

Exhibit No.:

75

Issues:

Weather
Normalization

Witness:

Dennis L. Patterson

Sponsoring Party:

Mo PSC Staff

Type of Exhibit:

Surrebuttal Testimony

Case No.:

WR-2003-0500 &
WC-2004-0168

Date Testimony Prepared:

December 5, 2003

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

FILED

JAN 23 2004

SURREBUTTAL TESTIMONY

OF

Missouri Public
Service Commission

DENNIS L. PATTERSON

MISSOURI-AMERICAN WATER COMPANY

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

Jefferson City, Missouri
December 2003

Exhibit No. 75
Case No(s) WR-2003-0500
Date 12/16/03 Rptr SLM

**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

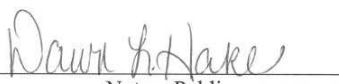
AFFIDAVIT OF DENNIS L. PATTERSON

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 8 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 4th day of December, 2003.

My commission expires _____
DAWN L. HAKE
Notary Public - State of Missouri
County of Cole
Notary Public

My Commission Expires Jan 9, 2005

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Surrebuttal Testimony of
Dennis L. Patterson

1 A. Dr. Spitznagel made the erroneous assumption that the DUMMY
2 coefficient from my linear regression model accounts only for missing bills from
3 customers that were connected after the test year had begun.

4 Q. What are the implications of the erroneous assumption?

5 A. The figures Dr. Spitznagel cites thereafter do not address the problem at
6 hand, namely, all usage that is not accounted for in anomalous data for the test year. That
7 is, although it addresses missing Florissant consumption, the model Dr. Spitznagel
8 displays at his Schedule ELS-2R (Spitznagel rebuttal) is missing a coefficient for other
9 usage that was not accounted for in the test year.

10 Q. How would you specify a model to address the usage not otherwise
11 accounted for, given an estimate of unbilled usage from customers connected after the
12 test year began?

13 A. I would specify an indicator variable (dummy) again. If the coefficient for
14 the new indicator were not statistically significant, then one could assert that
15 Dr. Spitznagel's estimate of unbilled usage for the new customers has indeed accounted
16 for the anomaly.

17 Q. Have you calculated such a regression model?

18 A. Yes. The results are displayed at Schedule 1. The indicator variable,
19 UNCOUNT, has been added to the model in Dr. Spitznagel's Schedule ELS-2R, where
20 unbilled Florissant usages had been added to the 2002 data point.

21 Q. Was the coefficient for UNCOUNT statistically significant?

22 A. Yes. It was highly significant. Based on the assumption that there were
23 about 310,435 customers connected during the test year, and assuming that

Surrebuttal Testimony of
Dennis L. Patterson

1 Dr. Spitznagel's estimate of Florissant usage is correct, almost exactly 20 gallons per
2 customer per day were still unaccounted for in the test year.

3 Q. What does this indicate?

4 A. This indicates that the Florissant adjustment proposed by Dr. Spitznagel
5 does not account for the entire anomaly. In fact, if the new customers are indeed
6 responsible for the 2002 anomaly, it would appear that they are pumping water into the
7 system through their meters. Since this is ridiculous, there must exist other factors that
8 contribute to usage unaccounted for in the test year.

9 Q. Where have you addressed these factors?

10 A. I have addressed these factors in my supplemental direct testimony, which
11 will be filed should the Commission grant Staff's motion to file said testimony.

12 Q. What are these additional factors?

13 A. They include a single reduction in sales that is apparent in April of the
14 second quarter of the test year, and several instances where thousands of customers were
15 re-routed from one billing cycle to another during the test year.

