

EXHIBIT

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Case No.:

Cost of Service/Rate Design

Meisenheimer/Direct

Public Counsel

EO-2002-384

DIRECT TESTIMONY
OF
BARBARA A. MEISENHEIMER

FILED²
DEC 07 2005

Missouri Public
Service Commission

Submitted on Behalf of the Office of the Public Counsel

AQUILA, INC.

CASE NO. EO-2002-384

September 19, 2005

Exhibit No. 21
Case No(s) EO-2002-384
Date 11-07-05 Rptr XF

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

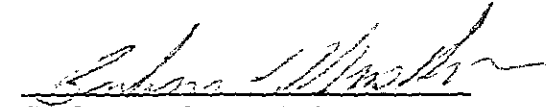
In the Matter of an Examination of Class Cost of)
Service and Rate Design in the Missouri)
Jurisdictional Electric Service Operations of) **Case No. EO-2002-384**
Aquila, Inc., Formerly Known as UtiliCorp United)
Inc.)

AFFIDAVIT OF BARBARA A. MEISENHEIMER

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Barbara A. Meisenheimer, of lawful age and being first duly sworn, deposes and states:

1. My name is Barbara A. Meisenheimer. I am Chief Utility Economist for the Office of the Public Counsel.
2. Attached hereto and made a part hereof for all purposes is my direct testimony consisting of pages 1 through 16 and schedules.
3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.



Barbara A. Meisenheimer

Subscribed and sworn to me this 19th day of September 2005.



JERENE A. BUCKMAN
My Commission Expires
August 10, 2009
Cole County
Commission #05754036



Jerene A. Buckman
Notary Public

My Commission expires August 10, 2009.

**Aquila Networks
Class Cost of Service and Rate Design
EO-2002-384**

**Direct Testimony
of
Barbara Meisenheimer**

1 **Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.**

2 A. Barbara A. Meisenheimer, Chief Utility Economist, Office of the Public Counsel,
3 P. O. 2230, Jefferson City, Missouri 65102. I am also an adjunct instructor for
4 William Woods University.

5 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND EMPLOYMENT**
6 **BACKGROUND.**

7 A. I hold a Bachelor of Science degree in Mathematics from the University of
8 Missouri-Columbia (UMC) and have completed the comprehensive exams for a
9 Ph.D. in Economics from the same institution. My two fields of study are
10 Quantitative Economics and Industrial Organization. My outside field of study is
11 Statistics. I have taught economics courses for the University of Missouri-
12 Columbia, William Woods University, and Lincoln University, mathematics for
13 the University of Missouri-Columbia and statistics for William Woods University.

14 **Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THIS COMMISSION?**

15 A. Yes, I have testified on numerous issues before the Missouri Public Service
16 Commission. (PSC or Commission).

17 **Q. WHAT IS THE PURPOSE OF THIS CASE?**

1 A. This case was established as a result of the Stipulation and Agreement in ER-
2 2002-672 that addressed UtiliCorp United, Inc.'s Missouri Public Service (MPS)
3 service area. The purpose was to examine class cost of service and rate design.
4 Aquila is the name under which UtiliCorp United now operates. St. Joseph Light
5 and Power Company (L&P) was purchased subsequent to the Stipulation and
6 Agreement in ER-2002-672, however, the cost of service and rate design are
7 being examined in this case.

8 **Q. WHAT IS YOUR PREVIOUS EXPERIENCE IN THE PREPARATION OF**
9 **CLASS COST OF SERVICE STUDIES?**

10 A. I have prepared and supervised the preparation of cost of service studies on behalf
11 of Public Counsel for over eight years. These include class cost of service studies
12 related to natural gas, water and electric utilities, and services cost studies related
13 to telecommunications carriers.

14 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

15 A. The purpose of my direct testimony is to present Public Counsel's Class Cost of
16 Service (CCOS) study results and preliminary inter-class class rate design
17 recommendations. My CCOS study results are provided in Schedule BAM Direct
18 MPS Page 1 and Schedule BAM Direct LP Page 1. Illustrative rate design
19 examples are provided in Schedule BAM Direct MPS Page 2 and Schedule BAM
20 Direct LP Page 2. I would like to point out that the illustrative rate design
21 examples are based solely on the cost developed in this case. Other
22 considerations related to setting just and reasonable rates are discussed later in
23 this testimony.

I. CLASS COST OF SERVICE STUDY

Q. WHAT IS THE MAIN PURPOSE OF PERFORMING A CCOS STUDY?

A. The primary purpose of a CCOS study is to determine the relative class cost responsibility for each customer class by allocating costs among the classes based on principles of cost causation. CCOS study results also provide guidance for determining how rates (e.g., customer charges) should be designed to collect revenues from customers within a class, depending on customer usage levels and patterns of use.

Q. WHAT IS THE RELATIVE IMPORTANCE OF CCOS STUDY RESULTS IN DEVELOPING RATE DESIGN?

A. CCOS study results provide the Commission with a general guide in setting the just and reasonable rate for the provision of service based on costs. In addition, other factors are also relevant considerations when setting rates including the value of a service, affordability, rate impact, rate continuity, etc. A determination as to the particular manner in which the results of a cost of service study and all the other factors are balanced in setting rates can only be determined on a case-by-case basis.

