Exhibit No.:	
Issues:	Residential Customer Charges; Residential Volumetric Charges
Witness:	Martin Hyman
Sponsoring Party:	Missouri Department of Economic Development – Division of Energy
Type of Exhibit:	Direct Testimony (Rate Design)
Case Nos.:	WR-2015-0301 and SR-2015-0302

MISSOURI PUBLIC SERVICE COMMISSION

MISSOURI-AMERICAN WATER COMPANY

CASE NOs. WR-2015-0301
AND
SR-2015-0302

DIRECT TESTIMONY (RATE DESIGN)

OF

MARTIN R. HYMAN

ON

BEHALF OF

MISSOURI DEPARTMENT OF ECONOMIC DEVELOPMENT

DVISION OF ENERGY

Jefferson City, Missouri
January 20, 2016

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas	))))	WR-2015-0301 and SR-2015-0302

AFFIDAVIT OF MARTIN HYMAN

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

Martin R. Hyman, of lawful age, being duly sworn on his oath, deposes and states:

1. My name is Martin R. Hyman. I work in the City of Jefferson, Missouri, and I am employed by the Missouri Department of Economic Development as a Planner II, Division of Energy.
2. Attached hereto and made a part hereof for all purposes is my Direct Testimony (Rate Design) on behalf of the Missouri Department of Economic Development – Division of Energy.
3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct to the best of my knowledge.

Martin R. Hyman

Subscribed and sworn to before me this 20th day of January, 2016.

Melissa Ann Adams
Notary Public

My commission expires:

MELISSA ANN ADAMS
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: March 09, 2019
Commission Number: 15633820

MELISSA ANN ADAMS NOTARY PUBLIC NOTARY SEAL COMMISSION #15633820 COLE COUNTY STATE OF MISSOURI MY COMMISSION EXPIRES 03/09/2019

TABLE OF CONTENTS

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Martin R. Hyman. My business address is 301 West High Street, Suite 720, PO Box 1766, Jefferson City, Missouri 65102.

Q. By whom and in what capacity are you employed?

A. I am employed by the Missouri Department of Economic Development – Division of Energy ("DE") as a Planner II.

Q. Please describe your educational background and employment experience.

A. In 2011, I graduated from the School of Public and Environmental Affairs at Indiana University in Bloomington with a Master of Public Affairs and a Master of Science in Environmental Science. There, I worked as a graduate assistant, primarily investigating issues surrounding energy-related funding under the American Recovery and Reinvestment Act of 2009. I also worked as a teaching assistant in graduate school and interned at the White House Council on Environmental Quality in the summer of 2011. I began employment with DE in September, 2014. Prior to that, I worked as a contractor for the U.S. Environmental Protection Agency to coordinate intra-agency modeling discussions.

Q. Have you previously filed testimony before the Public Service Commission ("Commission") in this case?

A. Yes. I filed Direct Revenue Requirement Testimony in this case (WR-2015-0301 and SR-2015-0302).

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your Direct Testimony (Rate Design) in this proceeding?

A. The purpose of my Direct Rate Design Testimony is to:

1. Generally oppose Missouri-American Water Company's ("MAWC" or "Company") proposed increases to its residential customer charges, particularly where not based on cost-of-service allocation principles;
2. Support MAWC's proposed transition away from residential declining block water rate structures towards uniform water rates, though not the specific rates proposed by the Company in this case;
3. Provide support for an eventual transition towards inclining block water rates; and
4. Present a bill frequency analysis of residential customers served by MAWC, a bill impact analysis based on this frequency analysis and the Company's rate design proposal, and a demonstration of the residential bill impacts from a revenue neutral shift to uniform volumetric rates in the Brunswick and Platte County districts.

I base my positions on these billing analyses, along with considerations of cost of service, equity, efficiency, and gradualism.

III. OVERVIEW OF WATER RATE DESIGN CONSIDERATIONS

Q. Why is the Division of Energy interested in water efficiency?

A. As explained in my Direct Revenue Requirement testimony, there is a "water-energy" nexus involving the "embedded energy" used to pump, treat, distribute, and dispose of

water and wastewater.[1] This nexus is acknowledged by the Company,[2] which incurs significant fuel and power expenses.[3] Based on these considerations, it is clear that the promotion of water efficiency leads to the promotion of energy efficiency.

Q. Are the residential rate design considerations in the electric power sector similar to those in the water sector with respect to end-use efficiency?

A. Generally, yes. Higher customer charges decrease the customer's incentive to use water more efficiently compared to higher variable charges, since a customer charge does not change with the amount of water used. Similarly, declining block rate structures – those in which higher tiers, or "blocks," of use incur lower variable charges – discourage efficient water use. Theoretically, the ideal water rate design to encourage conservation and efficiency would involve low customer charges and inclining variable rate blocks, with the customer and volumetric charges based on cost-of-service allocation, equity, gradualism and efficiency principles. Uniform volumetric rates would also improve the price signal sent to customers compared to declining block rates. As indicated later, the Company has proposed to transition most of its districts to uniform volumetric rates.

[1] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Direct Testimony of Martin R. Hyman on Behalf of the Missouri Department of Economic Development – Division of Energy, December 23, 2015, pages 2-3, lines 14-21 and 1-5.
[2] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Corrected Direct Testimony of Frank L. Kartmann on Behalf of Missouri-American Water Company, August 6, 2015, pages 32-33, lines 6-19 and 1-4.
[3] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Summary of Operating and Maintenance Expenses, Depreciation, Amortization and General Taxes For the Test Year Ended December 31, 2014, July 31, 2015, Schedule: CAS-9, page 1, line 4.

A. CUSTOMER CHARGES

Q. What types of costs are allocated to customer charges in water rate design?

A. The American Water Works Association publishes a cost allocation manual ("AWWA manual") which is used as a reference guide for ratemaking in the water utility industry.[4] This manual states that, "Fixed and variable charges as defined for rate design in a cost-of-service water-rate analysis depart from standard or traditional accounting definitions of fixed and variable costs."[5] In a cost of service rate design (as is used in Missouri), customer charges recover dedicated "customer-related costs" based on the number of customers served by a utility or based on another "nonconsumptive" measure.[6]

Q. What are some examples of dedicated customer-related costs?

A. The AWWA manual lists meter reading, billing, meter and service line-related costs, and – in the case of minimum charges – a minimum quantity of water as the typical costs included in customer charges. Some utilities include a share of service capacity in customer charges as well.[7]

Q. Should the Commission allow the Company to recover service capacity and minimum consumption costs in its customer charges?

