

**BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE**

PETITION OF ATMOS ENERGY)	
CORPORATION TO REVISE)	DOCKET NO. 16-00028
PERFORMANCE BASED)	
RATEMAKING MECHANISM)	
TARIFF RIDER)	

PRE-FILED DIRECT TESTIMONY OF

CHRISTOPHER C. KLEIN, PH.D.

**ON BEHALF OF THE TENNESSEE ATTORNEY GENERAL
CONSUMER PROTECTION AND ADVOCATE DIVISION**

November 7, 2016

**BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE**

IN RE:

**PETITION OF ATMOS ENERGY
CORPORATION TO REVISE
PERFORMANCE BASED
RATEMAKING MECHANISM
TARIFF RIDER**

DOCKET NO. 16-00028

AFFIDAVIT

I, Christopher C. Klein, Regulatory Economist, on behalf of the Consumer Protection and Advocate Division of the Attorney General's Office, hereby certify that the attached Direct Testimony represents my opinion in the above-referenced case and the opinion of the Consumer Protection and Advocate Division.

Sworn to and subscribed before me
this 7th day of November, 2016.



NOTARY PUBLIC



My commission expires: May 6, 2019

**BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE**

November 7, 2016

DOCKET NO. 16-00028

**PRE-FILED DIRECT TESTIMONY OF
DR. CHRISTOPHER C. KLEIN**

1 **Q. Please state your name and your current position.**

2 **A.**My name is Christopher C. Klein. I am a Professor in the Economics and Finance
3 Department at Middle Tennessee State University (MTSU) in Murfreesboro, Tennessee.

4 **Q. What is your educational background?**

5 **A.**I received a B. A. in Economics from the University of Alabama in 1976 and I received a
6 Ph. D. in Economics from the University of North Carolina at Chapel Hill in 1980.

7 **Q. What is your professional experience involving regulated industries?**

8 **A.**I was employed as an Economist in the Antitrust Division of the Bureau of Economics at
9 the Federal Trade Commission (FTC) in Washington, D.C., for six years starting in 1980.
10 In 1986, I was hired as the first Economist for the Tennessee Public Service Commission
11 (TPSC). Although my title changed over the years, I functioned as the Chief Economist
12 for the TPSC and, after 1996, the Tennessee Regulatory Authority (TRA), until August of
13 2002, when I assumed my current position with MTSU.

14 **Q. What were your duties at the FTC?**

15 **A.**I performed the economic analysis in antitrust investigations involving more than 20
16 industries and contributed to staff reports on mergers in the petroleum industry,
17 competition in grocery retailing, and the economics of predatory, or “sham,” litigation.

18 **Q. What was your primary responsibility at the TPSC?**

1 **A.** I was an expert witness for the staff of the TPSC in rate cases and other similar
2 proceedings involving telecommunications, natural gas, electric, and water utilities, as
3 well as motor carriers. I testified in 36 dockets before the TPSC on the issues of cost of
4 capital, rate design, and competitive effects. I also filed testimony before the Federal
5 Communications Commission (FCC).

6 **Q. How did your responsibilities change when the TRA supplanted the TPSC?**

7 **A.** I oversaw the Utility Rate Division and then the Economic Analysis Division. The TRA
8 staff no longer testified in proceedings before the agency, but provided analysis and
9 advice to the TRA Directors. I was responsible for all such advice and analysis provided
10 to the Directors by these Divisions, either individually or in concert with other TRA staff,
11 in all proceedings that came before the agency for resolution. These proceedings
12 included rate cases and tariff filings by public utilities, as well as those associated with
13 the implementation of the federal Telecommunications Act of 1996.

14 **Q. Were you a member of any regulatory committees or boards while you worked for**
15 **the TPSC and the TRA?**

16 **A.** Yes. I was a member of the National Association of Regulatory Utility Commissioners
17 (NARUC) Staff Subcommittee on Gas. I was a member of, and Chaired, the Research
18 Advisory Committee to the Board of Directors of the National Regulatory Research
19 Institute (NRRI). I also served on the State Staff of the FCC's Federal-State Joint Board
20 in CC Docket No.80-286 (the "Separations" Joint Board) and as a Group Leader on the
21 NARUC Staff Subcommittee on Accounts Multi-State Audit Team that produced the
22 1988 Report on Bell Communications Research.

23

1 **Q. What is your primary responsibility at MTSU?**

2 **A.** I teach classes in the general area of applied microeconomics, including Principles of
3 Microeconomics, Intermediate Microeconomic Theory, Managerial Economics,
4 Economics of Antitrust and Regulation, and Econometrics, as well as undertaking
5 scholarly research, participating in various university committees, and serving on
6 dissertation committees.

7 **Q. Have you taught at any other universities?**

8 **A.** I taught classes in the Economics of Regulation and in Antitrust Economics in the
9 Economics Department at Vanderbilt University for several years while I was employed
10 at the TRA.

11 **Q. Are you a member of any professional organizations?**

12 **A.** I am a member of the American Economic Association, the Southern Economic
13 Association, the Industrial Organization Society, and Alpha Pi Mu: the National
14 Industrial Engineering Honor Society, as well as Beta Gamma Sigma: the International
15 Honor Society for Collegiate Schools of Business.

16 **Q. Have you published articles in professional or academic journals and presented**
17 **papers at professional meetings?**

18 **A.** More than 40 of my articles have appeared in professional or academic journals such as
19 *Energy Economics*, *Utilities Policy*, *The Electricity Journal*, *The Journal of Applied*
20 *Regulation* and many others. I have made more than 80 presentations at professional
21 meetings.

1 **Q. Have you testified before any other governmental bodies in Tennessee?**

2 **A.** Yes. I have testified before various committees of the Tennessee General Assembly on
3 regulatory issues, especially issues involving competition in the telecommunications
4 industry, as well as before the Tennessee Advisory Commission on Intergovernmental
5 Relations and the Tennessee Regulatory Authority. A complete list is provided in my
6 Vita beginning on page 6 of my Exhibit.

7
8 **PURPOSE OF TESTIMONY**
9

10 **Q. What is the purpose of your testimony?**

11 **A.** I will address the changes requested by Atmos Energy Corporation (Atmos) in its
12 Performance Based Ratemaking Mechanism (PBRM). In very general terms, these
13 include: 1) exclusion of the NYMEX closing prices from the calculation of the
14 benchmark price for First-of-Month (FOM) gas purchases; 2) elimination of the
15 deadband from the calculation of gas purchase savings; 3) elimination of the \$1.25
16 million cap on Atmos's share of savings under the PBRM; 4) modification of the sharing
17 percentages between Atmos and its customers under the PBRM.

18 **Q. What do you recommend on Atmos's proposals to exclude the NYMEX prices and**
19 **the deadband from the calculation of savings under the PBRM?**

20 **A.** First, I note that changes to the deadband were the only changes contemplated by the
21 TRA's order in the most recent previous docket involving Atmos's PBRM (13-00111).
22 Arguably, the proposal to eliminate the deadband is the only change properly before the
23 TRA at this time. As long as the \$1.25 million cap is maintained, I recommend

elimination of the deadband, since this will have a minimal effect on Atmos's savings and incentives under the PBRM. Similarly, if the TRA determines that the exclusion of the NYMEX prices from the benchmark price calculation is properly before it, then I recommend exclusion of NYMEX prices as long as the cap is maintained.