Q. PLEASE OUTLINE THE BASIC ELEMENTS OF PREPARING A CCOS STUDY.

A. A CCOS Study is designed to functionalize, classify, and allocate costs. Functionalizing costs involves categorizing accounts by the type of electric utility function(s) with which each account is associated. The categories of accounts include Production, Transmission, Distribution, Customer Accounts, Administrative and General, etc.

1 The next step is to classify costs as customer related, demand related, commodity
2 related, or "other" costs. Customer related costs vary in relation to the number of
3 customers. Demand related costs vary with usage during different periods such as
4 peak and average load periods. Commodity related costs vary with annual energy
5 consumption. For example, the cost associated with customer records and
6 collection expense, meter plant, and meter reading expense are considered to be
7 customer-related because they vary primarily based on the number of customers
8 served and might occur whether or not the customer uses any electricity.

9 The final step in the CCOS is to develop and apply allocation factors that
10 apportion a reasonable share of jurisdictional costs to each customer class.
11 Allocation factors should be developed in a manner that is consistent with the
12 functionalization and classification of costs described above. For example,
13 unweighted customer related cost allocation factors are expressed as ratios that
14 reflect the proportion of customers in a particular class to the total number of
15 customers that contribute to the causation of the relevant cost. Likewise, demand
16 related allocators should reflect each class's use during specific time periods and
17 commodity related allocators should reflect each class's annual consumption. In
18 simpler terms, if the cost for a particular activity were thought of as a pie, then
19 allocators would represent the size of the slices of "cost" pie that each class would
20 be assigned.

21 **Q. WHICH CUSTOMER CLASSES ARE USED IN YOUR CCOS STUDY?**

22 A. For Aquila's MPS system, I used a Residential Class (RG), a Small General
23 Service Class (SGS), a Large General Service Class (LGS), a Large Power
24 Service Class (LPS), and a Special Contract Class (SC). For Aquila's L&P

1 system, I used a Residential Class (RG), a Small General Service Class (SGS), a
2 Large General Service Class (LGS), and a Large Power Service Class (LPS).
3 Both studies exclude Lighting as a class. I have allocated both direct cost and
4 revenues associated with Lighting to the other classes in proportion to overall cost
5 of service.

6 **Q. ON WHAT DATA ARE YOUR CCOS STUDIES BASED?**

7 A. My CCOS study is based on common data agreed upon by the Company and Staff
8 including data related to investments, expenses and revenues, peak demand,
9 customer counts and energy use.

10 **Q. HOW IS INTANGIBLE PLANT ALLOCATED?**

11 A. Intangible Plant (FERC Account No. 301) pertains to organization cost. It
12 includes all fees paid to federal or state governments for the privilege of
13 incorporation along with related expenditures. It should be allocated to each
14 customer class according to the benefits each receives from the existence of this
15 business, or according to the extent to which each class contributes to the overall
16 cost of conducting the business. Therefore, my method applies a composite total
17 cost of service allocator to Intangible Plant.

18 **Q. HOW IS PRODUCTION PLANT ALLOCATED?**

19 A. Production Plant includes the cost of land, structures and equipment used in
20 connection with power generation. Both demand and energy characteristics of a
21 system's loads are important determinants of production plant costs. I allocate the
22 Production Plant according to (1) 12-month non-coincident peak (NCP) average
23 and peak allocators and (2) an energy (kWh) allocator. The first allocation

1 method is a reasonably close approximation to a TOU method which the
2 Commission has previously determined reasonable. The latter allocation method
3 is applied to costs that vary primarily based on fuel consumption or the amount of
4 time generation units are utilized. The details of my calculations are provided in
5 Schedule BAM Direct MPS Page 3 and Schedule BAM Direct LP Page 3.

6 **Q. HOW DID YOU ALLOCATE TRANSMISSION PLANT?**

7 A. Transmission Plant includes the cost of land, structures and equipment used in
8 connection with transmission operations. Transmission facilities are installed to
9 provide reliable service throughout the year including periods of scheduled
10 maintenance. It can also, at times, substitute for generation and can minimize the
11 cost of generation facilities through the sales or purchases of power. Therefore,
12 Transmission Plant costs can be equitably allocated on the same basis as the
13 Production Plant. Accordingly, I chose to use the same 12-month NCP average
14 and peak allocators that I used for Production Plant to allocate Transmission
15 Plant.

16 **Q. HOW DID YOU ALLOCATE DISTRIBUTION PLANT?**

17 A. Distribution Plant includes the cost of land, structures and equipment used in
18 connection with distribution operations. Distribution plant equipment reduces
19 high-voltage energy from the transmission system to lower voltages, delivers it to
20 the customer and monitors the amounts of energy used by the customer. Many of
21 the distribution costs associated with providing service to electric utility
22 customers are not directly associated with or reasonable assignable to a particular
23 class with precision. For example, with the exception of service drops and

1 meters, most of the facilities between the utility customer's point-of-service and
2 the distribution substation are shared facilities. Since no portion of such facilities
3 are directly related to the number of customers, the associated costs are best
4 classified as demand related, rather than customer related. Furthermore, since
5 distribution systems are designed to meet more localized peak demand instead of
6 system-wide peak demand, such costs are best allocated based upon non-
7 coincident peak demand.

8 In the functionalization and allocation of Distribution Plant, my study also reflects
9 that distribution facilities provide service at two voltage levels: primary and
10 secondary, and that some large industrial customers may choose to take service at
11 primary voltages because of their large electrical requirements. Different
12 allocation factors were used for allocating costs at different levels of the
13 distribution system.

