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Exhibit No.:	
Issues:	Weather Normalization
Witness:	Dennis L. Patterson
Sponsoring Party:	Mo PSC Staff
Type of Exhibit:	Supplemental Direct Testimony
Case No.:	WR-2003-0500 & WC-2004-0168
Date Testimony Prepared:	December 15, 2003

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

SUPPLEMENTAL DIRECT TESTIMONY

OF

DENNIS L. PATTERSON

MISSOURI-AMERICAN WATER COMPANY

CASE NO. WR-2003-0500 & WC-2004-0168

Jefferson City, Missouri
December 2003

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the General Rate Increase for Water and Sewer Service Provided by Missouri-American Water Company	)))	Case No. WR-2003-0500
Staff of the Missouri Public Service Commission, Complainant, v. Missouri-American Water Company, Respondent	)))	Case No. WC-2004-0168

AFFIDAVIT OF DENNIS L. PATTERSON

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

Dennis L Patterson, of lawful age, on his oath states: that he has participated in the preparation of the foregoing testimony in question and answer form, consisting of 10 pages of testimony to be presented in the above case, that the answers in the foregoing testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.

Dennis L. Patterson

Subscribed and sworn to before me this 15th day of December, 2003.

DAWN L. HAKE
Notary Public – State of Missouri
County of Cole
My Commission Expires Jan 9, 2005

Notary Public

My commission expires

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SUPPLEMENTAL DIRECT TESTIMONY

OF

DENNIS L. PATTERSON

MISSOURI-AMERICAN WATER COMPANY

CASE NOS. WR-2003-0500 AND WC-2004-0168

Q. What is the purpose of your Supplemental Direct Testimony?

A. I will correct certain errata and make a material revision to my Direct Testimony.

SUMMARY

Q. Please summarize your errata.

A. I will correct the weather-normalized gallons per meter per day (GMD) for the Missouri-American Water Company (MAWC or Company) St. Louis District (STL) Monthly Residential and Quarterly Commercial customers to read 11,051.03 GMD and 965.63 GMD respectively.

Q. Please summarize your revision.

A. I will revise the weather-normalized GMD for the STL quarterly Residential customers from 290.2 GMD to 292.05 GMD.

Q. Please summarize the factors that convinced you to make the revision.

A. These factors were 1) the weather, 2) a deficit in the expected increase in sales from new customers, 3) a new customer information system, 4) a material increase in volumes unaccounted for during the test year, 5) billing adjustments during April of the test year, and 6) meters added after the test year had begun.

ERRATA

Q. Why have you submitted your errata?

A. The corrected quantities represent the results of the analyses I presented in my Direct Testimony, and should have appeared in Schedule 1-1 of my written Direct Testimony.

Q. What are the supporting data and analyses for the corrected quantities?

A. The corrected quantities are already supported in the remaining schedules of my Direct Testimony and in the working papers I have previously furnished to the Company. The corrected quantities appear at Schedule 1 attached to my Supplemental Direct Testimony. Schedule 1 is intended to replace Schedule 1-1 from my Direct Testimony.

REVISED GMD FOR STL QUARTERLY RESIDENTIAL CUSTOMERS

Q. Why was it necessary to revise your weather-normalized GMD for the STL quarterly Residential customers?

A. Test year quarterly residential Mgallons were unexpectedly low, and test year quarterly residential GMD were also unexpectedly low. I came to the conclusion that the test year billing data had been compromised by the factors summarized above, and therefore recalculated my weather normalized GMD for quarterly residential customers.

Q. How did these factors affect test year billed sales?

A. These factors and their effects are discussed below.

WEATHER RESPONSE

Q. What was the apparent weather response in the test year?

A. The apparent weather response was negative. Unadjusted STL quarterly residential customer GMD decreased dramatically from 286.8 GMD in 2001 to 277.1 GMD in 2002. However, an increase to about 299.4 GMD would have been expected because the weather was significantly hotter and drier in 2002. The expected weather-adjusted quantity is 292.05 GMD. The statistical analysis is presented at Schedule 2 attached to my supplemental direct testimony. The calculations are discussed in the CALCULATIONS section below.

DEFICIT IN TOTAL SALES

Q. Was the increase in test year sales consistent with an increase in meters connected?

A. No. Total sales rose too little when the new meters were connected: Total usage for STL quarterly residential customers increased from 30,367,468 thousands of gallons (Mgallons) in 2001 to 31,454,872 Mgallons in 2002, an increase of about 3.5%. However, the average number of meters (customers) increased from 289,867 over the 2001 test year to 310,435 over the last quarters of the test year, an increase of more than 7.0%. Thus, the increase in total sales would appear to be to small even if the weather had not been drier in 2002. (Please see Schedule 3 attached to my supplemental direct testimony.)

NEW CUSTOMER INFORMATION SYSTEM

Q. Did the Company have a new customer information system?

A Yes. The Company installed a new customer information system called "ECIS" in December of 2001 (please see item e. in the letter attached as Schedule 4).

Q. Would it be logical for billing problems to surface during the first few months of a change in billing systems?

A. Yes, it would be logical for billing problems to surface during the first few months a new system was in use.

Q. Is there any evidence of such problems in the present case?

A. Yes. Evidence of such problems exists in the apparent shifting of tens of thousands of customers between the three monthly groups of quarterly billing cycles during the initial three quarters of the test year. (Please see Schedule 5 attached to my supplemental direct testimony.) While it would not be easy to attribute errors directly to the new system, the fact that ECIS is new stands as a strong reason to question any unexpected responses, and the unstable numbers of bills are further evidence that a problem exists.

Q. How would you adjust test year volumes for the effects of using a new billing system?

A. Since the test year billed volumes are anomalous, I believe that the only recourse is to base the estimate of weather normalized test year gallons per customer per day on weather response from previous years.

Q. Did you ask the Company for the results of any study showing whether billed volumes were missed during the test year?

A. I have communicated personally with Company representatives Ed Grubb and Richard Ciottone on the subject. They indicated that such results were not available.

VOLUMES UNACCOUNTED FOR

Q. How does the Company check to see whether an acceptable percentage of all the water it pumps is actually sold?

A. The Company is constantly calculating such a crosscheck by comparing volumes sold by billing month and quarter with the volumes of water pumped between calendar dates. Schedules 6-1, 6-2 and 6-3 (attached to my supplemental direct testimony) show these comparisons for the billing years of 2000, 2001 and 2003 respectively.