Q. If the TRA determines that Atmos's proposed elimination of the deadband is the only issue properly raised in this docket, how do you recommend that the TRA consider Atmos's additional proposals?

A. Given the relatively sweeping alterations to the PBRM proposed by Atmos, I recommend that the TRA open a docket for a full review of the PBRM, including its purpose and continuing necessity in the current environment. This would follow a broader consultant's review of the PBRM under a continuing triennial review procedure.

Atmos's proposals in this docket, as well as others, could be considered at that time.

Q. If the TRA determines that Atmos's additional proposals are properly considered in this docket, what do you recommend?

A. I recommend approval of Atmos's proposed elimination of the deadband and exclusion of NYMEX prices from the benchmark as long as the \$1.25 million cap on Atmos's share of savings is maintained. If the \$1.25 million cap is eliminated, then I recommend adopting a single set of sharing percentages to determine Atmos's share of the calculated savings from all categories of gas costs under the PBRM. These sharing percentages when applied to Atmos's prior performance under the PBRM, but including all of Atmos's proposed cost categories and alterations approved by the TRA, should result in no more than \$1.25 million in shared savings attributed to Atmos during the previous PBRM year. For example, a 90% share of savings to customers and a 10% share of savings to Atmos

1 would satisfy this condition for the 2014-15 year. This insures that Atmos is only
2 rewarded for new behavior that results in additional savings going forward and is not
3 given additional rewards for past behavior that generated already realized savings under
4 the previous version of the PBRM.

5 **Q. Do you have any other recommendations?**

6 A. Yes. I recommend a deadline of December 1 for Atmos to file the executed Asset
7 Management contract to allow sufficient time for TRA review before the beginning of the
8 PBRM plan year on April 1. I also recommend that Atmos file its tariff to implement the
9 PBRM rate adjustment on July 1.

10 **Q. How is your testimony organized?**

11 A. I will address the role of economic incentives in the justification for the existing PBRM
12 first, then I turn to the issue of the deadband in the context of the previous PBRM docket
13 (13-00111). Next, I discuss the need for a comprehensive review of Atmos's PBRM,
14 including an examination of its ongoing desirability, additional issues raised but not
15 properly investigated in this docket, and any additional proposals by Atmos. Finally, I
16 recommend a general approach to Atmos's proposed changes should the TRA decide to
17 address them in this docket. I summarize my recommendations in a short conclusion.

18
19 **ECONOMIC INCENTIVES AND THE PBRM**
20

21 **Q. How does the general concept of economic incentives apply to Atmos's PBRM?**

22 A. Economic incentives should reward a company for improved performance. Regulated
23 utilities like Atmos under standard rate-of-return regulation have an incentive to reduce

1 costs because this will increase profits or reduce losses between rate cases. Roughly 20
2 years ago, however, annual gas cost adjustment mechanisms were adopted for natural gas
3 utilities in Tennessee that insured the recovery of actual gas costs between rate cases.
4 The purpose of such mechanisms was to prevent market fluctuations in gas prices from
5 triggering rate cases. Unfortunately, these mechanisms removed the incentive for the gas
6 utilities to benefit from reduced gas costs, since gas costs were passed directly to
7 consumers. Alternative arrangements, like Atmos's PBRM, are intended to remedy this
8 situation by creating incentives for utilities to seek gas cost savings by sharing any such
9 savings between the gas utilities and their customers.

10 **Q. How does Atmos's existing PBRM work?**

11 A. Atmos's existing PBRM has three main savings components that are subject to an overall
12 cap of \$1.25 million on Atmos's share. One component shares payments from an Asset
13 Manager, currently an Atmos affiliated gas marketer, AEM, for managing certain gas
14 procurement assets (largely transportation and storage contracts) and providing gas
15 supplies to Atmos. These "AMA fees" are shared 90%/10% between consumers and
16 Atmos. Second, gas procurement savings have two main components: gas price savings
17 and avoided demand charges. Gas price savings are calculated by comparing Atmos's
18 purchases to a benchmark calculated from several indexes surrounded by a "deadband,"
19 currently 97.4% to 102% of the benchmark. Atmos does not share in any gas price
20 savings unless its gas purchases fall below the lower end of the deadband. In recent
21 years, Atmos has realized no savings from gas purchases due to the deadband, leaving all
22 procurement savings to be realized through avoided demand charges. Procurement
23 savings are shared 50%/50% between consumers and Atmos. The third component is

1 capacity release revenues and off-system sales that are shared 90%/10% between
2 consumers and Atmos, but these have generated relatively small dollar amounts
3 compared to the other components in recent years.

4 **Q. What role does the \$1.25 million cap play in the PBRM?**

5 A. First, Atmos's share of the overall PBRM savings are calculated as described above. If
6 Atmos's share exceeds \$1.25 million, then the amount in excess of \$1.25 million is
7 shifted to customers and Atmos receives \$1.25 million. If Atmos's share is less than the
8 \$1.25 million cap, then Atmos receives that amount under the PBRM.

9 **Q. How does Atmos actually receive its share of PBRM savings?**

10 A. Atmos's share of savings triggers a rate increase to its customers that results in a revenue
11 increase equal to Atmos's savings share based on the previous year's volumes of gas
12 sales. Customers also receive the benefit of the savings that Atmos generates through a
13 pass through of gas costs, such that they receive a net benefit from PBRM savings. Since
14 Atmos now operates under a plan that guarantees its allowed rate of return on gas
15 distribution operations through annual adjustments, its share of PBRM savings is in
16 addition to its allowed rate of return.

17 **Q. What was the issue in Docket No. 13-00111 that concerned Atmos's PBRM?**

18 A. In Docket No. 13-00111, the main issue was Atmos's request to suspend the resetting of
19 the deadband every three years to 1% below the most recent audited results under the
20 PBRM. Atmos had achieved gas commodity costs at 90.9% of the benchmark which
21 would result in the low end of the deadband being set at 89.9% of the benchmark. Atmos
22 claimed it had no chance of achieving such low gas commodity costs and would have no
23 incentive to seek gas commodity cost savings during the next three-year period. Atmos

asked that the deadband be set permanently at 97.7% to 102% of the benchmark. Several other minor changes to the PBRM were proposed, but were not opposed.

Q. What did the TRA conclude on the deadband issue in Docket No. 13-00111?

A. The TRA's Order in that docket denied Atmos's request, but set the lower end of the deadband to 97.4% of the benchmark for the next three years. It also ordered that, "The scope of the triennial review set to conclude in July 2015 shall include a review of the deadband range, including an evaluation of an appropriate deadband range and whether one is necessary." On this basis, the deadband is the only item the TRA must consider in the current docket, since no other alterations to the PBRM were ordered to be addressed in the current triennial review.

Q. If the TRA only considers alterations to the deadband provision of Atmos's PBRM, what do you recommend?

A. As long as the \$1.25 million cap stays in place, I recommend elimination of the deadband as Atmos requests.

Q. What is the significance of the \$1.25 million cap to the deadband provision of Atmos's PBRM?

A. Elimination of the deadband is likely to increase Atmos's overall calculated savings under its PBRM as well as its share of the total savings. In recent years, however, Atmos's share of savings has been limited by the \$1.25 million cap. See Table 1 in my Exhibit. If this continues, elimination of the deadband will produce no change in the share of savings earned by Atmos under the PBRM. In short, elimination of the deadband is likely to have no effect on Atmos's share of savings or its incentives under the PBRM.