14 Meter facilities costs are generally related to each individual customer. New
15 investment occurs when a new customer is added to the system. Therefore, meter
16 costs are usually classified as customer related. Since large customers require
17 large meters and some large customers use multiple meters, I allocated the meters
18 account based upon meter numbers weighted to reflect the proportional meter cost
19 associated with the customers represented in the various classes based on data
20 available from a Company meter cost study.

21 Service facilities are also classified as customer related. The NARUC Electric
22 Utility Cost Allocation Manual recognizes that service cost vary with customer
23 size. However, I did not have specific data available to develop the weighted cost

as I did for meters. It seems likely that services vary to a lesser extent with customer size than do meters, therefore I applied a fourth root formula to the meter weights to reflect that the cost increases with size but at a declining rate. Since primary customers take service directly at primary voltages, no cost of service lines were allocated to the Primary class.

The functional categories and classifications for Distribution Plant are as follows:

360-362	Distribution Substations	Demand at Primary Station
364	Poles Towers and Fixtures	Demand at Primary Customer and Demand at Secondary
365	Overhead Conductors & Devices	Demand at Primary Customer and Demand at Secondary
366	Underground Conduit	Demand at Primary Customer and Demand at Secondary
367	Underground Conductors & Devices	Demand at Primary Customer and Demand at Secondary
368	Line Transformers	Transformer Demand
369	Services	Adjusted Weighted Meter
370	Meters	Weighted Meter Count
371	Installation on Customer Premises	Direct Assign to Industrial

Q. HOW DID YOU ALLOCATE GENERAL PLANT?

A. General Plant includes land, structures and equipment used in support of Production, Transmission and Distribution Plant. Therefore, it was allocated using a composite allocator based on previously allocated gross non-general plant.

Q. PLEASE DISCUSS THE METHODS THAT YOU USED TO ALLOCATE EXPENSES.

1 A. Expenses were directly assigned if possible. For the expenses that could not be
2 directly assigned, consistent with the principle that "expenses follow plant", the
3 allocators that were applied to the expenses accounts were the same as those
4 applied to the Production, Transmission, and Distribution Plant accounts to which
5 the expenses are related.

6 **Q. HOW DID YOU ALLOCATE POWER PRODUCTION EXPENSES?**

7 A. Power Production Expenses were broken down into demand-related and energy-
8 related production and purchased power costs. The demand-related expenses
9 were allocated based on the 12-month NCP average and peak allocators. The
10 energy-related expenses were allocated based on kWhs at generation.

11 **Q. HOW WERE TRANSMISSION EXPENSES ALLOCATED?**

12 A. Transmission Expenses were allocated according to the "expenses follow plant"
13 principle. The allocators applied to transmission expenses were the same as those
14 I applied to transmission plant.

15 **Q. HOW WERE DISTRIBUTION EXPENSES ALLOCATED?**

16 A. Distribution Expenses were allocated according to the "expenses follow plant"
17 principle. The allocators applied to distribution expenses were the same as those I
18 applied to the plant associated with those expenses. For expenses that are not
19 associated with any particular category of distribution plant, such as supervision
20 and engineering, I used an aggregate distribution expense allocator based on the
21 sum of Accounts 582, 583, 584, 586 and 587.

22 **Q. HOW DID YOU ALLOCATE CUSTOMER ACCOUNTS EXPENSES?**

1 A. I allocated Customer Records & Collections (Account 903) to all customer classes
2 based on unweighted customer numbers. I used Staff data to determine the
3 allocators for Meter Reading (Account 902). I used rate revenues to allocate
4 Uncollectible Accounts (Account 904).

5 **Q. HOW DID YOU ALLOCATE CUSTOMER SERVICE EXPENSES AND SALES**
6 **EXPENSES?**

7 A. Customer Service Expenses including Accounts 907, 909 and 910 were allocated
8 to all customers based on weighted customer numbers. Customer Sales Expenses
9 including Accounts 911, 912, 913 and 916 were allocated to all customer classes
10 based on overall cost of service.

11 **Q. HOW ARE ADMINISTRATIVE AND GENERAL (A & G) EXPENSES**
12 **ALLOCATED?**

13 A. Property Insurance expense (Account 924) was allocated on the basis of gross
14 plant. Injuries and Damages and Employee Pensions and Benefits (Accounts 925
15 and 926) are both payroll related expenses so I allocated them based on a payroll
16 expense allocator that I developed based on Company information. The
17 remaining A & G accounts are allocated based on each class' share of total cost of
18 service.

19 **Q. HOW DID YOU ALLOCATE PROPERTY TAXES?**

20 A. I allocated property taxes on the basis of allocated total gross plant.

21 **Q. HOW DID YOU ALLOCATE STATE AND FEDERAL INCOME TAXES?**

22 A. These taxes were allocated on the basis of rate base since a utility company's
23 income taxes will be a function of the size of its rate base, and thus each class

1 should contribute revenues for income taxes in proportion with the amount of rate
2 base that is necessary to serve it.