Q. Did total sales correspond with system intake during the test year?

A. No. Volumes unaccounted for, or the Mgallons remaining when total STL sales for all classes are subtracted from total STL system intake, rose from 9,613,944 Mgallons in 2001 to 11,047,815 Mgallons in 2002, an increase in volumes unaccounted for of 1,433,871 Mgallons (Schedules 6-2 and 6-3). There was also an increase in volumes unaccounted for of 696,131 Mgallons from billing year 2000 to 2001 (Schedules 6-1 and 6-2). The increase in billing year 2001 could be at least partly explained by the introduction of ECIS in December.

Q. What deficits (or surpluses) in the test year of 2002 might be included in volumes unaccounted for?

A. The deficit in usage attributed to the weather might be included in the volumes unaccounted for, as might billing errors that occurred during the test year but were not adjusted within the test year. Of course, problems with the new customer information system could be responsible for these deficits.

Q. What deficits (or surpluses) in the test year might not be included in volumes unaccounted for?

A. Adjustments to test year total sales to compensate for the initial months of the test year (where added customers had not yet been connected) had originally not been present in either the billed volumes or the volumes pumped. Therefore, these deficits would not be included in volumes unaccounted for. Similarly, once a customer is no longer connected and once he is no longer billed, he has no effect on either billed volumes or volumes pumped, and so an adjustment to reflect his permanent departure would not be connected with volumes unaccounted for.

BILLING ADJUSTMENTS

Q. Did you examine the STL quarterly residential billing data for instances where billing adjustments had been or should have been made?

A. Yes. I saw one such instance in April of the second quarter of the test year.

Q. Did you examine billing cycle data to make this assessment?

A. No. However, I examined monthly aggregations of quarterly billing data where a third of the 63 billing cycles were read each month. For this discussion, the group of cycles read in January is Group A. Group B was read in February, and Group C was read in March. The groups appear in the same order in the other three quarters of the test year.

Q. Do these adjustment events often occur for these customers?

A. No. The STL quarterly residential class is vast, and individual adjustments do not usually cause noticeable errors for the entire class. However, an

examination of bills and volumes for the customers billed in the first month of every quarter (Group A) showed a material deficit in the April billing month in the second billing quarter of the test year. In fact, April sales were lower in the test year than they had been for any previous year. (Please see Schedule 7 attached to my supplemental direct testimony.)

Q. Has this happened before?

A. Yes, only twice. Two such deficits have occurred for Group A customers in the past: once in April of 1993, and once in April of 1998 (Schedule 7).

Q. Were there unusual circumstances in those years?

A. Yes. 1993 was the year of a 500-year flood, and several thousand customers were rerouted in 1998.

Q. Did it appear that customers were transferring among the billing cycles during the test year?

A. It certainly did. In fact, both customer bills and sales increased significantly for March (Group C) billing cycle. But the increase in Group C customer bills did not appear to have come from Group A, and therefore it is doubtful that the additional Group C Mgallons did so. In fact, it did not appear that significant numbers of customers were transferring to and from the April (Group A) cycles during the quarter leading up to the occurrence, or in the quarter in question. (Please see Schedules 5 and 7).

Q. How large was the April 2002 billing adjustment?

A. Comparison of other April sales (from those prior billing years without unusual events) indicated that the April 2002 deficit was about 336,534 Mgallons. This

deficit would be a part of volumes unaccounted for. (Please see the STL quarterly accounts and the calculation of the deficit on Schedule 8 attached to my supplementary direct testimony.)

ADJUSTMENTS FOR ADDED METERS

Q. Were additional meters connected after the test year had begun?

A. Yes. Approximately 21,000 quarterly residential meters were added during the test year. Some of these were not yet connected for the first month of the first quarter, while most were not yet connected until the beginning of the second quarter. An adjustment is needed to bring test year sales to the level that would have been achieved if the new customers were present for all months of the test year. The adjustment would be an addition to the volumes unaccounted for. Company witness Edward L. Spitznagel, Jr., PhD. is assisting the Staff in calculating this adjustment. At this stage, Dr. Spitznagel believes the adjustment for the bulk of the new customers is 2,047,050 Mgallons (Spitznagel Rebuttal Testimony, Schedule ELS-1R, "Estimated Florissant consumption for the missing fourth quarter . . .")

CALCULATIONS

Q. How did you calculate your revised estimate without billing adjustment information?

A. I used reported annual average meter counts (customers rather than customer bills) and reported annual volumes to calculate GMD for the years 1993 through 2002. I then used linear regression to calculate weather-normalized usage in GMD, based on the years of 1993 through 2002. However, I now wished to quantify the effects of the various anomalies discussed above.

Q. Were you able to separate the effects of these events?

A. No, not in the time available. The events occurred in overlapping time periods, and I therefore chose to combine them.

Q. How were you able to calculate the combined effects?

A. In the regression model, I included a dummy (indicator) variable for 2002 to quantify the difference in response between that year and the others. I then omitted the effects attributed to the dummy variable when calculating the weather-normalized GMD estimate for 2002. This measure substitutes a reasonable estimate for missing billing information, and adjusts 2002 so that it is comparable with the prior years on a per-customer basis.

Q. What were the results of your calculations?

A. Where I had initially estimated normalized usage as 290.2 GMD for the STL Quarterly Residential rate class, I now estimate this quantity to be 292.05 GMD. The new estimate is reflected in the table at Schedule 1. The statistical analysis is presented at Schedule 2. The underlying usage data is presented at Schedule 8, while an annual aggregation of the weather data may be found at Schedule 3. I have previously furnished appropriate working papers to the Company during the pre-hearing conferences, and have forwarded updated copies with the filing of my Supplemental Direct Testimony.

RECOMMENDATION

Q. How would you recommend that the test year volumes be adjusted for a number of significant effects causing the test year to be different from previous years?

A. In the current case, I would essentially repeat what the Company did for 1992. That is, I would assign the average weather-normalized GMD from the previous years to the unreliable or anomalous year. This figure is 292.05 GMD (Schedule 1), and the anomalous billing year is the test year, namely, 2002.