1 **Q. Is it your position that the deadband is the only issue that the TRA is required to**
2 **address in this docket?**

3 A. Yes.
4

5 **COMPREHENSIVE REVIEW OF ATMOS'S PBRM**
6

7 **Q. If the TRA wishes to address any of the other alterations to the PBRM requested by**
8 **Atmos, what do you recommend?**

9 A. I recommend a new docket for a comprehensive review of Atmos's PBRM to follow the
10 next triennial review. Atmos's proposed changes to the PBRM are so sweeping that an
11 overall review of all aspects of the PBRM should be undertaken before such major
12 alterations are made. This review should also address any additional changes to the plan
13 that may be desirable in the current regulatory context.

14 **Q. What issues would you include in this comprehensive review?**

15 A. This review would include an evaluation of whether the PBRM remains necessary or
16 desirable in the current regulatory context. For example, since 2011 Atmos has benefited
17 from its PBRM more than Piedmont Natural Gas Company has from a similar
18 mechanism in Tennessee, suggesting that the incentives provided to Atmos may be
19 excessive. See Table 1 in my Exhibit.

20 This review could also address questions that have been raised in this docket concerning
21 the role of Atmos's affiliate marketer, AEM. For instance, Exeter's response to CPAD
22 First Informal Discovery Request admitted that Exeter did not investigate a marketer's
23 claim that suggested that AEM enjoys preferences as Atmos affiliated marketer that

1 effectively exclude independent marketers from serving certain Atmos service territories.
2 See page 4 of my Exhibit. If true, the resulting lack of competition for Atmos's business
3 may reduce the AMA fees received by Atmos to the detriment of Atmos's customers.
4 Issues raised by Atmos in this docket, such as removal or alteration of the \$1.25 million
5 cap on Atmos's share of savings and modification of the sharing percentages, could also
6 be examined in more depth.

7 **Q. What other factors should be included in the comprehensive review?**

8 A. The potential acquisition of Atmos's affiliated marketer and current Asset Manager under
9 the PBRM, AEM, by Centerpoint Energy Services, Inc., should be reviewed for any
10 resulting effects on Atmos's PBRM savings. For example, the preferences enjoyed by
11 AEM suggested by Exeter's response to CPAD First Informal Discovery Request (page 4
12 of my Exhibit) may continue and serve to restrict competition for Atmos's Asset
13 Manager contract under the PBRM. Centerpoint affiliates' relationship with AEM may
14 deserve scrutiny for any similar effects.

15 **Q. What other information would be important to any comprehensive review?**

16 A. Information on all Tennessee regulated natural gas customers should be examined. This
17 includes similar mechanisms for Chattanooga Gas Company and Piedmont Natural Gas
18 Company. The goal is to create an incentive mechanism that is fair to both the
19 companies and the customers in Tennessee. To attempt to do this on a company by
20 company basis is too narrow. Data for all companies should be considered in determining
21 what constitutes a fair set of incentives.

22 **Q. If the TRA decides not to initiate a comprehensive review at this time, what changes**
23 **to Atmos's PBRM do you recommend?**

1 A. In the absence of a comprehensive review, I recommend only removing the deadband and
2 excluding NYMEX prices from the benchmark calculation in Atmos's PBRM. All other
3 aspects of Atmos's PBRM should remain in place, especially the \$1.25 million cap.

4
5 **ATMOS'S PROPOSALS IN THIS DOCKET**
6

7 **Q. If the TRA does not follow your recommendation for a comprehensive review of**
8 **Atmos's PBRM and decides to grant some or all of Atmos's requests, what do you**
9 **recommend for Atmos's proposals in this docket?**

10 A. If the \$1.25 million cap stays in place, then I recommend approval of Atmos's requests to
11 eliminate the deadband and exclude NYMEX prices from the benchmark calculation. If
12 the cap is eliminated, however, then the sharing percentages should be carefully adjusted
13 to insure that the resulting incentives reward Atmos only for additional savings going
14 forward and not for savings that would have been realized under the current plan as it is,
15 regardless of the TRA's actions on the remaining alterations suggested by Atmos.

16 **Q. How should the sharing percentages in the PBRM be adjusted to maintain**
17 **appropriate incentives for Atmos if the cap is eliminated?**

18 A. Whatever other alterations proposed by Atmos are approved, the sharing percentages
19 must be revised if the cap is removed. Failure to revise the percentages in the absence of
20 the cap will reward Atmos for savings that are currently being achieved, rather than
21 limiting the reward to savings going forward that are in excess of those currently
22 achieved. This is especially important, because increases in Atmos's share of savings are

1 realized as rate increases for customers. These are justified only in the presence of
2 increased benefits to customers from reduced gas costs.

3 To implement the appropriate sharing percentages in the absence of the cap, all of the
4 changes to the PBRM should be applied to a previous year's results, then the sharing
5 percentages adjusted so that Atmos's share of savings on this *pro forma* basis is less than
6 or equal to the \$1.25 million cap currently in place. Using these sharing percentages
7 going forward will guarantee that Atmos's share of savings will increase only if Atmos
8 achieves savings over and above that under the current PBRM.

9 For example, Table 2 of my Exhibit shows a summary of the 2014-15 results under the
10 current PBRM. Total savings are about [REDACTED], but Atmos's share is limited by the
11 cap to \$1.25 million. Table 3 of my Exhibit shows all of Exeter's recommendations
12 requested by Atmos in this docket, including the sharing percentages requested by
13 Atmos, applied to the 2014-15 PBRM results. The calculated savings in Table 3 are
14 about [REDACTED] and Atmos's share, now without the cap, is about [REDACTED]. But,
15 this is without any change in behavior by Atmos, so Atmos's share should be limited to
16 the \$1.25 million cap or less. Changing all of the sharing percentages to 90% customer
17 and 10% Atmos will limit Atmos share to about [REDACTED]; achieving the \$1.25
18 million cap exactly requires sharing percentages of 88.85% customers and 11.15%
19 Atmos. These are similar to the "blended" sharing percentages suggested by Exeter in its
20 response to TRA Party Staff DR-04.

21 **Q. Are you recommending a single set of sharing percentages for all savings categories**
22 **under the PBRM?**

1 A. Yes. This is preferable to multiple sets of sharing percentages for ease of administration
2 of the PBRM by the TRA. Any sharing percentages that achieve the \$1.25 million cap on
3 a *pro forma* basis would be acceptable for limiting Atmos's incentives going forward to
4 savings in excess of those already achieved.

5 **Q. Do you recommend on-going triennial reviews?**

6 A. Yes. These are needed to track Atmos's performance under the PBRM and to assure that
7 any unusual circumstances are observed and adjusted for in a timely manner.

8 In addition, since the current Asset Manager, AEM, is being acquired by Centerpoint
9 Energy Services, Inc., a triennial review is necessary to examine the actions, policies, and
10 financial soundness of, in effect, a new Asset Manager and its affiliated companies.