3 **Q. PLEASE DESCRIBE THE RESULTS OF PUBLIC COUNSEL'S CLASS COS**
4 **STUDY.**

5 A. Schedule BAM Direct MPS Page 1 and Schedule BAM Direct LP Page 1 show
6 the results of Public Counsel's Class COS Study. Since a CCOS study is designed
7 to determine the relative cost responsibility of customer classes, Schedule BAM
8 Direct MPS Page 1 and Schedule BAM Direct LP Page 1 are based on the
9 assumption that total company revenues remain constant. Line 13 of each
10 schedule shows the current revenue percentage by class. Line 15 of each schedule
11 shows the class revenue percentage assuming equalized rates of return. For MPS,
12 the result shows that the Residential class is about 1% above cost. The SGS and
13 LGS classes are above cost by a greater amount ranging from approximately 3%
14 to 6%. The SC and LP classes, on the other hand, are well below cost of service
15 at approximately 12% and 23%. For the L&P system, the Residential class is
16 slightly above cost while the SGS and LGS classes are more significantly above
17 cost at approximately 18% and 5%. The LP class is below cost of service by
18 about 10%.

19 The tables below provide summaries of each class's current percent of revenue as
20 well as the amount and percentage change from current revenues required to
21 equalize the rates of return.

Table 1. CCOS Results Aquila Systems -MPS

	Residential	SGS	LGS	LPS	SC
Class Revenue %	53.17%	16.83%	13.81%	16.01%	0.18%
Revenue Neutral Shift	(\$1,788,394)	(\$3,166,113)	(\$1,547,506)	\$6,370,484	\$131,529
%	-1.04%	-5.79%	-3.45%	12.24%	22.86%

Table 2. CCOS Results Aquila Systems -LP

	Residential	SGS	LGS	LPS
Class Revenue %	46.01%	8.44%	19.82%	25.72%
Revenue Neutral Shift	(\$90,678)	(\$1,376,078)	(\$962,366)	\$2,429,121
%	-0.22%	-17.82%	-5.31%	10.33%

Q. DID YOU PERFORM ANY ANALYSIS OF THE CUSTOMER-RELATED COSTS THAT ARE ATTRIBUTABLE TO THE TYPICAL RESIDENTIAL CUSTOMER?

A. Yes, I did. I included costs that are related to services, meters, meter installations, and customer accounts expenses. The costs associated with services, meters, and meter installations include the return on rate base for the relevant plant accounts, distribution operation and maintenance expenses associated with services, meters, and meter installations, plus the depreciation expense, payroll benefits, and

1 property taxes associated with services, meters, and regulators. Generally, these
2 costs are used to recommend customer charge changes. I am not recommending
3 changes to the customer charge in this testimony.
4

5 **II. RATE DESIGN**

6 **Q. SHOULD THE COMMISSION ADOPT A RATE DESIGN IN THIS CASE PRIOR**
7 **TO DETERMINING ANY REVENUE REQUIREMENT CHANGE IN CASE NO.**
8 **ER-2005-0436?**

9 **A.** No. The Commission should consider the impact of any overall rate increase
10 resulting from ER-2005-0436 prior to adopting a particular rate design in this
11 case. Deciding this case in isolation may have unanticipated and unacceptable
12 rate impacts when coupled with an overall increase in revenue requirement. The
13 Commission has long recognized that it is necessary to consider all relevant
14 factors in establishing rates. This is especially important in this case since the cost
15 data we are utilizing is from the period 2001 through 2003.

16 **Q. WHEN THE TIME COMES, HOW DO YOU RECOMMEND THAT THE**
17 **COMMISSION ACCOMMODATE FACTORS SUCH AS AFFORDABILITY,**
18 **RATE IMPACT, AND RATE CONTINUITY IN DETERMINING RATE**
19 **DESIGN?**

20 **A.** Generally, I recommend that the Commission adopt a rate design that balances
21 movement toward cost of service with rate impact and affordability
22 considerations. To reach this balance, I believe that in cases where the existing
23 revenue structure departs greatly from the class cost of service, the
24 Commission should impose, at a maximum, class revenue shifts equal to one half

1 of the "revenue neutral shifts" indicated by Public Counsel's Class Cost of
2 Service studies.. Revenue neutral shifts are shifts that hold overall company
3 revenue at the existing level but allow for the share attributed to each class to be
4 adjusted to reflect the cost responsibility of the class. In addition to moving half
5 way to the revenue neutral shifts, I recommend that if the Commission determines
6 that an overall increase in revenue requirement is necessary in ER-2005-0436,
7 then no customer class should receive a net decrease as the combined result of: (1)
8 the revenue neutral shift that is applied to that class, and (2) the share of the total
9 revenue increase that is applied to that class. Likewise, if the Commission
10 determines that an overall decrease in revenue requirement is necessary, then no
11 customer class should receive a net increase as the combined result of: (1) the
12 revenue neutral shift that is applied to that class, and (2) the share of the total
13 revenue decrease that is applied to that class.

14 **Q. HAVE YOU PROVIDED EXAMPLES OF THIS RATE DESIGN METHOD?**

15 **A.** Yes. In Schedule BAM Direct MPS Page 2 and Schedule BAM Direct LP Page 3
16 I have illustrated the steps described above. Line 9 shows half the revenue neutral
17 shifts indicated by my CCOS study. On each schedule, lines 13 to 32 show
18 examples of the combined impact of spreading among the classes either an
19 increase or a decrease in revenue requirement and half the revenue neutral shift
20 indicated by my CCOS studies. Line 26 shows the adjustment that insures that no
21 class either receives an increase when others are receiving a decrease or receives a
22 decrease when others receive an increase. This method promotes movement
23 toward cost of service while avoiding undue adverse impacts on any particular
24 customer class.

