planned/ Controlled <sup>c</sup>	No	
9. Bus Section	Yes	Planned/ Controlled <sup>c</sup>	No	

**Standard TPL-002-0 System Performance Following Loss of a Single BES Element**

<p><b>D<sup>d</sup></b> Extreme event resulting in two or more (multiple) elements removed or Cascading out of service</p>	<p>3Ø Fault, with Delayed Clearing<sup>e</sup> (stuck breaker or protection system failure):</p> <table border="0"> <tr> <td>1. Generator</td> <td>3. Transformer</td> </tr> <tr> <td>2. Transmission Circuit</td> <td>4. Bus Section</td> </tr> </table> <hr/> <p>3Ø Fault, with Normal Clearing<sup>e</sup>:</p> <hr/> <ol style="list-style-type: none"> <li>5. Breaker (failure or internal Fault)</li> <li>6. Loss of towerline with three or more circuits</li> <li>7. All transmission lines on a common right-of way</li> <li>8. Loss of a substation (one voltage level plus transformers)</li> <li>9. Loss of a switching station (one voltage level plus transformers)</li> <li>10. Loss of all generating units at a station</li> <li>11. Loss of a large Load or major Load center</li> <li>12. Failure of a fully redundant Special Protection System (or remedial action scheme) to operate when required</li> <li>13. Operation, partial operation, or misoperation of a fully redundant Special Protection System (or Remedial Action Scheme) in response to an event or abnormal system condition for which it was not intended to operate</li> <li>14. Impact of severe power swings or oscillations from Disturbances in another Regional Reliability Organization.</li> </ol>	1. Generator	3. Transformer	2. Transmission Circuit	4. Bus Section	<p>Evaluate for risks and consequences.</p> <ul style="list-style-type: none"> <li>▪ May involve substantial loss of customer Demand and generation in a widespread area or areas.</li> <li>▪ Portions or all of the interconnected systems may or may not achieve a new, stable operating point.</li> <li>▪ Evaluation of these events may require joint studies with neighboring systems.</li> </ul>
1. Generator	3. Transformer					
2. Transmission Circuit	4. Bus Section					

- a) Applicable rating refers to the applicable Normal and Emergency facility thermal Rating or system voltage limit as determined and consistently applied by the system or facility owner. Applicable Ratings may include Emergency Ratings applicable for short durations as required to permit operating steps necessary to maintain system control. All Ratings must be established consistent with applicable NERC Reliability Standards addressing Facility Ratings.
- b) Planned or controlled interruption of electric supply to radial customers or some local Network customers, connected to or supplied by the Faulted element or by the affected area, may occur in certain areas without impacting the overall reliability of the interconnected transmission systems. To prepare for the next contingency, system adjustments are permitted, including curtailments of contracted Firm (non-recallable reserved) electric power Transfers.
- c) Depending on system design and expected system impacts, the controlled interruption of electric supply to customers (load shedding), the planned removal from service of certain generators, and/or the curtailment of contracted Firm (non-recallable reserved) electric power Transfers may be necessary to maintain the overall reliability of the interconnected transmission systems.
- d) A number of extreme contingencies that are listed under Category D and judged to be critical by the transmission planning entity(ies) will be selected for evaluation. It is not expected that all possible facility outages under each listed contingency of Category D will be evaluated.
- e) Normal clearing is when the protection system operates as designed and the Fault is cleared in the time normally expected with proper functioning of the installed protection systems. Delayed clearing of a Fault is due to failure of any protection system component such as a relay, circuit breaker, or current transformer, and not because of an intentional design delay.
- f) System assessments may exclude these events where multiple circuit towers are used over short distances (e.g., station entrance, river crossings) in accordance with Regional exemption criteria.

