Exhibit No.: _____

Issue(s): Class Cost of Service
Witness/Type of Exhibit: Hong Hu/Rebuttal
Sponsoring Party: Public Counsel
Case Nos.: WR-2000-281 and SR-2000-282

REBUTTAL TESTIMONY

OF

HONG HU

Submitted on Behalf of the Office of the Public Counsel

MISSOURI-AMERICAN WATER COMPANY

Case Nos.: WR-2000-281 and SR-2000-282

May 4, 2000

Exhibit No.: _____

Issue(s): Class Cost of Service
Witness/Type of Exhibit: Hong Hu/Rebuttal
Sponsoring Party: Public Counsel
Case Nos.: WR-2000-281 and SR-2000-282

REBUTTAL TESTIMONY

OF

HONG HU

Submitted on Behalf of the Office of the Public Counsel

MISSOURI-AMERICAN WATER COMPANY

Case Nos.: WR-2000-281 and SR-2000-282

May 4, 2000

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Missouri-American Water Company's Tariff Sheets Designed to Implement General Rate Increases for Water And Sewer Service Provided to Customers in the Missouri Service Area of the Company.	)))))	Case Nos. WR-2000-281 and SR-2000-282

AFFIDAVIT OF HONG HU

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Hong Hu, of lawful age and being first duly sworn, deposes and states:

1. My name is Hong Hu. I am a Public Utility Economist for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my rebuttal testimony consisting of pages 1 through 16 and Schedules HH REB-1 through HH REB-3.

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.

Hu Hong
Hong Hu

Subscribed and sworn to me this 4th day of May, 2000.

Bonnie S. Howard, Notary Public

My Commission expires May 3, 2001.

Table of Contents

Schedules

REBUTTAL TESTIMONY

OF

HONG HU

MISSOURI-AMERICAN WATER COMPANY

CASE NO. WR-2000-281

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

A. Hong Hu, Public Utility Economist, Office of the Public Counsel, P. O. Box 7800, Jefferson City, Missouri 65102.

Q. HAVE YOU TESTIFIED PREVIOUSLY IN THIS CASE?

A. Yes, I submitted direct testimony on the issues of CCOS study for the Missouri American Water Company (MAWC) and each of its seven districts on April 6, 2000.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is: (1) to update the results of Office of the Public Counsel (OPC)'s Class Cost of Service (CCOS) study; and (2) to present OPC's response to the CCOS study filed by MAWC, and the Public Service Commission Staff (Staff).

I. Updated CCOS study

Q. PLEASE EXPLAIN THE PURPOSE OF YOUR UPDATE TO THE CCOS STUDY.

A. The OPC CCOS study that was filed in my direct testimony was based on Company-provided accounting data and billing determinants. After the filing of my direct testimony, the Staff's accounting data and billing determinants became available. After receiving the information, OPC accounting staff adjusted Staff's accounting EMS runs to reflect OPC's positions in various accounting issues such as the plant adjustments described in the direct testimony of OPC witness Ted Biddy. My updated CCOS study reflects these changes.

Q. ON WHAT DATA IS YOUR UPDATED CCOS STUDY BASED?

A. My updated CCOS study utilizes financial data from the Staff's Accounting Schedules filed with the Staff's non-rate design testimony on April 3, 2000, as adjusted by OPC's accounting staff to reflect our recommendations regarding various accounting issues. It is my understanding that the data also reflects various adjustments to Staff's direct case that have been agreed to by all the parties. This most current data is for the year ending September 30, 2000, updated through December 31, 2000 and includes estimates with respect to the revenue requirement effect of an April 30 true-up. I have also adopted the Staff's billing determinant information and allocation of the corporate cost to each district.

Q. HOW HAVE YOUR CCOS STUDY RESULTS CHANGED BASED ON THE NEW DATA?

A. The updated CCOS study produced different class revenue requirements for the Company as well as each of the individual districts, as a result of the changes in the accounting data. However, despite changes in the revenue requirement, the class cost allocation percentages, which are the primary result of a CCOS study, exhibit virtually no change either company-wide or for any specific district. The summary of the CCOS study results and the detailed reports for the total company and each of the seven district of MAWC are shown in Schedule HH REB-1 and Schedules HH REB-2.1 through 2.8, respectively.

II. Responses to other parties' CCOS studies

Q. HAVE ALL THE PARTIES TO THIS CASE FILED CCOS STUDIES AND RATE DESIGN RECOMMENDATIONS?

A. No. OPC's direct testimony and the Staff's supplemental direct testimony are the only two submissions of district specific CCOS studies. In addition, OPC has filed a CCOS study for the entire company. MAWC filed a company-wide CCOS study but filed no testimony linking its CCOS study to its across-the-board rate increase recommendation. While there are other parties that have filed general comments on rate design issues or recommended an equal percentage rate increase for all customer classes within a district, none of these parties have conducted a district-by-district or company-wide CCOS study in support of their recommendation.

Q. PLEASE COMPARE THE RESULTS OF THE CCOS STUDIES FILED BY OPC, THE STAFF AND THE COMPANY.

A. In Table 1 through Table 4 that are shown below, I have summarized the Company's current revenues by class by district, in comparison with OPC's updated CCOS results, Staff's CCOS results and Company's CCOS results.

Table 1 - Summary: **Current Rate Revenue** by District by Class

	TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE
Company	30,583,204	19,866,774	5,480,224	2,450,096	1,028,575	1,276,092	481,443
	100%	65%	18%	8%	3%	4%	2%
Brunswick	116,725	66,937	17,456	1,208	2,231	26,330	2,562
	100%	57%	15%	1%	2%	23%	2%
Joplin	7,581,907	4,187,016	1,921,776	820,690	229,733	281,398	141,294
	100%	55%	25%	11%	3%	4%	2%
Mexico	1,580,962	818,088	232,993	263,652	103,732	122,372	40,125
	100%	52%	15%	17%	7%	8%	3%
Parkville	1,517,468	1,120,138	213,084	11,705	44,050	93,663	34,828
	100%	74%	14%	1%	3%	6%	2%
St. Charles	7,964,148	6,931,339	831,885	5,006	139,985	0	55,934
	100%	87%	10%	0%	2%	0%	1%
St. Joseph	9,979,848	5,671,297	1,921,598	1,261,212	280,496	666,114	179,130
	100%	57%	19%	13%	3%	7%	2%
Warrensburg	1,842,147	1,073,866	342,821	82,931	230,127	85,116	27,286
	100%	58%	19%	5%	12%	5%	1%