Q. Does this conclude your Supplemental Direct Testimony?

A. Yes.

Schedule 1

Missouri American Water Company Case No. WR-2003-0500
Staff's Weather Normalized Usage Per Customer Per Day
Based On 1971 Through 2000 Normal Weather

District	Monthly Residential	Monthly Commercial	Quarterly Residential	Quarterly Commercial	Monthly OPA	Quarterly OPA
Brunswick	125.48	190.26				
Jefferson City	167.63	876.37				
Joplin	198.76	911.53				
Mexico	153.80	602.28				
Parkville Water	281.19	962.48				
St. Charles	271.91	1,264.85				
St. Joseph	168.80	862.60				
St. Louis	11,051.03	14,302.64	292.05	965.63	15,344.37	1,509.07
Warrensburg	181.89	824.36				

Reasons for changes:	Errata		Revision	Errata	

MISSOURI-AMERICAN WATER WR-2003-0500 ST LOUIS COUNTY QUARTERLY RESIDENTIAL

MAWC NORMAL = 284.0628664 (Gallons/Meter/Day)	MAWC Normal: 277.62 (Gallons/Bill/Day)	Meters: 310,435	Bills: 317,639

DNSHORT
12.93

YYYY	CCD(ALL CUS)	SHORT	NSHORT	DNSHORT	2002	Regression Line	Residual	Wx & Dummy Adjusted	Projected Normal	Hot&Dry: 1988	Cool&Wet: 1993	Expected
1993	262.8	4.32	6.51	-2.19	0	263.78	(1.02)	291.03	292.05	327.66	262.76	
1994	293.8	6.65	6.51	0.14	0	293.83	0.01	292.06	292.05	328.69	263.79	
1995	282.0	5.68	6.51	-0.83	0	281.34	0.67	292.72	292.05	329.35	264.45	
1996	284.5	5.55	6.51	-0.96	0	279.68	4.83	296.88	292.05	333.51	268.61	
1997	287.2	6.35	6.51	-0.16	0	289.99	(2.77)	289.27	292.05	325.90	261.01	
1998	270.9	4.92	6.51	-1.59	0	271.48	(0.55)	291.50	292.05	328.13	263.23	
1999	294.6	6.53	6.51	0.02	0	292.32	2.24	294.29	292.05	330.92	266.02	
2000	281.8	5.85	6.51	-0.66	0	283.51	(1.66)	290.39	292.05	327.02	262.12	
2001	286.8	6.24	6.51	-0.27	0	288.56	(1.73)	290.32	292.05	326.95	262.05	
2002	277.4	7.07	6.51	0.56	1	277.41	0.00	292.05	292.05	328.68	263.78	299.35
2003												
2004												

	Max h2o Gain	Drainage Rate	H2O Needs (In)
5.00	0.44	1.00%	0.07

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.974597
R Square	0.949839
Adjusted R Sq	0.935507
Standard Erro	2.494869
Observations	10

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	825.0461	412.523	66.27544	2.8267E-05
Residual	7	43.5706	6.224372		
Total	9	868.6167			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	292.0488	1.16998	249.6187	4.37E-15	289.2821973	294.815317	289.2822	294.8153173
DNSHORT	12.93244	1.140949	11.33481	9.31E-06	10.23452747	15.6303567	10.23453	15.63035668
2002	-21.9341	3.011259	-7.28404	0.000165	-29.0546359	-14.813653	-29.0546	-14.813653

Schedule 2

MISSOURI-AMERICAN WATER COMPANY
CASE NO. WR-2003-0500
DISTRICT: ST LOUIS COUNTY WATER (QUARTERLY RESIDENTIAL)

YYYY	GMD	METERS	MGAL	MDT	PRCP	LITE	EVAP	OPEN	GAIN	LOSS	CLOSE	AVAIL	NEEDS	SHORT	NSHORT	DNSHORT
1970				54.8	36.2	320	265	3.426	21.49	21.02	3.896	7.01	12.88	5.86	6.51	-0.65
1971				56.8	33.7	320	280	3.896	20.26	19.65	4.505	6.36	13.30	6.94	6.51	0.43
1972				55.2	33.7	321	272	4.505	20.15	19.72	4.936	6.17	13.36	7.19	6.51	0.68
1973				57.3	39.8	320	266	4.936	20.67	20.83	4.776	6.26	12.59	6.33	6.51	-0.18
1974				56.2	36.8	320	262	4.776	19.84	20.93	3.679	6.44	12.36	5.92	6.51	-0.59
1975				56.7	40.2	320	267	3.679	22.79	22.33	4.134	7.65	12.75	5.10	6.51	-1.41
1976				55.3	23.5	321	269	4.134	15.12	16.66	2.598	5.18	12.81	7.64	6.51	1.13
1977				56.7	43.4	320	283	2.598	21.95	20.18	4.364	6.83	13.78	6.95	6.51	0.44
1978				54.7	37.7	320	273	4.364	18.40	18.56	4.207	6.60	13.14	6.55	6.51	0.04
1979				54.7	29.5	320	276	4.207	15.48	16.55	3.135	5.81	13.19	7.38	6.51	0.87
1980				56.9	27.5	321	289	3.135	16.88	17.51	2.504	6.38	14.53	8.15	6.51	1.64
1981				56.6	45.5	320	260	2.504	23.14	21.63	4.018	7.29	12.31	5.02	6.51	-1.49
1982				55.4	55.0	320	261	4.018	23.26	22.47	4.808	7.09	12.19	5.09	6.51	-1.42
1983				56.2	44.8	320	279	4.808	19.41	19.28	4.939	5.87	13.54	7.67	6.51	1.16
1984				56.6	51.7	321	266	4.939	20.81	20.81	4.939	5.72	13.00	7.28	6.51	0.77
1985				55.5	50.7	320	265	4.939	20.58	20.82	4.697	6.96	12.54	5.59	6.51	-0.92
1986				57.9	34.9	320	276	4.697	20.91	21.51	4.101	6.62	13.65	7.03	6.51	0.52
1987				58.5	38.4	320	277	4.101	20.18	19.50	4.788	6.04	13.82	7.78	6.51	1.27
1988				56.5	33.9	321	287	4.788	17.16	17.01	4.936	5.06	14.40	9.34	6.51	2.83
1989				55.3	28.6	320	268	4.936	16.58	18.90	2.622	6.01	12.49	6.48	6.51	-0.03
1990				58.1	45.1	320	268	2.622	23.44	21.45	4.613	6.60	12.55	5.96	6.51	-0.55
1991				58.3	33.5	320	281	4.613	19.98	20.03	4.567	6.02	13.79	7.77	6.51	1.26
1992				56.2	33.5	321	248	4.567	20.42	20.30	4.687	5.46	11.75	6.29	6.51	-0.22
1993	262.76	274,429	26,337,508	54.7	54.8	320	247	4.687	23.47	23.54	4.621	7.69	12.02	4.32	6.51	-2.19
1994	293.85	277,001	29,729,856	56.8	34.7	320	266	4.621	20.12	20.31	4.438	5.97	12.62	6.65	6.51	0.14
1995	282.00	279,330	28,771,525	56.2	41.7	320	265	4.438	19.56	20.25	3.753	6.92	12.60	5.68	6.51	-0.83
1996	284.50	281,490	29,250,936	55.0	43.7	321	257	3.753	21.43	20.94	4.241	6.60	12.15	5.55	6.51	-0.96
1997	287.22	283,094	29,698,300	55.2	31.2	320	253	4.241	18.47	18.97	3.747	5.51	11.86	6.35	6.51	-0.16
1998	270.92	284,600	28,162,554	58.8	43.6	320	269	3.747	24.36	24.81	3.304	7.99	12.90	4.92	6.51	-1.59
1999	294.56	285,908	30,760,506	58.0	34.1	320	271	3.304	19.39	20.13	2.560	6.37	12.90	6.53	6.51	0.02
2000	281.85	286,670	29,511,009	56.2	37.4	321	265	2.560	21.46	19.95	4.074	6.56	12.41	5.85	6.51	-0.66
2001	286.83	289,867	30,367,468	57.8	35.3	320	270	4.074	23.00	22.39	4.677	7.61	13.85	6.24	6.51	-0.27
2002	277.41	310,435	31,454,872	57.9	41.0	320	270	4.677	20.41	21.44	3.648	7.17	14.24	7.07	6.51	0.56

