BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

IN THE MATTER OF THE APPLICATION OF	)	
OKLAHOMA GAS AND ELECTRIC COMPANY	)	
FOR AN ORDER OF THE COMMISSION	)	CAUSE NO. PUD 201100087
AUTHORIZING APPLICANT TO MODIFY ITS	)	
RATES, CHARGES, AND TARIFFS FOR RETAIL	)	
ELECTRIC SERVICE IN OKLAHOMA	)	

Direct Testimony

of

Lawrence W. Thompson

on behalf of

Oklahoma Gas and Electric Company

July 28, 2011

Q. **Please state your name.**

A. My name is Lawrence W. Thompson.

Q. **Whom do you represent?**

A. I am testifying on behalf of Oklahoma Gas and Electric Company, ("OG&E").

Q. **Have you testified previously before this Commission?**

A. Yes. I have submitted direct and rebuttal testimony in numerous prior cases involving electric and natural gas ratemaking.

Q. **Are your qualifications contained in the record?**

A. Yes. My credentials are summarized on Exhibit LWT-1.

Q. **What is the purpose of your testimony in this proceeding?**

A. I will describe the purpose, conduct, and application of certain analyses of customer related costs performed on behalf of OG&E and incorporated in the class cost of service study filed by OG&E and sponsored by witness Veitch.

Q. **Please describe the studies which are the subject of your testimony.**

A. In late 2008, B&B Consulting International, LLC ("BBCI"), a consulting firm in Broken Arrow, Oklahoma was commissioned by OG&E to perform studies of electric customer costs using two analytical methods known as the Minimum System Method and the Zero Intercept Method. The studies were performed with the assistance of numerous OG&E personnel and the results were presented to OG&E management in a report in January, 2009.

Q. **Can you summarize the study recommendations?**

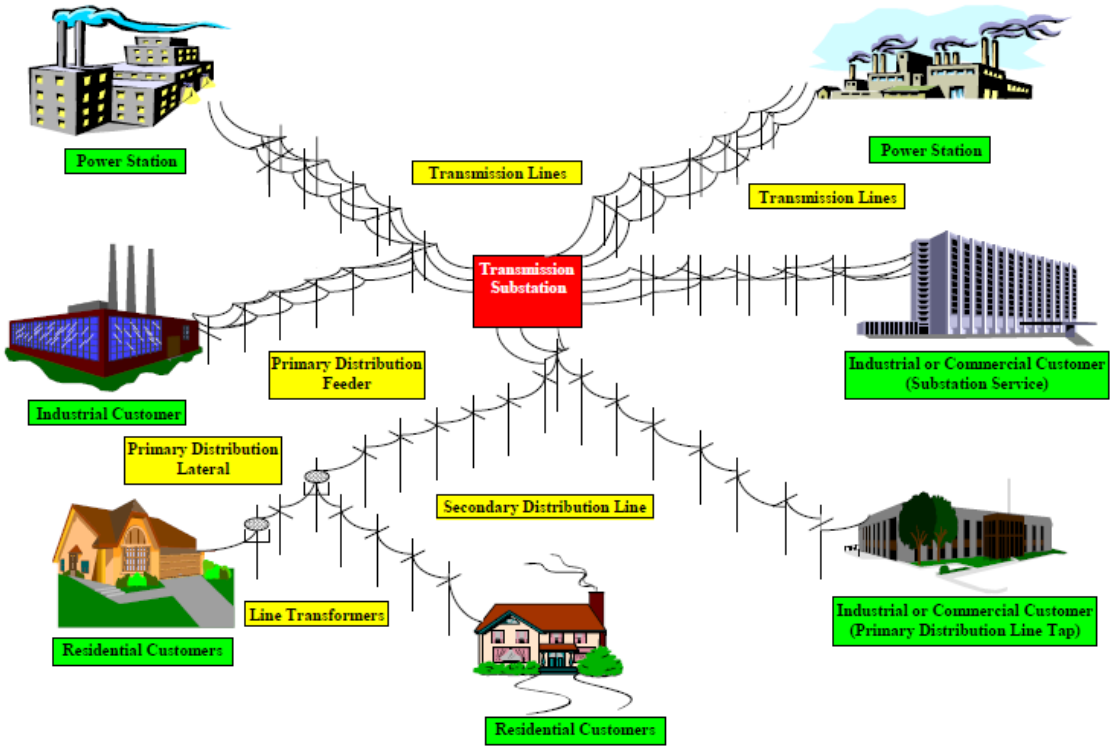
A. Yes. We recommended use of the Zero Intercept analytical method and provided a summary of the distribution plant classification percentages for the overhead and

underground line accounts and for distribution transformers. Our recommendation was based on both theoretical and practical considerations and represented, in our view, the most appropriate methodology for use in classifying the properties being evaluated.

