

**BEFORE THE**  
**PENNSYLVANIA PUBLIC UTILITY COMMISSION**

<b>IN RE: APPLICATION OF TRANS-ALLEGHENY</b>	<b>:</b>	
<b>INTERSTATE LINE COMPANY FOR</b>	<b>:</b>	
<b>(I) A CERTIFICATE OF PUBLIC CONVENIENCE</b>	<b>:</b>	
<b>TO OFFER, RENDER, FURNISH AND/OR</b>	<b>:</b>	
<b>SUPPLY TRANSMISSION SERVICE IN THE</b>	<b>:</b>	
<b>COMMONWEALTH OF PENNSYLVANIA;</b>	<b>:</b>	
<b>(II) AUTHORIZATION AND CERTIFICATION</b>	<b>:</b>	
<b>TO LOCATE, CONSTRUCT, OPERATE AND</b>	<b>:</b>	<b>Docket Nos. A-110172</b>
<b>MAINTAIN CERTAIN HIGH VOLTAGE ELECTRIC</b>	<b>:</b>	<b>A-110172F0002</b>
<b>TRANSMISSION LINES AND RELATED ELECTRIC</b>	<b>:</b>	<b>A-110172F0003</b>
<b>SUBSTATION FACILITIES; (III) AUTHORITY</b>	<b>:</b>	<b>A-110172F0004</b>
<b>TO EXERCISE THE POWER OF EMINENT</b>	<b>:</b>	<b>G-00071229</b>
<b>DOMAIN FOR THE CONSTRUCTION AND</b>	<b>:</b>	
<b>INSTALLATION OF AERIAL ELECTRIC</b>	<b>:</b>	
<b>TRANSMISSION FACILITIES ALONG THE</b>	<b>:</b>	
<b>PROPOSED TRANSMISSION LINE ROUTES</b>	<b>:</b>	
<b>IN PENNSYLVANIA; (IV) APPROVAL OF AN</b>	<b>:</b>	
<b>EXEMPTION FROM MUNICIPAL ZONING</b>	<b>:</b>	
<b>REGULATION WITH RESPECT TO THE</b>	<b>:</b>	
<b>CONSTRUCTION OF BUILDINGS; AND</b>	<b>:</b>	
<b>(V) APPROVAL OF CERTAIN RELATED</b>	<b>:</b>	
<b>AFFILIATED INTEREST ARRANGEMENTS</b>	<b>:</b>	

**REBUTTAL TESTIMONY OF DR. JAY ZARNIKAU**

**Re: Impacts of Energy Efficiency and**  
**Demand Side Management Programs on the Need for TrAIL**

**December 10, 2007**

REBUTTAL TESTIMONY OF DR. JAY ZARNIKAU

1 I. INTRODUCTION

2 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

3 A. My name is Jay Zarnikau. My business address is 1515 Capital of Texas Hwy,  
4 South, Suite 110, Austin, Texas, 78746.

5

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

7 A. I am the president of Frontier Associates LLC. We provide consulting  
8 assistance to energy consumers, electric and gas utilities, and government  
9 agencies on topics related to energy economics and pricing, utility cost  
10 allocation and rate design, forecasting, resource planning, energy efficiency  
11 program design and evaluation, and energy and regulatory policy. We also  
12 manage a number of energy efficiency programs, including new home  
13 construction energy efficiency programs, air conditioner replacement  
14 programs, and lighting retrofit projects for hotel chains around the country.

15

16 Q. PLEASE STATE BRIEFLY YOUR EDUCATIONAL BACKGROUND AND  
17 PROFESSIONAL QUALIFICATIONS.

18 A. I have a Ph.D. degree in Economics from the University of Texas. I completed  
19 undergraduate studies in Business Administration and Economics at the State  
20 University of New York and McGill University in Canada.

1 From 1983 through 1991, I was employed by the Public Utility Commission of  
2 Texas, where I served as the Manager of Economic Analysis from 1985  
3 through 1988; as the Assistant Director of the Electric Division from 1987 to  
4 1988; and as the Director of the Electric Utility Regulation from 1988 to 1991.  
5 From 1991 through 1993, I held a faculty-level research position at The  
6 University of Texas College of Engineering Center for Energy Studies. I  
7 served as a vice president at Planergy, Inc. from 1992 to 1999. Since 1999, I  
8 have been president of Frontier Associates LLC.

9  
10 I have written a number of reports and journal articles on the topics of energy  
11 policy, rate design, energy efficiency, demand response, and electric utility  
12 restructuring. I currently teach graduate-level classes in statistics at the  
13 University of Texas as a part-time Visiting Professor at the LBJ School of  
14 Public Affairs and in the College of Natural Sciences.

15  
16 My resume, which is attached to this rebuttal testimony as TrAILCo Rebuttal  
17 Exhibit JZ-1, describes in greater detail my educational background and prior  
18 work experience.

19  
20 Q. ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

21 A. I am appearing on behalf of Trans-Allegheny Interstate Line Company  
22 (“TrAILCo”).

1 Q. DID YOU SUBMIT DIRECT TESTIMONY ON BEHALF OF TRAILCO  
2 PREVIOUSLY IN THIS PROCEEDING?

3 A. No, I did not.

4

5 Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS  
6 PROCEEDING?

7 A. The purpose of my rebuttal testimony is to address certain conclusions reached  
8 by Robert Fagan testifying on behalf of the Office of Consumer Advocate  
9 ("OCA") regarding whether demand side management ("DSM") programs can  
10 alleviate the need for the portion of TrAIL consisting of the 500kV  
11 transmission line from 502 Junction Substation to Prexy Substation, the Prexy  
12 Substation, and the related 138 kV transmission lines (collectively, the "Prexy  
13 Facilities") proposed by TrAILCo. While Mr. Fagan does not go as far as  
14 saying DSM can fully displace the need for the Prexy Facilities, his testimony  
15 erroneously leaves such an impression. Further, some aspects of Mr. Fagan's  
16 testimony overstate the potential contribution of DSM programs toward  
17 reducing the need for the Prexy Facilities. I will provide a more realistic  
18 depiction of the potential contribution of DSM programs in the area to be  
19 served by the Prexy Facilities.