Schedule 3

Missouri-American Water Company

535 North New Ballas Road • St. Louis, Missouri 63141 • Phone (314) 991-3404 • Fax (314) 432-7824

www.mawc.com

January 16, 2003

Mr. Dennis Patterson
Missouri Public Service Commission
200 Madison St.
Jefferson City, MO 65102

Dear Dennis:

Enclosed in the box is the data related to the customer billing information that the Company agreed to provide to the staff and Office of Public Council per the stipulation in the merger case (Case. No. WM-2001-309).

The information being provided is for the year 2001 and is as follows:

a) Meter reading schedules.
b) Revenue summaries.
c) Final, local, and additional billing reports for all operations except St. Louis (St. Louis has a different billing system).
d) Bill Analysis Report for all operations except St. Louis. This report provides usage data by class, by month, by size of meter.
e) For St. Louis, the monthly bill analysis from the CIS system (January 2001 – November 2001) and the Bill Frequency Report from new ECIS (December 2001).

We will be forwarding to you the 2002 data within the next two weeks.

If you have any questions, please feel free to give me a call at 314.996.2363.

Sincerely,

Edward J. Grubb
Director, Rates & Revenue

EJG/dh

Enclosures

Cc: Mr. Dean Cooper, Byrdon, Swearengen & England, 312 E. Capitol Ave., Jefferson City, MO 65102

Ms. Ruth O'Neil, Office of Public Counsel, Governor Office Building, Suite 650, 250 Madison St., Jefferson City, MO 65102-7800

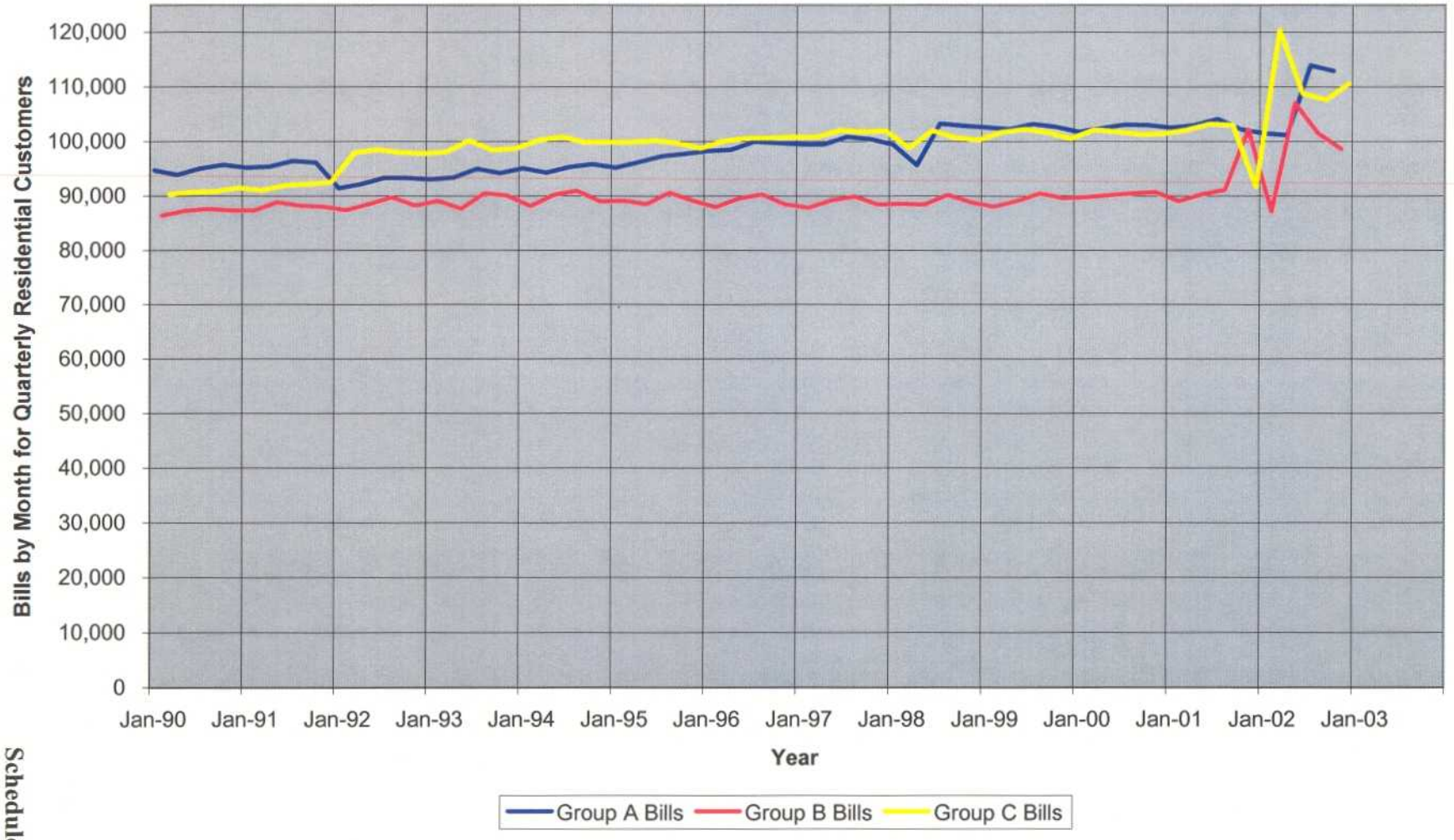
Mr. Cliff Snodgrass, Missouri Public Service Commission, 200 Madison St., Jefferson City, MO 65102