Q. **Would you discuss the background considerations in performing the studies?**

A. Yes. I think it is important to understand the kinds of facilities that compose an electric utility system. Chart 1 below will assist in this explanation.

Chart 1
A Typical Electric System



This chart is a schematic diagram of a typical electric system. It is composed of power plants, transmission lines, transmission to distribution substations, primary voltage distribution lines, line transformers, and secondary voltage lines connecting individual small consumers to the grid. A review of the diagram will reveal that some customers are served directly off the transmission system and make no use of lower voltage facilities. In OG&E's rate structure, these are referred to as Service Level 1 consumers. Likewise, some customers are served at primary distribution voltages and make no use of secondary

distribution voltage facilities. Finally, many customers require all of the facilities shown in order to receive electric service at the desired voltage. This is why rates for high voltage customers (service levels 1 through 4) are generally lower than for secondary voltage customers served at Service Level 5. Likewise, as shown on the schematic, certain facilities are used by only a single customer.

Q. **What is the proper basis for determination of customer related costs for ratemaking purposes?**

A. In my opinion rates should be based on cost. There are, however, many ways to categorize costs. Most utility costs are joint costs. This simply means that they are not associated with a single customer but must be allocated among many users. Most utility costs, other than fuel and purchased energy, are fixed costs related to capital costs and the costs to operate and maintain capital assets. Many fixed costs depend upon the level of electrical load to be served. These are typically allocated on the basis of demand. Certain other costs, however, are incurred in order to connect customers to the electric system in order to provide access to electric service. We refer to these as customer related costs. It is these costs which the studies done on behalf of OG&E attempted to define.

Q. **What is your definition of customer related costs?**

A. I believe that customer related costs include the entire cost of meters, services, street lights, and utility property on customer premises. In addition, I believe that a portion of the costs of overhead and underground lines and line transformers should be included as customer related costs.

Q. **How much of the overhead lines, underground lines, and line transformer costs should be treated as customer related costs?**

A. That is precisely the question which OG&E hoped to resolve by commissioning the studies using the Minimum System and Zero Intercept evaluations. Chart 2 shows the percentages of the relevant investment accounts which the studies indicated should be treated as customer related costs.

Chart 2

Item	% Customer Minimum System Analysis	% Customer Zero Intercept Analysis
Poles (Acct 364.1)	85.30%	54.94%
OH Conductor (Acct 365.1)	78.44%	54.94%
UG Conduit (Acct 366.1)	96.33%	37.57%
UG Conductor (Acct 367.1)	78.88%	37.57%
Line Trans – OH + UG	73.89%	71.67%

The Minimum System analysis always resulted in a higher percent of the distribution plant accounts being classified as customer related than did the Zero Intercept analysis.

Q. **What are the commonly accepted study methods for estimating customer related costs?**

A. There are three basic methods I have seen used in regulatory proceedings involving electric utilities. The specific implementation of each of the three methods has varied considerably among individual cases. The three Customer Cost Analysis methods are outlined below:

- Property Inventory / usage correlation studies.
  - Is based on correlating the usage of customers connected to sample inventory areas with the investment in the corresponding areas.
  - These are very expensive to do.
  - OG&E has not done this in recent times.
- Minimum System Evaluation
  - Rests on the theory that an appropriate measure of customer related costs is the cost of a theoretical distribution system composed of components of the smallest size in use.
  - Such an analysis was done by BBCI on behalf of OG&E.
- Zero Intercept Evaluation
  - Rests on the theory that only the portion of distribution investment needed to connect a customer and provide voltage – but no capacity is customer related.
  - Involves use of regression techniques to identify the cost of theoretical "zero capacity" components.
  - Such an analysis was done by BBCI on behalf of OG&E.