11 **Q. Do you have any other recommendations?**

12 A. Yes. The TRA staff is often unable to review Atmos's proposed contract with the Asset
13 Manager in sufficient detail due to the timing of the filing, usually in late February or
14 March with a deadline of April 1 for the beginning of the new plan year under the PBRM.
15 The TRA should consider imposing a deadline such as December 1 for Atmos to file the
16 executed Asset Management Contract.

17 A related issue arises with the effective date for the rate adjustment to implement
18 Atmos's share of savings under the PBRM. Currently, the PBRM plan year ends March
19 31, but Atmos delays its tariff filing until November 1 to coincide with rate adjustments
20 under the ACA. This requires accumulating interest on Atmos's PBRM savings for
21 seven months. A more appropriate date for the tariff filing under the PBRM is July 1.

CONCLUSION

Q. Can you summarize your recommendations?

A. Yes. I recommend that the TRA only approve the elimination of the deadband from Atmos's PBRM at this time, but initiate a comprehensive review of the PBRM at the conclusion of the next triennial review. In any case, Atmos should file its tariff for the PBRM rate adjustment by July 1 and its executed Asset Manager contract by December 1 of each year.

If the TRA decides to consider all of Atmos's requests at this time, then I recommend approval of the elimination of the deadband and exclusion of NYMEX prices from the benchmark calculation. If the \$1.25 million cap on Atmos's share of savings is removed, then the sharing percentages must be adjusted to prevent additional rewards to Atmos for its existing behavior and limiting rewards to changes in behavior that result in additional savings over and above those realized under the current plan. This is necessary regardless of the approval of other items requested by Atmos. A single set of sharing percentages of 90% customer and 10% Atmos achieves this goal.

Q. Does this conclude your testimony at this time?

A. Yes.

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DOCKET NO. 16-00028

PRE-FILED DIRECT EXHIBIT OF

CHRISTOPHER C. KLEIN, PH.D.

**ON BEHALF OF THE TENNESSEE ATTORNEY GENERAL
CONSUMER PROTECTION AND ADVOCATE DIVISION**

November 7, 2016

Table 1 -Company Retained PBR Incentive Payments			
Year	Atmos	Piedmont	
2009	\$ 94,358	\$	1,586,304
2010	\$ 291,710	\$	1,313,302
2011	\$ 292,139	\$	731,048
2012	\$ 1,250,000	\$	748,906
2013	\$ 1,250,000	\$	923,334
2014	\$ 1,250,000	\$	1,600,000
2015	\$ 1,250,000	\$	1,243,257
Total	\$ 5,678,206	\$	8,146,150

Table 2: Audited PBRM Results for 2014-15

<u>Current PBR Total, to date:</u>		Share to <u>PGA</u>	Share to <u>Company</u>	
Capacity Release	\$		\$	\$
Gas Cost - All Pipelines	\$		\$	\$
Monthly AMA Upfront Payment	\$		\$	\$
Cumulative Total for PBR YR	\$		\$	\$
Annual Cap			1,250,000	
Atmos Savings Exceeding Cap	\$		\$	
Total Shared Savings	\$		\$ 1,250,000	\$

Table 3: Exeter Recommendations Applied to 2014-15 PBRM Results

<u>Current PBR Total, to date:</u>		Share to <u>PGA</u>	Share to <u>Company</u>	
Avoided Cost delivered 75/25 share	\$		\$	\$
Avoided Cost discount 75/25 share	\$		\$	\$
Capacity Release	\$		\$	\$
Gas Cost - All Pipelines	\$		\$	\$
Monthly AMA Upfront Payment	\$		\$	\$
Cumulative Total for PBR YR	\$		\$	\$
Remove Cap on Atmos sharing				
Total Shared Savings	\$		\$	

RESPONSE TO FIRST INFORMAL DISCOVERY REQUEST
OF THE CONSUMER PROTECTION AND ADVOCATE DIVISION
TO EXETER ASSOCIATES, INC.

1. Refer to Exeter's response to CPAD 1-5. Specifically refer to the document contained in the "Archive Folder-3531 Atmos Energy\Old Versions of Report" folder of this response that is titled "Report Deleted Paragraph". The information in this file ("information") reads as follows:

AEM is the largest marketer on the Atmos system, serving customers responsible for approximately 70 percent of total transportation volumes. As previously explained, the Atmos System consists of three separate service territories. Capacity costs for the West and Middle Tennessee service territories are lower than capacity costs for the East Tennessee service territory. Under the current terms and conditions of transportation service, marketers are not currently required to deliver gas to the service territory in which their customers are located. This allows marketers to deliver gas to the lower-cost West and Middle Tennessee territories to serve customers located in the higher-cost East Tennessee service territory. Non-affiliated marketers have claimed that this makes it more difficult to compete with Atmos' affiliate AEM and they believe if a marketer other than an affiliate were the largest, Atmos would modify its transportation tariff to require deliveries to the service territory in which the marketers' customers were located. Further investigation of this claim is beyond the Scope of Review of Exeter's investigation.

- a. Identify the "[n]on-affiliated marketers [who] have claimed that this makes it more difficult to compete with Atmos' affiliate AEM" and provide any communication with such non-affiliated marketers providing the basis for such non-affiliated marketers claim(s).
- b. Explain in detail with specificity the basis for the above-referenced claim(s), and related information, and the basis upon which the above-referenced claim(s), and related information, was considered for inclusion in the report.
- c. Explain in detail with specificity the steps by which this information was evaluated or considered, including a detailed description of the investigation of this claim and the analysis leading to Exeter's determination not to include this information in the report. In your response, identify any person with whom this information (or any part or aspect of it) was discussed, as well as each such person's rationale or basis for including or not including all or any part of this information. Further, if this information was discussed or was the subject of other communication, please provide

a summary and/or any document provided or exchanged with respect to the substance of the information.

Response:

- a. As identified on page 18 of Exeter's report, the marketer making this claim agreed to discuss Atmos' affiliate relationships on the condition of anonymity. The only communication with this marketer was a single phone call.
- b. The referenced language in the draft report was based on discussions with a single marketer. The marketer provided no specific basis for the claim. The referenced draft report language was considered for inclusion in the final report; however, Exeter elected to modify the language in the final report as a result of obtaining additional information on the marketer. In a separate unrelated proceeding, Exeter discovered that the marketer had misrepresented its response to an RFP to provide a firm gas supply service to a local gas distribution company in another jurisdiction. The marketer's response to the RFP is subject to a confidentiality agreement.

It should also be noted that in another separate unrelated proceeding in a third jurisdiction, the marketer failed to deliver gas as required under a firm gas supply service arrangement.

- c. To the best of Mr. Mierzwa's recollection, the information obtained from Exeter's discussion with the marketer was not discussed with other individuals. No further investigation of the marketer's claim was made because, as explained at page 18 of the final report, Atmos' existing terms and conditions of transportation service were applied equally to affiliated and non-affiliated marketers during the review period and no violations of the Company's Standards of Conduct were found during Exeter's review.