## **Interpretation of TPL-002-0 Requirements R1.3.2 and Requirement R1.3.12 and the identical requirements (Requirements R1.3.2 and Requirement R1.3.12) in TPL-003-0 for MISO**

### **Request for Interpretation received from MISO on August 9:**

*MISO asks if the TPL standards require that any specific dispatch be applied, other than one that is representative of supply of firm demand and transmission service commitments, in the modeling of system contingencies specified in Table 1 in the TPL standards.*

*MISO then asks if a variety of possible dispatch patterns should be included in planning analyses including a probabilistically based dispatch that is representative of generation deficiency scenarios, would it be an appropriate application of the TPL standard to apply the transmission contingency conditions in Category B of Table 1 to these possible dispatch pattern.*

**R1.3.2** Cover critical system conditions and study years as deemed appropriate by the responsible entity.

### **The following interpretation of TPL-002-0 and TPL-003-0 R1.3.2 was developed by the NERC Planning Committee on September 12, 2007:**

TPL-002 and TPL-003 do not specify the process for selection of the credible critical generation dispatch for modeling of critical system conditions. The selection of the credible critical generation dispatch for modeling of critical system conditions is within the discretion of the Planning Authority/Transmission Planner.

### **Request for Interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.12 received from MISO on August 9:**

*MISO asks if the term “planned outages” means only already known/scheduled planned outages that may continue into the planning horizon, or does it include potential planned outages not yet scheduled that may occur at those demand levels for which planned (including maintenance) outages are performed? If the requirement does include not yet scheduled but potential planned outages that could occur in the planning horizon, is the following a proper interpretation of this provision?*

*The system is adequately planned and in accordance with the standard if, in order for a system operator to potentially schedule such a planned outage on the future planned system, planning studies show that a system adjustment (load shed, re-dispatch of generating units in the interconnection, or system reconfiguration) would be required concurrent with taking such a planned outage in order to prepare for a Category B contingency (single element forced out of service)? In other words, should the system in effect be planned to be operated as for a Category C3 n-2 event, even though the first event is a planned base condition?*

*If the requirement is intended to mean only known and scheduled planned outages that will occur or may continue into the planning horizon, is this interpretation consistent with the original interpretation by*

*NERC of the standard as provided by NERC in response to industry questions in the Phase I development of this standard?*

**R1.3.12** Include the planned (including maintenance) outage of any bulk electric equipment (including protection systems or their components) at those demand levels for which planned (including maintenance) outages are performed.

**The interpretation of TPL-002-0 and TPL-003-0 Requirement R1.3.12 was developed by the NERC Planning Committee on September 12, 2007**

TPL-002-0 and TPL-003-0 explicitly provide that the inclusion of planned (including maintenance) outages of any bulk electric equipment at demand levels for which the planned outages are performed are within the discretion of the Planning Authority/Transmission Planner.

**INTERROGATORY NO. 55:**

At page 16, lines 4-5 of his direct testimony, Mr. Gass indicates that electrical occurrences 1 through 3 identified in Exhibit SWG-1 are violations of the PJM Generator and Load Deliverability Procedures. With respect to Mr. Bouford's testimony:

a. Did Mr. Bouford follow the PJM Generator and Load Deliverability Procedures when developing the results included in Attachments B, C and F of his direct testimony for electrical occurrences 1 through 3?

b. If he did not follow the PJM Generator and Load Deliverability Procedures, then explain in complete detail (i) why he did not do so, and (ii) what process(es) he used to perform the Generator and Load Deliverability tests.

c. Please also provide copies of all generator and load deliverability tests Mr. Bouford did perform that support or are relevant to Mr. Bouford's analyses.

**INTERROGATORY RESPONSE NO. 55:**

a. No.

b. (i) The PJM Generator and Load Deliverability Procedures contain extensive data about each individual component in the PJM system and rather extensive processing of that data. In order to validate the reasonableness of the base case results and review the pertinent contingencies, as presented in Chart A of Exhibit SWG-1 in Scott W. Gass's testimony, TRC focused on the thermal loading and steady-state voltage performance of the system in conducting its studies..

(ii) The 2011 and 2012 Base Cases were obtained through the PJM web site <http://www.pjm.com/planning/project-queues/queues-gen-info.html> . Specifically the downloaded files were packaged ZIP files from "Queue S (Through 07.31.2007)", for the 2012 case set and "Queue R (Through 01.31.2007)" for the 2011 case set, with each package containing at least a PSS/E save case. The PJM 2011 case name was "RTEP2011s\_final\_nondiversified\_2wndg\_wfe1000\_122006.sav" and the 2012 case name was "S Queue\_rtep2012s\_062207.sav".