A. No. Regarding the capacity cost-related charges, the AWWA manual notes that:

> The use of a water system is reflected in both potential and average usage patterns, **so a continued reliance on volumetric charges has value from an equity perspective**.

[4] Zieburtz, Bill and Giardina, Rick. 2012. "Principles of Water Rates, Fees, and Charges." American Water Works Association. AWWA Manual M1. Sixth ed. Denver: American Water Works Association.
[5] *Ibid*, page 138.
[6] *Ibid*, pages 137-138.
[7] *Ibid*, pages 138-139.

> The extent to which a strategy of large service charges is employed is frequently limited as a result of **concerns over impacts on affordability for smaller customers** …. (Emphases added.)[8]

The AWWA manual also states that minimum charges typically lead to higher customer charges (which, by extension, would increase the difficulty of maintaining basic customer service); may be deemed inequitable; and, if the minimum water quantity is inflated, are believed to discourage conservation.[9] Consequently, DE does not recommend the inclusion of capacity and minimum consumption components in customer charges.

Q. Should the Commission attempt to set the Company's customer charges at the lowest level necessary while still allowing the Company to recover its dedicated customer-related fixed costs?

A. Yes, with the recognition that the Company currently relies upon volumetric sales more heavily than customer charges, as noted by Company witness Jeanne M. Tinsley.[10] While it is a generally accepted principle of ratemaking to align revenues and charges with their cost causers, it is also generally accepted that this principle is limited by considerations of equity, fairness, gradualism, and efficiency. Allowing the Company to fully recover its fixed accounting costs in its customer charges without regard to other ratemaking principles would encourage inefficient water consumption. Company witness Paul R. Herbert acknowledges a key problem with such a "straight fixed variable" rate design in his testimony, stating that there would be, "…a guarantee of recovering the Company's

[8] *Ibid*, page 139.
[9] *Ibid*, pages 139-140.
[10] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Direct Testimony of Jeanne M. Tinsley on Behalf of Missouri-American Water Company, July 31, 2015, page 17, Chart 1 and lines 1-8.

fixed costs, however low-use customers would be adversely affected and there would be little incentive for customers to conserve."[11] Given the AWWA manual's definition of customer costs in cost of service rate setting, a movement towards cost-of-service-based rates should not be conflated with a movement towards the recovery of fixed accounting costs through customer charges.

B. VOLUMETRIC RATE STRUCTURES

Q. What are some of the rationales for moving towards inclining block or uniform water rates?

A. The AWWA manual states that inclining block rates can send "consistent" price signals[12] and recover peak capacity costs.[13] Regarding uniform rates, the AWWA manual indicates that, "In general, [they] … provide a more conservation-oriented rate signal than decreasing block rates."[14]

Q. Should the Commission require MAWC to implement residential inclining block rates across all of its districts in this rate case?

A. No. Although the eventual transition to inclining block rates would promote efficiency, a transition from declining block to uniform rates in the current case would also accomplish this goal in a more gradual manner while avoiding rate shock, particularly among lower income ratepayers. However, MAWC should be required to implement residential inclining block rates in a subsequent case.

[11] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Direct Testimony of Paul R. Herbert on Behalf of Missouri-American Water Company, July 31, 2015, page 20, lines 22-24.
[12] Zieburtz and Giardina, page 113.
[13] *Ibid*, page 112.
[14] *Ibid*, page 100.

Q. Are there any subsidiaries of the American Water Company which use inclining block rate structures?

A. Yes. Most service areas in California American Water's territory have inclining block rate structures for residential customers; the Long Island district of New York American Water also has inclining block rates for residential summer consumption.[15]

C. COMMISSION STAFF'S RATE DESIGN ANALYSIS

Q. How do the rate design principles described above compare to the Commission Staff's ("Staff") recent "Water Utility Rate Design Analysis?"[16]

A. Among other analyses, Staff used data from one of its proposed consolidated districts in the previous MAWC rate case to determine the effects of various customer charge increases on residential bills. Staff performed its analyses both in the presence of a uniform rate and in the presence of an inclining block rate. Staff's analysis of the average bill impact involved an average use of 6,000 gallons, just below an apparent 7,000 gallon threshold at which higher customer charges would work more favorably for customers. Customers using above approximately 6,000 gallons of water would have less expensive monthly bills under the higher customer charges Staff investigated. Staff's two-tiered inclining block rate (pivoting at Staff's reported statewide average use of 5,000 gallons per month) indicated similar bill impacts at the 6,000 gallon level of use as with uniform rates.[17]

[15] Company response to Data Request DED-DE 1-208.
[16] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Staff's Water Utility Rate Design Analysis, June 16, 2015.
[17] *Ibid*, pages 4-6.

Q. Did Staff specifically analyze any scenarios in which the customer charge was held constant – or decreased – at the same time that inclining block rates were implemented?

A. No. This type of analysis might have yielded results indicating the benefits of such rate designs with respect to usage and efficiency. The focus on higher customer charges may incorrectly suggest that such a component of rate design is desirable.

IV. COMPANY'S RESIDENTIAL CUSTOMER CHARGE PROPOSALS

Q. What residential customer charges are proposed by the Company in this case?

A. Table 1 below shows the Company's proposed monthly residential customer charges for the majority of its districts.

Table 1. Proposed monthly residential customer charges.[18]

Meter Size	Proposed Charge
5/8"	$17.40
3/4"	$22.30
1"	$31.60
1-1/2"	$54.90
2"	$82.90
3"	$148.10
4"	$241.20
6"	$474.20
8"	$753.70
10"	$1,280.30
12"	$1,740.00

[18] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Detail of Test Year Operating Revenues at Present and Proposed Rates – By District For the Test Year Ended December 31, 2014, July 31, 2015, Schedule CAS-12-BRU, page 1, lines 2-14.
Although derived from the Company's Brunswick-specific accounting schedules, these proposed monthly customer charges would apply to virtually every metered monthly customer in all of the districts subsequently discussed.

Mr. Herbert states that MAWC proposes identical customer charges for all districts (referred to as both "customer charges" and "minimum charges" in his testimony) by meter size.[19] Under his proposal, the customer charge for a 5/8" meter would be $17.40 per month or $31.00 per quarter, with, "… increases to the larger sizes … based on the existing meter ratios by size to the 5/8-inch charge."[20]

Q. Do these proposals represent increases or decreases compared to the Company's current residential customer charges?

A. The results vary by current district, proposed rate zone,[21] and meter size, as illustrated in Tables 2 and 3 below.

[19] Herbert, page 13, lines 3-4.
[20] *Ibid*, page 14, lines 7-10.
[21] Mr. Herbert describes the Company's proposed rate zones in his testimony on pages 13-14, lines 18-24 and 1.