VITA

CHRISTOPHER C. KLEIN

EDUCATION:

Ph. D. (Economics), University of North Carolina - Chapel Hill (1980)
B. A. (Economics), University of Alabama - Tuscaloosa (1976)

EXPERIENCE:

2002-Present	Middle Tennessee State University Professor of Economics, 2013-Present Associate Professor of Economics, 2002-2013
2002-Present	Consultant Clients included: AGL Resources, Inc.; Reseller Coalition; Tennessee Advisory Commission on Intergovernmental Relations; Tennessee American Water Company, Inc.; Tennessee Attorney General, Consumer Protection and Advocate Division; Tennessee Department of Environment and Conservation; US LEC of Tennessee, Inc.; Verizon Wireless; West Virginia American Water Company, Inc.; Z-Tel Communications, Inc.
1996-2002	Tennessee Regulatory Authority Chief, Economic Analysis Division, 1997-2002 Chief, Utility Rate Division, 1996-97
1998-2001	Vanderbilt University Adjunct Associate Professor of Economics
1986-1996	Tennessee Public Service Commission Director, Utility Rate Division, 1994-96 Economist & Research Director, 1993-94 Commission Economist, 1986-1993
1990-1994	Middle Tennessee State University Adjunct Faculty, Department of Economics and Finance
1980-1986	Federal Trade Commission Economist, Bureau of Economics - Antitrust Division

PROFESSIONAL ACTIVITIES:

Editor, *Journal for Economic Educators*, 2007 to present.
Member 1994-96, State Staff, Federal-State Joint Board, Federal Communications Commission
CC Docket No.80-286 ("Separations" Joint Board).

Chair 1993-95, member 1990-95, Research Advisory Committee to the Board of Directors of the National Regulatory Research Institute at Ohio State University.
Member 1990-95, Staff Subcommittee on Gas, National Association of Regulatory Utility Commissioners.
Group Leader: Economics, Contracts, and Non-affiliate Revenue; NARUC* Staff Subcommittee on Accounts Multi-state Audit Team, 1988 Report on Bell Communications Research.
Referee: *Applied Economics*, *Contemporary Economic Policy*, *Eastern Economic Journal*, *Journal of Economic Education*, *Land Economics*, *Management and Decision Economics*, *Media Economics*, *Review of Industrial Organization*, *Social Science Quarterly*, *Southern Economic Journal*.
Memberships: American Economic Association (AEA, since 1981), Southern Economic Association (1982), Industrial Organization Society (1986).

HONORS:

Beta Gamma Sigma, International Honor Society for Collegiate Schools of Business, 2008
Top 30 Score, 2003-2004 Student Evaluation of Faculty Performance, Jones College of Business, Middle Tennessee State University.
Resolution of Recognition, National Regulatory Research Institute, 1995
Listed in various Who's Who publications, 1990-
Certificate of Commendation, Federal Trade Commission, 1985
First in my class to complete the Ph. D., 1980
Alpha Pi Mu, National Industrial Engineering Honorary, 1973

GRANTS RECEIVED:

MTSU Jones College Summer Research Grant: 2004, 2005, 2007, 2012.
MTSU Faculty Research and Creative Activity Academic Year Grant: 2004-2005 (with Reuben Kyle)
MTSU Faculty Research and Creative Projects Committee Summer Salary Grant: 2006, 2009.

TEACHING
At MTSU

ECON 2420, Principles of Economics – Microeconomics
ECON 3520, Intermediate Microeconomic Theory
ECON 4400, Economics of Antitrust and Regulation
ECON 4570, Managerial Economics
ECON 4620/5620, Econometrics and Forecasting
ECON 4720, Economic Issues in the Music Industry
ECON 7121, Seminar in Applied Microeconomic Theory (Ph.D. Program)
ECON 7250, Methods of Outcome Assessment (Ph.D. Program)
Student Internships (ECON/FIN 4890, ECON/FIN 5890, ECON/FIN 6440)

At Vanderbilt University

ECON 252, Antitrust Economics
ECON 283, Economics of Regulation

MTSU Dissertation Committees

Shea W. Slonaker, Chair, *Three Essays on the Recorded Music Industry*, Ph. D. 2009.

Hua Liu, *U.S. Trade Deficit, Productivity Growth and Offshore Outsourcing*, Ph. D. 2006.

Jennifer Wilgus, *A Life-Cycle Approach to Human Capital Investment and Skill-Biased Technological Change*, Ph. D. 2005.

Anelia Sasser, *A Theoretical Examination of Title IV Financial Aid for Higher Education*, D.A. 2004.

Vanderbilt University Dissertation Committees:

Aster Adams, *The Impact of Deregulation and Competition on Efficiency, Financial Performance, and Shareholder Wealth of Electric Utilities in the United States*, Ph. D. 2009.

David B. Sapper, *Trial Selection and the Effects of Sentencing Reform in Criminal Antitrust Cases: A Theoretical and Empirical Analysis*, Ph. D. 2006.

T. Randolph Beard, *Bankruptcy, Safety Expenditure, and Safety Regulation in the Motor Carrier Industry*, Ph. D. 1988

PUBLICATIONS

"Do State Funded Merit Scholarships for Higher Education Improve High School Graduation Rates?" with Elizabeth A. Perry-Sizemore, submitted to *Journal of Education Finance*, 2016.

"Sequence of MBA Core Course Completion and Student Performance in an MBA Program," with E. Anthon Eff, submitted to *Journal of Education for Business*, 2016.

"The Music Industry as a Vehicle for Economic Analysis," *Journal of Economic Education*, 46(4),403-411, 2015.

"Education Production Functions," *Encyclopedia of Educational Theory and Philosophy*, D. Phillips ed., Sage: Los Angeles, 2014.

"Econometrics as a Capstone Course in Economics," *Journal of Economic Education*, 2013.

"Identifying the Best Buys in U.S. Higher Education," with E. Anthon Eff and Reuben Kyle, *Research in Higher Education*, 2012.

"Chart Turnover and Sales in the Recorded Music Industry: 1990-2005," with Shea W. Slonaker, *Review of Industrial Organization*, 36:351-372, 2010.

"What Can We Learn from Education Production Studies?" with E. Anthon Eff, *Eastern Economic Journal*, 36:450-479, 2010.

"Public Transportation Ridership Levels," with Christopher R. Swimmer, *Journal for Economic Educators*, 10(1): 40-46, Summer 2010.

"Analysis of U.S. Foreign Aid Determinants for 2003," with Joshua M. Hill, *Journal for Economic Educators*, 9(1): 48-52, Summer 2009.

"Intra-district Public School Funding Equity and Performance in Nashville, Tennessee," *Journal of Education Finance*, Summer 2008.

"A Tale of Three Inputs: Cost and Production Duality with Time Utilization of Capital," *Applied Economics Research Bulletin*, 1(1) 2008.