Q. **Which of the methods is preferable?**

A. If the cost of the study were not a consideration and geographic (such as Urban/Rural) rate zones were being considered, I would recommend the first method which involves relating an inventory of distribution properties to the number and load requirements of customers being served by the properties being inventoried. However, such studies are extremely expensive to perform, costing perhaps a million dollars or more. This is the only one of the three analytical methods which considers customer density in the evaluations and is merited in the context of the possibility of Urban/Rural rate zones. In the absence, however, of the willingness to fund a very expensive study and an interest in arriving at results pertinent to Urban/Rural rate differentials, my preference is the Zero Intercept method.

Q. **Why do you prefer the Zero Intercept Method?**

A. I believe it rests on a more defensible theoretical basis than the Minimum System approach and using it avoids controversy regarding whether or not duplicative costs are being assigned to small consumers. It rests on the theory that the proper proportion of an asset's cost to view as customer related is that portion which provides no load serving capacity. This is accomplished through use of a regression technique where component costs are compared with electrical capacity, expressed in KVA or Amperes, in order to determine the cost of a "zero capacity" system. The remaining portion of the costs is then allocated on the basis of demand.

Q. **How is this different from what is done in a Minimum System analysis?**

A. In a Minimum System analysis, the cost comparison is done between the average cost of the components installed and the cost of the smallest sized components being installed by the utility. The cost of a "Zero Capacity" component is almost always lower than that for the minimum size component. In addition, the use of the Minimum System approach becomes problematical when the load carrying capability in the minimum system components is not recognized when allocating demand related distribution costs. As noted previously, both analytical methods were employed in the studies by BBCI.

Q. **Were there activities common to the performance of both studies?**

A. Yes. The following activities were conducted and provided supporting data for both of the studies. These are subsequently referred to as Common Study Activities.

- Performance of engineering estimates to identify the current construction costs of various service arrangements needed to serve distribution customers of various sizes.
- Tabulation of the investment costs for each engineering estimate by each pertinent property account established by the Federal Energy Regulatory Commission ("FERC").
- Analysis of Geographic Information System records to identify the relative frequency of occurrence of each size component on the OG&E system.
- Estimation of average unit costs by component size and for all sizes based on the activities above.

Q. **What additional activities were required in order to complete the Minimum System Analysis?**

A. In addition to the Common Study Activities described previously, the following activities were required:

- Computation of the minimum size unit costs based on the activities above.
- Comparison of the Minimum System Cost for each component with the average cost as a percentage. This is the value which was used in classifying property accounts into customer and demand related properties and costs.

Q. **What additional activities were required in order to complete the Zero Intercept Analysis?**

A. In addition to the Common Study Activities described previously, the following activities were required:

- Performance of a regression analysis for each type of component having an electrical capacity rating to determine the cost of theoretical "Zero Capacity" components.
- Comparison of the Zero Capacity Cost for each component with the average cost as a percentage, then ascribing the percentage found for components having electrical capacity to those supporting components which did not. For example, the percentage

found for Overhead Conductor was applied to Poles, Towers and Fixtures. This is the value used in classifying property accounts into customer and demand related properties and costs.

Q. **How is the regression formula derived used to estimate the cost of a zero capacity component?**

A. The formula is derived using the assumption of a linear relationship and applying a simple least squares curve fit technique to the available data. It is applied in order to estimate the cost of various size components, including the zero capacity value. The formula can generally be expressed as an equation having the form of

$$Y=B+M*X$$

Where:

Y is the unit cost

B is the cost of a Zero Capacity item

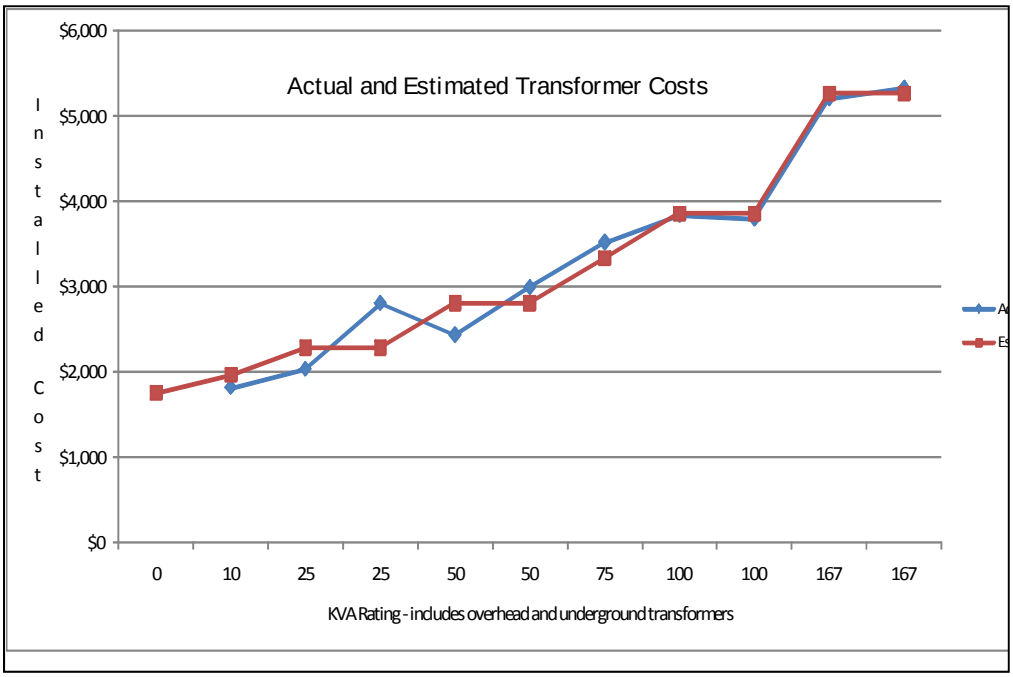
M is the slope of the regression line or incremental cost for additional capacity units, and

X is the size in capacity of the unit being estimated.

An example of an application of the formula, applied to line transformers, is shown as Chart 3. In this instance the actual formula was *Y* (Unit Cost) = *1757.578155* + *21.01718914*X* (Transformer KVA). The regression line and the data used for its development are shown on Chart 4. Term "B", in this instance is $1,757.58. When this value is multiplied times the number of installed transformers and then divided by the current cost of transformers, the resulting value represents the customer percentage of transformer investment. The resulting percentage is used to separate the corresponding rate base investment in transformers into customer and demand components in the cost of service study.