20

21 In addition, I will challenge the contention of various witnesses at the public  
22 input hearings to the effect that other transmission facilities proposed by

1 TrAILCo in this proceeding and similar proceedings in Virginia and West  
2 Virginia (i.e., the 502 Junction to Loudoun line) could be displaced if  
3 Allegheny Power were to aggressively implement DSM programs.

4

5 Q. WILL THE USE OF VARIOUS TERMS IN YOUR REBUTTAL  
6 TESTIMONY BE CONSISTENT WITH THE DEFINITIONS ASSIGNED  
7 TO THOSE TERMS IN THE TABLE OF NOMENCLATURE ATTACHED  
8 TO TRAILCO WITNESS FLITMAN'S DIRECT TESTIMONY AS  
9 TRAILCO EXHIBIT DEF-1?

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

11

12 EXHIBITS

13 Q. PLEASE IDENTIFY AND DESCRIBE THE EXHIBITS TO YOUR  
14 REBUTTAL TESTIMONY.

15 A. I am sponsoring one exhibit with my rebuttal testimony, my resume, which is  
16 attached hereto and marked as TrAILCo Rebuttal Exhibit JZ-1.

17

18 II. SUMMARY OF CONCLUSIONS

19 Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.

20 A. I have reached the following principal conclusions:

- 21 • The aggressive implementation of a comprehensive set of energy efficiency  
22 and DSM programs by Allegheny Power cannot displace the need for the

1           Prexy Facilities within the timeframe that PJM determined that such  
2           facilities are needed.

- 3           • The aggressive implementation of a comprehensive set of energy efficiency  
4           and DSM programs by Allegheny Power will not be a reasonable substitute  
5           for the planned transmission line from the 502 Junction Substation to  
6           Loudoun County, Virginia.

7

8    Q.    PLEASE DESCRIBE THE ORGANIZATION OF YOUR REBUTTAL  
9           TESTIMONY IN THIS PROCEEDING.

10   A.    My testimony is organized as follows:

- 11           • Section III presents the reasons why energy efficiency and DSM programs  
12           within the Allegheny Power service area cannot displace the need for the  
13           Prexy Facilities.

- 14           • Section IV explains that energy efficiency and DSM initiatives within the  
15           Allegheny Power service area cannot materially affect the need for the  
16           proposed transmission line from 502 Junction Substation to Loudoun  
17           County, Virginia.

18

19   III.    DSM PROGRAMS CANNOT DISPLACE THE PREXY FACILITIES NEED

20   Q.    PLEASE DEFINE THE TERM "DSM" PROGRAMS AS USED IN THIS  
21           REBUTTAL TESTIMONY.

1 A. DSM refers to actions taken by a utility to manage the demand for electricity.  
2 Such actions might include programs or pricing strategies designed to affect  
3 the level or temporal pattern of electricity consumption. DSM encompasses  
4 the concepts of “energy efficiency” and “demand response,” as OCA witness  
5 Fagan uses those phrases. He defines “energy efficiency” as improvements in  
6 the technical efficiency of end use devices or systems, and defines “demand  
7 response” as resources allowing for the shifting or cycling of loads.

8

9 Q. DO YOU AGREE WITH OCA WITNESS FAGAN’S CONTENTION THAT  
10 THERE ARE OPPORTUNITIES TO REDUCE DEMAND WITHIN THE  
11 ALLEGHENY POWER SERVICE AREA WHICH WILL BE SERVED BY  
12 THE PREXY FACILITIES?

13 A. Yes. I agree that there are numerous opportunities for demand reduction and  
14 energy conservation in Washington County and portions of neighboring  
15 counties (northern Greene County and adjacent portions of Allegheny County).

16

17 Q. WHY THEN DO YOU BELIEVE THAT MR. FAGAN HAS OVERSTATED  
18 THE POSSIBLE CONTRIBUTION OF AGGRESSIVE DSM IN  
19 POTENTIALLY REDUCING THE NEED FOR THE PREXY FACILITIES?

20 A. My opinion is based upon the following concerns with Mr. Fagan’s testimony:

- 1           •    His analysis fails to recognize that the rate of demand growth in the  
2                    Washington County area exceeds the average growth rate in Allegheny  
3                    Power's Pennsylvania service area as a whole.
- 4           •    He failed to consider the amount of “lead time” necessary to implement  
5                    effective DSM programs.
- 6           •    While he may have relied upon a reasonable method to obtain a very  
7                    rough estimate of the amount of demand reduction that might be  
8                    achievable in the Washington County area through aggressive DSM  
9                    programs, it is imprudent to rely upon this simplistic estimate for setting  
10                  program goals.

11

12   Q.    WHY DO YOU BELIEVE MR. FAGAN HAS UNDERESTIMATED THE  
13            RATE OF DEMAND GROWTH IN THE AREA WHICH WILL BE  
14            SERVED BY THE PREXY FACILITIES?

15   A.    Figure 2 in Mr. Fagan’s testimony, OCA Statement No. 2, page 9, relies upon  
16            a demand projection for the entire West Penn Power Company (“West Penn”)  
17            service area (i.e., the Allegheny Power service area in Pennsylvania), reflecting  
18            a growth rate in demand of 0.91%. While the projected rate of growth in peak  
19            demand in the overall West Penn service area is 0.91%, recent growth in  
20            demand in the Washington County area has been around 2.9%. I understand  
21            West Penn anticipates that demand growth in this Washington County area will

1 continue to exceed the service area-wide average rate, and will be  
2 approximately 1.3% over the next five years.

3

4 Based upon this demand growth data, Figure 2 in Mr. Fagan's testimony, OCA  
5 Statement No. 2, page 9, is meaningless. While the scenarios constructed by  
6 Mr. Fagan could lead to a 0.4% growth rate (under one of his scenarios) or  
7 negate any growth in the entire West Penn service area (under his "aggressive  
8 energy efficiency" scenario), the energy efficiency initiatives described by Mr.  
9 Fagan cannot slow growth in the Washington County area to this level if the  
10 forecast growth rate is indeed higher. As he noted, the need for the Prexy  
11 Facilities is primarily associated with load growth in the Washington County  
12 area. Thus, even if one accepts all of Mr. Fagan's other assumptions (which,  
13 as I discuss below, would not be correct), he overstates the ability of DSM to  
14 mitigate the need for the Prexy Facilities.