Table 2 - Summary: **OPC Cost of Service** by District by Class

	TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE
Total	36,217,859	20,342,109	6,698,618	4,427,372	1,567,453	2,757,702	424,605
	100%	56%	19%	12%	4%	8%	1%
Brunswick	423,240	189,310	49,570	3,702	7,854	170,017	2,788
	100%	45%	12%	1%	2%	40%	1%
Joplin	6,866,922	3,570,315	1,691,398	911,899	244,454	346,914	101,941
	100%	52%	25%	13%	4%	5%	1%
Mexico	2,864,318	1,201,556	386,343	682,018	196,655	368,077	29,668
	100%	42%	13%	24%	7%	13%	1%
Parkville	2,555,793	1,731,025	408,832	19,114	96,311	268,845	31,667
	100%	68%	16%	1%	4%	11%	1%
St. Charles	8,333,853	7,094,419	951,395	5,381	204,402	0	78,256
	100%	85%	11%	0%	2%	0%	1%
St. Joseph	12,751,440	5,381,827	2,466,361	2,609,756	495,346	1,681,119	117,030
	100%	42%	19%	20%	4%	13%	1%
Warrensburg	2,422,300	1,214,832	482,249	137,285	360,264	202,654	25,016
	100%	50%	20%	6%	15%	8%	1%

Table 3 - Summary: **Staff Cost of Service** by District by Class

	TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE
Total	34,472,538	21,560,603	5,417,322	3,193,634	1,293,700	2,394,222	612,276
	100%	63%	16%	9%	4%	7%	2%
Brunswick	410,610	193,428	50,090	2,971	6,823	152,291	5,009
	100%	47%	12%	1%	2%	37%	1%
Joplin	6,660,422	3,752,370	1,456,875	743,879	209,098	319,603	177,811
	100%	56%	22%	11%	3%	5%	3%
Mexico	2,798,263	1,382,016	348,468	507,841	155,796	307,956	96,188
	100%	49%	12%	18%	6%	11%	3%
Parkville	2,574,860	1,851,477	348,608	13,847	81,352	228,872	50,705
	100%	72%	14%	1%	3%	9%	2%
St. Charles	8,258,501	7,140,835	856,753	4,439	173,084	-	83,390
	100%	86%	10%	0%	2%	0%	1%
St. Joseph	11,233,762	5,817,759	1,931,292	1,816,008	332,523	1,198,219	137,963
	100%	52%	17%	16%	3%	11%	1%
Warrensburg	2,536,120	1,422,718	425,236	104,650	335,025	187,282	61,210
	100%	56%	17%	4%	13%	7%	2%

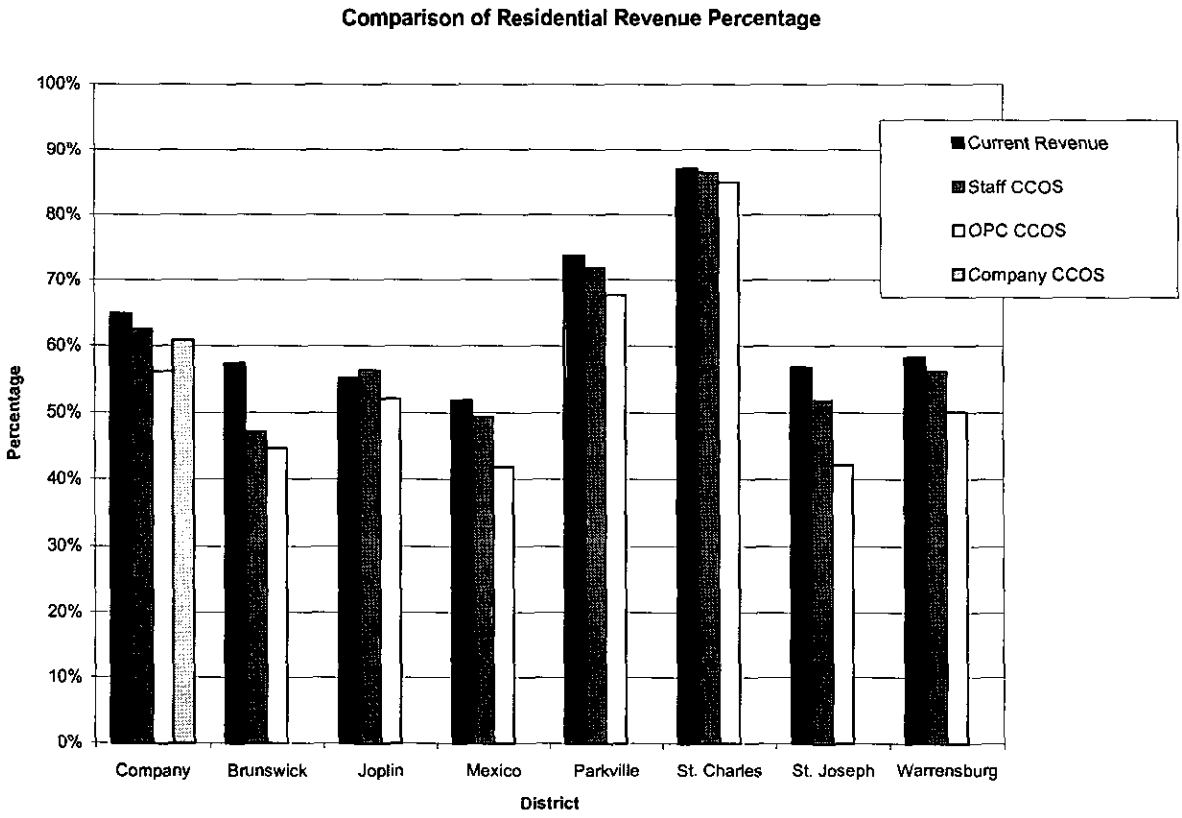
Table 4 - Summary: **Company Cost of Service** by Class

	TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE
Total	46,572,014	28,342,808	7,855,409	5,039,344	1,608,130	3,244,283	482,040
	100%	61%	17%	11%	3%	7%	1%

Q. WHAT ARE YOUR GENERAL CONCLUSIONS FROM COMPARING MAWC'S CURRENT REVENUE WITH THE RESULTS OF THE CCOS STUDIES?

A. A prominent and obvious result of the comparison between current revenue and the various CCOS study results is that all the CCOS studies show that the residential class is paying a higher percentage of the total revenue requirement than their allocated class cost of service, despite the parties' use of different allocation methods. As illustrated in the chart below, residential current revenue exceeds residential CCOS for the entire company as well as in each specific

district, with only one minor exception (Staff's CCOS study shows Residential Class in Joplin pays a little below their cost of service).