1 **Q. YOU STATED PREVIOUSLY THAT THE COMMISSION SHOULD NOT**
2 **“ADOPT A RATE DESIGN IN THIS CASE PRIOR TO DETERMINING THE**
3 **REVENUE REQUIREMENT CHANGE IN CASE NO. ER-2005-0436.” IF THE**
4 **COMMISSION PROCEEDS TO ADOPT A RATE DESIGN IN THIS CASE**
5 **DESPITE PUBLIC COUNSEL’S RECOMMENDATION TO THE CONTRARY,**
6 **WHAT DOES PUBLIC COUNSEL RECOMMEND?**

7 A. If the Commission proceeds to adopt a rate design in this case despite Public
8 Counsel’s recommendation to the contrary, Public Counsel recommends that the
9 Commission’s rate design determination should consist of an approved method
10 for adjusting class revenue requirements (where the magnitude of such adjustment
11 vary depending on the level of revenue requirement determined by the
12 Commission in Case No. ER-2005-0436) rather than approving the specific levels
13 of class revenue requirements or the class revenue requirement proportions of the
14 total revenue requirements. Specifically, I would recommend that the
15 Commission adopt the method described in this testimony to be implemented
16 once the revenue requirement is determined in the rate case.

17 **Q. IF THE COMMISSION PROCEEDS TO ADOPT SPECIFIC LEVELS OF CLASS**
18 **REVENUE REQUIREMENTS IN THIS CASE DESPITE PUBLIC COUNSEL’S**
19 **RECOMMENDATION TO THE CONTRARY, WHAT DO YOU RECOMMEND?**

20 A. If the Commission proceeds to adopt specific levels of class revenue requirements
21 in this case despite Public Counsel’s recommendation to the contrary, Public
22 Counsel recommends that the Commission adjust class revenues by the amounts
23 shown on Line 9 of Schedule BAM Direct MPS Page 2 and Line 9 of Schedule
24 BAM Direct LP Page 2.

1 **Q. DO YOU ANTICIPATE A NEED TO UPDATE YOUR COST STUDY?**

2 A. Yes. While I anticipate no change in the general methods used, I intend to request
3 additional information to determine if Account 371 Installation on Customer
4 Premises would be more reasonably apportioned based on an alternative allocator.

5 **Q. DO YOU ANTICIPATE MAKING ADDITIONAL RATE DESIGN**
6 **RECOMMENDATIONS IN THIS PROCEEDING?**

7 A. Yes. Depending on the developments in ER-2005-0436, I may make additional
8 recommendations in this case.

9 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

10 A. Yes.

Aquila Networks-MPS
ER-2002-384
Summary of OPC Class Cost of Service Study Results

		Total	Residential	Small GS Schools Mun. Churches	Large GS RTP	LPS	Modine/Therm
1	O & M EXPENSES	222,063,207	112,250,560	34,693,166	31,295,564	43,315,788	508,129
2	DEPREC. & AMORT. EXPENSE	34,727,256	19,442,734	5,553,945	4,184,257	5,477,443	68,876
3	TAXES	24,216,986	13,538,417	3,954,302	2,956,849	3,718,610	48,809
4	Subtotal - Expenses and Taxes	281,007,449	145,231,711	44,201,413	38,436,669	52,511,842	625,814
5	TOTAL RATE BASE	663,236,221	370,847,875	109,021,026	81,026,825	101,002,072	1,338,424
6	IMPLICIT RATE OF RETURN	9.45%					
7	REQUIRED OPERATING INCOME TO EQUALIZE CLASS RATES OF RETURN	62,705,816	35,061,895	10,307,417	7,660,699	9,549,263	126,542
8	Non-rate rev (except off-sys.)	3,887,748	2,039,049	616,508	521,497	702,183	8,511
9	Off-system sales rev.	14,884,205	7,268,210	2,377,506	2,241,561	2,960,040	36,888
10	OFFSETTING REVENUES	18,771,953	9,307,259	2,994,014	2,763,058	3,662,224	45,399
11	REQ. OPER. INCOME LESS OFFSETTING REV.	43,933,863	25,754,636	7,313,403	4,897,642	5,887,040	81,142
12	CURRENT RATE REVENUE*	324,941,312	172,774,741	54,680,929	44,881,816	52,028,398	575,428
	*Adj For Lighting and Unaccounted	5,167,156					
13	CURRENT REVENUE PERCENTAGES	100.00%	53.17%	16.83%	13.81%	16.01%	0.18%
14	RATE REVENUE DEFICIENCY	0	(1,788,394)	(3,166,113)	(1,547,506)	6,370,484	131,529
15	REQUIRED % INCREASE IN RATE REVENUES TO EQUALIZE CLASS RATES OF RETURN	0.0%	-1.04%	-5.79%	-3.45%	12.24%	22.86%
16	REV. % WITH EQUALIZED ROR	100.00%	52.62%	15.85%	13.34%	17.97%	0.22%