Table 2. Current monthly residential customer charges and proposed changes.[22]

Meter Size	Rate Zone	District	Current Charge	Change
5/8"	1	St. Louis	$14.42	20.67%
		St. Joseph	$10.65	63.38%
		Joplin	$18.53	-6.10%
		Warrensburg	$11.73	48.34%
		Maplewood, Riverside, Stonebridge, Saddlebrooke	$22.06	-21.12%
		Emerald Pointe	$11.07	57.18%
		Tri-States	$7.45	133.56%
	2	Mexico	$13.35	30.34%
		Jefferson City	$17.30	0.58%
		Platte County	$15.47	12.48%
	3	Brunswick	$22.06	-21.12%
		Ozark Mountain and Lake Taneycomo	$22.06	-21.12%
		Spring Valley and Lakewood Manor	$22.06	-21.12%
3/4"	1	St. Louis	$16.09	38.60%
		St. Joseph	$13.63	63.61%
		Warrensburg	$15.02	48.47%
		Tri-States	$8.20	171.95%
	2	Mexico	$17.08	30.56%
1"	1	St. Louis	$19.50	62.05%
		St. Joseph	$19.32	63.56%
		Joplin	$33.61	-5.98%
		Warrensburg	$21.28	48.50%
		Maplewood, Riverside, Stonebridge, Saddlebrooke	$38.48	-17.88%
		Emerald Pointe	$25.52	23.82%
		Tri-States	$10.44	202.68%
	2	Mexico	$24.21	30.52%
		Jefferson City	$22.20	42.34%
		Platte County	$28.06	12.62%
	3	Brunswick	$38.48	-17.88%
		Ozark Mountain and Lake Taneycomo	$38.48	-17.88%
1-1/2"	1	St. Louis	$27.88	96.92%
		St. Joseph	$33.61	63.34%
		Joplin	$58.45	-6.07%
	2	Jefferson City	$30.38	80.71%
		Platte County	$48.76	12.59%
2"	1	St. Louis	$37.95	118.45%
		St. Joseph	$50.73	63.41%
		Joplin	$88.24	-6.05%
		Warrensburg	$55.84	48.46%
		Emerald Pointe	$78.53	5.56%
		Tri-States	$21.62	283.44%
	2	Mexico	$63.56	30.43%
		Jefferson City	$40.17	106.37%
		Platte County	$73.65	12.56%
3"	1	St. Louis	$64.87	128.30%
		St. Joseph	$90.69	63.30%
4"	1	St. Louis	$95.12	153.57%
6"			$179.24	164.56%
8"			$280.14	169.04%
10"			$414.69	208.74%

[22] Schedule CAS-12-BRU, page 1, lines 2-14; Schedule CAS-12-JFC, page 1, lines 2-14; Schedule CAS-12-JOP, page 1, lines 2-14; Schedule CAS-12-MRS, page 1, lines 2-14 and 25-31; Schedule CAS-12-MEX, page 1, lines 2-14; Schedule CAS-12-OML, page 1, lines 2-14; Schedule CAS-12-PLW, page 1, lines 2-14; Schedule CAS-12-SVL, page 1, lines 2-14; Schedule CAS-12-SJO, page 1, lines 2-14; Schedule CAS-12-STL, page 1, lines 2-15; Schedule CAS-12-TRI, page 1, lines 2-14; Schedule CAS-12-WAR, page 1, lines 2-14.

Table 3. Comparison of current and proposed quarterly customer charges for the St. Louis District, Rate A.[23]

Meter Size	Current Charge	Proposed Charge	Change
5/8"	$21.13	$31.00	46.71%
3/4"	$26.16	$39.70	51.76%
1"	$36.29	$56.30	55.14%
1-1/2"	$61.49	$97.80	59.05%
2"	$91.73	$147.70	61.02%
3"	$172.50	$263.90	52.99%
4"	$263.32	$429.70	63.19%
6"	$515.59	$844.80	63.85%
8"	$818.32	$1,342.80	64.09%
10"	$1,221.94	$2,281.00	86.67%

Note that Rankin Acres, White Branch, and Anna Meadows will continue to be billed at flat rates[24] and are excluded from these tables. Meter sizes for which no meter billings exist or are anticipated under the Company's accounting schedules are excluded as well. Additionally, the charges shown in both tables for the St. Louis district apply to Rate A (which includes the residential, commercial, industrial, and "other public authority" classes); it should also be noted that St. Louis is the only district which has customers billed under quarterly customer charges.

Q. What do you observe from these comparisons?

A. The Company's proposed changes vary significantly by district and meter size. With respect to the monthly customer charges, Brunswick, Ozark Mountain and Lake Taneycomo, Spring Valley and Lakewood Manor, Joplin, and the combined Maplewood, Riverside, Stonebridge, and Saddlebrooke district (excluding Emerald Pointe) would experience customer charge decreases across meter sizes; by contrast, all of the

[23] Schedule CAS-12-STL, page 2, lines 2-15.
[24] Schedule CAS-12-RKA, page 1, lines 2-12; Schedule CAS-12-STL, page 9, lines 2-5.

Company's current districts in its proposed first and second rate zones would experience customer charge increases (except for Joplin and the combined Maplewood, Riverside, Stonebridge and Saddlebrooke district). Proposed changes at the 5/8" level range from -21.12 percent to 133.56 percent. The high end of this range increases at certain larger meter sizes. The proposed quarterly customer charges uniformly exhibit increases, with all but the 5/8" meter size customer charge increasing by over 50 percent.

Overall, the comparisons suggest that MAWC's customer charge proposal will result in disparate impacts between the Company's districts; some of these disparities may be due to differences in the costs of service by district. Additionally, the sharp relative increase in customer charges within some of the Company's current districts could lead to rate shock and, particularly if volumetric rates were to be held constant or reduced, could result in less efficient customer choices regarding consumption.

Q. Did the Company include the appropriate cost components in its customer charge proposal?

A. No. Mr. Herbert developed a "billing and collecting costs" allocation factor (Factor 12) using the total number of bills or customers by classification.[25] However, this allocation factor is applied inappropriately to several types of costs. To reduce the complexity of the arguments in this case and to focus on the most concerning of these costs, I will focus on the application of the billing and collecting cost allocator to "Uncollectible Accounts."[26]

[25] Herbert, Schedule C, page II-25.
[26] *Ibid*, Schedule B, page II-6, columns 1 and 2.