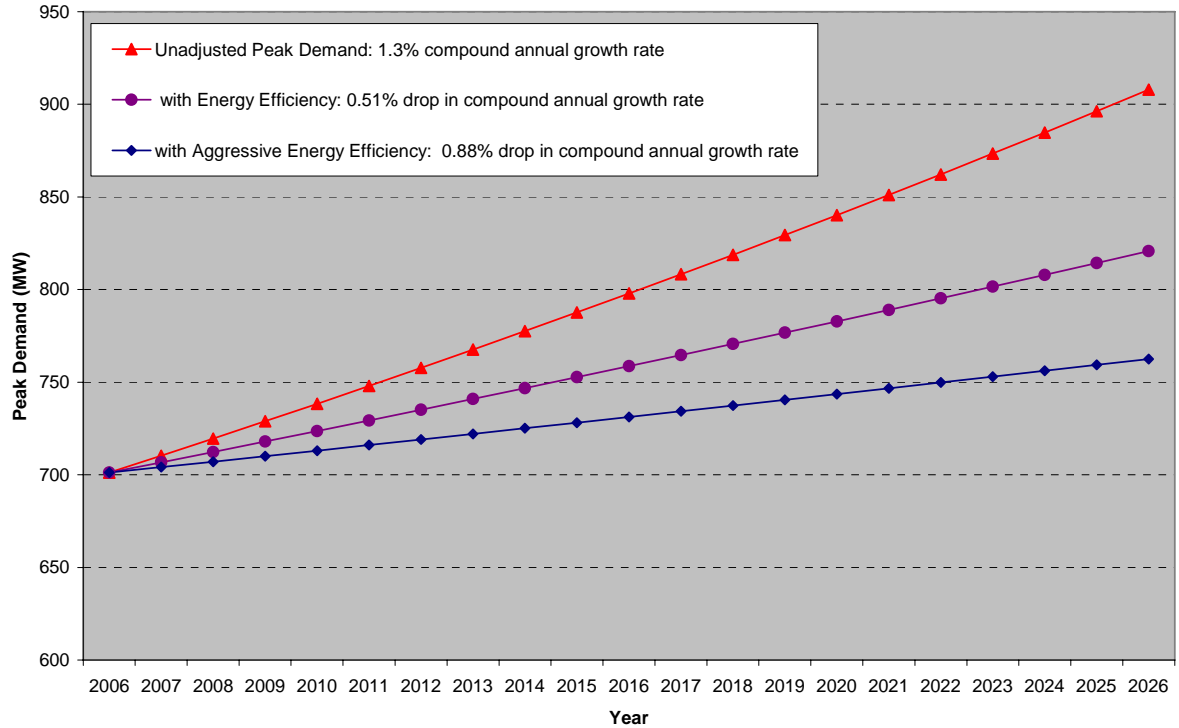
15

16 In Figure 1, I present a revised load forecast for the Prexy area that reflects the  
17 two scenarios proposed by Mr. Fagan, but also accounts for area-specific  
18 expected load growth. While Mr. Fagan's version of Figures 1 and 2 use the  
19 total peak demand for West Penn and a 0.91% growth rate as a starting point,  
20 my figure presents the current level of peak demand (provided to me by  
21 TrAILCo) in the Prexy area and applies the 1.3% projected average annual  
22 growth rate provided to me by TrAILCo. Under Mr. Fagan's first scenario,

1 energy efficiency is used to slow demand growth by 0.51% each year. I have  
2 similarly made that calculation (i.e., reduced the rate of load growth by  
3 0.51%), and it appears as the middle line on my graph. Under Mr. Fagan's  
4 "Aggressive EE" scenario, demand is reduced by 0.88% each year. I have  
5 similarly adopted (solely for the purposes for this analysis) his assumption that  
6 aggressive energy efficiency could reduce load growth by that rate, and I have  
7 reflected that scenario on my graph.

8  
9 While Figure 2 in Mr. Fagan's testimony suggests that any demand growth can  
10 be essentially eliminated through aggressive energy efficiency, my Figure 1  
11 demonstrates that this is not possible. The projected rate of growth in peak  
12 demand in the Washington County area is simply too high to be fully offset  
13 through the aggressive energy efficiency scenario described by Mr. Fagan.

**Figure 1**  
**Effects of Energy Efficiency on Projected Peak Demand for Prexy Area**



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I understand that much of this growth is related to the construction of retail stores, including shopping malls, new homes, office buildings, a casino, and various manufacturing activities (e.g., titanium melting, corrugated cardboard production, plastic production, and specialty metals production) in Washington County. This growth will be even more pronounced with the opening of a Tanger Outlet Mall, the continued growth at the California Technical Park, and the expansion at Southpointe. Residential activity in Washington County has also been a large factor in the growth, including steady, significant numbers of building permits granted in the county over the past ten years. (See:

1 <http://socds.huduser.org/permits/>) Much of this growth is the result of  
2 economic growth in Pittsburgh and the effects of that growth on outer suburbs.

3

4 Q. YOU CONTEND THAT OCA WITNESS FAGAN HAS ALSO FAILED TO  
5 CONSIDER THE AMOUNT OF “LEAD TIME” NECESSARY TO  
6 IMPLEMENT EFFECTIVE DSM PROGRAMS. CAN DSM PROGRAMS  
7 ALONE PROVIDE THE RELIEF THAT WOULD BE NEEDED TO  
8 DISPLACE THE PREXY FACILITIES AS QUICKLY AS WOULD  
9 CONSTRUCTION OF THOSE PROPOSED TRANSMISSION UPGRADES  
10 AND RELATED FACILITIES?

11 A. No. Just as transmission investments involve some planning, permitting, and  
12 construction time, DSM programs require lead time for market research,  
13 planning, regulatory approval, and start-up activities. One significant  
14 difference between the two resources is that the full capacity of a transmission  
15 line or substation may be available once the project is complete. DSM  
16 programs normally require some “ramp up” time and (more importantly) some  
17 time for the cumulative effects of the program to “build up” into a significant  
18 system resource. Some programs can be implemented fairly quickly. But  
19 some programs take longer than others to achieve significant impacts.  
20 Consequently, it can take a number of years for a full “suite” of programs to  
21 contribute a significant level of demand reduction.