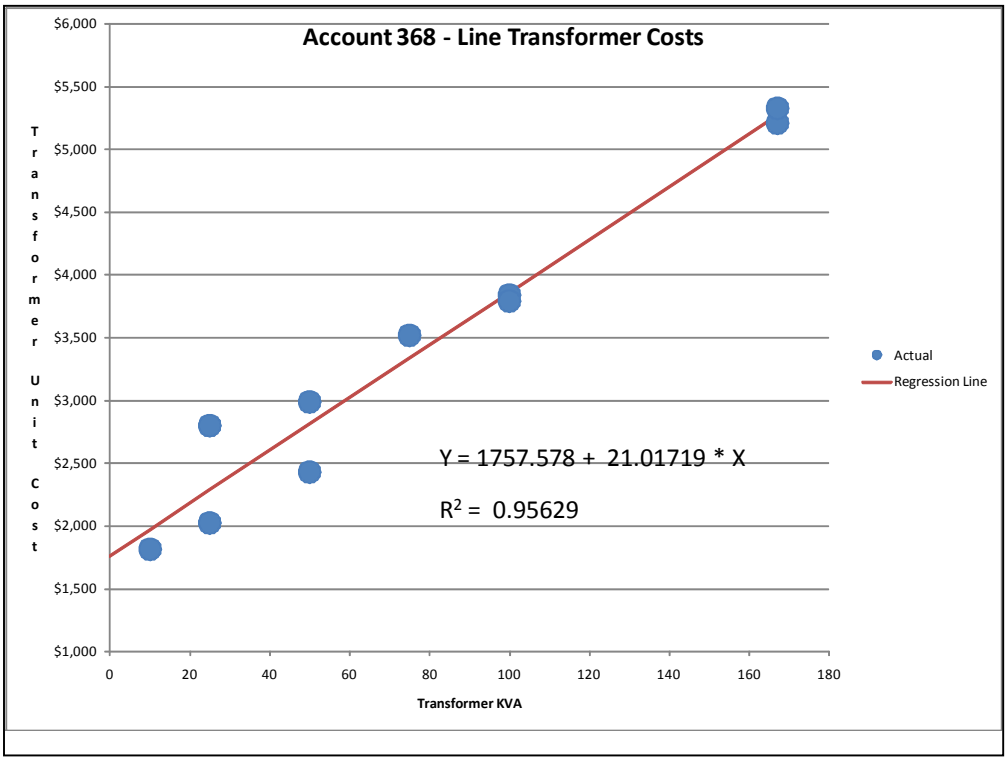
1

Chart 3



2

Chart 4



Q. **Were the costs for the distribution Accounts 364, 365, 366, and 367 analyzed in the same manner?**

A. Yes, they were.

Q. **Are there problems which are frequently encountered in the conduct or use of customer cost studies such as the ones you have been discussing?**

A. Yes. Problems do exist in the performance and use of such studies. Some of them are listed below:

- Data problems are common. Valid historical data is difficult to obtain. This was a factor in our choice to use only current construction data in the studies.
- Judgment calls are required. We believe the ones made were sound. An example is the choice of the size of the minimum system components. Our choice was to use the minimum size components currently being installed.
- The Minimum System analysis is alleged by some to allocate an excessive amount of cost to small consumers because some demand serving capacity is embedded in the minimum system components.
- Such studies have been criticized because they do not address customer density issues. However, such studies are not intended to address cost differences which vary with customer density. To do this would require a property inventory / customer usage analysis. This is not a weakness of the studies but is a matter of ratemaking policy. Unless geographic rates are expected to be instituted, a study incorporating customer density is not useful in setting rates. It should also be noted that customer density is driven by customer choice, not utility policy, and certainly not by electrical demand.

Q. **Why are studies, such as those under discussion here, sometimes relied upon by regulatory commissions?**

A. There are three reasons, as outlined below.

- Absent performance of very expensive property inventory studies, such studies represent the best way available to estimate customer costs.

- Such studies, while imperfect, are the best tools affordable for determining the most appropriate classification of distribution costs into Customer and Demand Components.
- Such studies provide guidance for rate design.

Q. **What is the range of possible methods which could be used to classify Distribution Plant between the Customer and Demand Classifications?**

A. The two extremes would be to classify all distribution plant as demand related or to classify all distribution plant (except substations) as customer related. While I do not believe that either of these extremes offers a realistic view of the purpose of distribution lines and transformers, those do represent the extremes or "Bookends" which might define the range of possible outcomes.

Q. **Have you performed any measure of what the outcomes of the possible methods you have discussed would yield in terms of Class Revenue Requirements?**

A. Yes, I have. Exhibit LWT-2 is a tabulation showing the Revenue Requirement for the retail service classes using each of the classification methods previously discussed. As a review of Exhibit LWT-2 will reveal, the total jurisdictional revenue requirements for the four methods are very similar, while the revenues required for the various classes are responsive to the method chosen. The overall revenue requirement remains relatively constant regardless of the classification method because any increase in customer related costs is accompanied by a corresponding decrease in demand related costs and vice versa. The Zero Intercept method tends to produce results in the middle of the range of values for each class of service.

Q. **What impact does the choice of the distribution cost classification method have on monthly customer costs?**

A. The monthly customer costs for each secondary voltage service class are shown on Exhibit LWT-3.

Q. **Please describe Exhibit LWT-3.**

A. Exhibit LWT-3 is a comparison of monthly customer costs. It represents the monthly service charge for secondary voltage (Service Level 5) customers which is justified based upon the level of customer related costs for each service class divided by the number of annual bills. There are four columns on the exhibit representing the four methods of classifying distribution property and expenses into customer related and demand related items as discussed previously. It is notable that the customer cost indicated for each of the customer classes by the Zero Intercept method tend to fall in the middle of the range of possible values.

Q. **What is your recommendation?**

A. I have two recommendations. First, because of reasons previously cited, including its theoretical superiority and lack of controversy regarding duplicative allocation of costs to small consumers, the Zero Intercept method should be adopted as the measure of customer related costs for Cost of Service analyses. My second recommendation is that the costs for customers served at secondary voltages be set at the values indicated in Exhibit LWT-3 in the column representing the Zero Intercept method.