Another general conclusion is that all parties' CCOS studies consistently show that the industrial class and the resale class are paying less than (or merely equal to) their allocated class cost of service. I strongly believe that these facts suggest that the residential class revenue percentage should decrease and that the industrial and resale class revenue percentages should increase. I recommend that the Commission be guided by these principles in whatever rate design it adopts.

Q. ARE THERE ANY SIGNIFICANT DIFFERENCES AMONG THE RESULTS OF THE PARTIES' CCOS STUDIES?

A. Yes. Although all the CCOS studies point in the same direction, they differ quite significantly in degree. OPC's CCOS study shows that far less cost should be allocated to the residential customer class and far more cost should be allocated to the industrial customer class than either the Company's or the Staff's CCOS study.

Q. IN YOUR OPINION, WHAT IS THE MAIN REASON THAT THE MAWC AND THE STAFF CCOS STUDY RESULTS DIFFER FROM OPC'S CCOS STUDY RESULTS?

A. I believe the main reason is that the Company's allocation method has allocated too much cost to peak usage (i.e., extra capacity) so that the residential class, being the high peak user, is allocated a disproportionately larger share of cost. The Staff's CCOS study has the same limitation because it basically uses the same allocation method as the Company, only disaggregated to the district specific level.

Q. PLEASE EXPLAIN WHY THE COMPANY'S ALLOCATION METHOD HAS ALLOCATED TOO MUCH COST TO PEAK USAGE.

A. The Company's CCOS study uses the Base & Extra Capacity (B&EC) method, as described in the 1991 version, and prior versions of, the "Water Rates Manual" or "M1 Manual" published by the American Water Works Association (AWWA)", to allocate capacity-related costs associated with treatment, transmission, pumping, storage, and distribution facilities. Customer class allocations are largely driven by this method. In this method, base costs refer to the average

demand, which is the cost of serving total annual demand at a constant level without any peaks or fluctuations. Extra capacity costs in this method represent the cost of serving peak demands in excess of the average daily or hourly demand. The B&EC method is claimed to allocate substantial portions of capacity costs on the basis of class contributions to both average annual demand and peak demand. However, the appearance of allocating base-related capacity costs on the basis of average demand is illusory. Instead, the B&EC method will produce results that are very similar, if not identical, to a pure peak responsibility method.

Q. IS THE "PEAK RESPONSIBILITY" METHOD, OR THE EQUIVALENT "B&EC" METHOD, A REASONABLE METHOD FOR ALLOCATING THE COMPANY'S CAPACITY COSTS TO THE CUSTOMER CLASSES?

A. No. The Company's facilities are utilized to provide its customers' year round water consumption needs as well as to satisfy their maximum usage demand. A reasonable cost allocation methodology should give weight to both class annual water consumption and class maximum water demand. If a customer were able to avoid water usage in the peak period, peak responsibility method would mean that it doesn't have to pay for any portion of the capacity-related cost even if it benefited from the existence of those facilities by using water in the non-peak period. Obviously such an allocation is neither fair nor reasonable. However, the end result of the B&EC method is exactly that. It gives insufficient recognition to base-related capacity costs and allocates costs purely according to customers' maximum water usage. Therefore, it allocates disproportionately more cost to groups with low load factor like the residential class, and disproportionately less cost to groups with high load factor like the industrial class.

Q. HOW MUCH IMPACT DOES THIS PRODUCE?

A. Capacity-related costs are a major portion of the Company's total costs. A skewed allocation of the capacity-related costs will have a great impact on the overall class cost allocation. The Commission should reject any CCOS study that relies on this kind of allocation method unless it is modified to better reflect the cost causation responsibility associated with different usage patterns.

Q. CAN YOU GIVE AN EXAMPLE DEMONSTRATING THAT THE B&EC METHOD ACTUALLY PRODUCES SIMILAR RESULTS AS A PURE PEAK RESPONSIBILITY METHOD?

A. Yes. As an example, I have reproduced Factor 2 in the Company's CCOS study filed in Mr. William Stout's direct testimony. It is shown in Table 5 below. Factor 2 is reported in Schedule WMS-2, Table 2-C, Page 2 of 23 and Page 3 of 23 in Mr. Stout's testimony and is used by Mr. Stout to allocate costs associated with facilities serving base and maximum day extra capacity functions.

Table 5A is an exact duplicate of Mr. Stout's derivation of Factor 2. In Table 5B, columns (1) to (4) duplicate the underlying average consumption and maximum day extra capacity data that Factor 2 is based upon. In column (5), I simply added the average consumption and the maximum day extra capacity to derive the maximum day capacity. Column (6) shows what the allocation factor would be if the allocation is based solely on maximum day capacity without any consideration of average consumption. It is a pure peak responsibility allocation. I call this factor the "peak capacity allocation factor".

Column (7) of the Table 5B shows the differences between the "peak capacity allocation factor" and Mr. Stout's "factor 2". We can see that the differences between the results of these two allocation methods are very small (less than half of 1 percent).

Table 5. B&EC Method as Used in the Company's Allocation Factor 2 and a Comparison with the "Peak Capacity Allocation Factor"

Table 5A

Customer Classification	Average Daily Consumption		Maximum Day Extra Capacity		
	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)* 0.5882	(4)	(5)=(4)* 0.4118	(6)=(3)+(5)
Residential	0.4822	0.2836	0.5717	0.2354	0.5191
Commercial	0.1974	0.1161	0.1755	0.0723	0.1884
Industrial	0.1724	0.1014	0.1022	0.0421	0.1435
Other Public Authority	0.0425	0.0250	0.0378	0.0156	0.0406
Other Water Utilities	0.0950	0.0559	0.1127	0.0464	0.1023
Private Fire Protection	0.0013	0.0008	0.0000	0.0000	0.0008
Public Fire Protection	0.0092	0.0054	0.0000	0.0000	0.0054
Total	1.0000	0.5882	1.0000	0.4118	1.0000

Table 5B

Customer Classification	Average Daily Consumption, 1,000 Gallons	Maximum Day Extra Capacity: Factor	Rate of Flow, 1,000 Gallons Per Day	Maximum Day Capacity, 1,000 Gallons	"Peak Capacity Allocation Factor"	Difference bt "Factor 2" and "Peak Capacity Allocation Factor"
(1)	(2)	(3)	(4)=(2)*(3)	(5)=(2)+(4)	(6)	(7)
Residential	18,471	1.0	18,471.5	36,942.5	0.5232	-0.0041
Commercial	7,561	0.8	5,670.8	13,231.8	0.1874	0.0010
Industrial	6,605	0.5	3,302.4	9,907.4	0.1403	0.0032
Other Public Authority	1,628	0.8	1,221.3	2,849.3	0.0403	0.0002
Other Water Utilities	3,641	1.0	3,641.2	7,282.2	0.1031	-0.0008
Private Fire Protection	50	0.0	-	50.0	0.0007	0.0001
Public Fire Protection	352	0.0	-	352.0	0.0050	0.0004
Total	38,308	0.8	32,307.2	70,615.2	1.0000	

Table 5C

Weight based on maximum day ratio during the period 1990 - 1998

	Maximum Day Ratio	Weight
Average Day	1.00	0.5882

Maximum Day		
Extra Capacity	0.70	0.4118
Total	1.70	1.0000

More interestingly, the source of this minor difference is Mr. Stout's decision to base the weighting of the factors on maximum day ratios experienced during the period 1990 through 1998 instead of the maximum day ratio in the same year of his current data. If the current maximum day ratio is used to develop weighting, Mr. Stout's "Factor 2" will turn out to be exactly the same as the "Peak Capacity Allocation Factor". This is shown below in Table 6.