The PTI PSS/E load flow program was utilized to analyze the base case system and all pertinent contingencies. The maximum solution iteration parameter was changed from 20 to 99 for each of the above cases. The cases were then solved with solution parameters that allowed adjustment of load tap-changing transformers

***RESPONSE CONTINUED ON NEXT PAGE***

**INTERROGATORY RESPONSE NO. 55 [continued]:**

(LTCs), static VAR compensators (SVCs), switched shunt devices, phase angle regulators (PARs), and immediately applied generator VARs, with the area interchange control disabled.

The CPV Warren generation model was connected to the Meadowbrook 138-kV bus, the CPV St. Charles generation model was connected to the 230-kV system between Morgantown and Talbots substations, and they were inserted into the appropriate cases, with no manual generation re-dispatch. The cases were solved using the above solution parameters and saved as "PJM2011-Warren" and "PJM2012-Warren". The cases were then altered, where the Possum Point #5 generation was taken offline, with no manual generation re-dispatch. The cases were then solved using the above solution parameters and saved as "PJM2011-Warren-WOP" and "PJM2012-Warren-WOP".

Contingency analysis files were created with post-contingency solution parameters that kept the adjustment of LTC, SVC, and PAR devices locked.

PSS/E ACCC contingency processing was performed and the results for area 145 (VAP) and 201 (AP) were tabulated using the following criteria:

For any 500 kV bus, the voltage must remain at or above 101% of the nominal value.

For any bus at less than 500 kV, the voltage must remain at or above 93%.

Post-contingency, no line loading may exceed 94% of its Long Term Emergency (LTE) rating.

c. See Attachment H in the Responses of CPV Warren, LLC To Trans-Allegheny Interstate Line Company's Discovery Requests (Third Set) To CPV Warren, LLC.

**PREPARED BY:** James D. Bouford  
**DATE PREPARED:** December 14, 2007

**INTERROGATORY NO. 54:**

At page 5, line 5, and page 8, line 1, of Mr. Bouford's testimony, Mr. Bouford states that he used a 2011 base case from the 2007 RTEP. With respect to this base case,

- a. identify and provide a complete copy of it;
- b. explain how he acquired it;
- c. explain whether it is publicly available, and if so, where;
- d. explain whether he was directed to use it as a basis for his calculations, and if so, by whom; and
- e. state when he contends it was initially prepared by PJM and made available, and if this date is after March 30, 2007, please explain why he believes it is appropriate to be used in this proceeding.

**INTERROGATORY RESPONSE NO. 54:**

a. The case is identified as, "RTEP 2011 BASECASE 2<sup>nd</sup> Rev. on 02/07/06, 2011 NON\_DIVERSIFIED 50/50 LOAD MODEL" that was last modified on 06/25/2007 at 3:24 P.M. The 2011 base case from the 2007 RTEP is available only to members of PJM through PJM's website. TrAILCo's parent, Allegheny Energy, is a member of PJM and thus able to obtain the requested document of its own accord. CPV Warren accordingly objects to providing the 2011 base case from the 2007 RTEP to TrAILCo since that document is available to Allegheny Energy.

b. TRC Engineering obtained access to it through CPV Warren LLC, a PJM member.

c. It is not publicly available.

d. No directions were given to use it as a basis for his analysis.

e. It was last modified on 06/25/2007, and is assumed to have been made available at that date. It uses the most accurate load projection and system topology data available to PJM. As stated by TrAILCo's own witness, in Mr. Gass's testimony on page 10, "However, transmission planning is not a 'one-time' activity. Instead, it is dynamic and involves ongoing review of changes in the transmission system that result from the decommissioning of existing plants, the addition of new plants, changes in load

***RESPONSE CONTINUED ON NEXT PAGE***

**INTERROGATORY RESPONSE NO. 54 [continued]:**

patterns and other events that affect the topology of the transmission system.” Based on that statement, it is appropriate to use a model that presents the changes to the load patterns and system topology PJM considers most probable to occur to determine the future expansion needs of the PJM system. Mr. Bouford chose to use the 2011 base case from the 2007 RTEP so that he could base his calculations and analyses on the best available and most current data.

**PREPARED BY:** James D. Bouford  
**DATE PREPARED:** December 12, 2007