22

1 In order to ramp up the suite of programs proposed by Mr. Fagan, the  
2 following steps would normally be required:

- 3 • Market research to identify specific energy efficiency opportunities.
- 4 • Cost-benefit analyses, to determine which energy efficiency  
5 opportunities might be exploited through a utility program in a cost-  
6 effective manner (e.g., at a cost lower than comparable supply-side  
7 investments).
- 8 • Review of program design and program delivery options.
- 9 • Program design to establish incentive levels or promotional  
10 mechanisms, targeted levels of participation and impacts, marketing  
11 channels, and evaluation plans. This may involve further cost-benefit  
12 analyses.
- 13 • Staffing and program management, including the establishment of  
14 databases, contracts, and internal procedures.
- 15 • Program rollout, including marketing and outreach.

16 Of course, these steps are in addition to any regulatory review processes, such  
17 as approval by this Commission, which is uncertain as to process, timing and  
18 outcome.

19

20 The impacts of a fully implemented suite of programs accrue very gradually  
21 over time. The 1% electricity consumption reduction cited by Mr. Fagan in

1 OCA Statement No. 2, page 10, reflect the impacts of a very “mature” suite of  
2 programs, or programs which have been administered for a number of years.  
3 Yet, Mr. Fagan’s analysis is premised upon DSM programs having an impact  
4 on demand as soon as 2008. His analysis is thus flawed for this reason as well,  
5 because it assumes that Allegheny Power could “jump” to mature program  
6 status without allowing time for program design, approval, implementation,  
7 rollout, or maturation.

8  
9 As an example of the time needed, consider the fact that a demonstration  
10 project conducted in 1992 and 1993 within the Pacific Gas & Electric  
11 Company service area in California assessing whether DSM programs could  
12 displace the need for transmission and distribution upgrades in an area found  
13 that, even for an aggressive campaign, “it requires at least 3 to 5 years to plan  
14 and implement the initial stages of a fully integrated plan for a single  
15 distribution planning area. . . it takes at least 3 years to mount a highly  
16 concentrated DSM effort in a single area.”<sup>1</sup>

17  
18 More mature DSM programs result in greater program awareness by energy  
19 consumers and the establishment of delivery channels (e.g., participation by  
20 energy services companies, homebuilders, vendors of energy equipment, and  
21 other trade allies) necessary for the programs to achieve significant impacts.

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<sup>1</sup>Targeting DSM for Transmission and Distribution Benefits: A Case Study of PG&E's Delta District, R. Orans, et al., Energy and Environmental Economics with Pacific Gas & Electric for the Electric Power Research Institute, EPRI TR-100487, May, 1992, p. ES-5.

1 Put simply, it would take years for the types of programs described by Mr.  
2 Fagan to reach their full potential, and the needs that the Prexy Facilities are  
3 intended to address are not (based on the evidence of the other witnesses in this  
4 proceeding) ones that we can wait years to see if they can be mitigated through  
5 DSM.

6  
7 I understand from reviewing TrAILCo witness Hozempa's Rebuttal testimony,  
8 that a 31% reduction in demand from the forecast peak demand in Washington  
9 and Greene Counties would be needed in order to fully displace the need for  
10 the Prexy Facilities. In my judgment, demand reductions of this magnitude are  
11 not attainable through DSM programs within the time frame that Mr. Fagan  
12 was relying on. The analysis presented in my Figure 1 suggests that, at best  
13 (and accepting all his other assumptions), Mr. Fagan's aggressive energy  
14 efficiency scenario would yield a 32 MW reduction or 4.3% reduction from the  
15 projected load growth, and this completely ignores the need for any lead-time  
16 for planning and regulatory approval.

17  
18 Q. PLEASE ELABORATE UPON YOUR FURTHER CONCERN ABOUT  
19 RELYING ON MR. FAGAN'S APPROACH FOR OBTAINING A VERY  
20 ROUGH ESTIMATE OF THE AMOUNT OF DEMAND REDUCTION  
21 THAT MIGHT BE ACHIEVABLE IN THE WASHINGTON COUNTY  
22 AREA THROUGH AGGRESSIVE DSM PROGRAMS.

1 A. Mr. Fagan's analysis in OCA Statement No. 2, pages 8 to 17, assumes that the  
2 achievements of successful demand reduction programs in other areas of the  
3 U.S. can be replicated in the Washington County area. But this assumption is  
4 unsupported. Energy efficiency opportunities are completely dependent upon  
5 a location's building stock, industrial facilities, energy prices, energy  
6 alternatives, availability of energy-efficient equipment, building codes,  
7 consumer attitudes, demographic features, and many other factors. DSM  
8 programs that work well in California or New England may not necessarily  
9 succeed in Pennsylvania. OCA witness Fagan has not presented any market  
10 research and analyses suggesting that the levels of energy efficiency he  
11 assumes are achievable could truly be achieved through aggressive DSM  
12 efforts in Washington County.

13

14 Because programs tend to rely upon voluntary participation by energy  
15 consumers, it must also be recognized that there is considerable uncertainty  
16 inherent in forecasting the impacts of a suite of programs. Some of this  
17 uncertainty can be minimized through careful market research and planning.  
18 However, the performance of demand reduction program that relies upon  
19 consumer behavior is likely to remain much more uncertain than the  
20 performance of transmission infrastructure.

1 Q. WHAT HAS BEEN THE TRACK RECORD OF OTHER UTILITIES THAT  
2 HAVE ATTEMPTED TO RELY UPON DSM PROGRAMS AS A MEANS  
3 OF DISPLACING THE NEED FOR TRANSMISSION INVESTMENTS?