Table 6. B&EC Method Based on Current Maximum Day Ratio and a Comparison with the "Peak Capacity Allocation Factor"

Table 6A

Customer Classification	Average Daily Consumption		Maximum Day Extra Capacity		
	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)* 0.5425	(4)	(5)=(4)* 0.4575	(6)=(3)+(5)
Residential	0.4822	0.2616	0.5717	0.2616	0.5232
Commercial	0.1974	0.1071	0.1755	0.0803	0.1874
Industrial	0.1724	0.0935	0.1022	0.0468	0.1403
Other Public Authority	0.0425	0.0231	0.0378	0.0173	0.0403
Other Water Utilities	0.0950	0.0516	0.1127	0.0516	0.1031
Private Fire Protection	0.0013	0.0007	0.0000	0.0000	0.0007
Public Fire Protection	0.0092	0.0050	0.0000	0.0000	0.0050
Total	1.0000	0.5425	1.0000	0.4575	1.0000

Table 6B

Customer Classification	Average Daily Consumption, 1,000 Gallons	Maximum Day Extra Capacity: Factor	Maximum Day Extra Capacity: Rate of Flow, 1,000 Gallons Per Day	Maximum Day Capacity, 1,000 Gallons	"Peak Capacity Allocation Factor"	Difference bt "Factor 2" and "Peak Capacity Allocation Factor"
(1)	(2)	(3)	(4)=(2)*(3)	(5)=(2)+(4)	(6)	(7)
Residential	18,471	1.0	18,471.5	36,942.5	0.5232	0.0000
Commercial	7,561	0.8	5,670.8	13,231.8	0.1874	0.0000
Industrial	6,605	0.5	3,302.4	9,907.4	0.1403	0.0000
Other Public Authority	1,628	0.8	1,221.3	2,849.3	0.0403	0.0000
Other Water Utilities	3,641	1.0	3,641.2	7,282.2	0.1031	0.0000
Private Fire Protection	50	0.0	-	50.0	0.0007	0.0000
Public Fire Protection	352	0.0	-	352.0	0.0050	0.0000
Total	38,308	0.8	32,307.2	70,615.2	1.0000	

Table 6C

Weight based on current maximum day ratio

	Maximum Day Ratio	Weight
Average Day	1.00	0.5425
Maximum Day Extra Capacity	0.84	0.4575
Total	1.84	1.0000

This example clearly demonstrates that the B&EC method produces an equivalent result to a pure peak responsibility allocation method.

Q. CAN IT BE SHOWN THAT THE B&EC METHOD AS DESCRIBED IN THE WATER RATES MANUALS BY AWWA AND A PURE PEAK RESPONSIBILITY ALLOCATION METHOD PRODUCE SIMILAR OR IDENTICAL RESULTS IN EVERY CASE?

A. Yes. Carefully examination of the formula for allocating costs by these two methods demonstrate that these two methods are mathematically identical. The mathematical proof is shown in Schedule HH REB-3.

Q. HAS THE EQUIVALENCY OF THESE TWO METHODS BEEN DEMONSTRATED TO THE COMMISSION IN PRIOR CASES?

A. To my knowledge, the Commission has not been made aware of this fact that the B&EC method identifies with the peak responsibility allocation method in any previous water rate cases. However, the B&EC method utilized by the water industry is identical to the "Average & Excess" method relied upon by many electric utilities. The fact that this method produces similar or identical results to a pure peak responsibility allocation method has long been recognized by many researchers and regulators in the electricity area. In Case No. EO-96-15, Staff

witness James C. Watkins discussed the "Average & Excess" method and wrote the following statement in his rebuttal testimony:

> "Average & Excess" is an innocuous sounding, misleading name for the "Peak Responsibility" method of allocating capacity costs. In using this method, it is each class's contribution to peak demand that is the sole determinant of the capacity costs allocated to each class.

Q. HAS THE EQUIVALENCY OF THESE TWO METHODS BEEN RECOGNIZED ANYWHERE ELSE IN THE COUNTRY?

A. Yes. In a report that was prepared for water and wastewater rates in the city of Austin, Texas, the residential and small commercial ratepayers' consultant discussed the B&EC method in great detail. Her conclusion was that:

> Although the utility's cost study may intend to recognize that both annual demand and peak demand are determinants of capacity costs, the B&EC method, as applied, does not actually account for average demand. Even worse, in most instances the allocation factors are more biased against classes with high peaking factors than a pure peak responsibility approach.[1]

Q. CAN THE B&EC METHOD BE MODIFIED SO THAT THE WEIGHTING BETTER REFLECTS THE COST CAUSATION RESPONSIBILITY ASSOCIATED WITH DIFFERENT USAGE PATTERNS?

A. Yes. I believe that the B&EC method could be modified to reflect the correct weighting between base-related cost and extra-capacity cost. As I described in my direct testimony, there is a certain correspondence between capacity and cost; that

[1] Residential and Small Commercial Ratepayers' Consultant's Report Regarding the City of Austin's Water & Wastewater Utility Rates, Prepared for the City of Austin, By Ellen Blumenthal, P. C., October 1, 1993.

is, the unit cost decreases as the size of the facility increases. This phenomenon is called the economies of scale. Recognition of economies of scale in facility sizing can lead to a more accurate weighting between base-related cost and extra-capacity cost so that base costs are adequately accounted for. In table 7, I have shown a weighting of factors based on a scale economies factor of 0.5.