**Aquila Networks-MPS
ER-2002-384
Illustration of OPC Rate Design Method**

	Total	Residential	Small GS Schools Mun.Churches	Large GS RTP	LPS	SC odine/Therr
1 Revenue Neutral Shifts (RNS) to Equalize Class						
2 Rates of Return (ROR)	\$0	(\$1,788,394)	(\$3,166,113)	(\$1,547,506)	\$6,370,484	\$131,529
3 Percentage Revenue Change to Equalize Class ROR		-1.04%	-5.79%	-3.45%	12.24%	22.86%
4						
5 Current Class Revenue Percentages		53.17%	16.83%	13.81%	16.01%	0.18%
6						
7 COS Indicated Class Revenue Percentages	100.00%	52.62%	15.85%	13.34%	17.97%	0.22%
8						
9 OPC's Recommended Revenue Neutral Shifts	(0)	(894,197)	(1,583,056)	(773,753)	3,185,242	65,764
10 OPC Recommended Revenue Neutral Shift Percentage		-0.52%	-2.90%	-1.72%	6.12%	11.43%
11						
12 OPC's Recommended Revenue Percentages	100.00%	52.90%	16.34%	13.57%	16.99%	0.20%
13						
14 <u>Spread of Possible Rate Change</u>						
15 \$5 Million Rate Reduction	(5,000,000)	(2,644,794)	(817,038)	(678,708)	(849,594)	(9,866)
16 \$5 Million Rate Increase	5,000,000	2,644,794	817,038	678,708	849,594	9,866
17						
18 <u>Combined Impact of Revenue Decrease and OPC's RNS</u>						
19 Combined Impact \$5 Million Decrease and OPC Shifts	(5,000,000)	(3,538,991)	(2,400,094)	(1,452,461)	2,335,648	55,898
20 Combined Impact \$5 Million Increase and OPC Shifts	5,000,000	1,750,597	(766,019)	(95,045)	4,034,836	75,631
21						
22 <u>Percentage Change in Class Rate Revenue</u>						
23 Combined Impact \$5 Million Decrease and OPC Shifts	-1.54%	-2.05%	-4.39%	-3.24%	4.49%	9.71%
24 Combined Impact \$5 Million Increase and OPC Shifts	1.54%	1.01%	-1.40%	-0.21%	7.76%	13.14%
25						
26 <u>Adjusted Impact of Revenue Decrease and OPC's RNS</u>						
27 Combined Impact \$5 Million Decrease and OPC Shifts	(5,000,000)	(2,393,945)	(1,623,540)	(982,515)	-	-
28 Combined Impact \$5 Million Increase and OPC Shifts	5,000,000	1,493,412	-	-	3,442,068	64,519
29						
30 <u>Adjusted Percentage Change in Class Rate Revenue</u>						
31 Combined Impact \$5 Million Decrease and OPC Shifts	-1.54%	-1.39%	-2.97%	-2.19%	0.00%	0.00%
32 Combined Impact \$5 Million Increase and OPC Shifts	1.54%	0.86%	0.00%	0.00%	6.62%	11.21%

**Aquila Networks-MPS
Production Allocator Development**

Co Reported MO Sys LF = 51.3300%
From MO DemandFactors Sheet

				NCP Demands											
		Annual Energy incl Losses	as % of total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Res MW	@ Gen	2494775	45.47%	526	500	472	374	498	698	730	769	590	409	456	511
SGS MW	@ Gen	837138	15.26%	146	144	142	140	177	213	225	221	218	186	141	152
LGS MW	@ Gen	852395	15.53%	154	152	144	141	148	168	176	175	174	154	141	152
LPS MW	@ Gen	1245078	22.69%	163	162	165	180	184	199	205	208	200	187	160	163
SPECIAL MW	@ Gen	13932	0.25%	2	2	2	2	2	3	3	3	3	3	2	2
LTG MW	@ Gen	43877	0.80%	10	10	10	10	10	10	10	10	10	10	10	10
	@ Gen		0.00%												
SYS MW	@ Gen	5487194	100.00%	1002	970	935	848	1020	1291	1349	1386	1196	949	910	991

				NCP Demands											
		Annual Energy incl Losses	as % of total	Aug	Jul	Jun	Sep	May	Jan	Dec	Feb	Oct	Mar	Nov	Apr
Res MW	@ Gen	2494775	45.47%	769	730	698	590	498	526	511	500	409	472	456	374
SGS MW	@ Gen	837138	15.26%	221	225	213	218	177	146	152	144	186	142	141	140
LGS MW	@ Gen	852395	15.53%	175	176	168	174	148	154	152	152	154	144	141	141
LPS MW	@ Gen	1245078	22.69%	208	205	199	200	184	163	163	162	187	165	160	180
SPECIAL MW	@ Gen	13932	0.25%	3	3	3	3	2	2	2	2	3	2	2	2
LTG MW	@ Gen	43877	0.80%	10	10	10	10	10	10	10	10	10	10	10	10
	@ Gen														