Q. What is the amount of the uncollectible accounts cost claimed by the Company in this case for all water districts?

A. MAWC claims $3,423,934 in uncollectible accounts across all water districts for its cost of service during the test year, of which $3,338,336 is allocated to its Rate A customers.[27] The uncollectible accounts total for all water districts represents 39.3 percent of the Company's total customer accounting expense.[28]

Q. Why is it inappropriate to recover uncollectible accounts expense through the customer charge?

A. Each customer within a class is not equally responsible for costs associated with uncollectible expenses. Therefore, uncollectible expenses should not be collected on a uniform basis through the customer charge. Uncollectible accounts expense generally varies with the level of revenue and should be recovered through variable charges which change with the amount of use.

Q. What is your overall recommendation with respect to the Company's residential customer charges?

A. Based on my comparison of the Company's current and proposed residential customer charges, as well as MAWC's inappropriate inclusion of uncollectible account costs in these charges, DE recommends that the Commission reject the Company's customer charge proposals. The Commission should favor the lowest possible customer charges necessary to allow the recovery of dedicated customer-related costs while simultaneously

[27] *Ibid*, columns 1, 3, and 4.
[28] *Ibid*, columns 1 and 3.

considering equity, efficiency, and gradualism principles. The Company's proposal accomplishes none of these goals.

V. COMPANY'S RESIDENTIAL VOLUMETRIC RATE DESIGN PROPOSALS

Q. Did the Company propose uniform residential volumetric rates for those water districts with volumetric charges?

A. Yes. The proposed residential volumetric rates for Rate A metered customers are mostly uniform.[29]

Q. In principle, do you agree with this type of residential rate design for the current case?

A. Yes. Uniform volumetric rates can encourage efficient consumption through a relatively simple and equitable design, and they provide a more gradual transition towards inclining block rates from declining block rates.

Q. Did the Company similarly propose uniform volumetric rates for its small commercial customers?

A. Yes.[30] To the extent such rates are not already in place, DE supports their gradual implementation, although the bill impacts of the specific rates proposed by the Company would need to be examined.

[29] *Ibid*, page 14, lines 13-14.
[30] Schedule CAS-12-BRU, page 2, lines 17-21; Schedule CAS-12-JFC, page 2, lines 17-21; Schedule CAS-12-JOP, page 2, lines 17-21; Schedule CAS-12-MRS, page 2, lines 17-21 and 34-35; Schedule CAS-12-MEX, page 2, lines 17-21; Schedule CAS-12-PLW, page 2, lines 17-21; Schedule CAS-12-SVL, page 2, lines 16-20; Schedule CAS-12-SJO, page 2, lines 17-21; Schedule CAS-12-STL, pages 1 and 2, lines 19-20 and 31-32; Schedule CAS-12-TRI, page 2, lines 17-21; Schedule CAS-12-WAR, page 2, lines 17-21.

Q. What changes are proposed by the Company in the residential volumetric charges for each district?

A. The Company proposes the same uniform rate within each of its proposed three rate zones for its metered residential customers, as shown below in Table 4.

Table 4. Comparison of current and proposed residential volumetric charges (in dollars per 100 gallons).[31]

Rate Zone	District		Current Charge	Proposed Charge	Change
1	St. Louis (Monthly and Quarterly)		$0.34447	$0.41363	20.08%
	St. Joseph		$0.49115		-15.78%
	Joplin		$0.41838		-1.14%
	Warrensburg		$0.35833		15.43%
	Maplewood, Riverside, Stonebridge, Saddlebrooke		$0.23700		74.53%
	Emerald Pointe		$0.07100		482.58%
	Tri-States		$0.31100		33.00%
2	Mexico		$0.68929	$0.65000	-5.70%
	Jefferson City		$0.57140		13.76%
	Platte County	Block 1	$0.77731		-16.38%
		Block 2	$0.47700		36.27%
3	Brunswick	Block 1	$1.08500	$0.90000	-17.05%
		Block 2	$0.75000		20.00%
	Ozark Mountain and Lake Taneycomo		$0.85000		5.88%
	Spring Valley and Lakewood Manor		$1.08500		-17.05%

The table includes all Rate A customers in St. Louis, since the Company's tariffs do not distinguish between the residential, commercial, industrial, and other public authority classes in that area. It should be noted that the table does not include the Company's current rate blocks in instances where its accounting schedules do not indicate any billing units, nor does the table include additional current rate blocks in instances where the rate blocks are already indicated to be uniform.

[31] Schedule CAS-12-BRU, page 1, lines 16-20; Schedule CAS-12-JFC, page 1, lines 16-20; Schedule CAS-12-JOP, page 1, lines 16-20; Schedule CAS-12-MRS, page 1, lines 16-20 and 33-34; Schedule CAS-12-MEX, page 1, lines 16-20; Schedule CAS-12-OML, page 1, lines 16-20; Schedule CAS-12-PLW, page 1, lines 16-20; Schedule CAS-12-SVL, page 1, lines 16-20; Schedule CAS-12-SJO, page 1, lines 16-20; Schedule CAS-12-STL, pages 1 and 2, lines 19-20 and 31-32; Schedule CAS-12-TRI, page 1, lines 16-20; Schedule CAS-12-WAR, page 1, lines 16-20.

Q. What do you observe from these comparisons?

A. As with the proposed residential customer charges, the changes to the proposed residential volumetric charges vary significantly by district. However, the direction of these variations is less clear by proposed rate zone than with the proposed customer charges.

Few districts currently have declining block rates since customers tend to use water within the first rate block, so the Company-wide transition to uniform rates seems to have a minimal effect on rate structures in most instances. The second tier of Emerald Pointe's rate, however, will significantly increase; this is particularly noteworthy since this district currently has no first block volumetric rate and would transition to a volumetric charge at all levels of use.[32] A less drastic effect is evident for the Brunswick and Platte County districts' second tiers, with the previous first blocks of the rates in these two districts declining. This indicates a "leveling" of the volumetric rates in these two districts based on their zonal prices. The effects of these block-level changes complicate more precise descriptions of the changes to the volumetric rates in Brunswick and Platte County outside of more specific bill impact analyses.

For those districts which already have effectively uniform rates based on customer usage patterns, the majority would experience rate increases. The exceptions are the St. Joseph, Mexico, Joplin, and Spring Valley and Lakewood Manor districts. The proposed changes are also not uniform. Overall, the range of volumetric charge proposal changes is from

[32] Missouri Public Service Commission Case Nos. WR-2015-0301 and SR-2015-0302, *In the Matter of Missouri-American Water Company's Request for Authority to Implement a General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas*, Proposed Tariff P.S.C. MO No. 13, July 31, 2015, Sheet No. RT 1.1.