Table 7. B&EC Method Modified to Reflect Economies of Scale

Table 7A

Customer Classification	Average Daily Consumption		Maximum Day Extra Capacity		
	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)* 0.7365	(4)	(5)=(4)* 0.2635	(6)=(3)+(5)
Residential	0.4822	0.3551	0.5717	0.1506	0.5058
Commercial	0.1974	0.1454	0.1755	0.0462	0.1916
Industrial	0.1724	0.1270	0.1022	0.0269	0.1539
Other Public Authority	0.0425	0.0313	0.0378	0.0100	0.0413
Other Water Utilities	0.0950	0.0700	0.1127	0.0297	0.0997
Private Fire Protection	0.0013	0.0010	0.0000	0.0000	0.0010
Public Fire Protection	0.0092	0.0068	0.0000	0.0000	0.0068
Total	1.0000	0.7365	1.0000	0.2635	1.0000

Table 7B

Customer Classification	Average Daily Consumption, 1,000 Gallons	Maximum Day Extra Capacity: Factor	Maximum Day Extra Capacity: Rate of Flow, 1,000 Gallons Per Day	Maximum Day Capacity, 1,000 Gallons	"Peak Capacity Allocation Factor"	Difference bt "Factor 2" and "Peak Capacity Allocation Factor"
(1)	(2)	(3)	(4)=(2)*(3)	(5)=(2)+(4)	(6)	(7)
Residential	18,471	1.0	18,471.5	36,942.5	0.5232	(0.0174)
Commercial	7,561	0.8	5,670.8	13,231.8	0.1874	0.0042
Industrial	6,605	0.5	3,302.4	9,907.4	0.1403	0.0136
Other Public Authority	1,628	0.8	1,221.3	2,849.3	0.0403	0.0009
Other Water Utilities	3,641	1.0	3,641.2	7,282.2	0.1031	(0.0034)
Private Fire Protection	50	0.0	-	50.0	0.0007	0.0003
Public Fire Protection	352	0.0	-	352.0	0.0050	0.0018
Total	38,308	0.8	32,307.2	70,615.2	1.0000	

Table 7C

Weight based on current maximum day ratio adjusted for economies of scale

	Maximum Day Ratio	Cost Ratio	Weight
Average Day	1.00	1.00	0.7365
Maximum Day Extra Capacity	0.84	0.36	0.2635
Total	1.84	1.36	1.0000

Q. WOULD YOU PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE B&E METHOD?

A. The B&E method that is currently utilized by the Company and the Staff is not an appropriate method for the allocation of capacity-related costs. I have proven that this method produces pure peak responsibility allocation factors when the maximum to average usage ratio is used in determining the weighting between base costs and extra capacity costs. Therefore, the method allocates too much cost to low load factor groups such as the residential class and too little cost to high load factor usage groups such as the industrial class. For these reasons, I recommend that the Commission find that the original B&EC method is not a reasonable method for allocating capacity-related costs and that any CCOS study that allocates capacity-related costs on this basis cannot produce reasonable results and should therefore be rejected.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Office of the Public Counsel
Summary of Cost of Service Results
WR-2000-281

Table 1 - Summary: Cost of Service by District by Class

	TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	FIRE SERVICE	One-time Revenue Increase	One-time Revenue Increase
Total	36,217,859	20,342,109	6,698,618	4,427,372	1,567,453	2,757,702	424,605	18.42%	5,634,655
	100%	56%	18%	12%	4%	8%	1%		
Brunswick	423,240	189,310	49,570	3,702	7,854	170,017	2,788	262.60%	306,515
	100%	45%	12%	1%	2%	40%	1%		
Joplin	6,866,922	3,570,315	1,691,398	911,899	244,454	346,914	101,941	-9.43%	(714,985)
	100%	52%	25%	13%	4%	5%	1%		
Mexico	2,864,318	1,201,556	386,343	682,018	196,655	368,077	29,668	81.18%	1,283,356
	100%	42%	13%	24%	7%	13%	1%		
Parkville	2,555,793	1,731,025	408,832	19,114	96,311	268,845	31,667	68.42%	1,038,326
	100%	68%	16%	1%	4%	11%	1%		
St. Charles	8,333,853	7,094,419	951,395	5,381	204,402	0	78,256	4.64%	369,705
	100%	85%	11%	0%	2%	0%	1%		
St. Joseph	12,751,440	5,381,827	2,466,361	2,609,756	495,346	1,681,119	117,030	27.77%	2,771,592
	100%	42%	19%	20%	4%	13%	1%		
Warrensburg	2,422,300	1,214,832	482,249	137,285	360,264	202,654	25,016	31.49%	580,153
	100%	50%	20%	6%	15%	8%	1%		

Office of the Public Counsel
MAWC Class Cost of Service Summary

Brunswick District

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		249,299	100,869	27,451	2,258	4,754	106,513	1,034	6,418
2	Depreciation Expenses		44,797	18,528	4,736	299	643	16,415	449	3,727
3	Taxes		(62,356)	(26,305)	(6,593)	(397)	(857)	(21,870)	(724)	(5,611)
4	TOTAL Expenses and Taxes		231,739	93,092	25,594	2,160	4,540	101,058	760	4,534
5										
6	Spread public fire expenses & taxes to others	15	0	3,571	805	50	108	0	0	(4,534)
7	TOTAL Expenses and Taxes after Spread		231,739	96,663	26,399	2,210	4,648	101,058	760	0
8										
9	Current Revenue									
10	Rate Revenue		114,445	66,002	17,199	1,187	2,186	25,317	2,554	0
11	Other Revenue	25	2,280	935	257	22	46	1,013	8	0
12	TOTAL Current Revenues		116,725	66,937	17,456	1,208	2,231	26,330	2,562	0
13	Current Revenue Percentage		100.00%	57.35%	14.95%	1.04%	1.91%	22.56%	2.19%	0.00%
14										
15	OPERATING INCOME		(115,014)	(29,726)	(8,943)	(1,002)	(2,417)	(74,728)	1,802	0
16										
17	TOTAL Rate Base		884,928	370,089	93,861	5,908	12,713	320,381	9,389	72,586
18										
19	Spread public fire rate base to others	15	0	57,161	12,888	801	1,736	0	0	(72,586)
20	TOTAL Rate Base after Spread		884,928	427,250	106,749	6,710	14,449	320,381	9,389	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		72,918	35,205	8,796	553	1,191	26,399	774	
25										
26	Uncollectible	13	1,377	854	236	50	101	126	10	0
27										
28										
29	Additional Income Tax Required		117,206	49,017	12,432	783	1,684	42,433	1,244	9,614
30	Spread public fire expenses & taxes to others	15	0	7,571	1,707	106	230	0	0	(9,614)
31										
32	Class COS with Recommended ROR		423,240	189,310	49,570	3,702	7,854	170,017	2,788	
33	Class COS Percentage		100.00%	44.73%	11.71%	0.87%	1.86%	40.17%	0.66%	
34										
35	Gross Revenue Increase/Defficiency		306,515							