16 Q. What was the nature of the reduction in April sales during the test year?

17 A. Monthly sales for SLCW quarterly Residential customers are charted on
18 the graph at Schedule 2 attached to my surrebuttal testimony, while monthly customer
19 bills for this class are charted on the graph at Schedule 3, also attached to my surrebuttal
20 testimony. Please note that the quarterly sales for the April group of billing cycles was
21 only 1,657,728 thousands of gallons in the test year, even though sales for most years
22 approach 2,000,000 thousands of gallons (Schedule 2). Also, please note that the number

Surrebuttal Testimony of
Dennis L. Patterson

1 of customers in the April cycles had changed very little from the previous quarter
2 (Schedule 3).

3 Q. Have such reductions occurred before 2002?

4 A. Yes, but only twice since 1990. A similar reduction occurred in April of
5 1993 (a 500-year flood year that followed re-routing in 1992). A second such reduction
6 occurred in 1998; however, customers were redistributed among the billing cycle routes
7 in that sales quarter.

8 Q. What was the average of April sales in most billing years?

9 A. The average of April sales in all the remaining years between 1990 and
10 2001 is 1,994,263 thousands of gallons.

11 Q. What is the magnitude of the reduction in sales for April of the test year?

12 A. It would therefore appear that April sales alone are about 336,534
13 thousands of gallons too low in the test year (1,994,263-1,657,728 thousands of gallons).

14 Q. What do you believe was the cause of this anomaly?

15 A. Since tens of thousands of customers were redistributed among the billing
16 cycles in the first two quarters of the test year, and since an April reduction was twice
17 associated with similar events in previous years, I believe the customer redistribution in
18 2002 is an obvious cause of the anomaly.

19 Q. How do you believe this anomaly should be addressed?

20 A. This event should only be repeated infrequently in the future. Therefore,
21 test year sales should be adjusted to reverse the reduction in April sales. That is, an
22 adjustment of 336,534 thousands of gallons should be added to test year sales, in addition

Surrebuttal Testimony of
Dennis L. Patterson

1 to the 219,349 thousands of gallons that Dr. Spitznagel believes should be added for
2 missing Florissant consumption.

3 Q. Have you performed your calculations where the April reduction was
4 reversed?

5 A. Yes. I have calculated a linear regression where 336,534 thousands of
6 gallons for April and 219,349 thousands of gallons for Florissant, or a total of about
7 555,883 thousands of gallons, were added to the St. Louis County Quarterly Residential
8 test year sales. The model still includes the indicator variable UNCOUNT. The results
9 are displayed at Schedule 4 attached to my surrebuttal testimony.

10 Q. What were the results of this analysis?

11 A. The reversal of the April sales reduction improves unaccounted for sales
12 in 2002, so that the UNCOUNT coefficient is now reduced to about -17 gallons per
13 customer per day. This means that test year sales are still too low by about 1,931,149
14 thousands of gallons over the 12 billing months.

15 Q. What do you believe has caused the test year sales to be low by this
16 amount?

17 A. I believe that the massive rerouting of tens of thousands of customers
18 among the billing cycles has either caused the reduction directly by shortening the billing
19 year for some customers (Schedule 3), or has masked some other isolated anomaly
20 similar to the reduction in April sales that I have quantified above (graph at Schedule 2;
21 analysis at Schedule 4). I suspect it is a combination of such events.

22 Q. Can you quantify at least one instance where the test year was shortened
23 for some customers?

Surrebuttal Testimony of
Dennis L. Patterson

1 A. Yes. Please refer to the chart at Schedule 3 and the quarterly customer
2 bills data in Schedule 5, which are attached to my surrebuttal testimony. In the third
3 quarter of 2002, July customers increased by 12,781 customers while August customers
4 decreased by 5,565 customers, and while September customers decreased by 1,136
5 customers (Schedule 5). Therefore 5,565 customers were read in July that had formerly
6 been read in August. As a consequence, their July bill was only two months in length.
7 Their October bills will be the normal length, however, and will include most of the
8 summer usage that would formerly have appeared in their November bills. Ignoring any
9 residual summer usage, these 5,565 customers would be billed for three quarters of about
10 91 days and one quarter of only about 61 days. Thus, they will not be billed for 31 days
11 each of base usage that they would normally have used during the test year. Similarly,
12 1,136 customers will not be billed for 61 days of the test year.