4 A. The record has been mixed at best. The Pacific Gas and Electric Company's  
5 "Delta project" which I cited earlier produced 2.3 MW of demand reduction  
6 and was initially considered successful in demonstrating the benefits of using  
7 DSM to defer transmission and distribution system investments. But while it  
8 was originally hoped that the targeted DSM would defer a substation by about  
9 8 years,<sup>2</sup> it only succeeded in deferring the substation project by about 2  
10 years.<sup>3</sup> Other programs have been implemented in Connecticut and Long  
11 Island, New York with some success but at great cost. In 2006, two efforts in  
12 Texas met with little success. American Electric Power sought to reduce  
13 demand in a transmission-constrained area of the Rio Grande Valley by 5 MW,  
14 but only achieved a 1 MW demand reduction through a load management  
15 program (all from a single customer). CenterPoint Energy sought demand  
16 reduction in a transmission-constrained portion of its network in Houston, but  
17 failed to sign up any customers to its targeted load management program.

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<sup>2</sup> See Targeting DSM for Transmission and Distribution Benefits: A Case Study of PG&E's Delta District, R. Orans, et al., Energy and Environmental Economics with Pacific Gas & Electric for the Electric Power Research Institute, EPRI TR-100487, May, 1992, Figures ES-1 and ES-2.

<sup>3</sup> Martin Kushler, Dan York, and Edward Vine, "Energy-Efficiency Measures Alleviate T&D Constraints," April 1, 2005.

1 Q. HAVE YOU IDENTIFIED ANY SPECIAL CHALLENGES ASSOCIATED  
2 WITH THE IMPLEMENTATION OF SUCCESSFUL DSM PROGRAMS IN  
3 WASHINGTON AND GREENE COUNTIES?

4 A. Yes. According to the rebuttal testimony of TrAILCo witness Hozempa,  
5 demand reduction of more than 6,000 hours per year would be required in  
6 order to fully displace the need for the Prexy Facilities. This suggests that  
7 demand response programs (e.g., residential direct load control or an industrial  
8 load interruptible or curtailment program) could not alone substitute for the  
9 Prexy Facilities. Normally, limits are placed on the numbers of hours that  
10 customers on such programs may be interrupted. Such limits are typically in  
11 the 40 hours per year to 80 hours per year range. This is significant because  
12 demand response programs are often the quickest types of DSM programs that  
13 can be implemented by a utility. However, demand response programs may  
14 not be well-suited to meeting the specific reliability needs identified by PJM  
15 and TrAILCo for the Prexy Facilities, since they could not provide demand  
16 reduction for the large number of hours necessary to displace the need for the  
17 Prexy Facilities.

18

19 It is also significant to note that the saturation of electric space heating  
20 equipment seems to be fairly low in West Penn's service territory. Only about  
21 17% of the homes in West Penn use electricity for space heating, according to  
22 Allegheny Power's 2006 Residential Appliance Saturation Survey. This

1 percentage appears to be even lower in Washington County, although small  
2 sample sizes at the county level render it difficult to determine whether the  
3 difference is significant. This suggests to me that there may be limited  
4 opportunities to achieve large winter peak demand reductions through  
5 residential energy efficiency programs.

6

7 The U.S. Environmental Protection Agency's designation of Washington  
8 County as a non-attainment area (i.e., an area which is out of compliance with  
9 certain air quality standards) may further limit some DSM opportunities in this  
10 area. For example, it might be difficult for industrial facilities to operate  
11 backup generators in order to curtail usage upon the request of PJM or  
12 Allegheny Power.

13

14 IV. DEMAND SIDE MANAGEMENT INITIATIVES WITHIN THE  
15 ALLEGHENY POWER SERVICE AREA CANNOT AFFECT THE NEED  
16 FOR THE 502 JUNCTION TO LOUDOUN LINE

17

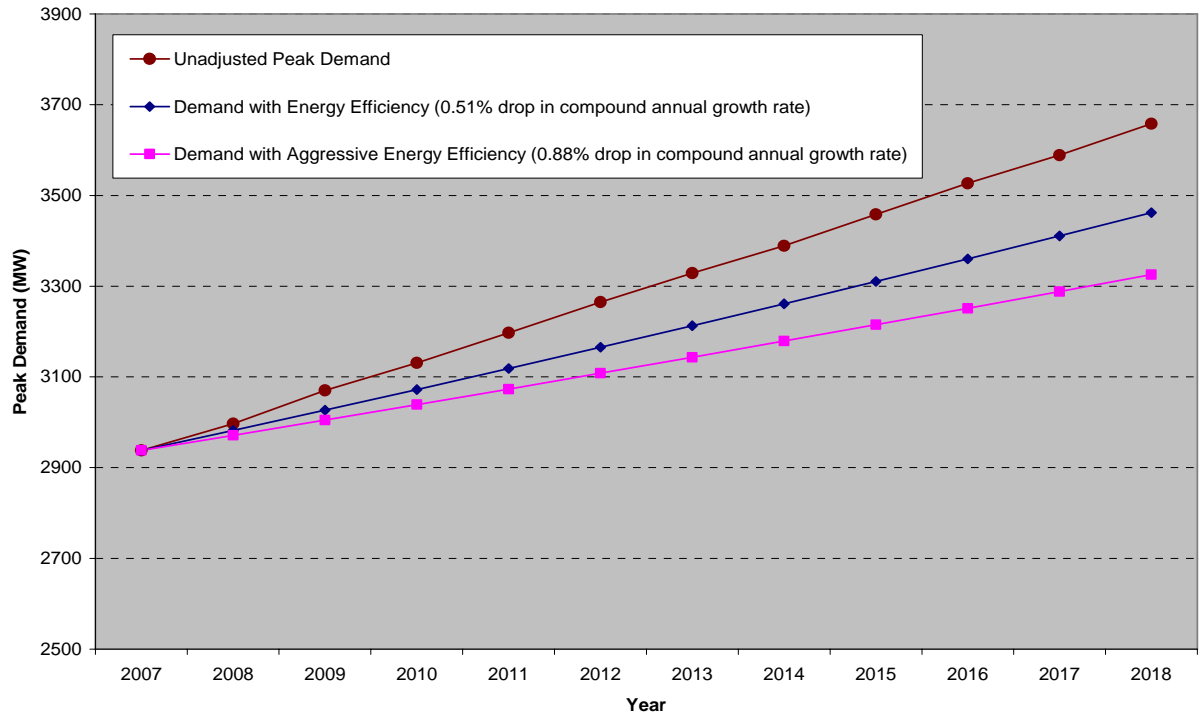
18 Q. AT THE PUBLIC HEARINGS, A NUMBER OF WITNESSES SUGGESTED  
19 THAT ENERGY EFFICIENCY COULD BE USED TO DISPLACE THE  
20 NEED FOR THE PROPOSED LINE FROM THE 502 JUNCTION  
21 SUBSTATION TO THE LOUDOUN SUBSTATION IN LOUDOUN  
22 COUNTY, VIRGINIA. DO YOU AGREE WITH THIS ASSERTION?