Mr. Frank Kartmann, Vice President - Operations, Missouri-American Water Company

Missouri-American Water Company, St. Louis Rates Department

Schedule 4

Missouri-American Water Company
District: St. Louis County Water
Class: Quarterly Residential
Issue: Bills Per Billing Cycle and ECIS



Schedule 5

OPERATING DATA REPORT (RE-FORM 329)

	RESIDENTIAL	APARTMENTS	COMMERCIAL	INDUSTRIAL	FIRE SERVICE	OTHER	TOTAL
1 NUMBER OF BILLS							
2 Monthly	603	0	4,794	2,552	0	239	8,188
3 Bi-monthly or quarterly	1,177,966	0	62,441	0	0	8,198	1,248,605
4 Other	0	0	0	0	0	50	50
5 Total actual	1,178,569	0	67,235	2,552	0	8,487	1,256,843
6 Budget	1,154,085	0	67,714	2,769	0	5,006	1,229,361
7 Over (under)	24,484	0	(479)	(217)	0	3,481	27,482
8 WATER SALES (1,000 GAL.)							
9 Metered (rev. summary)	29,736,604	0	8,137,158	6,633,702	0	4,700,425	49,207,889
10 Flat rate (estimated)	0	0	0	0	0	0	0
11 Total billed	29,736,604	0	8,137,158	6,633,702	0	4,700,425	49,207,889
12 (Credits)	0	0	0	0	0	0	0
13 Net	29,736,604	0	8,137,158	6,633,702	0	4,700,425	49,207,889
14 Budget	30,834,597	0	8,022,656	6,716,544	0	4,212,357	49,786,154
15 Over (under)	(1,097,993)	0	114,502	(82,842)	0	488,068	(578,265)
16 REVENUES (DOLLARS)							
17 Billed	67,794,577	0	16,777,733	7,017,365	6,243,707	5,635,897	103,469,279
18 (Credits)	0	0	0	0	0	0	0
19 Net	67,794,577	0	16,777,733	7,017,365	6,243,707	5,635,897	103,469,279
20 Budget	69,920,795	0	16,494,284	7,053,294	6,159,804	4,508,294	104,136,471
21 Billed rev./1,000 gal.	2.280		2.062	1.058		1.199	1.976
22 Budget rev./1,000 gal.	2.268		2.056	1.050		1.070	1.968
23 CUSTOMERS							
24 Beginning of period	286,334	0	15,680	214	2,954	1,422	306,604
25 Gains	1,303	0	84	0	122	147	1,656
26 (Losses)	(7)	0	(104)	(6)	0	(52)	(169)
27 End of period	287,630	0	15,660	208	3,076	1,517	308,091
28 Budget	289,804	0	16,465	213	0	1,588	308,070
29 Over (under)	(2,174)	0	(805)	(5)	3,076	(71)	21

30 SYSTEM DELIVERY (1,000 GAL.)	ACTUAL		BUDGET		OVER (UNDER)	NON-REVENUE USAGE
31 Water sales (line 13)	49,207,889	84.7%	49,786,154	84.5%	(578,265)	
32 Non-revenue usage (line 54)	0	0.0%	0	0.0%	0	
33 Unaccounted for	8,917,813	15.3%	9,158,105	15.5%	(240,292)	
34 Total	58,125,702	100.0%	58,944,259	100.0%	(818,557)	

35	ACTUAL	BUDGET	LAST YEAR
36 FIRE HYDRANTS	27,875	27,644	27,768
37 PRECIPITATION	38.50	37.46	33.70
38 NEW SERVICES	553	0	1,829
39 SERVICES REPLACED	0	0	0
40 NON-SCH. OVERTIME HRS.			
41 Operating	23,912.0	15,879.0	18,644.3
42 Maintenance	56,682.0	59,307.0	67,099.1
43 Construction	14,775.0	19,104.0	15,537.1
44 Other	8,043.7	0.0	6,693.9
45 Total	103,412.7	94,290.0	107,974.4
46 EMPLOYEES			
47 Production	132	147	129
48 Distribution	284	261	285
49 Commercial	30	28	0
50 Adm. & Gen.	92	132	133
51 Total	538	568	547
52 OPER./MAINT. PAYROLL	20,066,408	19,627,337	21,392,496
53 CAPITAL/OTHER PAYROLL	7,763,437	6,206,080	7,261,160
54 TOTAL PAYROLL	27,829,845	25,833,417	28,653,656

CUSTOMERS		NO. EST. BILLS	
Monthly	674	This year	0
Bi-mo./qtrly.	304,334	Last year	0
Other	3,083	3 OR MORE EST.	
Total (L 27)	308,091	This year	0
		Last year	0

DISTRIBUTION SYSTEM:	
Office	0
Meter shop	0
Dist. bldgs.	0
Drain. Store.	0
Ident. leak.	0
Flush mains	0
Bleeders	0
Fire usage	0
Street clean.	0
Sewer flush.	0
Franchise A	0
Franchise B	0
Other A	0
Total	0

Max Day Pump	258.520		
Avg Day Pump	158.813		

YEAR-TO-DATE December 31, 2000 ST LOUIS COUNTY WATER COMPANY

Schedule 6-1

OPERATING DATA REPORT (RE-FORM 329)