Σ SYS MW	@ Gen	5487194	100.00%	1386	1349	1291	1196	1020	1002	991	970	949	935	910	848	Allocate shr by Mnthly NCP		P & A Allocator - 1
NCP Demands As Percent of Monthly Sum																Sum Products		
Res MW	@ Gen			55.50%	54.10%	54.09%	49.36%	48.81%	52.48%	51.58%	51.53%	43.12%	50.53%	50.14%	44.11%		51.52%	48.41%
SGS MW	@ Gen			15.95%	16.68%	16.48%	18.22%	17.40%	14.62%	15.34%	14.86%	19.58%	15.17%	15.44%	16.66%		16.45%	15.84%
LGS MW	@ Gen			12.60%	13.06%	13.01%	14.57%	14.48%	15.37%	15.36%	15.64%	16.20%	15.35%	15.44%	16.65%		14.29%	14.93%
LPS MW	@ Gen			15.00%	15.18%	15.40%	16.72%	18.08%	16.27%	16.44%	16.67%	19.69%	17.60%	17.59%	21.20%		16.58%	19.72%
SPECIAL MW	@ Gen			0.20%	0.21%	0.22%	0.26%	0.24%	0.25%	0.25%	0.32%	0.24%	0.26%	0.27%	0.24%		0.25%	0.25%
LTG MW	@ Gen			0.74%	0.76%	0.80%	0.86%	1.01%	1.03%	1.04%	1.06%	1.09%	1.10%	1.13%	1.22%		0.92%	0.86%
@ Gen																		
100.00% 100.00% 100.00% 100.00% 100.00% 100.00% 100.00% 100.00% 100.00% 100.00% 100.00% 100.00% 100.00%																		
CP Demands																		
SYS MW	Month @ Gen			Aug	Jul	Jun	Sep	May	Jan	Dec	Feb	Oct	Mar	Nov	Apr			
				1244	1258	1163	1139	955	911	887	849	796	810	755	662			
				Successive Cap Increments	-14	96	24	184	44	24	38	53	-15	55	93	662		
				No of Months Occuring	1	2	3	4	5	6	7	8	9	10	11	12		
				-14	48	8	46	9	4	5	7	-2	5	8	55			
				Capacity Increments in Month	180	194	146	138	92	84	80	74	68	69	64	55		
				as % of CP	14.48%	15.61%	11.76%	11.12%	7.42%	6.72%	6.40%	5.96%	5.43%	5.56%	5.12%	4.44%	100.00%	

1 -- Formula is: LF * Energy Share + (1 - LF) * Demand Share

Aquila Networks-LP
ER-2002-384
Summary of OPC Class Cost of Service Study Results

		TOTAL	Residential	Small GS	Large GS	LPS
1	O & M EXPENSES	64,998,991	28,844,060	4,348,655	12,478,424	19,327,851
2	DEPREC. & AMORT. EXPENSE	9,880,499	4,745,245	704,534	1,803,899	2,626,821
3	TAXES	5,866,245	2,837,632	428,406	1,072,939	1,527,268
4	Subtotal - Expenses and Taxes	80,745,735	36,426,937	5,481,595	15,355,263	23,481,940
5	TOTAL RATE BASE	173,865,418	85,272,401	13,060,357	31,240,298	44,292,361
6	IMPLICIT RATE OF RETURN	9.28%				
	REQUIRED OPERATING INCOME TO EQUALIZE					
7	CLASS RATES OF RETURN	16,138,919	16,138,919	7,915,343	2,899,856	4,111,403
8	Non-rate rev (except off-sys.)	1,823,180	834,435	125,966	343,526	519,253
9	Off-system sales rev.	3,591,593.00	1,508,846.66	220,025.27	740,201.02	1,122,520.05
10	OFFSETTING REVENUES	5,414,773	2,343,282	345,992	1,083,727	1,641,773
11	REQ. OPER. INCOME LESS OFFSETTING REV.	10,724,146	5,572,061	866,326	1,816,129	2,469,630
12	CURRENT RATE REVENUE*	91,469,881	42,089,676	7,723,999	18,133,758	23,522,449
	*Includes Rev. Adj (Lighting & Unaccounted)	2,148,998				
13	CURRENT REVENUE PERCENTAGES	100.00%	46.01%	8.44%	19.82%	25.72%
14	RATE REVENUE DEFICIENCY	0	(90,678)	(1,376,078)	(962,366)	2,429,121
15	REQUIRED % INCREASE IN RATE REVENUES TO EQUALIZE CLASS RATES OF RETURN	0.00%	-0.22%	-17.82%	-5.31%	10.33%
16	REV. % WITH EQUALIZED ROR	100.00%	45.92%	6.94%	18.77%	28.37%