1 A. No. According to the rebuttal testimony of TrAILCo witness Hozempa, a  
2 demand reduction of 36% or 829.4 MW in the Allegheny Power Transmission  
3 Zone would be required by 2011 to eliminate the need for this line. According  
4 to Mr. Hozempa's testimony, this is approximately one-third of the Potomac  
5 Edison load, plus some load in Pennsylvania.

6  
7 It would be nearly impossible for DSM programs undertaken by Allegheny  
8 Power to achieve a level of demand reduction anywhere near this level. If I  
9 again adopt the scenarios recommended by Mr. Fagan in OCA Statement No.  
10 2, page 9, 124 MW of demand reduction could be achieved through aggressive  
11 energy efficiency by 2011, which is just 15% of the amount of demand  
12 reduction that TrAILCo considers necessary in order to displace the line.  
13 Figure 2 presents peak demand projections for The Potomac Edison Company  
14 service area of Allegheny Power under the energy efficiency scenarios  
15 developed by Mr. Fagan which, as I have discussed earlier, fail to incorporate  
16 adequate lead time for program planning and ramp-up. In this figure, I am  
17 using Potomac Edison's load as a proxy for the portion of the Allegheny Zone  
18 served by the Mt. Storm-Doubs line, since a load growth projection for that  
19 exact area was not readily available. However, I have been informed by  
20 Allegheny Power that this is a reasonable proxy and that expected growth rates  
21 in these two (largely over-lapping) regions should be similar. Clearly, it would

1 be virtually impossible for Allegheny Power to displace the need for this  
2 transmission line through DSM programs affecting load within its service area.

**Figure 2**  
**Effects of Energy Efficiency on Peak Demand for Potomac Edison Company**



3  
4

5 Q. WOULD IT BE POSSIBLE FOR TRAILCO TO FORCE OTHER UTILITIES  
6 (OTHER THAN ALLEGHENY POWER) THAT MIGHT BENEFIT FROM  
7 THIS LINE TO LAUNCH NEW DSM PROGRAMS?

8 A. No.

1 Q. WOULD INITIATIVES TO LAUNCH DSM PROGRAMS BY OTHER  
2 UTILITIES THAT MIGHT BENEFIT FROM THIS LINE FACE  
3 CHALLENGES SIMILAR TO THOSE THAT YOU HAVE REPORT HERE?

4 A. Yes. New DSM programs undertaken by other utilities would require planning  
5 and a ramp-up period. For many utilities, regulatory approvals are required  
6 before a utility can undertake a new program.

7

8 Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

9 A. Yes. However, I reserve the right to file such additional testimony as may be  
10 necessary or appropriate.

## Resumé

### **Jay Zarnikau, PhD**

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## PROFESSIONAL EXPERIENCE

### **1999- President, Frontier Associates, Austin, Texas**

Responsible for providing assistance in the design and implementation of energy efficiency programs, utility resource planning, electricity pricing, rate analysis/design, program evaluation, demand forecasting, and energy policy. Also assists industrial and commercial energy consumers in rate negotiations and energy procurement activities.

### **1992-1999 Vice President, Planergy, Austin, Texas**

Responsible for providing assistance in the design and implementation of energy efficiency programs, and providing consulting assistance in the areas of utility resource planning, electricity pricing, program evaluation, demand forecasting, and energy policy.

### **1991-1993 Manager of Energy Strategies Research Program, The University of Texas at Austin Center for Energy Studies, Austin, Texas**

Held faculty-level research position. Served on dissertation and thesis committees. Supervised independent study projects.

Responsible for the oversight of research projects in the areas of utility resource planning, regulation, electricity pricing, and policy analysis.

Coordinated a study of the technical and achievable potential for energy efficiency savings in Texas.

Program Manager for EPRI-sponsored effort to develop a new integrated resource planning framework and model.

**1983-1991 Director of Electric Utility Regulation (from 1988 to 1991), Economist (1983 to 1988) Public Utility Commission of Texas, Austin, Texas**

Supervised a professional staff of over fifty accountants, economists, and engineers responsible for analyzing regulatory and technical issues and providing recommendations to the Commission. Prepared and defended testimony in over twenty proceedings on topics including: load forecasting, rate design, cogeneration, system planning, demand-side management program impacts, billing determinants, wheeling, and computer modeling.

**1982-1983 Research Associate, Bureau of Business Research, University of Texas at Austin, Austin, Texas**

Assisted in maintenance of statewide economic-demographic forecasting model, prepared projections for state legislature and state agencies, and conducted studies to determine the value of various mineral resources in Texas.

**EDUCATION**

Ph.D. (1990) and M.A. (1983) in Economics, University of Texas at Austin

Fields completed in Econometrics, Resource Economics, and Micro Modeling

B.S. in Business Administration and Economics, State University of New York, Oswego, New York, May 1981

McGill University, Montreal, Quebec, 1979-1980

**PUBLICATIONS AND RESEARCH PAPERS**

***Refereed Journals:***

“Aggregate Consumer Response to Wholesale Prices in the Restructured Texas Electricity Market,” forthcoming in Energy Economics, 2007. With Ian Hallett.

“Industrial Energy Consumer Response to Wholesale Prices in the Restructured Texas Electricity Market,” Energy -- the International Journal, 2007. With Greg Landreth, Ian Hallett, and Subal Kumbhakar.

“Trends in Prices to Commercial Energy Consumers in the Competitive Texas Electricity Market,” Energy Policy, 2007. With Marilyn Fox and Paul Smolen.

“Testing Functional Forms in Energy Modeling: An Application of the Bayesian Approach,” Energy Economics, 2006. With Ni Xiao and Paul Damien.

“Consumer Demand for ‘Green Power’ and Energy Efficiency,” Energy Policy, 2003.