	RESIDENTIAL	APARTMENTS	COMMERCIAL	INDUSTRIAL	FIRE SERVICE	OTHER	TOTAL
1 NUMBER OF BILLS							
2 Monthly	733	0	4,485	2,321	51	110	7,700
3 Bi-monthly or quarterly	1,093,658	0	58,239	340	0	4,049	1,156,286
4 Other	0	0	0	0	0	0	0
5 Total actual	1,094,391	0	62,724	2,661	51	4,159	1,163,986
6 Budget	1,194,817	0	65,304	2,568	2,961	3,541	1,269,191
7 Over (under)	(100,426)	0	(2,580)	93	(2,910)	618	(105,205)
8 WATER SALES (1,000 GAL.)							
9 Metered (rev. summary)	31,055,460	0	8,465,390	6,584,001	0	4,255,116	50,359,966
10 Flat rate (estimated)	0	0	0	0	0	0	0
11 Total billed	31,055,460	0	8,465,390	6,584,001	0	4,255,116	50,359,966
12 (Credits)	0	0	0	0	0	0	0
13 Net	31,055,460	0	8,465,390	6,584,001	0	4,255,116	50,359,966
14 Budget	30,815,397	0	7,988,317	6,767,474	0	4,329,833	49,901,021
15 Over (under)	240,063	0	477,073	(183,473)	0	(74,718)	458,945
16 REVENUES (DOLLARS)							
17 Billed	72,452,768	0	18,013,605	7,147,850	6,618,164	5,166,769	109,399,156
18 (Credits)	0	0	0	0	0	0	0
19 Net	72,452,768	0	18,013,605	7,147,850	6,618,164	5,166,769	109,399,156
20 Budget	73,083,107	0	17,194,239	7,478,098	6,535,229	4,927,881	109,218,554
21 Billed rev./1,000 gal.	2.333		2.128	1.086		1.214	2.041
22 Budget rev./1,000 gal.	2.372		2.152	1.105		1.138	2.058
23 CUSTOMERS							
24 Beginning of period	287,630	0	15,660	208	3,076	1,517	308,091
25 Gains	4,047	0	3,006	367	90	513	8,023
26 (Losses)	(1,810)	0	(37)	(10)	(14)	(1,327)	(3,198)
27 End of period	289,867	0	18,629	565	3,152	703	312,916
28 Budget	290,258	0	15,862	214	3,033	858	310,225
29 Over (under)	(391)	0	2,767	351	119	(155)	2,691

30 SYSTEM DELIVERY (1,000 GAL.)	**ACTUAL**		**BUDGET**		**OVER (UNDER)**	**NON-REVENUE USAGE**
31 Water sales (line 13)	50,359,966	84.0%	49,901,021	84.8%	458,945	
32 Non-revenue usage (line 54)	0	0.0%	0	0.0%	0	
33 Unaccounted for	9,613,944	16.0%	8,928,078	15.2%	685,866	
34 Total	59,973,910	100.0%	58,829,099	100.0%	1,144,811	

35	**ACTUAL**	**BUDGET**	**LAST YEAR**	**CUSTOMERS**		**DISTRIBUTION SYSTEM:**	
36 FIRE HYDRANTS	27,848	27,991	27,875				
37 PRECIPITATION	37.98	33.30	38.50	Monthly	3,900	Office	0
38 NEW SERVICES	826	2,160	218	Bi-mo./qtrly.	309,016	Meter shop	0
39 SERVICES REPLACED	0	0	0	Other	0	Dist. bldgs.	0
40 NON-SCH. OVERTIME HRS.				Total (L 27)	312,916	Drain. Store.	0
41 Operating	19,173.56	22,389.00	23,911.10	**NO. EST. BILLS**		Ident. leak.	0
42 Maintenance	45,574.57	57,328.00	56,681.10	This year	0	Flush mains	0
43 Construction	14,319.80	0.00	14,775.00	Last year	0	Bleeders	0
44 Other	21,270.02	0.00	8,043.80	**3 OR MORE EST.**		Fire usage	0
45 Total	100,337.95	79,717.00	103,411.00	This year	0		
46 EMPLOYEES				Last year	0		
47 Production	136	141	132			Street clean.	0
48 Distribution	277	286	284			Sewer flush.	0
49 Commercial	7	0	30			Franchise A	0
50 Adm. & Gen.	74	134	92				
51 Total	494	561	538			Franchise B	0
52 OPER./MAINT. PAYROLL	19,214,802	20,754,199	20,109,255	Max Day Pump	269.130	Other A	0
53 CAPITAL/OTHER PAYROLL	5,489,249	6,345,026	7,025,336	Avg Day Pump	164.312		
54 TOTAL PAYROLL	24,704,050	27,099,225	27,134,591			Total	0