-17.05 percent to 74.53 percent, excluding Emerald Pointe. Such variation suggests potentially inequitable outcomes.

Q. Are there districts in which the Company proposes customer charge increases at the same time as volumetric charge decreases?

A. Yes. The Company proposes to increase the customer charges of the St. Joseph and Mexico districts at the same time that it proposes to lower the volumetric charges of these two districts. Higher customer charges and lower volumetric charges discourage efficiency efforts on the part of customers by dampening the price signal. The shift away from volumetric pricing for these specific districts also raises equity concerns, particularly since the increased recovery of revenues through the customer charge – as opposed to the volumetric charge – shifts the risk of revenue recovery away from MAWC and towards its ratepayers.

Q. In the districts where the Company proposes increases (or decreases) to its customer charges, are accompanying decreases (or increases) always proposed for these districts' volumetric charges?

A. No. For example, the proposed 5/8" meter size customer charge in the Warrensburg district would increase by 48.34 percent, while the proposed volumetric charge would also increase by 15.43 percent. In comparison, the proposed monthly 5/8" meter size customer charge in the Joplin district would decrease by 6.10 percent at the same time that the volumetric charge would decrease by 1.14 percent; similarly, for the Spring Valley and Lakewood Manor district, the Company proposes a 21.12 percent customer charge decrease at this meter size and a 17.05 percent volumetric charge decrease. Such

disparities raise additional equity concerns about the Company's proposed treatment of its current districts.

Q. Based on these observations, what is your recommendation with respect to the Company's proposed volumetric charges?

A. Although DE recommends that the Commission approve MAWC's proposal to move to a uniform residential rate structure in this case, my observations also support a recommendation that the Commission reject the specific residential rate design proposed by the Company. The customer and volumetric charge proposals of the Company would lead to potentially inequitable and inefficient outcomes and violate the principle of gradualism.

VI. RESIDENTIAL BILL FREQUENCY AND BILL IMPACT ANALYSES

A. BILL FREQUENCY ANALYSIS

Q. What is the purpose of a bill frequency analysis?

A. The purpose of a bill frequency analysis is to determine the average (mean), minimum, and maximum amount of use for various groups of customers. This analysis can serve as the basis for other calculations, such as a bill impact analysis.

Q. What is the basis of your analysis?

A. My analysis is based on a sample of customer billing and usage data received in response to a data request by DE. The response was marked highly confidential.[33] The Company provided a sample for both a winter and a summer month.

[33] Attachments 1 and 2 to Company response to Data Request DED-DE 1-200 (Highly Confidential).

Q. How did you conduct your analysis?

A. I filtered the data provided by the Company to show only residential usage records; so that all records related to actual usage rather than billing adjustments, I also checked that no records included billing quantities or net charges below zero or prices of zero. Next, I segregated the data by district, after which I identified customer usage data by meter size. I filtered my initial samples by the 5/8" and 3/4" meter sizes in my final samples, as indicated below. Finally, I used the "Descriptive Statistics" option of Excel's Data Analysis tool to obtain summary statistics in each district for the winter and summer month provided by the Company.

In the case of St. Louis, I distinguished between customers billed on a monthly and quarterly basis. For customers billed on a monthly basis, my initial analysis indicated high average and maximum usages. Upon consultation with the Company, it was determined that the records in this sample included multifamily customers; consequently, I filtered my analysis by meter size to account for this fact using a 3/4" meter size as my threshold. Most Rate A customers in St. Louis are metered using 5/8" or 3/4" meters,[34] and the results obtained from the subsequent analysis conformed more closely to the average use which the Company described for the area during my consultation. Given that the maxima obtained when compiling data under all meter sizes for other districts were also relatively high – and that the 5/8" and 3/4" meter sizes tend to serve most customers in the Rate A class for the Company overall[35] – I limited my final analysis for

[34] Herbert, Schedule C-SLM, page SLM-20, columns 1 and 3.
[35] *Ibid*, Schedule C, page II-21, columns 1 and 3.

the other districts (including quarterly St. Louis customers) to these two meter sizes as well.

Q. Were the districts always clearly defined by the "rate category" or district labels specified in the data set?

A. No. While in most cases the districts and rate categories were identical, the exceptions were the groups under District No. 8 and the subdivisions of the St. Louis district. Based on the rates shown in Table 4, District No. 8, Group 1 appears to encompass Spring Valley and Lakewood Manor, District No. 8, Group 2 appears to encompass Ozark Mountain and Lake Taneycomo, and District No. 8, Group 3 appears to encompass Maplewood, Riverside, Stonebridge, and Saddlebrooke. The districts were labeled differently in the sample provided than what would be expected from the Company's testimony and its tariffs. For example, the "Jefferson City" district fell under both its own rate category and a portion of District No. 8.

I used these rate category groups for District No. 8 in my analysis, with the exception noted below for Saddlebrooke; I maintained Jefferson City as its own district unless its associated entries were marked as included under the District No. 8 rate category. Additionally, I separated two of the subdivisions of the St. Louis district (Warren County and St. Charles) but grouped the remaining subdivisions, which consisted of portions of St. Louis County, under St. Louis. Warren County and St. Charles were grouped by their rate category descriptions (as opposed to their "district" descriptions in the data set) since some customers in the St. Charles rate category appear to fall under the Warren County "district" subdivision. All of these subdivisions of the St. Louis district share the volumetric rate for St. Louis shown in Table 4.

Q. Did you exclude any districts or subdivisions from your analysis?

A. Yes. Saddlebrooke was excluded since there have been previous issues with billing in that area. Additionally, no residential data was obtained for the Tri-States or Emerald Pointe rates described above.

Q. How did you account for usage with respect to the declining block rates in Brunswick and Platte County?

A. Within the sample received, no usage was detected in the second rate block of the Brunswick district. However, there was usage within the second rate block of the Platte County District for certain customers; this required the manual addition of the usage from the second rate block into the first for those customer bills for the purposes of this bill frequency analysis.

Q. What were your results?

A. The results are shown below in Table 5. Note that the St. Louis quarterly results are normalized to a monthly basis.

Table 5. Results of residential bill frequency analysis (gallons per month).