13 Q. What would the base usage be for one these 6,701 customers?

14 A. One estimate would be the average daily usage for the winter months of
15 January, February and March of 2001, which were not disturbed by re-routing. During
16 these three months (or 92 nominal billing days), 6,419,019 thousands of gallons were
17 sold and 293,456 bills were issued. This works out to $(6,419,019 * 1,000) / (293,456 * 92)$
18 $= 237.8$ gallons per customer per day for base usage.

19 Q. What would the total reduction in annual sales be for these 6,701
20 customers?

21 A. The total reduction in annual base sales for these 6,701 customers would
22 be: $237.8 \text{ gcd} * (5,565 \text{ customers} * 31 \text{ days} + 1,136 \text{ customers} * 61 \text{ days}) / 1,000$ equals
23 57,503 thousands of gallons.

Surrebuttal Testimony of
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1 Q. Have you calculated a regression analysis where this adjustment has been
2 applied to test year sales?

3 A. Yes. This adjustment leads to the regression model at Schedule 6,
4 attached to my surrebuttal testimony. The test year volumes have risen to 32,068,258
5 thousands of gallons, the observed usage has risen to 282.8 GCD, and the unaccounted
6 for usage now stands at UNCOUNT = -16.5 GCD. However, the weather-normalized
7 GCD stands unchanged at 292.05 GCD as before.

8 Q. Have you calculated similar adjustments for all the rerouting events that
9 are evident on the chart in Schedule 3?

10 A. No. However, the results from analysis of the third-quarter rerouting
11 establish that the consequences would definitely be material. Just as importantly, since
12 the reroutes are so massive in the initial two quarters of the test year, they could easily
13 mask such events as the drop in April sales that I quantified in the discussion above and
14 in the analysis at Schedule 4.

15 Q. What have you established with your discussion?

16 A. I have established that the test year sales included a number of very large
17 reductions in sales that are not recurring in nature.

18 Q. Do you believe it is necessary to quantify every such reduction?

19 A. I believe this would be desirable, but that it would not be necessary given
20 that the test year deficit is an anomaly.

21 Q. What do you recommend?

22 A. I recommend that 292.05 gallons per customer per day be used to calculate
23 adjusted test year sales for the test year in this rate case. That is, the test year total actual

Surrebuttal Testimony of
Dennis L. Patterson

1 sales should be adjusted upward by the number of thousands of gallons that would be
2 calculated by using the DUMMY coefficient in the model I sponsored in my written
3 supplemental direct testimony, which will be filed should the Commission grant Staff's
4 motion to file said testimony.

5 Q. What do you recommend to avoid contention on similar issues in the
6 future.

7 A. As I state in my written supplemental direct testimony, which will be filed
8 should the Commission grant Staff's motion to file said testimony, I recommend that a
9 reporting system of electronic monthly and quarterly billing cycle data be established for
10 all districts of the Company, and that it be modeled after the successful system that has
11 been established for Laclede Gas Company. The data should be submitted to the Staff
12 and Public Counsel every month, in a format that could easily be analyzed with such
13 tools as personal computer spreadsheets.

14 Q. Does this conclude your written surrebuttal testimony?

15 A. Yes, it does.

Missouri-American Water Company
Case No. WR-2003-0500

Usage Unaccounted For

The data as adjusted by 219,349 thousands of gallons for new Florissant customers leads to the regression model:

YEAR	GCD	DNSHORT	UNCOUNT
1993	262.75710	-2.18583	0
1994	293.84699	0.13807	0
1995	282.00387	-0.82838	0
1996	284.50282	-0.95675	0
1997	287.21737	-0.15905	0
1998	270.92365	-1.59080	0
1999	294.56215	0.02134	0
2000	281.84581	-0.66038	0
2001	286.82671	-0.26983	0
2002	279.34781	0.56437	1