Office of the Public Counsel
MAWC Class Cost of Service Summary

Total Company

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		15,377,975	8,391,845	2,693,575	1,822,620	676,541	1,113,005	124,476	555,913
2	Depreciation Expenses		4,346,706	2,206,506	746,537	500,715	163,407	322,060	72,206	335,273
3	Taxes		3,821,932	1,923,002	671,234	464,735	148,249	301,353	54,052	259,308
4	TOTAL Expenses and Taxes		23,546,613	12,521,353	4,111,347	2,788,071	988,196	1,736,418	250,734	1,150,494
5										
6	Spread public fire expenses & taxes to others	15	0	861,541	197,866	40,265	50,822	0	0	(1,150,494)
7	TOTAL Expenses and Taxes after Spread		23,546,613	13,382,894	4,309,212	2,828,336	1,039,019	1,736,418	250,734	0
8										
9	Current Revenue									
10	Rate Revenue		29,963,137	19,524,434	5,365,281	2,371,422	1,001,678	1,226,435	473,886	0
11	Other Revenue	25	620,068	343,252	114,709	78,361	26,995	49,324	7,427	0
12	TOTAL Current Revenues		30,583,204	19,867,687	5,479,990	2,449,783	1,028,673	1,275,759	481,313	0
13	Current Revenue Percentage		100.00%	64.96%	17.92%	8.01%	3.36%	4.17%	1.57%	0.00%
14										
15	OPERATING INCOME		7,036,591	6,484,793	1,170,777	(378,553)	(10,346)	(460,659)	230,580	0
16										
17	TOTAL Rate Base		127,157,057	63,423,460	22,539,390	15,777,361	4,923,937	10,269,354	1,745,232	8,478,323
18										
19	Spread public fire rate base to others	15	0	6,348,946	1,458,128	296,727	374,522	0	0	(8,478,323)
20	TOTAL Rate Base after Spread		127,157,057	69,772,405	23,997,518	16,074,089	5,298,459	10,269,354	1,745,232	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		10,477,742	5,749,246	1,977,395	1,324,505	436,593	846,195	143,807	
25										
26	Uncollectible	13	28,795	22,170	3,479	887	1,641	265	353	0
27										
28										
29	Additional Income Tax Required	22	2,164,710	1,079,715	383,708	268,592	83,825	174,825	29,711	144,334
30	Spread public fire expenses & taxes to others	15	0	108,084	24,823	5,051	6,376	0	0	(144,334)
31										
32	Class COS with Recommended ROR		36,217,859	20,342,109	6,698,618	4,427,372	1,567,453	2,757,702	424,605	
33	Class COS Percentage		100.00%	56.17%	18.50%	12.22%	4.33%	7.61%	1.17%	
34										
35	Gross Revenue Increase/Defficiency		5,634,655							

Office of the Public Counsel
MAWC Class Cost of Service Summary

Joplin District

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		3,335,505	1,695,888	790,729	424,318	122,591	158,416	35,228	108,336
2	Depreciation Expenses		839,242	406,173	196,326	108,264	26,143	42,367	16,689	43,280
3	Taxes		1,279,022	596,825	305,378	175,294	41,030	69,102	23,363	68,029
4	TOTAL Expenses and Taxes		5,453,769	2,698,887	1,292,433	707,875	189,764	269,885	75,280	219,645
5										
6	Spread public fire expenses & taxes to others	15	0	160,190	45,337	6,838	7,280	0	0	(219,645)
7	TOTAL Expenses and Taxes after Spread		5,453,769	2,859,077	1,337,770	714,713	197,044	269,885	75,280	0
8										
9	Current Revenue									
10	Rate Revenue		7,403,470	4,096,066	1,877,475	796,125	223,379	271,942	138,483	0
11	Other Revenue	25	178,437	90,950	44,300	24,566	6,353	9,457	2,811	0
12	TOTAL Current Revenues		7,581,907	4,187,016	1,921,776	820,690	229,733	281,398	141,294	0
13	Current Revenue Percentage		100.00%	55.22%	25.35%	10.82%	3.03%	3.71%	1.86%	0.00%
14										
15	OPERATING INCOME		2,128,137	1,327,939	584,006	105,977	32,689	11,513	66,013	0
16										
17	TOTAL Rate Base		20,510,730	9,528,518	4,893,239	2,814,359	652,041	1,112,614	386,007	1,123,952
18										
19	Spread public fire rate base to others	15	0	819,714	231,995	34,991	37,252	0	0	(1,123,952)
20	TOTAL Rate Base after Spread		20,510,730	10,348,233	5,125,235	2,849,349	689,293	1,112,614	386,007	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		1,690,084	852,694	422,319	234,786	56,798	91,679	31,807	
25										
26	Uncollectible	13	(7,774)	(5,659)	(1,433)	(209)	(342)	(50)	(81)	0
27										
28										
29	Additional Income Tax Required		(269,158)	(125,041)	(64,213)	(36,932)	(8,557)	(14,601)	(5,065)	(14,749)
30	Spread public fire expenses & taxes to others	15	0	(10,757)	(3,044)	(459)	(489)	0	0	14,749
31										
32	Class COS with Recommended ROR		6,866,922	3,570,315	1,691,398	911,899	244,454	346,914	101,941	
33	Class COS Percentage		100.00%	51.99%	24.63%	13.28%	3.56%	5.05%	1.48%	
34										
35	Gross Revenue Increase/Defficiency		(714,985)							