“Functional Forms in Energy Demand Modeling,” Energy Economics, 2004.

“When Different Types of Energy Resources are Aggregated for Use in Econometric Studies, Does the Aggregation Approach Matter?,” Energy Economics, 1999.

“Will Tomorrow’s Energy Efficiency Indices Prove Useful in Economic Studies?,” The Energy Journal, 1999.

“A Re-examination of the Causal Relationship between Energy Consumption and GDP,” Journal of Energy and Development, 1996.

“Can Different Energy Resources be Added or Compared?,” Energy - The International Journal, 1995, Vol. 21, No. 6. With Philip Schmidt and Sid Guermouche.

“Advanced Pricing in Electrical Systems,” IEEE Trans. on Power Systems, 1995. With Martin Baughman and Shams Siddiqi.

“Integrating Transmission into IRP,” IEEE Trans. on Power Systems, 1995. With Martin Baughman and Shams Siddiqi.

“Customer Responsiveness to Real-Time Pricing of Electricity,” The Energy Journal, December 1990, Vol. 11, No. 4.

“Spot Market Pricing of Electricity,” Forum for Applied Research and Public Policy, Winter 1990, Vol. 5, No. 4. With Martin Baughman and George Mentrup.

***Non-Refereed Journals, Proceedings, and Research Reports:***

“The Quest for Competitive Electricity Markets,” forthcoming in LBJ Journal of Public Affairs.

“Fostering Demand Response in Restructured Markets,” forthcoming in Competitive Electricity Markets: Design, Implementation and Performance, edited by Fereidoon P. Sioshansi.

“Will the Texas Market Succeed, Where So Many Others Have Now Failed?,” Proceedings of the US Energy Association Conference, Houston, August 2007. With Parviz Adib.

- “Has Texas Achieved Too Much Demand Response?,” 17<sup>th</sup> National Energy Services Conference Proceedings, January 2007.
- “A Look Inside the Most Successful Restructured Electricity Market in North America: Texas,” Proceedings of IAEE Conference. Potsdam, Germany, May 2006.
- “Texas: The Most Robust Restructured Electricity Market in North America,” in Electricity Market Reform: An International Perspective, Ed. Pereidoon Sioshansi and Wolfgang Pfaffenberger, Elsevier, 2007.
- “Changing Installation Practices of A/C Installers – Three Years of Results,” ACEEE Summer Study on Energy Efficiency in Building, 2006. With Mike Stockard and Phil Audet.
- “Using Demand Response Programs to Provide Operating Reserves in Wholesale Power Markets: A Case Study of the ERCOT Market,” US Energy Association’s Dialogue, 2006.
- “Do Industrial Energy Consumers Respond to Price Signals in the Restructured Texas Electricity Market?,” 15<sup>th</sup> National Energy Services Conference Proceedings, December 2004.
- “Will Tomorrow’s Restructured Markets Provide Opportunities to Better Determine the Value Of Demand-Side Resources?,” 14<sup>th</sup> National Energy Services Conference Proceedings, December 2003.
- “Energy Efficient Windows in the Southern Residential Windows Market,” ACEEE Summer Study Proceedings, 2002. With Alison Tribble, Kate Offringa, Bill Prindle, Dariush Arasteh, Arlene Stewart, and Ken Nittler.
- “The Window Market in Texas: Opportunities for Energy Savings and Demand Reduction,” Symposium on Improving Building Systems in Hot & Humid Climates, May 2002. With Lauren Campbell.
- “The Treatment of Demand-Side Resources in ERCOT’s Restructured Markets,” 12<sup>th</sup> National Energy Services Conference Proceedings, December 2001.
- “Electricity Resource Planning in Korea,” Discussion Paper, 1999. With Y.H. Kwun.
- “Agriculture: An Often-Overlooked Opportunity for Energy Conservation,” Strategic Planning for Energy and the Environment, 1997. With Alex Lee.

- “Energy Efficiency Opportunities in the Industrial Sector,” Energy Engineering, Vol. 93, No. 3, 1996. With Alex Lee.
- "Taking Advantage of Real-Time Pricing Programs to Reduce Energy Costs in Manufacturing," ACEEE Summer Study on Energy Efficiency in Industry Proceedings, August 1997.
- “Should Your Facility be Served Under a Real-Time Pricing Tariff?,” Energy Buyer’s Guide, December 1996.
- "Opportunities for Energy Efficiency in the Texas Industrial Sector," ACEEE Summer Study on Energy Efficiency in Industry Proceedings, August 1995. Contributor.
- “Measuring Negawatts,” presentation to the Institute for Statistics and Decision Sciences, Duke University, 1994.
- "Integrated Resource Planning in the United States," Proceedings of World Energy Council, Neptune, Romania, June 1994.
- "Design and Implementation of a Demand Cooperative," Conference Proceedings: Demand-Side Management Opportunities and Perspectives in the Asia-Pacific Region, International Energy Agency, Seoul, November 1993.
- "Real-Time Pricing of Electricity: An Assessment," Proceedings of the Eleventh Annual Industrial Energy Technology Conference, Houston, September 1989. With Martin Baughman.
- “Opportunities for Energy Efficiency in the Texas Industrial Sector,” Sustainable Energy Development Council, 1995. Contributor and project leader.
- “Neoelectrification of Industry in the Information Age,” Edison Electric Institute, 1994. With Philip Schmidt, Frederick T. Sparrow, and John Vanston.
- “Advanced Pricing in Electrical Systems,” CES Discussion Paper, October, 1992. With Martin Baughman and Shams Siddiqi.
- “Comprehensive Electrical Systems Planning,” Center for Energy Studies for the Electric Power Research Institute, 1994. With Martin Baughman and Shams Siddiqi.
- “Opportunities for Energy Efficiency in Texas,” Center for Energy Studies, May 1992. With Bruce Hunn and other contributors.

## **OTHER ACTIVITIES**

Adjunct Lecturer and Visiting Professor, University of Texas LBJ School of Public Affairs. Taught graduate-level statistics classes during six of last nine semesters.