SUMMARY OUTPUT

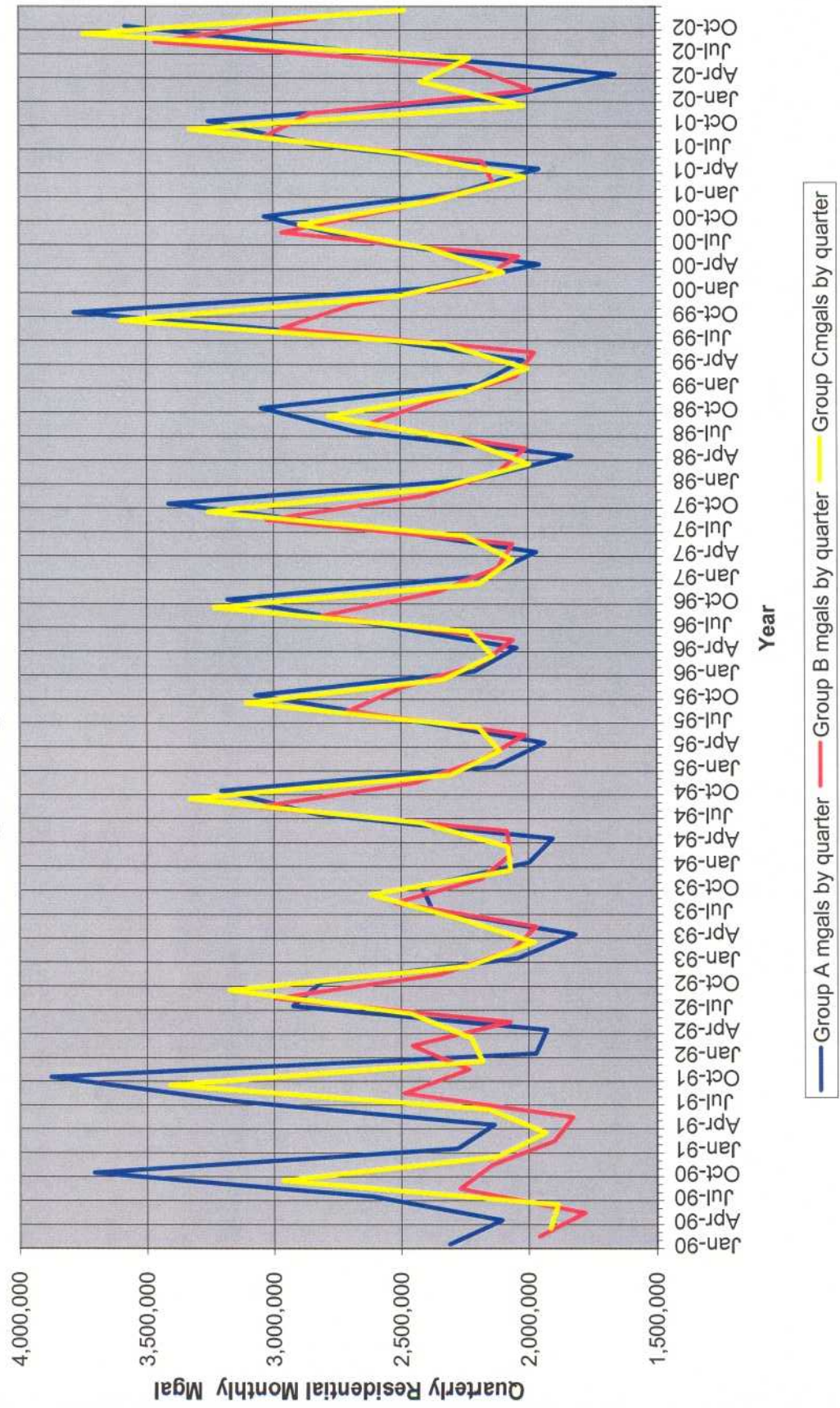
Regression Statistics	
Multiple R	0.974141099
R Square	0.948950881
Adjusted R Square	0.934365419
Standard Error	2.494869145
Observations	10