Office of the Public Counsel
MAWC Class Cost of Service Summary

Mexico District

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		1,127,977	477,799	145,124	245,981	83,884	131,056	9,023	35,110
2	Depreciation Expenses		383,484	144,481	49,867	93,894	23,192	51,499	4,770	15,781
3	Taxes		(54,169)	(18,796)	(7,126)	(14,295)	(3,031)	(8,021)	(674)	(2,226)
4	TOTAL Expenses and Taxes		1,457,292	603,484	187,864	325,580	104,045	174,534	13,119	48,665
5										
6	Spread public fire expenses & taxes to others	15	0	35,246	7,009	3,308	3,102	0	0	(48,665)
7	TOTAL Expenses and Taxes after Spread		1,457,292	638,730	194,874	328,888	107,147	174,534	13,119	0
8										
9	Current Revenue									
10	Rate Revenue		1,549,922	805,189	228,831	256,216	101,535	118,343	39,809	0
11	Other Revenue	25	31,039	12,900	4,162	7,436	2,197	4,029	316	0
12	TOTAL Current Revenues		1,580,962	818,088	232,993	263,652	103,732	122,372	40,125	0
13	Current Revenue Percentage		100.00%	51.75%	14.74%	16.68%	6.56%	7.74%	2.54%	0.00%
14										
15	OPERATING INCOME		123,670	179,358	38,119	(65,236)	(3,415)	(52,162)	27,005	0
16										
17	TOTAL Rate Base		11,029,164	4,070,556	1,437,672	2,750,327	670,192	1,524,366	129,812	446,240
18										
19	Spread public fire rate base to others	15	0	323,190	64,273	30,330	28,447	0	0	(446,240)
20	TOTAL Rate Base after Spread		11,029,164	4,393,746	1,501,945	2,780,657	698,639	1,524,366	129,812	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		908,803	362,045	123,760	229,126	57,568	125,608	10,697	
25										
26	Uncollectible	13	7,315	5,216	858	237	844	85	75	0
27										
28										
29	Additional Income Tax Required		490,908	181,180	63,991	122,417	29,830	67,850	5,778	19,862
30	Spread public fire expenses & taxes to others	15	0	14,385	2,861	1,350	1,266	0	0	(19,862)
31										
32	Class COS with Recommended ROR		2,864,318	1,201,556	386,343	682,018	196,655	368,077	29,668	
33	Class COS Percentage		100.00%	41.95%	13.49%	23.81%	6.87%	12.85%	1.04%	
34										
35	Gross Revenue Increase/Defficiency		1,283,356							

Office of the Public Counsel
MAWC Class Cost of Service Summary

Parkville District

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		1,032,786	670,263	158,569	8,706	40,860	108,236	7,553	38,598
2	Depreciation Expenses		279,788	168,897	40,280	1,636	8,704	27,534	5,184	27,552
3	Taxes		164,991	100,155	24,221	1,007	5,325	16,959	2,731	14,592
4	TOTAL Expenses and Taxes		1,477,564	939,315	223,071	11,350	54,889	152,729	15,468	80,742
5										
6	Spread public fire expenses & taxes to others	15	0	65,940	11,182	607	3,013	0	0	(80,742)
7	TOTAL Expenses and Taxes after Spread		1,477,564	1,005,255	234,252	11,957	57,902	152,729	15,468	0
8										
9	Current Revenue									
10	Rate Revenue		1,486,123	1,099,152	208,045	11,462	42,845	90,174	34,443	0
11	Other Revenue	25	31,345	20,986	5,039	243	1,204	3,489	384	0
12	TOTAL Current Revenues		1,517,468	1,120,138	213,084	11,705	44,050	93,663	34,828	0
13	Current Revenue Percentage		100.00%	73.82%	14.04%	0.77%	2.90%	6.17%	2.30%	0.00%
14										
15	OPERATING INCOME		39,904	114,883	(21,168)	(252)	(13,853)	(59,066)	19,359	0
16										
17	TOTAL Rate Base		8,202,026	4,945,161	1,233,785	48,736	264,890	886,931	123,343	699,180
18										
19	Spread public fire rate base to others	15	0	571,004	96,826	5,260	26,090	0	0	(699,180)
20	TOTAL Rate Base after Spread		8,202,026	5,516,165	1,330,611	53,996	290,980	886,931	123,343	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		675,847	454,532	109,642	4,449	23,977	73,083	10,163	
25										
26	Uncollectible	13	4,848	3,881	446	90	329	45	56	0
27										
28										
29	Additional Income Tax Required		397,534	239,681	59,799	2,362	12,839	42,988	5,978	33,888
30	Spread public fire expenses & taxes to others	15	0	27,675	4,693	255	1,265	0	0	(33,888)
31										
32	Class COS with Recommended ROR		2,555,793	1,731,025	408,832	19,114	96,311	268,845	31,667	
33	Class COS Percentage		100.00%	67.73%	16.00%	0.75%	3.77%	10.52%	1.24%	
34										
35	Gross Revenue Increase/Defficiency		1,038,326							

Office of the Public Counsel
MAWC Class Cost of Service Summary

St Charles District

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		3,435,320	2,821,354	377,742	2,512	80,804	0	16,255	136,653
2	Depreciation Expenses		837,100	610,771	78,894	390	16,447	(0)	11,874	118,724
3	Taxes		1,818,505	1,366,056	189,383	947	38,799	0	22,484	200,836
4	TOTAL Expenses and Taxes		6,090,925	4,798,181	646,019	3,849	136,050	0	50,613	456,214
5										
6	Spread public fire expenses & taxes to others	15	0	397,937	45,055	237	12,985	0	0	(456,214)
7	TOTAL Expenses and Taxes after Spread		6,090,925	5,196,118	691,074	4,085	149,035	0	50,613	0
8										
9	Current Revenue									
10	Rate Revenue		7,831,358	6,818,529	816,548	4,918	136,776	0	54,586	0
11	Other Revenue	25	132,790	112,809	15,337	88	3,209	0	1,348	0
12	TOTAL Current Revenues		7,964,148	6,931,339	831,885	5,006	139,985	0	55,934	0
13	Current Revenue Percentage		100.00%	87.03%	10.45%	0.06%	1.76%	0.00%	0.70%	0.00%
14										
15	OPERATING INCOME		1,873,223	1,735,220	140,811	920	(9,051)	(0)	5,322	0
16										
17	TOTAL Rate Base		25,461,764	19,110,783	2,679,849	13,260	549,059	(0)	313,888	2,794,925
18										
19	Spread public fire rate base to others	15	0	2,437,901	276,020	1,450	79,553	0	0	(2,794,925)
20	TOTAL Rate Base after Spread		25,461,764	21,548,685	2,955,869	14,710	628,612	(0)	313,888	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		2,098,049	1,775,612	243,564	1,212	51,798	(0)	25,864	
25										
26	Uncollectible	13	867	811	39	0	14	0	3	0
27										
28										
29	Additional Income Tax Required		144,011	108,090	15,157	75	3,105	(0)	1,775	15,808
30	Spread public fire expenses & taxes to others	15	0	13,789	1,561	8	450	0	0	(15,808)
31										
32	Class COS with Recommended ROR		8,333,853	7,094,419	951,395	5,381	204,402	0	78,256	
33	Class COS Percentage		100.00%	85.13%	11.42%	0.06%	2.45%	0.00%	0.94%	
34										
35	Gross Revenue Increase/Defficiency		369,705							