ERCOT Working Group on Demand Side Resources, Founder and Co-Chair (2001)

Board Member and Vice President for Publications, Association of Energy Services Professionals

Retail Energy Aggregators of Texas, Director, 2001-2003

State of Texas Energy Policy Partnership, Member, 1992

National Association of Regulatory Utility Commissioners Staff Subcommittee on Wheeling and Transmission, Member, 1990

Member of American Economic Association and International Association for Energy Economics (Vice President of local chapter).

Reviewer for International Energy Review, ACEEE Summer Study, IEEE Transactions on Power Systems, Energy Economics, Energy Policy, and The Energy Journal

## **TESTIMONY**

*PUCT Docket No. 31540: Proceeding to Consider Protocols to Implement a Nodal Market in the Electric Reliability Council of Texas Pursuant to PUC Subst. R. 25.501.* Testimony before the Public Utility Commission of Texas (PUCT) on behalf of Nucor Steel and Chaparral Steel on demand side issues.

*Public Service Commission of South Carolina, Docket No. 2005-1-E: Progress Energy Carolinas, Inc. Annual Review of Base Rates for Fuel Costs.* Reviewed the utility's fuel costs and rates on behalf of a large industrial customer of the utility.

*Railroad Commission of Texas, Docket No. 9400: Application of TXU Gas Company for a Rate Increase.* Provided cost allocation and rate design testimony on behalf of a group of cities. Also provided testimony in a district court to support a Writ of Mandamus.

*U.S. Bankruptcy Court, Southern District, In re. Texas Commercial Energy, LLC, Case No. 03-20366-C-11.* Testified in support of a claim.

*Public Utility Commission of Texas (PUCT) Docket No. 23950: Petition of Reliant Energy to Establish Price to Beat Fuel Factor.* Presented (on the utility's behalf) a forecast of the Company's future sales of electricity.

*PUCT Docket No. 22537: Application of Reliant Energy HL&P to Implement Wholesale Power Service – General Land Office Rate Schedule.* Testified in support of tariff approval.

- PUCT Docket No. 22355: Application of Reliant Energy HL&P for Approval of Unbundled Cost of Service Rate.* Examined competitive opportunities that might be available to commercial and residential customers under various parties' rate design proposals.
- PUCT Docket No. 22349: Application of Texas-New Mexico Power Company for Approval of Unbundled Cost of Service Rate.* Requested (on behalf of the utility) funding for energy efficiency programs and system benefit fund programs.
- PUCT Docket No. 21527: Application of TXU Electric Company for Financing Order to Securitize Regulatory Assets.* Evaluated application on behalf of Nucor Steel.
- PUCT Docket No. 17942: Application for Approval of Time-of-Use Rate Options for TU Electric Company.* Analyzed utility proposal on behalf of Nucor Steel Company.
- PUCT SOAH Docket No. 473-96-0333: Application of TU Electric Company for Real-Time Pricing Proposal in Compliance with the Commission's Order in Docket No. 14570.* Analyzed the utility's filing on behalf of Nucor Steel Company.
- PUCT Docket No. 9491: Texas-New Mexico Power Company rate case.* Described applicable prudence standards and explored purchased power, cogeneration, and conservation as alternatives to the completion of the TNP One power plant project. Analyzed the utility's filing on behalf of PUCT Staff.
- PUCT Docket No. 6992 Remand: Texas-New Mexico Power Company power plant certification case.* Projected the costs of standby, wheeling, purchased power and cogeneration over a forty-year horizon, and explored purchased power, cogeneration, and conservation as alternatives to the completion of the TNP One power plant project. Analyzed the utility's filing on behalf of PUCT Staff.
- PUCT Docket No. 9300: TU Electric rate case.* Recommended changes to proposed tariffs for interruptible service and explored other rate design and system planning issues. Analyzed the utility's filing on behalf of PUCT Staff.
- PUCT Docket No. 8425: Houston Lighting and Power Company rate case.* Analyzed proposed tariffs for interruptible service, standby service, economic development rates and wheeling services, and recommended alternative rates and calculation methodologies. Analyzed the utility's filing on behalf of PUCT Staff.
- PUCT Docket No. 8422: Rita Blanca Cooperative tariff application.* Proposed some modifications to the design of a proposed economic development tariff. Analyzed the utility's filing on behalf of PUCT Staff.
- PUCT Docket No. 8363: El Paso Electric Company rate case.* Provided recommendations regarding future generation mix and total fuels expenses. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 7460: El Paso Electric Company rate case.* Reviewed the demand forecasts upon which the utility relied in its decision to participate in the Palo Verde nuclear project. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 7195/6755: Gulf States Utilities Company rate case.* Reviewed the demand forecasts upon which the utility relied in its decision to initiate the River Bend nuclear project. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 6992: Texas-New Mexico Power Company power plant certification case.* Projected the availability of purchased power and confirmed its viability as an alternative to the proposed TNP One power plant. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 6184: Economic Viability for South Texas Unit 2.* Analyzed the capabilities of various resource planning models to assist in selecting an appropriate means of determining the reasonableness of completing a nuclear power plant construction project. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 8191: Cherokee County Electric Cooperative rate case.* Reviewed adjustments to test-year sales, demand, and numbers of customers data. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 6375: Central Power and Light Company rate case.* Reviewed adjustments to test-year sales, demand, and numbers of customers data. Critiqued the utility's long-term load forecast. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 6105: Central Power and Light Company Avoided Cost calculation.* Recommended rejection of the utility's long-term load forecast for the purpose of calculating long-run avoided costs. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 6064: Houston Lighting and Power Company Avoided Cost calculation.* Reviewed the utility's demand projections. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 5994: Inquiry into the rates paid by Houston Lighting and Power Company to Qualifying Facilities.* Projected future demand for electricity on the utility system and the need for firm cogeneration capacity. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 8015: Amendment to TU Electric's certificate for the Comanche Peak nuclear plant.* Reviewed the utility's future demand and capacity needs. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 6526: TU Electric Company power plant certificate case.* Reviewed the utility's demand projections. Analyzed the utility's filing on behalf of PUCT Staff.

*PUCT Docket No. 5568: Texas-New Mexico Power Company rate case.* Reviewed adjustments to test-year sales, demand, and number of customers data, and miscellaneous operations and maintenance expenses. Analyzed the utility's filing on behalf of PUCT Staff.