- "Telephone Penetration in Tennessee: Are Intrastate Universal Service Policies Effective?" with Aster R. Adams and David B. Sapper, *Journal of Applied Regulation*, 2, November 2004, pp. 87-108.
- "A Switching Regime Approach to Measuring the Effects of Technological Change in Ocean Shipping," with J. David Bass and Reuben Kyle, *Journal of Productivity Analysis*, 22:1-2, July-September, 2004, pp. 29-49..
- "The Financial Implications of Unbundling on Bell Company Profits: A Review of the Evidence," with T. Randolph Beard and George S. Ford, *CommLaw Conspectus: The Journal of Communications Law and Policy*, v. 12 n.1, Fall/Winter 2003.
- "Bell Companies as Profitable Wholesale Firms: The Financial Implications of UNE-P," with T. Randolph Beard, *Phoenix Center Policy Paper No. 17*, November 2002, www.phoenix-center.org.
- "Connecting Tennessee: Bridging the Digital Divide," with Rose M. Gregory, *NRRI Quarterly Bulletin*, vol. 21 no. 3, Spring 2001.
- "Regulation vs. Deregulation: It's All in the Externalities," *Tennessee's Business*, Middle Tennessee State University, v. 11, n. 3 (November), 2001.
- "The Role of Public Power in a Restructured Electric Power Industry," with David Sapper, *The Electricity Journal*, August/September 2001.
- "Regulator Preferences and Utility Prices: Evidence from Natural Gas Distribution Utilities," with George Sweeney, *Energy Economics*, vol. 21, n. 1, 1999.
- "Competition in Telecommunications: A Progress Report for Tennessee," *Tennessee's Business*, Middle Tennessee State University, Murfreesboro, TN; vol. 9, n. 1, 1999.
- "Technological Change and the Production of Ocean Shipping Services," with Reuben Kyle, *Review of Industrial Organization*, December 1997.
- "The Haunting of Universal Service: Open Markets, Efficient Funding and the Ghost of the Fair Rate of Return," *Proceedings of Tenth NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1996.
- "Productivity Growth in Telecommunications: The Case of Tennessee," *Proceedings of Tenth NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1996.
- "Capture vs. Compromise: Entry Regulation of Intrastate Trucking," with Reuben Kyle and Jennifer Wilgus, *Logistics and Transportation Review*, v. 32 n. 3, September 1996.
- "Price Discrimination: What is 'Undue' for a U.S. Utility?" *Utilities Policy*, vol. 4 no. 4, October 1994.
- "Single Service Price Variations and 'Subsidies' in the Pricing of Telecommunications Services," *Proceedings of Ninth NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1994.
- "What Is Undue Price Discrimination by a Regulated Utility?" *NRRI Quarterly Bulletin*, March 1994.
- "A Comparison of Cost-Based Pricing Rules for Natural Gas Distribution Utilities," *Energy Economics*, July 1993.

- "Negotiating a Transportation Rate Under Threat of Bypass: A Case Study," *Proceedings of the Eighth Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1992.
- "A Multinomial Logit Model of Intrastate Trucking Regulation in Tennessee," with Jennifer Jose and Reuben Kyle, *Papers and Proceedings of the Nineteenth Annual Meeting of the Midsouth Academy of Economics and Finance*, v. 16, 1992.
- "Ramsey Prices for Natural Gas Distribution Utilities," *Proceedings of the Seventh NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1990.
- "Intervention as Entry Deterrence: Evidence from Sham Litigation Cases," *Proceedings of the Seventh NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute, Columbus, OH, 1990.
- Book Review, *Changing the Rules: Technological Change, International Competition, and Regulation in Communications*, Edited by Robert W. Crandall and Kenneth Flamm, Brookings 1989; *Review of Industrial Organization*, Fall 1990.
- "Double Leverage and Strategic Financing Decisions," *NRRI Quarterly Bulletin*, v. 11, n. 3, September 1990.
- "Predation in the Courts: Legal Versus Economic Analysis in Sham Litigation Cases," *International Review of Law & Economics*, June 1990.
- "Rate Design for Natural Gas Utilities: A Comparison of Ramsey and Cost of Service Pricing," *NRRI Quarterly Bulletin*, December 1989.
- "Dissecting Divestiture: A Telecommunications Book Review Article," *Review of Industrial Organization*, October 1989.
- The Economics of Sham Litigation: Theory, Cases, and Policy*, Bureau of Economics Staff Report, Federal Trade Commission, April 1989.
- "New Agreements, Non-affiliate Revenues, and Economic Issues," with Mike Amato and Francis Fok, in *Report on Bell Communications Research*, National Association of Regulatory Utility Commissioners, 1988.
- "Merger Incentives and Cost of Capital Regulation of Subsidiaries," *Midsouth Journal of Economics and Finance*, March 1988.
- "Strategic Sham Litigation: Economic Incentives in the Context of the Case Law," *International Review of Law & Economics*, December 1986.
- "Is There a Principle for Defining Industries? Comment," *Southern Economic Journal*, October 1985.
- "A Note on Defining Geographic Markets," with Ed Rifkin and Noel Uri, *Regional Science and Urban Economics*, February 1985.
- "Process Analysis, Capital Utilization, and the Existence of Dual Cost and Production Functions," FTC Bureau of Economics Working Paper No. 116, May 1984.
- "A General Theory of Hedonic Pricing of Capital as a Factor of Production," FTC Bureau of Economics Working Paper No. 105, December 1983.

"The International Market for Crude Oil," with Fred Lipson and Harvey Blumenthal, in *Mergers in the Petroleum Industry*, Federal Trade Commission, 1982.

PRESENTATIONS

"Do State Funded Merit Scholarships for Higher Education Improve High School Graduation Rates?" with Elizabeth Perry-Sizemore, Southern Economic Association Annual Conference, New Orleans, LA, November 2015.

"Sequence of MBA Core Course Completion and Student Performance in an MBA Program," with E. Anthon Eff, Southern Economic Association Annual Conference, New Orleans, LA, November 2015.

"The Music Industry as a Vehicle for Economic Analysis," Southern Economic Association Annual Conference, Atlanta, GA, November 2014.

"The Music Industry as a Vehicle for Economic Analysis," American Economic Association National Conference on Teaching Economics, Chicago, IL, May 2013.

"Supply Innovation and Sales of Recorded Music: 1990-2010," Southern Economic Association Annual Conference, New Orleans, LA, November 2012.

"Econometrics as a Capstone Course in Economics," American Economic Association National Conference on Teaching Economics, Boston, MA, May 2012.

"Music Supply, Chart Turnover, and the Random Copying Hypothesis in the Digital Age," with Shea Slonaker, International Industrial Organization Conference, Arlington, VA, March 2012.

"Econometrics as a Capstone Course in Economics," Southern Economic Association Annual Conference, Washington, DC, November 2011.

"Do State Funded Merit Scholarships for Higher Education Reduce High School Dropout Rates for All Students?" with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, Washington, DC, November 2011.

"Do State Funded Merit Scholarships for Higher Education Improve Pre-College Academic Performance?" with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, Atlanta, GA, November 2010.

"The Effect of State Funded Merit Scholarships for Higher Education on Pre-College Academic Performance," with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, San Antonio, TX, November 2009.

"The Effect of State Funded Merit Scholarships for Higher Education on High School Graduation Rates," with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, Washington, DC, November 2008.

"Identifying the Best Buys in U.S. Higher Education," with E. Anthon Eff and Reuben Kyle, Southern Economic Association Annual Conference, Washington, DC, November 2008.

"Product Variety and Sales in the Recorded Music Industry: 1990-2005," with Shea Slonaker, International Industrial Organization Conference, Arlington, VA, May 2008.

"Identifying the Best Buys in U.S. Higher Education," with E. Anthon Eff and Reuben Kyle, Academy of Economics and Finance Annual Meeting, Nashville, TN, February 2008.