Zone	Area	Winter Monthly Use (Gallons)					Summer Monthly Use (Gallons)				
		Average	Minimum	Maximum	Standard Deviation	Sample Size	Average	Minimum	Maximum	Standard Deviation	Sample Size
1	St. Louis (Monthly)	6,222	0	347,072	15,475	614	7,802	0	496,672	21,185	609
	St. Louis (Quarterly)	5,396	0	278,755	6,664	112,633	6,983	0	2,493,583	11,444	114,457
	St. Charles	4,719	0	791,800	5,751	27,715	6,845	0	250,600	6,973	27,858
	Warren County	4,299	0	22,400	2,721	426	4,619	0	49,000	5,012	434
	St. Joseph	3,854	0	349,316	4,612	28,054	4,103	0	175,780	4,471	28,220
	Joplin	3,614	0	135,388	3,452	19,583	4,186	0	128,656	5,357	18,757
	Warrensburg	3,747	0	101,728	3,587	6,771	4,947	0	119,680	6,215	6,727
	Maplewood, Riverside, Stonebridge	2,850	0	34,400	2,540	1,283	5,372	0	227,200	9,890	1,311
2	Mexico	3,388	0	54,604	2,846	4,334	3,715	0	70,312	3,866	4,395
	Jefferson City	3,471	0	142,868	3,280	8,955	4,229	0	83,776	4,907	8,993
	Platte County	3,877	0	89,000	3,121	4,955	7,688	0	194,700	8,995	4,995
3	Brunswick	2,432	0	14,300	1,999	335	2,460	0	12,400	1,914	338
	Ozark Mountain and Lake Taneycomo	2,125	0	16,000	2,420	498	2,711	0	36,100	3,245	505
	Spring Valley and Lakewood Manor	2,792	0	15,400	2,755	142	3,727	0	47,400	5,139	133

Q. What do you observe from these results?

A. As expected, monthly summer use is higher than monthly winter use in all districts; however, the magnitude of this difference varies significantly by district. For example, the difference between the average monthly summer use and average monthly winter use in the Brunswick district is only 29 gallons per month, whereas the difference is 3,811 gallons per month in Platte County. The range of average usages across districts is wide in both seasons and expands during the summer. However, the range of average usages is not consistent between the Company's proposed rate zones. Excluding average summer usage in Platte County, the widest range of average usages is generally found in the first rate zone, while the smallest is found in the second rate zone. The highest and lowest averages appear in the first and third rate zones, respectively.

Q. What can you conclude from these results?

A. The Company's residential customers exhibit heterogeneous usage patterns, not only between MAWC's current districts (and subdivisions thereof) but between the Company's proposed rate zones.

B. BILL IMPACT ANALYSIS

Q. What is the purpose of a bill impact analysis?

A. The purpose of a bill impact analysis is to determine the changes to customer bills as the result of changes in rates. While such an analysis is often based on the "average" customer's use, it should also take into account customers who use more or less amounts of a given commodity to determine equity and efficiency impacts.

Q. What is the basis of your analyses?

A. My first analysis is based on the bill frequency analysis described above, along with the Company's current and proposed rates. I also analyzed a revenue-neutral shift to uniform volumetric rates for the two Company districts in which declining block rates still apply (Brunswick and Platte County).

Q. How did you conduct your first analysis?

A. I multiplied the average winter and summer usages determined in the bill frequency analysis by the volumetric rates described above, then added in the customer charges previously described for the 5/8" and 3/4" meter sizes. These are the most common meter sizes for Rate A,[36] as well as the sizes for which I performed a bill frequency analysis. In addition to the average usages, I included bill impacts at usages above and below the average usages; however, due to the extremely high maxima and low minima observed in the bill frequency analysis, I elected to include usages at 50 percent below and 100 percent above the average usage as my comparison points. This provided enough variation to capture impacts at usages approaching one standard deviation above the average for some districts as well as a certain level of minimum use. The data used in my bill impact analysis are shown below in Table 6; note that the units are in 100 gallons per month in order to mirror the Company's volumetric charge units.

[36] *Ibid.*

Table 6. Monthly usage data used in bill impact analysis (100 gallons per month).

Zone	Area	Winter Monthly Use (100 Gallons)			Summer Monthly Use (100 Gallons)		
		Average	100% Greater	50% Less	Average	100% Greater	50% Less
1	St. Louis (Monthly)	62.22	124.43	31.11	78.02	156.04	39.01
	St. Louis (Quarterly)	53.96	107.92	26.98	69.83	139.66	34.91
	St. Charles	47.19	94.38	23.60	68.45	136.90	34.22
	Warren County	42.99	85.99	21.50	46.19	92.39	23.10
	St. Joseph	38.54	77.09	19.27	41.03	82.06	20.52
	Joplin	36.14	72.28	18.07	41.86	83.73	20.93
	Warrensburg	37.47	74.94	18.74	49.47	98.94	24.74
	Maplewood, Riverside, Stonebridge	28.50	56.99	14.25	53.72	107.43	26.86
2	Mexico	33.88	67.76	16.94	37.15	74.30	18.57
	Jefferson City	34.71	69.43	17.36	42.29	84.58	21.14
	Platte County	38.77	77.53	19.38	76.88	153.75	38.44
3	Brunswick	24.32	48.63	12.16	24.60	49.21	12.30
	Ozark Mountain and Lake Taneycomo	21.25	42.51	10.63	27.11	54.23	13.56
	Spring Valley and Lakewood Manor	27.92	55.83	13.96	37.27	74.54	18.64

Q. Did you exclude any districts or subdivisions from this analysis?

A. Yes. As with the bill frequency analysis, Saddlebrooke, Tri-States, and Emerald Pointe were excluded. Additionally, districts and subdivisions were excluded for which the Company's accounting schedules show no bills within certain meter sizes.

Q. What were your results?

A. The results for the 5/8" bill impact analysis are shown below in Tables 7a through 7c, while the results for the 3/4" bill impact analysis are shown below in Tables 8a through 8c. Note that the results for the St. Louis quarterly bill impact reflect a quarterly bill and are not normalized to reflect a monthly bill.

Table 7a. Residential bill impacts at current Company rates, 5/8" meter size.