ANOVA

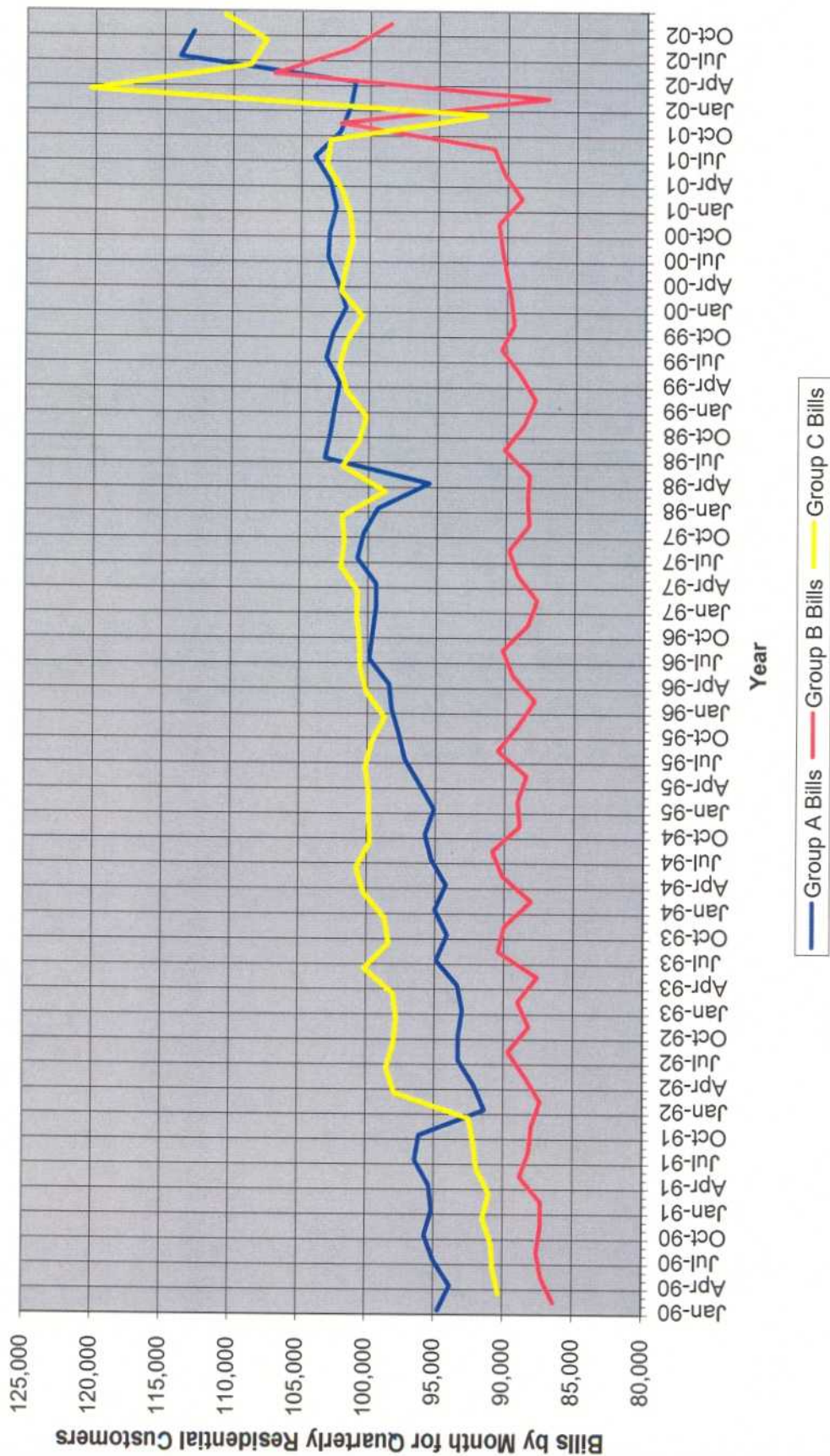
	df	SS	MS	F	Significance F
Regression	2	809.9329485	404.9664742	65.06141842	3.00579E-05
Residual	7	43.57060434	6.224372048		
Total	9	853.5035528			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	292.0487573	1.169979527	249.6186903	4.37204E-15	289.2821973	294.8153173
DNSHORT	12.93244208	1.140949364	11.33480809	9.31445E-06	10.23452747	15.63035668
UNCOUNT	-19.99961924	3.011259207	-6.641613315	0.000292786	-27.12011069	-12.87912779