Office of the Public Counsel
MAWC Class Cost of Service Summary

St Joseph District

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		5,438,427	2,297,012	988,621	1,033,916	218,082	660,905	46,921	192,970
2	Depreciation Expenses		1,626,293	607,816	298,566	331,390	54,732	219,692	17,773	96,323
3	Taxes		357,657	137,826	65,182	71,486	12,609	47,275	3,744	19,535
4	TOTAL Expenses and Taxes		7,422,377	3,042,653	1,352,370	1,436,793	285,423	927,872	68,438	308,828
5										
6	Spread public fire expenses & taxes to others	15	0	198,476	69,396	24,054	16,902	0	0	(308,828)
7	TOTAL Expenses and Taxes after Spread		7,422,377	3,241,129	1,421,766	1,460,847	302,325	927,872	68,438	0
8										
9	Current Revenue									
10	Rate Revenue		9,791,209	5,592,993	1,885,450	1,221,829	273,230	640,385	177,322	0
11	Other Revenue	25	188,639	78,304	36,148	39,384	7,266	25,729	1,808	0
12	TOTAL Current Revenues		9,979,848	5,671,297	1,921,598	1,261,212	280,496	666,114	179,130	0
13	Current Revenue Percentage		100.00%	56.83%	19.25%	12.64%	2.81%	6.67%	1.79%	0.00%
14										
15	OPERATING INCOME		2,557,471	2,430,168	499,833	(199,635)	(21,829)	(261,758)	110,692	0
16										
17	TOTAL Rate Base		51,564,626	19,089,718	9,565,557	10,950,874	1,726,774	7,309,584	467,520	2,454,598
18										
19	Spread public fire rate base to others	15	0	1,577,507	551,566	191,186	134,338	0	0	(2,454,598)
20	TOTAL Rate Base after Spread		51,564,626	20,667,225	10,117,123	11,142,061	1,861,113	7,309,584	467,520	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		4,248,925	1,702,979	833,651	918,106	153,356	602,310	38,524	
25										
26	Uncollectible	13	17,854	11,953	2,522	1,266	1,324	352	437	0
27										
28										
29	Additional Income Tax Required		1,062,284	393,268	197,060	225,599	35,573	150,585	9,631	50,567
30	Spread public fire expenses & taxes to others	15	0	32,498	11,363	3,939	2,768	0	0	(50,567)
31										
32	Class COS with Recommended ROR		12,751,440	5,381,827	2,466,361	2,609,756	495,346	1,681,119	117,030	
33	Class COS Percentage		100.00%	42.21%	19.34%	20.47%	3.88%	13.18%	0.92%	
34										
35	Gross Revenue Increase/Defficiency		2,771,592							

Office of the Public Counsel
MAWC Class Cost of Service Summary

Warrensburg District

	CLASS COST OF SERVICE SUMMARY:		TOTAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER PUBLIC AUTHORITY	SALES FOR RESALE	PRIVATE FIRE SERVICE	PUBLIC FIRE SERVICE
1	O & M Expenses		758,660	384,240	137,652	38,208	110,001	53,837	5,535	29,186
2	Depreciation Expenses		336,005	152,442	63,410	18,558	45,907	28,069	4,372	23,248
3	Taxes		318,283	140,675	61,229	18,402	45,135	28,293	3,810	20,739
4	TOTAL Expenses and Taxes		1,412,948	677,357	262,290	75,169	201,042	110,199	13,717	73,174
5										
6	Spread public fire expenses & taxes to others	15	0	52,220	12,488	1,125	7,341	0	0	(73,174)
7	TOTAL Expenses and Taxes after Spread		1,412,948	729,577	274,779	76,293	208,383	110,199	13,717	0
8										
9	Current Revenue									
10	Rate Revenue		1,786,609	1,046,503	331,732	79,685	221,726	80,274	26,688	0
11	Other Revenue	25	55,538	27,363	11,089	3,246	8,400	4,842	598	0
12	TOTAL Current Revenues		1,842,147	1,073,866	342,821	82,931	230,127	85,116	27,286	0
13	Current Revenue Percentage		100.00%	58.29%	18.61%	4.50%	12.49%	4.62%	1.48%	0.00%
14										
15	OPERATING INCOME		429,199	344,288	68,042	6,638	21,744	(25,083)	13,569	0
16										
17	TOTAL Rate Base		9,503,818	4,136,010	1,855,683	567,013	1,371,263	874,071	106,511	593,268
18										
19	Spread public fire rate base to others	15	0	423,383	101,251	9,117	59,517	0	0	(593,268)
20	TOTAL Rate Base after Spread		9,503,818	4,559,393	1,956,934	576,130	1,430,780	874,071	106,511	0
21										
22	OPC Recommended ROR		8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	8.24%	
23										
24	Operating Income with Recommended ROR		783,115	375,694	161,251	47,473	117,896	72,023	8,776	
25										
26	Uncollectible	13	4,307	3,091	521	65	574	21	35	0
27										
28										
29	Additional Income Tax Required		221,930	96,583	43,333	13,241	32,021	20,411	2,487	13,854
30	Spread public fire expenses & taxes to others	15	0	9,887	2,364	213	1,390	0	0	(13,854)
31										
32	Class COS with Recommended ROR		2,422,300	1,214,832	482,249	137,285	360,264	202,654	25,016	
33	Class COS Percentage		100.00%	50.15%	19.91%	5.67%	14.87%	8.37%	1.03%	
34										
35	Gross Revenue Increase/Defficiency		580,153							

Mathematical Proof of Equivalence of "B&EC" Method and "Peak Responsibility" Method

Base Capacity Percentage = Class percentage of Base Capacity
= Class Base Capacity / Total Base Capacity

Extra Capacity = Maximum Capacity - Base Capacity

Extra Capacity Percentage = Class percentage of Extra Capacity
= Class Extra Capacity / Total Extra Capacity

Maximum Capacity Ratio = Total Maximum Capacity / Total Base Capacity

1/ Maximum Capacity Ratio = Total Base Capacity / Total Maximum Capacity

1 - 1/ Maximum Capacity Ratio = 1 - Total Base Capacity / Total Maximum Capacity
= (Total Maximum Capacity - Total Base Capacity) / Total Maximum Capacity
= Total Extra Capacity / Total Maximum Capacity

B&EC Factor[1] = [(1/Maximum Capacity Ratio)*Base Capacity Percentage] + [(1-1/Maximum Capacity Ratio)*Extra Capacity Percentage]

= [(Total Base Capacity / Total Maximum Capacity) * (Class Base Capacity / Total Base Capacity)]
+ [(Total Extra Capacity / Total Maximum Capacity) * (Class Extra Capacity / Total Extra Capacity)]

= [Class Base Capacity / Total Maximum Capacity] + [Class Extra Capacity / Total Maximum Capacity]

= (Class Base Capacity + Class Extra Capacity) / Total Maximum Capacity

= Class Maximum Capacity / Total Maximum Capacity

Peak Responsibility Factor = Class percentage of Maximum Capacity

= Class Maximum Capacity / Total Maximum Capacity

[1] The formula is formed as described in 1991 Water Rates Manuals published by the American Water Works Association.