YEAR-TO-DATE **December 31, 2001** **ST LOUIS COUNTY WATER COMPANY**

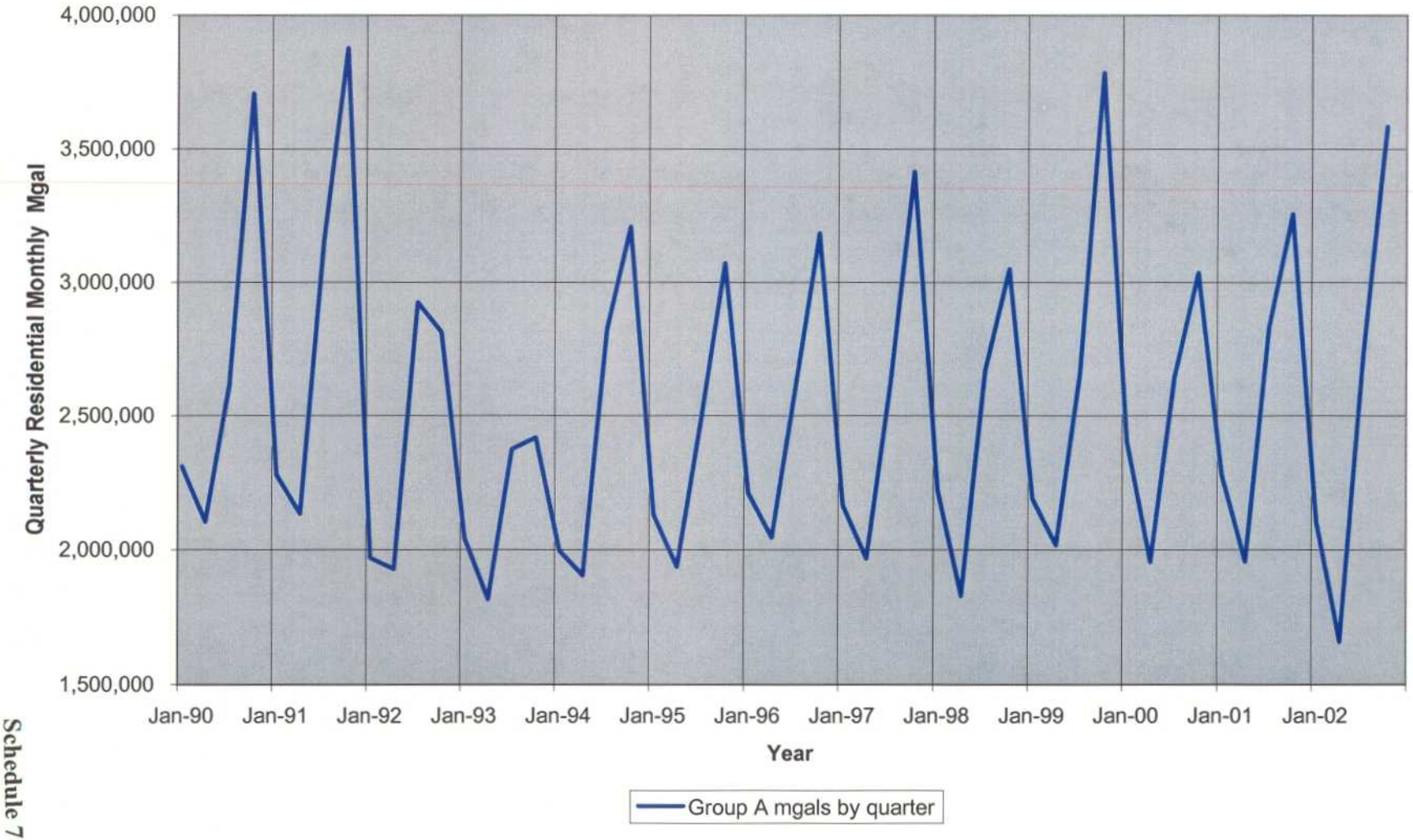
Schedule 6-2

Missouri-American Water Company
System Delivery, Water Sales and Number of Customers
St Louis County District
for the Year Ended December 31, 2002

Month	System Delivery	Water Sales Residential	Commerical	Industrial	OPA	OWU	Misc	Total	Customers Residential	Commerical	Industrial	OPA	OWU	Misc	Total
Jan	4,145,120	2,116,380	543,855	402,906	10,991	298,916	(26)	3,373,022	303,267	19,583	576	683	23	3,145	327,277
Feb	3,616,130	1,986,800	607,449	463,169	22,685	244,163	0	3,324,266	311,259	20,151	572	684	23	3,141	335,830
Mar	4,033,670	2,424,921	1,329,578	416,905	11,708	137,266	(53)	4,320,315	311,500	20,035	578	682	19	3,134	335,948
Apr	4,161,350	1,664,225	(208,317)	415,984	7,699	144,586	35	2,024,212	311,228	20,414	574	684	11	3,126	336,037
May	4,580,330	2,246,170	656,744	502,761	30,531	152,581	45	3,588,832	310,973	20,471	576	683	11	3,120	335,834
Jun	5,975,320	2,233,330	730,797	448,854	25,053	164,231	(20)	3,602,245	311,139	20,554	570	684	11	3,114	336,072
Jul	7,745,000	2,730,440	980,771	737,211	45,219	224,828	32	4,718,501	311,225	20,489	569	685	11	3,114	336,093
Aug	6,828,965	3,473,334	1,176,993	699,830	109,931	226,265	21	5,686,373	310,886	18,300	212	585	4	3,115	333,102
Sep	6,294,580	3,758,324	1,056,621	589,781	50,214	228,199	0	5,683,139	310,976	18,216	212	584	5	3,110	333,103
Oct	4,834,970	3,590,447	1,030,033	607,508	34,133	150,379	32	5,412,531	310,995	18,475	213	584	5	3,104	333,376
Nov	4,141,120	2,835,627	895,886	446,106	52,824	162,554	0	4,392,997	310,980	18,481	209	592	5	3,099	333,366
Dec	4,306,490	2,488,722	686,275	128,330	14,583	170,888	0	3,488,798	311,066	18,500	208	590	5	3,093	333,462
	60,663,045	31,548,718	9,486,684	5,859,345	415,572	2,304,856	55	49,615,230							

Schedule 6-3

Missouri-American Water Company
District: St. Louis County Water
Class: Quarterly Residential
Issue: Billing Adjustments for April (Group A) Quarterly Customers



Schedule 7

Missouri-American Water Company
S Louis Operation (Quarterly Accounts)
History of Water Sales
(Thousand Gallons)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	SELECTED APRIL	2002 APRIL	SELECTED MINUS 2002
Residential Sales																
1989																
1990	2,310,666	1,959,383	1,915,281	2,104,307	1,780,437	1,887,362	2,611,821	2,269,766	2,966,263	3,707,972	2,143,770	2,122,546	27,779,574	2,104,307		
1991	2,279,491	1,901,959	1,932,400	2,134,183	1,826,508	2,158,698	3,155,438	2,489,100	3,409,781	3,876,413	2,232,388	2,180,057	29,576,416	2,134,183		
1992	1,970,310	2,456,828	2,225,259	1,928,554	2,071,391	2,459,078	2,925,430	2,992,185	3,175,901	2,813,543	2,344,136	2,236,841	29,599,456	1,926,554		
1993	2,043,591	2,068,434	1,976,664	1,816,666	1,968,746	2,274,657	2,375,116	2,523,278	2,619,224	2,418,424	2,183,521	2,069,187	26,337,508			
1994	1,997,241	2,071,593	2,079,467	1,904,342	2,084,034	2,423,694	2,821,671	3,058,737	3,331,571	3,208,528	2,446,288	2,302,690	29,729,856	1,904,342		
1995	2,130,665	2,178,817	2,111,847	1,936,942	2,011,514	2,196,418	2,489,528	2,707,528	3,108,923	3,072,349	2,494,281	2,332,713	28,771,525	1,936,942		
1996	2,210,507	2,186,606	2,137,303	2,043,896	2,057,603	2,230,799	2,608,138	2,808,573	3,235,621	3,182,944	2,356,223	2,192,723	29,250,936	2,043,896		
1997	2,164,826	2,118,740	2,060,187	1,966,623	2,059,829	2,248,601	2,619,644	3,028,473	3,259,549	3,413,917	2,408,720	2,349,191	29,698,300	1,966,623		
1998	2,219,809	2,117,111	1,994,802	1,828,798	2,009,170	2,251,005	2,668,411	2,630,858	2,784,560	3,049,533	2,359,287	2,249,210	28,162,554			
1999	2,189,083	2,045,483	1,999,463	2,015,941	1,973,324	2,322,815	2,659,833	2,968,610	3,599,057	3,783,954	2,685,281	2,517,662	30,760,506	2,015,941		
2000	2,401,875	2,197,909	2,094,402	1,953,477	2,034,033	2,389,124	2,645,654	2,968,610	2,895,876	3,035,497	2,522,891	2,371,661	29,511,009	1,953,477		
2001	2,276,864	2,130,513	2,011,642	1,954,361	2,176,424	2,495,627	2,830,387	3,041,164	3,329,697	3,255,512	2,853,414	2,011,863	30,367,468	1,954,361		
2002	2,105,616	1,979,932	2,418,835	1,657,728	2,238,794	2,225,859	2,722,460	3,464,740	3,747,921	3,582,936	2,827,798	2,482,253	31,454,872		1,657,728	
														1,994,263		336,534