Zone	Area	Winter Bill			Summer Bill		
		Average Use	100% Greater Use	50% Less Use	Average Use	100% Greater Use	50% Less Use
1	St. Louis (Monthly)	$35.85	$57.28	$25.14	$41.29	$68.17	$27.86
	St. Louis (Quarterly)	$76.89	$132.66	$49.01	$93.29	$165.45	$57.21
	St. Charles	$30.68	$46.93	$22.55	$38.00	$61.58	$26.21
	Warren County	$29.23	$44.04	$21.82	$30.33	$46.24	$22.38
	St. Joseph	$29.58	$48.51	$20.12	$30.80	$50.95	$20.73
	Joplin	$33.65	$48.77	$26.09	$36.04	$53.56	$27.29
	Warrensburg	$25.16	$38.58	$18.44	$29.46	$47.18	$20.59
	Maplewood, Riverside, Stonebridge	$28.81	$35.57	$25.44	$34.79	$47.52	$28.43
2	Mexico	$36.70	$60.06	$25.03	$38.96	$64.56	$26.15
	Jefferson City	$37.14	$56.97	$27.22	$41.46	$65.63	$29.38
	Platte County	$45.60	$75.74	$30.54	$75.23	$134.98	$45.35
3	Brunswick	$48.44	$74.83	$35.25	$48.75	$75.45	$35.41
	Ozark Mountain and Lake Taneycomo	$40.13	$58.19	$31.09	$45.11	$68.16	$33.58
	Spring Valley and Lakewood Manor	$52.35	$82.64	$37.20	$62.50	$102.94	$42.28

Table 7b. Residential bill impacts at proposed Company rates, 5/8" meter size.

Zone	Area	Winter Bill			Summer Bill		
		Average Use	100% Greater Use	50% Less Use	Average Use	100% Greater Use	50% Less Use
1	St. Louis (Monthly)	$43.13	$68.87	$30.27	$49.67	$81.94	$33.54
	St. Louis (Quarterly)	$97.96	$164.92	$64.48	$117.65	$204.30	$74.32
	St. Charles	$36.92	$56.44	$27.16	$45.71	$74.03	$31.56
	Warren County	$35.18	$52.97	$26.29	$36.51	$55.61	$26.95
	St. Joseph	$33.34	$49.29	$25.37	$34.37	$51.34	$25.89
	Joplin	$32.35	$47.30	$24.87	$34.72	$52.03	$26.06
	Warrensburg	$32.90	$48.40	$25.15	$37.86	$58.32	$27.63
	Maplewood, Riverside, Stonebridge	$29.19	$40.97	$23.29	$39.62	$61.84	$28.51
2	Mexico	$39.42	$61.45	$28.41	$41.55	$65.69	$29.47
	Jefferson City	$39.96	$62.53	$28.68	$44.89	$72.37	$31.14
	Platte County	$42.60	$67.80	$30.00	$67.37	$117.34	$42.38
3	Brunswick	$39.28	$61.17	$28.34	$39.54	$61.69	$28.47
	Ozark Mountain and Lake Taneycomo	$36.53	$55.66	$26.96	$41.80	$66.21	$29.60
	Spring Valley and Lakewood Manor	$42.52	$67.65	$29.96	$50.94	$84.49	$34.17

Table 7c. Comparison of current and proposed Company rate impacts on residential bills, 5/8" meter size.

Zone	Area	Winter Bill			Summer Bill		
		Average Use	100% Greater Use	50% Less Use	Average Use	100% Greater Use	50% Less Use
1	St. Louis (Monthly)	20.31%	20.23%	20.41%	20.28%	20.20%	20.38%
	St. Louis (Quarterly)	27.40%	24.32%	31.56%	26.11%	23.48%	29.91%
	St. Charles	20.35%	20.26%	20.45%	20.30%	20.22%	20.40%
	Warren County	20.37%	20.27%	20.47%	20.36%	20.26%	20.46%
	St. Joseph	12.72%	1.60%	26.13%	11.59%	0.76%	24.89%
	Joplin	-3.87%	-3.02%	-4.66%	-3.69%	-2.85%	-4.51%
	Warrensburg	30.78%	25.44%	36.36%	28.54%	23.61%	34.18%
	Maplewood, Riverside, Stonebridge	1.30%	15.20%	-8.43%	13.88%	30.12%	0.30%
2	Mexico	7.41%	2.31%	13.52%	6.65%	1.75%	12.70%
	Jefferson City	7.62%	9.75%	5.38%	8.26%	10.28%	6.00%
	Platte County	-6.59%	-10.48%	-1.76%	-10.44%	-13.07%	-6.54%
3	Brunswick	-18.91%	-18.25%	-19.60%	-18.89%	-18.24%	-19.59%
	Ozark Mountain and Lake Taneycomo	-8.97%	-4.36%	-13.28%	-7.33%	-2.86%	-11.86%
	Spring Valley and Lakewood Manor	-18.77%	-18.14%	-19.47%	-18.49%	-17.92%	-19.18%

Table 8a. Residential bill impacts at current Company rates, 3/4" meter size.

Zone	Area	Winter Bill			Summer Bill		
		Average Use	100% Greater Use	50% Less Use	Average Use	100% Greater Use	50% Less Use
1	St. Louis (Monthly)	$37.52	$58.95	$26.81	$42.96	$69.84	$29.53
	St. Louis (Quarterly)	$81.92	$137.69	$54.04	$98.32	$170.48	$62.24
	St. Charles	$32.35	$48.60	$24.22	$39.67	$63.25	$27.88
	Warren County	$30.90	$45.71	$23.49	$32.00	$47.91	$24.05
	St. Joseph	$32.56	$51.49	$23.10	$33.78	$53.93	$23.71
	Warrensburg	$28.45	$41.87	$21.73	$32.75	$50.47	$23.88
2	Mexico	$40.43	$63.79	$28.76	$42.69	$68.29	$29.88

Table 8b. Residential bill impacts at proposed Company rates, 3/4" meter size.

Zone	Area	Winter Bill			Summer Bill		
		Average Use	100% Greater Use	50% Less Use	Average Use	100% Greater Use	50% Less Use
1	St. Louis (Monthly)	$48.03	$73.77	$35.17	$54.57	$86.84	$38.44
	St. Louis (Quarterly)	$106.66	$173.62	$73.18	$126.35	$213.00	$83.02
	St. Charles	$41.82	$61.34	$32.06	$50.61	$78.93	$36.46
	Warren County	$40.08	$57.87	$31.19	$41.41	$60.51	$31.85
	St. Joseph	$38.24	$54.19	$30.27	$39.27	$56.24	$30.79
	Warrensburg	$37.80	$53.30	$30.05	$42.76	$63.22	$32.53
2	Mexico	$44.32	$66.35	$33.31	$46.45	$70.59	$34.37

Table 8c. Comparison of current and proposed Company rate impacts on residential bills, 3/4" meter size.