Missouri-American Water Company
 District: St. Louis County Water
 Class: Quarterly Residential
 Issue: Mgaltons by Month Within Quarter



Missouri-American Water Company
 District: St. Louis County Water
 Class: Quarterly Residential
 Issue: Distribution of Customer Bills Among Billing Cycles



Missouri-American Water Company
Case No. WR-2003-0500

Usage Unaccounted For: UNCOUNT

The data as adjusted by adding 219,349 thousands of gallons for new Florissant customers in 2002,
and as adjusted by adding 336,534 thousands of gallons for April billing cycles in 2002,
leads to the regression model:

YEAR	GCD	DNSHORT	UNCOUNT
1993	262.75710	-2.18583	0
1994	293.84699	0.13807	0
1995	282.00387	-0.82838	0
1996	284.50282	-0.95675	0
1997	287.21737	-0.15905	0
1998	270.92365	-1.59080	0
1999	294.56215	0.02134	0
2000	281.84581	-0.66038	0
2001	286.82671	-0.26983	0
2002	282.31584	0.56437	1

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.973827544
R Square	0.948340085
Adjusted R Square	0.933580109
Standard Error	2.494869145
Observations	10

ANOVA					
	df	SS	MS	F	Significance F
Regression	2	799.8416229	399.9208115	64.25078841	3.13356E-05
Residual	7	43.57060434	6.224372048		
Total	9	843.4122272			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	292.0487573	1.169979527	249.6186903	4.37204E-15	289.2821973	294.8153173
DNSHORT	12.93244208	1.140949364	11.33480809	9.31445E-06	10.23452747	15.63035668
UNCOUNT	-17.03158825	3.011259207	-5.655968843	0.000769689	-24.15207971	-9.911096798