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Sales													
1989													
1990	573,445	313,192	346,046	538,074	314,316	355,145	680,815	437,756	552,871	879,597	424,668	433,734	5,849,659
1991	627,366	327,271	375,374	537,116	334,917	428,353	782,020	434,045	613,988	933,054	455,761	400,347	6,249,612
1992	344,774	557,768	378,682	310,966	440,351	429,383	487,034	611,400	527,939	510,468	523,521	426,838	5,549,124
1993	360,071	423,636	347,542	322,413	389,859	413,049	436,651	570,272	496,784	465,074	520,063	408,203	5,153,617
1994	378,395	417,873	366,237	325,470	413,934	403,572	460,085	601,984	518,821	530,038	522,427	400,443	5,339,279
1995	354,423	432,335	333,261	330,216	399,994	390,552	417,565	580,823	528,736	545,655	520,278	409,992	5,243,830
1996	375,149	410,601	364,190	356,054	403,790	387,023	459,509	590,291	539,064	550,479	509,332	400,782	5,346,264
1997	366,889	429,395	344,624	360,514	414,806	386,150	480,499	628,326	553,404	623,819	533,729	420,871	5,543,026
1998	413,979	420,590	356,606	312,311	435,527	441,067	450,520	680,135	588,123	511,811	588,068	464,456	5,663,193
1999	346,040	480,757	376,535	356,802	464,427	487,686	454,310	748,546	667,230	585,907	690,098	473,472	6,131,810
2000	392,501	475,814	407,416	344,281	472,279	459,578	475,207	736,493	606,019	541,850	656,173	481,663	6,049,274
2001	374,662	482,122	370,491	379,774	498,904	527,229	452,534	753,784	667,531	575,736	750,674	412,735	6,246,176
2002	424,288	473,805	419,321	289,603	488,559	506,490	607,904	863,925	711,985	794,484	733,346	562,845	6,876,553

Missouri-American Water Company
S Louis Operation (Quarterly Accounts)
History of Bills

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	
Residential Bills														
1989														
1990	94,886	86,394	90,297	93,817	87,249	90,699	95,016	87,562	90,832	99,493	87,307	91,473	1,091,005	272,751
1991	95,161	87,289	91,006	95,379	88,609	91,931	96,400	88,155	92,139	96,114	87,977	92,490	1,102,850	275,713
1992	91,377	87,362	97,880	92,144	88,447	98,496	93,284	89,696	97,983	93,262	88,185	97,796	1,115,902	278,976
1993	92,994	89,012	98,020	93,348	87,586	100,152	94,899	90,426	98,359	94,113	88,995	98,670	1,127,562	281,891
1994	95,027	88,067	100,210	94,226	90,122	100,769	95,286	90,863	99,787	95,749	88,909	99,863	1,138,888	284,722
1995	95,113	89,097	99,873	96,172	88,434	100,133	97,256	90,521	99,696	97,596	89,076	98,732	1,141,771	285,443
1996	96,233	87,866	100,072	96,426	89,437	100,538	99,865	90,179	100,587	99,641	88,366	100,797	1,154,046	288,512
1997	99,401	87,726	100,739	99,403	89,116	101,977	100,770	89,777	101,731	100,335	88,328	101,923	1,161,224	290,306
1998	99,301	88,467	98,769	95,580	88,323	101,911	103,204	90,152	100,707	102,800	88,735	100,182	1,158,121	289,530
1999	102,506	87,926	101,628	102,153	88,999	102,178	103,119	90,374	101,642	102,622	89,483	100,493	1,173,121	293,280
2000	101,700	89,701	102,083	102,318	90,036	101,705	103,019	90,374	101,243	102,925	90,631	101,405	1,177,143	294,286
2001	102,443	88,991	102,052	102,868	90,256	103,139	104,036	91,003	102,907	102,182	102,148	91,610	1,183,624	295,906
2002	101,446	87,040	120,354	101,951	107,006	108,726	113,872	101,441	107,590	112,873	98,510	110,614	1,270,557	317,639
	1.113	1.132	0.919	1.117	0.921	1.017	0.991	0.971	1.028	1.000	1.000	1.000		

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Commercial Bills													
1989													
1990	5,807	3,815	4,277	6,007	3,961	4,369	6,058	4,008	4,417	6,103	4,111	4,532	57,465
1991	6,280	4,024	4,489	5,994	4,257	4,549	6,221	3,982	4,586	6,047	4,158	4,550	59,137
1992	4,632	5,389	4,923	4,664	5,332	4,908	4,753	5,341	4,963	4,685	5,376	4,906	59,872
1993	4,770	5,391	4,895	4,709	5,052	5,121	4,865	5,375	4,896	4,606	5,394	4,785	59,859
1994	4,730	5,241	4,817	4,647	5,296	4,818	4,734	5,519	4,909	4,913	5,450	4,940	60,014
1995	4,892	5,472	4,924	4,921	5,345	4,927	4,886	5,402	4,888	5,060	5,440	4,833	60,990
1996	5,022	5,439	4,900	4,958	5,482	4,884	5,037	5,470	4,879	5,040	5,388	4,896	61,395
1997	5,046	5,420	4,930	5,083	5,395	4,935	5,034	5,493	4,918	5,070	5,382	4,973	61,679
1998	5,107	5,379	4,918	4,429	5,454	5,166	4,699	5,747	5,119	4,626	5,779	5,099	61,522
1999	4,677	5,777	5,167	4,565	5,826	5,147	4,631	5,834	5,194	4,617	5,808	5,103	62,346
2000	4,647	5,870	5,189	4,700	5,776	5,083	4,627	5,834	5,110	4,710	5,799	5,130	62,475
2001	4,688	5,723	5,178	4,709	5,624	5,249	4,681	5,701	5,248	4,675	6,763	4,663	62,902
2002	4,951	5,800	5,878	5,387	6,398	5,690	5,847	6,304	5,580	5,761	6,019	5,884	69,499

Schedule 8