- "Product Variety and Sales in the Recorded Music Industry: 1990-2005," with Shea Slonaker, Academy of Economics and Finance Annual Meeting, Nashville, TN, February 2008.
- "Do State Funded Merit Scholarships Induce Students to Learn more in High school?" with Elizabeth A. Perry-Sizemore, Southern Economic Association Annual Conference, New Orleans, LA, November 2007.
- "The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, Southern Economic Association Annual Conference, New Orleans, LA, November 2007.
- "The Shifting Appeal of Sham Litigation: Evidence from Appellate Decisions 1971-2006," International Industrial Organization Conference, Savannah, GA, April 2007.
- "The Shifting Appeal of Sham Litigation: Evidence from Appellate Decisions 1980-2006," Scholar's Week Poster Fair, MTSU, April 2007
- "Causality Tests for Public School Funding and Performance," Southern Economic Association Meeting, Charleston, SC, November 2006.
- "The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, Southern Economic Association Meeting, Washington, November 2005.
- "The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, International Industrial Organization Conference, Atlanta, April 2005.
- "Anticompetitive Litigation and the "Baselessness" Standard for Antitrust Liability," Southern Economic Association Meeting, New Orleans, November 2004.
- "The Price of Quality: Hedonic Estimation of Implicit Market Models for Higher Education," with Reuben Kyle, Southern Economic Association Meeting, New Orleans, November 2004.
- "VoIP: Let's Ask the Right Questions," Tennessee Regulatory Authority Forum on VoIP, Nashville Public Library, April 30, 2004.
- "Telephone Penetration in Tennessee: Are Intrastate Universal Service Policies Effective?" with Aster Rutibablira and David B. Sapper, Southern Economic Association Meeting, San Antonio, TX, November 2003.
- "Telephone Penetration in Tennessee: Are Intrastate Universal Service Policies Effective?" with Aster Rutibablira and David B. Sapper, International Industrial Organization Conference, Boston MA, April 4-5, 2003.
- "A Critique of Educational Production Functions," Southern Economic Association meeting, New Orleans, LA, November 2002.
- "Connecting Tennessee: Bridging the Digital Divide," with Rose M. Gregory, American Economic Association meeting, joint session with the Transportation and Public Utilities Group, Atlanta, GA, January 2002.
- "Long Term Contracts as Anticompetitive Devices in Telecommunications," Southern Economic Association Annual Meeting, Tampa, FL, November 2001.
- "The Role of Public Power in a Restructured Electric Power Industry," American Economic Association meeting, joint session with the Transportation and Public Utilities Group, Boston, MA, January 2000.
- "Universal Telephone Service in Tennessee: A Pre-Competition Assessment," with David Sapper, Southern Economic Association meeting, New Orleans, LA, November 1999.

- "Trucks, Planes, Trains, and Wires? Short-haul vs. Long-haul Long Distance Rates in Telecommunications," with Reuben Kyle, Southern Economic Association meeting, Baltimore, MD, November 1998.
- "The Economics of Time as a Resource," Southern Economic Association meeting, Atlanta, GA, November 1997.
- "Cost and Production Duality with Capital Utilization," Department of Economics Seminar Series, Vanderbilt University, February 1997.
- "Maximum Impropriety: The 'Baselessness' Standard for Improper Litigation," Southern Economic Association meeting, Washington, November 1996.
- "Cost and Production Duality with Capital Utilization," Southern Economic Association meeting, Washington, November 1996.
- "The Haunting of Universal Service: Open Markets, Efficient Pricing, and the Ghost of the Fair Rate of Return," Tenth NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1996.
- "Productivity Growth in Telecommunications: The Case of Tennessee," Tenth NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1996.
- "Productivity Growth in Telecommunications: The Case of Tennessee," Advanced Workshop in Regulation and Public Utility Economics, 15th Annual Conference, Lake George, NY, May 1996.
- "A Switching Regime Approach to Measuring the Effects of Technological Change in Ocean Shipping," with Reuben Kyle, Southern Economic Association meeting, New Orleans, November 1995.
- "Productivity Growth in Telecommunications: The Case of Tennessee," Southern Economic Association meeting, New Orleans, November 1995.
- "Local Service Price Variations and 'Subsidies' in Telecommunications," Southern Economic Association meeting, Orlando, November 1994.
- "Dynamic Effects of Regulatory Policy on Intrastate Long Distance Telephone Rates," Southern Economic Association meeting, Orlando, November 1994.
- "Single Service Price Variations and 'Subsidies' in the Pricing of Telecommunications Services," Ninth NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1994.
- "Suit, Countersuit, and Settlement in Sham Litigation," Annual Meeting of the Midsouth Academy of Economics and Finance, Nashville, February 1994.
- "New Evidence on the Effect of Regulation on Intrastate Long Distance Telephone Rates," Annual Meeting of the Midsouth Academy of Economics and Finance, Nashville, February 1994.
- "What is Undue Price Discrimination for a Public Utility?" Southern Economic Association meeting, New Orleans, November 1993.
- "Regulated Utility Prices and the Preferences of Regulators," with George Sweeney, Southern Economic Association meeting, New Orleans, November 1993.
- "A Test for Strategic Behavior Under Rate of Return Regulation," Southern Economic Association meeting, Washington, November 1992.

- "New Evidence on the Effect of Regulatory Policy on Intrastate Long Distance Telephone Rates," Southern Economic Association meeting, Washington, November 1992.
- "Technological Change and the Production of Ocean Shipping Services," with Reuben Kyle, Atlantic Economic Association meeting, Plymouth, MA, October 1992.
- "Negotiating a Transportation Rate Under Threat of Bypass: A Case Study," Eighth Biennial Regulatory Information Conference, Columbus, OH, September 1992.
- "A Multinomial Logit Model of Intrastate Trucking Regulation in Tennessee," with Jennifer W. Jose and Reuben Kyle, Midsouth Academy of Economics and Finance annual meeting, Mobile, February 1992.
- "Technological Change and the Production of Ocean Shipping Services," with Reuben Kyle, Southern Economic Association meeting, Nashville, November 1991.
- "Suit, Countersuit, and Settlement in Sham Litigation Cases," Southern Economic Association meeting, Nashville, November 1991.
- "Implementing Third Best Pricing Rules for Natural Gas Distribution Utilities," Southern Economic Association meeting, Nashville, November 1991.
- "Trucking Regulation in Tennessee," with Jennifer Jose and Reuben Kyle, Southern Economic Association meeting, Nashville, November 1991.
- "Research and Development in Regulated Markets: The Case of Bell Communications Research," Southern Economic Association meeting, New Orleans, November 1990.
- "Incentives for Trial and Settlement in Sham Litigation," Southern Economic Association meeting, New Orleans, November 1990.
- "Ramsey Prices for Natural Gas Distribution Utilities," Seventh NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1990.
- "Intervention as Entry Deterrence: Evidence from Sham Litigation Cases," Seventh NARUC Biennial Regulatory Information Conference, Columbus, OH, September 1990.
- "Funding Research and Development in Regulated Industries: The Case of Bell Communications Research," Ninth Annual Conference of the Advanced Workshop in Regulation and Public Utility Economics, New Paltz, NY, May 30 - June 1, 1990.
- "Incentives for Trial and Settlement in Sham Litigation," Bureau of Economics Seminar, Federal Trade Commission, February 1990.
- "Estimating Ramsey Prices for Natural Gas Utilities," Southern Economic Association meeting, Orlando, November 1989.
- "Incentives for Trial and Settlement in Sham Litigation," Department of Economics Seminar Series, Auburn University, November 1989.
- "Natural Gas Rate-Making: Now and In the Future," Associated Valley Industries Natural Gas Seminar, Nashville, October 1989.