Q. **Does that complete your testimony, Mr. Thompson?**

A. Yes, it does.

Exhibit LWT-1

QUALIFICATIONS OF
L. W. THOMPSON

EDUCATION: B.S. (Industrial Engineering) - Oklahoma State University - May, 1965.

Post Graduate courses - College of Business - University of Tulsa (1970-1971)

Public Utility Executive's Course - University of Idaho (1975)

REGISTRATION: Professional Engineer, Retired

CLIENT SERVICES PROVIDED:

A. Analysis and Evidentiary Presentation:

1. Electric, Gas, Water, & Wastewater Ratemaking
2. Economic Analysis of Powerplant Construction
3. Derivation of Avoided Generation Costs
4. Assistance with Fuel & Power sales and acquisition activities
5. Economic Evaluation of Hydroelectric projects
6. Evaluation of Gas & Electric Power Markets
7. Financial Evaluation and Forecasting
8. Property valuation and taxation

B. Modeling and Simulation:

1. Utility Cost of Service
2. Financial Results Modeling
3. Utility Billing and revenue testing

C. Training and Education:

1. Rate Case preparation and conduct
2. Cost of Service Analysis
3. Rate Design

Exhibit LWT-1

REPRESENTATIVE CLIENTS:

A. Oklahoma Gas and Electric Company
B. Oklahoma Natural Gas Company
C. City of Cleveland, Oklahoma
D. City of Mustang, Oklahoma
E. City of Norman, Oklahoma
F. City of Oklahoma City, Oklahoma
G. Town of Okarche, Oklahoma
H. Mount Joy Wire Corporation
I. The Minute Maid Company
J. Wausau Paper Corp.
K. CP Kelco U.S., Inc.
L. Legislative Council of Oklahoma

EXPERIENCE:

A. Public Utility Employment - Public Service Company of Oklahoma - 1965 to 1978.

1. Engineer in Training - 1965-1966
2. Military Leave of Absence - 1966 to 1969
3. Standards Engineer - 1969 to 1970
4. Load Research Engineer - 1971 to 1974
5. Manager of Rates - 1974 to 1976
6. Manager of Rates and Economic Studies - 1976 to 1978

B. Military Duty - Supply Corps Officer, U.S. Naval Reserve - 1966 to 1969

C. Business Consultant - 1978 to Present.

D. Filed testimony or appeared in the following Regulatory Proceedings:

1. Cause Number 25346 before the Oklahoma Corporation Commission
2. Cause Number 25897 before the Oklahoma Corporation Commission
3. Cause Number 26782 before the Oklahoma Corporation Commission
4. Cause Number 26814 before the Oklahoma Corporation Commission
5. Cause Number 26975 before the Oklahoma Corporation Commission
6. Cause Number 26981 before the Oklahoma Corporation Commission
7. Cause Number 27119 before the Oklahoma Corporation Commission
8. Cause Number 27202 before the Oklahoma Corporation Commission

9. Cause Number 27275 before the Oklahoma Corporation Commission

10. Cause Number 27297 before the Oklahoma Corporation Commission
11. Cause Number 27835 before the Oklahoma Corporation Commission
12. Cause Number 27915 before the Oklahoma Corporation Commission
13. Cause Number 28831 before the Oklahoma Corporation Commission
14. Cause Number 28875 before the Oklahoma Corporation Commission
15. Cause Number 29450 before the Oklahoma Corporation Commission
16. Cause Number 29637 before the Oklahoma Corporation Commission
17. Cause Number PUD000105 before the Oklahoma Corporation Commission
18. Cause Number PUD000252 before the Oklahoma Corporation Commission
19. Cause Number PUD000345 before the Oklahoma Corporation Commission
20. Cause Number PUD000439 before the Oklahoma Corporation Commission
21. Cause Number PUD000600 before the Oklahoma Corporation Commission
22. Cause Number PUD90000898 before the Oklahoma Corporation Commission
23. Cause Number PUD90001005 before the Oklahoma Corporation Commission
24. Cause Number PUD90001055 before the Oklahoma Corporation Commission
25. Cause Number PUD920001342 before the Oklahoma Corporation Commission
26. Cause Number PUD940000477 before the Oklahoma Corporation Commission
27. Cause Number PUD200100455 before the Oklahoma Corporation Commission
28. Docket E8242 before the Federal Power Commission
29. Docket ER78-511 before the Federal Energy Regulatory Commission
30. Docket RP77-55 before the Federal Energy Regulatory Commission
31. Docket 136,373-U before the Kansas Corporation Commission
32. Case Number 78-2-EL-CMR before the Ohio Public Utilities Commission
33. Case Number 78-3-EL-CMR before the Ohio Public Utilities Commission
34. Application Number NB-0053 before the Nebraska Public Service Commission
35. Case Number 78-1438-EL-AIR before the Ohio Public Utilities Commission
36. Case Number 78-1567-EL-AIR before the Ohio Public Utilities Commission
37. Case Number 78-1568-EL-AIR before the Ohio Public Utilities Commission