Aquila Networks-LP
ER-2002-384
Illustration of OPC Rate Design Method

	Total	Residential	Small GS	Large GS	LPS
1 Revenue Neutral Shifts (RNS) to Equalize Class					
2 Rates of Return (ROR)	\$0	(\$90,678)	(\$1,376,078)	(\$962,366)	\$2,429,121
3 Percentage Revenue Change to Equalize Class ROR		-0.22%	-17.82%	-5.31%	10.33%
4					
5 Current Class Revenue Percentages		46.01%	8.44%	19.82%	25.72%
6					
7 COS Indicated Class Revenue Percentages	100.00%	45.92%	6.94%	18.77%	28.37%
8					
9 OPC's Recommended Revenue Neutral Shifts	0	(45,339)	(688,039)	(481,183)	1,214,561
10 OPC Recommended Revenue Neutral Shift Percentage		-0.11%	-8.91%	-2.65%	5.16%
11					
12 OPC's Recommended Revenue Percentages	100.00%	45.97%	7.69%	19.30%	27.04%
13					
14 <u>Spread of Possible Rate Change</u>					
15 \$2 Million Rate Reduction	(2,000,000)	(919,305)	(153,842)	(385,976)	(540,878)
16 \$2 Million Rate Increase	2,000,000	919,305	153,842	385,976	540,878
17					
18 <u>Combined Impact of Revenue Decrease and OPC's RNS</u>					
19 Combined Impact \$2 Million Decrease and OPC Shifts	(2,000,000)	(964,644)	(841,881)	(867,159)	673,683
20 Combined Impact \$2 Million Increase and OPC Shifts	2,000,000	873,965	(534,197)	(95,207)	1,755,438
21					
22 <u>Percentage Change in Class Rate Revenue</u>					
23 Combined Impact \$2 Million Decrease and OPC Shifts	-2.19%	-2.29%	-10.90%	-4.78%	2.86%
24 Combined Impact \$2 Million Increase and OPC Shifts	2.19%	2.08%	-6.92%	-0.53%	7.46%
25					
26 <u>Adjusted Impact of Revenue Decrease and OPC's RNS</u>					
27 Combined Impact \$2 Million Decrease and OPC Shifts	(2,000,000)	(721,584)	(629,754)	(648,662)	-
28 Combined Impact \$2 Million Increase and OPC Shifts	2,000,000	664,763	-	-	1,335,237
29					
30 <u>Adjusted Percentage Change in Class Rate Revenue</u>					
31 Combined Impact \$2 Million Decrease and OPC Shifts	-2.19%	-1.71%	-8.15%	-3.58%	0.00%
32 Combined Impact \$2 Million Increase and OPC Shifts	2.19%	1.58%	0.00%	0.00%	5.68%

Aquila Networks-LP Production Allocator Development

Co Reported MO Sys LF = 60.5000%
From MO DemandFactors Sheet

				NCP Demands											
		Annual Energy incl Losses	as % of total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Res MW	@ Gen	769706	39.75%	181	175	162	122	113	180	200	196	167	107	147	177
SGS MW	@ Gen	111349	5.75%	23	23	21	19	23	27	29	28	25	22	23	24
LGS MW	@ Gen	394983	20.40%	73	72	68	70	74	82	83	81	82	74	70	72
LPS MW	@ Gen	660189	34.10%	89	91	91	95	92	105	106	107	102	99	90	88
SPECIAL MW	@ Gen	0	0.00%	0	0	0	0	0	0	0	0	0	0	0	0
LTG MW	@ Gen	0	0.00%	0	0	0	0	0	0	0	0	0	0	0	0
	@ Gen		0.00%												
SYS MW	@ Gen	1936227	100.00%	366	360	343	305	303	393	417	412	377	302	329	361

				NCP Demands											
		Annual Energy incl Losses	as % of total	Jul	Aug	Jun	Sep	Jan	Dec	Feb	Mar	Nov	Apr	May	Oct
Res MW	@ Gen	769706	39.75%	200	196	180	167	181	177	175	162	147	122	113	107
SGS MW	@ Gen	111349	5.75%	29	28	27	25	23	24	23	21	23	19	23	22
LGS MW	@ Gen	394983	20.40%	83	81	82	82	73	72	72	68	70	70	74	74
LPS MW	@ Gen	660189	34.10%	106	107	105	102	89	88	91	91	90	95	92	99
SPECIAL MW	@ Gen	0	0.00%	0	0	0	0	0	0	0	0	0	0	0	0
LTG MW	@ Gen	0	0.00%	0	0	0	0	0	0	0	0	0	0	0	0
	@ Gen														

Σ SYS MW	@ Gen	1936227	100.00%	417	412	393	377	366	361	360	343	329	305	303	302	Allocate shr by Mnthly NCP	P & A Allocator - 1
NCP Demands As Percent of Monthly Sum																	
Res MW	@ Gen			47.96%	47.56%	45.81%	44.44%	49.40%	49.09%	48.46%	47.35%	44.56%	39.95%	37.37%	35.42%	45.47%	42.01%
SGS MW	@ Gen			6.86%	6.80%	6.81%	6.71%	6.23%	6.52%	6.51%	6.10%	7.09%	6.10%	7.60%	7.23%	6.70%	6.13%
LGS MW	@ Gen			19.79%	19.60%	20.76%	21.75%	19.97%	19.94%	19.85%	19.95%	21.16%	22.79%	24.55%	24.38%	20.93%	20.61%
LPS MW	@ Gen			25.38%	26.04%	26.62%	27.10%	24.40%	24.45%	25.19%	26.60%	27.19%	31.16%	30.49%	32.97%	26.90%	31.25%
SPECIAL MW	@ Gen			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LTG MW	@ Gen			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	@ Gen																
				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
CP Demands																	
SYS MW	Month @ Gen			Jul	Aug	Jun	Sep	Jan	Dec	Feb	Mar	Nov	Apr	May	Oct		
				362	377	360	334	347	318	336	295	302	269	271	250		
				Successive Cap Increments	-15	17	26	-13	29	-18	41	-7	33	-1	21	250	
				No of Months Occuring	1	2	3	4	5	6	7	8	9	10	11	12	
					-15	9	9	-3	6	-3	6	-1	4	0	2	21	
				Capacity Increments in Month as % of CP	33	48	39	31	34	28	31	25	26	23	23	21	
					9.12%	13.26%	10.88%	8.49%	9.40%	7.78%	8.60%	6.99%	7.23%	6.23%	6.27%	5.75%	100.00%

1 -- Formula is: LF * Energy Share + (1 - LF) * Demand Share