- "Estimating Ramsey Prices for Natural Gas Utilities," Advanced Workshop in Regulation and Public Utility Economics, Eighth Annual Conference, Newport, RI, May 29-31, 1989.
- "The Role of Bell Communications Research in the Telecommunications Markets," Midsouth Academy of Economics and Finance Annual Conference, Nashville, February 1989.
- "The Organizational Structures of Public Utilities Under Different Regulatory Regimes," Southern Economic Association meeting, San Antonio, November 1988.
- "New Agreements, Non-affiliate Revenues, and Economic Issues," Report on Bell Communications Research, NARUC Multi-state Audit Team, presented to NARUC Staff Sub-committee on Accounts, Kalispell, Montana, September 1988.
- "Predation in the Courts: Empirical Analysis of Sham Litigation Cases," Joint Session of the Industrial Organization Society and the American Economic Association, Chicago, December 1987.
- "Rate of Return on Equity," National Conference on Unit Valuation Standards; Nashville, December 1987.
- "Merger Incentives and Organizational Structures Under Cost of Capital Regulation," Southern Economic Association meeting, Washington, November 1987.
- "Merger Incentives and Cost of Capital Regulation of Subsidiaries," Midsouth Academy of Economics and Finance Annual Conference, Mobile, February 1987.
- "The Incidence of Predatory Sham Litigation," Southern Economic Association meeting, New Orleans, November 1986.
- "A Welfare Analysis of the Department of Justice Merger Guidelines," Southern Economic Association meeting, Dallas, November 1985.
- "A Duality Approach to Labor Costs and Shiftwork," Southern Economic Association meeting, Atlanta, November 1984.
- "Strategic Sham Litigation: Economic Incentives in the Context of the Case Law," Southern Economic Association meeting, Atlanta, November 1984.
- "A General Theory of Hedonic Pricing of Capital as a Factor of Production," Southern Economic Association meeting, Washington, November 1983.

ECONOMIC TESTIMONY

- Testimony before the Public Service Commissions of Alabama, Louisiana, North Carolina, and South Carolina on behalf of the Reseller Coalition, various docket numbers, August 2010-May 2011.
- In the United States District Court for the Middle District of Tennessee: Owner-Operator Independent Drivers Association Inc. v. Keith Bissell, No. 3-90-0251, March 1992, (Affidavit).
- Before the Federal Communications Commission: Represcribing the Authorized Rate of Return for Interstate Services of Local Exchange Companies, CC Docket No. 89-624, March 1990.
- Before the Tennessee General Assembly: various Committees, 1994 - present.

Before the Tennessee Advisory Commission on Intergovernmental relations:
"Report on Pole Attachment Rate Study," with Reuben Kyle, January 18, 2007.

Before the Tennessee Regulatory Authority (docket numbers in parentheses):

Petition of Kingsport Power Company d/b/a AEP Appalachian Power Company General Rate Case and Motion for a Protective Order (16-00001), June 2016.

Petition of Atmos Energy Corporation for a General Rate Increase (14-00146), April 2015.

Petition of Piedmont Natural Gas Company, Inc. for Approval of a CNG Infrastructure Rider to Its Approved Rate Schedules and Service (14-00086), December 2014.

Petition to Revise Performance Based Ratemaking Mechanism Rider in Atmos Energy Corporation's Tariff (13-00111), November 2013.

Petition of Atmos Energy Corporation for an Adjustment of Rates (12-00064), September 2012.

Petition of Berry's Chapel Utility, Inc. to Change and Increase Rates and Charges (11-00198), April 2012.

Petition of Piedmont Natural Gas, Inc. for an Adjustment to Its Rates, Approval of Changes to Its Rate Design, Amortization of Certain Deferred Assets, Approval of New Depreciation Rates, Approval of Revised Tariffs and Service Regulations, and Approval of a New Energy Efficiency Program and GTI Funding, (11-00144), December 2011.

Petition of Tennessee American Water Company to Change and Increase Certain Rates and Charges so as To Permit It to Earn a Fair and Adequate Rate of Return on Its Property Used and Useful in Furnishing Water Service to Its Customers, (11-00189), April 2011.

Petition of Chattanooga Gas Company for General Rate Increase, Implementation of the EnergySmart Conservation Programs, and Implementation of a Revenue Decoupling Mechanism, (09-00183), April 2010.

Petition of Piedmont Natural Gas Company, Inc. to Implement a Margin Decoupling Tracker (MDT) and Related Energy Efficiency and Conservation Programs, (09-00104), December 2009.

Tennessee Rural Coalition Petition for Suspension and Modification Pursuant to 47 U.S.C. 1251(f)(2), (06-00228), May 2007.

Complaint of US LEC of Tennessee, Inc. against Electric Power Board of Chattanooga (02-00562), Feb. 2004.

Before the Tennessee Public Service Commission* (docket numbers in parentheses):

BellSouth D/B/A South Central Bell (95-02614) October 1995.**

United Telephone - Southeast (95-02615) September 1995.

United Telephone - Southeast (93-04818) January 1994.**

Chattanooga Gas Company (93-06946) December 1993.

South Central Bell Tariff 93-039 (93-03038) May 1993.**

South Central Bell (92-13527, et al) April 1993.**

Kingsport Power Co. (92-04425) October 1992.

* Written (prefiled) testimony on cost of capital, rate design, competitive effects, and/or other issues.

** Oral testimony as well as written.

United Cities Gas Co.(92-02987) Sept. 1992.
L & L Trucking, Inc. (91-06786) February 1992.**
Chattanooga Gas Company (91-03765) October 1991.
GTE South (91-05738) August 1991.**
Nashville Gas Company (91-02636) August 1991.
Intra-LATA "Competition" (89-11065, et al) Feb. 1991.
United Intermountain Tel. Co.(90-07832) Dec. 1990.**
Kingsport Power Company (90-05736) Nov. 1990.**
AT&T - South Central States (90-07460) Oct. 1990.**
L & L Trucking (90-03514; 90-04786) August 1990.**
South Central Bell Tel. Co. (90-05953) August 1990.**
GTE South (90-01273) June 1990.
Radio Common Carriers (89-11234) Nov. 1989.**
Nashville Gas Co. (89-10491) Oct. 1989.
United Cities Gas Co. (89-10017) Sept. 1989.
Crockett Telephone Co. (89-02325) May 1989.
ALLTEL Tennessee (89-02324) May 1989.
West Tennessee Telephone Co. (89-02323) May 1989.
Peoples Telephone Co. (89-02322) May 1989.
Ooltewah-Collegedale Telephone Co. (89-02321) May 1989.
Kingsport Power Co. (89-02126) March 1989.**
Chattanooga Gas Co. (88-01363) February 1989.**
Tennessee-American Water Co. (U-87-7534) March 1988.
Tellico Telephone Co. (U-87-7532) February 1988.
Claiborne Telephone Co. (U-87-7508) November 1987.**
Nashville Gas Co. (U-87-7499) October 1987.**
Kingsport Power Co. (U-86-7472) May 1987.**
United Cities Gas Co. (U-86-7442) February 1987.**
General Telephone of the South (U-86-7437) Nov. 1986.**