38. Case Number 79-537-EL-AIR before the Ohio Public Utilities Commission
39. Case Number 79-774-EL-CMR before the Ohio Public Utilities Commission
40. Case Number 79-529-EL-ATA before the Ohio Public Utilities Commission
41. Case Number 80-141-EL-AIR before the Ohio Public Utilities Commission
42. Case Number 80-1139-EL-AIR before the Ohio Public Utilities Commission
43. Case Number 82-517-EL-AIR before the Ohio Public Utilities Commission
44. Case Number 84-67-GA-AIR before the Ohio Public Utilities Commission
45. Docket 6690-UR-114 before the Wisconsin Public Service Commission
46. Docket 6690-UR-115 before the Wisconsin Public Service Commission
47. Docket 6690-UR-116 before the Wisconsin Public Service Commission
48. Docket 6690-UR-117 before the Wisconsin Public Service Commission
49. Docket 6690-UR-118 before the Wisconsin Public Service Commission
50. Docket 6690-UR-119 before the Wisconsin Public Service Commission
51. Docket 6690-UR-120 before the Wisconsin Public Service Commission

Exhibit LWT-2

Revenue Requirement by Class
($ X 1,000)

Rate Class	100% Demand	Zero Intercept	Minimum System	100% Customer
Residential	$804,630	$820,220	$834,103	$841,373
General Service	$155,984	$167,281	$171,558	$174,358
Oil Production	$11,917	$12,512	$12,568	$12,742
Schools Non-Demand	$21,130	$18,535	$17,105	$16,105
Schools Demand	$10,705	$9,688	$9,108	$8,737
Power & Light	$265,380	$257,343	$250,917	$247,919
Power & Light-TOU	$170,448	$159,751	$153,431	$149,528
Large Power & Light-TOU	$292,509	$286,704	$283,165	$281,056
Municipal Pumping	$7,897	$7,825	$7,686	$7,643
Municipal Lighting	$15,482	$15,030	$14,782	$14,617
Outdoor Security Lighting	$20,337	$21,451	$21,905	$22,227
Total Oklahoma Retail	$1,776,418	$1,776,340	$1,776,329	$1,776,304

Exhibit LWT-3

Monthly Customer Costs

Rate Class	Customer Cost / Month			
	100% Demand	Zero Intercept	Minimum System	100% Customer
Residential	$9.57	$21.94	$29.43	$34.14
Residential TOU	$9.62	$21.99	$29.48	$34.19
General Service	$10.58	$39.53	$53.29	$62.39
General Service TOU	$10.96	$39.90	$53.67	$62.76
Oil Production	$10.46	$35.44	$44.53	$52.89
Oil Production TOU	$11.03	$36.02	$45.12	$53.49
Schools Non-Demand	$12.04	$44.30	$61.96	$71.66
Schools Non-Demand TOU	$13.61	$45.87	$63.53	$73.23
Schools Demand	$34.40	$159.65	$216.25	$261.01
Schools Demand TOU	$37.83	$163.04	$219.61	$264.37
Power & Light	$32.03	$139.08	$182.48	$220.77
Power & Light-TOU	$34.50	$164.27	$224.15	$270.52
Large Power & Light-TOU	$169.30	$326.05	$405.47	$461.46
Municipal Pumping	$11.64	$46.88	$60.87	$72.70