Missouri-American Water Company

Case No. WR-2003-0500

District And Class: St. Louis County Water Quarterly Residential

Issue: Quarterly Bills By Month Within Quarter

Schedule 5

Year	Month	Quarter	yyyyqq	yyyyq4	Ending Date	Monthly Bills	Average Monthly Bills	Average Total Bills	Group A Bills	Group B Bills	Group C Bills	Group A Qtr to Qtr Change	Group B Qtr to Qtr Change	Group C Qtr to Qtr Change	Sum of Qtr-to-Qtr Changes	Sum of Annual Changes
2001	1	1	200101	200104	1/31/01	102,443	98,635	295,906	102,443	#N/A	#N/A	(486)				
2001	2	1	200101	200104	2/28/01	88,961	98,635	295,906	#N/A	88,961	#N/A		(1,670)			
2001	3	1	200101	200104	3/31/01	102,052	98,635	295,906	#N/A	#N/A	102,052			647	(1,509)	
2001	4	2	200102	200104	4/30/01	102,888	98,635	295,906	102,888	#N/A	#N/A	445				
2001	5	2	200102	200104	5/31/01	90,255	98,635	295,906	#N/A	90,255	#N/A		1,294			
2001	6	2	200102	200104	6/30/01	103,139	98,635	295,906	#N/A	#N/A	103,139			1,087	2,826	
2001	7	3	200103	200104	7/31/01	104,036	98,635	295,906	104,036	#N/A	#N/A	1,148				
2001	8	3	200103	200104	8/31/01	91,003	98,635	295,906	#N/A	91,003	#N/A		748			
2001	9	3	200103	200104	9/30/01	102,907	98,635	295,906	#N/A	#N/A	102,907			(232)	1,664	
2001	10	4	200104	200104	10/31/01	102,182	98,635	295,906	102,182	#N/A	#N/A	(1,854)				
2001	11	4	200104	200104	11/30/01	102,148	98,635	295,906	#N/A	102,148	#N/A		11,145			
2001	12	4	200104	200104	12/31/01	91,610	98,635	295,906	#N/A	#N/A	91,610			(11,297)	(2,006)	975
2002	1	1	200201	200204	1/31/02	101,440	105,880	317,639	101,440	#N/A	#N/A	(742)				
2002	2	1	200201	200204	2/28/02	87,040	105,880	317,639	#N/A	87,040	#N/A		(15,108)			
2002	3	1	200201	200204	3/31/02	120,354	105,880	317,639	#N/A	#N/A	120,354			28,744	12,894	
2002	4	2	200202	200204	4/30/02	101,091	105,880	317,639	101,091	#N/A	#N/A	(349)				
2002	5	2	200202	200204	5/31/02	107,006	105,880	317,639	#N/A	107,006	#N/A		19,966			
2002	6	2	200202	200204	6/30/02	108,726	105,880	317,639	#N/A	#N/A	108,726			(11,628)	7,989	
2002	7	3	200203	200204	7/31/02	113,872	105,880	317,639	113,872	#N/A	#N/A	12,781				
2002	8	3	200203	200204	8/31/02	101,441	105,880	317,639	#N/A	101,441	#N/A		(5,565)			
2002	9	3	200203	200204	9/30/02	107,590	105,880	317,639	#N/A	#N/A	107,590			(1,136)	6,080	
2002	10	4	200204	200204	10/31/02	112,873	105,880	317,639	112,873	#N/A	#N/A	(999)				
2002	11	4	200204	200204	11/30/02	98,510	105,880	317,639	#N/A	98,510	#N/A		(2,931)			
2002	12	4	200204	200204	12/31/02	110,614	105,880	317,639	#N/A	#N/A	110,614			3,024	(906)	26,057

Missouri-American Water Company
Case No. WR-2003-0500

Usage Unaccounted For: UNCOUNT

The data as adjusted by adding 219,349 thousands of gallons for new Florissant customers in 2002,
as adjusted by adding 336,534 thousands of gallons for April billing cycles in 2002,
as adjusted by adding 41,024 thousands of gallons (31 days base usage for 5,565 customers),
and as adjusted by adding 16,478 thousands of gallons (61 days base usage for 1,136 customers),
all leads to the regression model:

YEAR	GCD	DNSHORT	UNCOUNT
1993	262.75710	-2.18583	0
1994	293.84699	0.13807	0
1995	282.00387	-0.82838	0
1996	284.50282	-0.95675	0
1997	287.21737	-0.15905	0
1998	270.92365	-1.59080	0
1999	294.56215	0.02134	0
2000	281.84581	-0.66038	0
2001	286.82671	-0.26983	0
2002	282.82298	0.56437	1

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.973823199
R Square	0.948331623
Adjusted R Square	0.93356923
Standard Error	2.494869145
Observations	10

ANOVA

	df	SS	MS	F	Significance F
Regression	2	799.7035023	399.8517511	64.23969326	3.13536E-05
Residual	7	43.57060434	6.224372048		
Total	9	843.2741066			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	292.0487573	1.169979527	249.6186903	4.37204E-15	289.2821973	294.8153173
DNSHORT	12.93244208	1.140949364	11.33480809	9.31445E-06	10.23452747	15.63035668
UNCOUNT	-16.52444596	3.011259207	-5.487553486	0.000918577	-23.64493741	-9.403954503