Zone	Area	Winter Bill			Summer Bill		
		Average Use	100% Greater Use	50% Less Use	Average Use	100% Greater Use	50% Less Use
1	St. Louis (Monthly)	28.02%	25.13%	31.19%	27.01%	24.34%	30.17%
	St. Louis (Quarterly)	30.19%	26.10%	35.41%	28.51%	24.94%	33.39%
	St. Charles	29.29%	26.21%	32.38%	27.59%	24.79%	30.76%
	Warren County	29.72%	26.60%	32.76%	29.39%	26.30%	32.47%
	St. Joseph	17.45%	5.23%	31.07%	16.25%	4.28%	29.86%
	Warrensburg	32.88%	27.28%	38.26%	30.59%	25.26%	36.21%
2	Mexico	9.62%	4.01%	15.84%	8.81%	3.37%	15.03%

Q. What do you observe from these results?

A. Customers at the usage levels analyzed would generally experience a bill increase as a result of the Company's proposed rates. Across both meter sizes, most higher use customers would experience a lower percentage bill increase, while most lower use customers would experience a higher percentage bill increase. These disparate impacts by use are likely the result of the customer charge increases generally proposed by the Company; customer charge increases tend to impact lower use customers disproportionately. St. Joseph and Mexico, highlighted earlier due to the fact that their customer charges would increase while their volumetric charges would decrease, show particularly acute differences in bill impacts by usage in this regard.

However, there are notable exceptions to these trends at the 5/8" level, including: Joplin; Maplewood, Riverside, and Stonebridge; Platte County; Brunswick; Ozark Mountain and Lake Taneycomo; and Spring Valley and Lakewood Manor. Except for Platte County, all of these districts would receive decreases to their customer charges under the Company's proposal, and customers using less water would typically see lower bill impacts in these areas. Two of these districts (Joplin and the Spring Valley and Lakewood Manor area) would also experience volumetric charge decreases, as would the first rate blocks of the Brunswick and Platte County districts.

As these differences suggest, the bill impacts of the Company's proposal would not be the same across districts, much less within or between its proposed rate zones. The proposed third rate zone would tend to experience bill decreases at the 5/8" level, while most of the first rate zone (excluding Joplin and low usage winter customers in Maplewood, Riverside, and Stonebridge) would experience bill increases. The second

rate zone would experience mixed results at the 5/8" level. At the 3/4" meter size, customers would generally experience bill increases. The highest percentage bill increases would occur in the St. Louis and Warrensburg areas for both meter sizes; in these areas, the customer and volumetric charges would both increase under the Company's proposal. Low use customers in St. Joseph would also experience substantial percentage bill increases.

Q. Do the bill frequency and bill impact analyses support your previous conclusions regarding the Company's rate design proposals?

A. Yes. The heterogeneity in customer use across current districts suggests the difficulty the Company faces in designing more consolidated rates. The bill impacts customers would experience under the Company's proposed rate design confirm that many of its suggested customer charge increases would be inequitable for lower use customers. The overall rate design would also affect the districts in disparate ways. Most significantly, the higher bill impacts on some lower use customers indicate that the proposed rate design is not meant to encourage efficiency of use. The Commission should therefore reject the Company's proposed rate design.

Q. Do these analyses alter your previous conclusion regarding the merits of uniform volumetric rates?

A. No. Uniform volumetric rates, if properly designed, can encourage efficiency of use. However, the Company's proposal involves consolidating volumetric rate designs that apply to districts with differing underlying costs and with heterogeneous usage patterns. As expected, this leads to inequitable outcomes. The AWWA manual specifically warns:

> Uniform rates might not be perceived as equitable when variations in the cost of serving different customer groups are substantial. Unless a community's customers all show relatively similar demand patterns, the use of uniform rates by customer class should be considered to reflect the variations in the costs to serve different customer demands.[37]

In light of these considerations, DE supports the elimination of declining block rates for the residential class where they exist, but the Company should reconsider how it implements the transition.

Q. Could the Company's residential declining block rates be redesigned as uniform rates with minimal impacts to customer bills?

A. Yes. Tables 9a and 9b below show the residential volumetric rates for the Brunswick and Platte County districts, respectively, both with their present *pro forma* structures, sales, and revenues and as redesigned on a revenue neutral basis (i.e., no rate case or customer charge increases).

Table 9a. Revenue-neutral Brunswick district residential volumetric rates under declining block and uniform rates.[38]

Current Rates			
Block	**Sales (100 Gal)**	**Rate**	**Revenue**
1	99,274	$1.08500	$107,712
2	-439	$0.75000	-$329
Uniform Rates			
Block	**Sales (100 Gal)**	**Rate**	**Revenue**
N/A	98,835	$1.08649	$107,383

[37] Zieburtz and Giardina, page 99.
[38] CAS-12-BRU, page 1, lines 16-20.

Table 9b. Revenue-neutral Platte County district residential volumetric rates under declining block and uniform rates.[39]

Current Rates			
Block	**Sales (100 Gal)**	**Rate**	**Revenue**
1	3,815,007	$0.77731	$2,965,443
2	364,377	$0.47700	$173,808
Uniform Rates			
Block	**Sales (100 Gal)**	**Rate**	**Revenue**
N/A	4,179,384	$0.75113	$3,139,251

The revenues above exclude revenue adjustments shown in the Company's accounting schedules and are based on the products of the sales and rates in the districts.

Tables 10a and 10b show the resulting residential bill impacts from a change to uniform volumetric rates in these respective districts at the 5/8" meter size, assuming no changes in customer charges.

Table 10a. Bill impacts of revenue-neutral shift to residential uniform rates in Brunswick district, 5/8" meter size.

	Winter			Summer		
	Average	**100% Greater**	**50% Less**	**Average**	**100% Greater**	**50% Less**
Use (100 Gal)	24.32	48.63	12.16	24.60	49.21	12.30
Current Rates	$48.44	$74.83	$35.25	$48.75	$75.45	$35.41
Uniform Rates	$48.48	$74.90	$35.27	$48.79	$75.52	$35.43
Difference	0.0747%	0.0967%	0.0513%	0.0751%	0.0970%	0.0517%

[39] CAS-12-PLW, page 1, lines 16-20.

Table 10a. Bill impacts of revenue-neutral shift to residential uniform rates in Platte County district, 5/8" meter size.

	Winter			Summer		
	Average	**100% Greater**	**50% Less**	**Average**	**100% Greater**	**50% Less**
Use (100 Gal)	38.77	77.53	19.38	76.88	153.75	38.44
Current Rates	$45.60	$75.74	$30.54	$75.23	$134.98	$45.35
Uniform Rates	$44.59	$73.71	$30.03	$73.21	$130.96	$44.34
Difference	-2.2257%	-2.6803%	-1.6619%	-2.6756%	-2.9823%	-2.2193%

As this example demonstrates, the shift to residential uniform rates in the two districts where declining block rates currently apply based on customer usage would minimally impact customer bills. The main bill impacts noted in Tables 7a through 8c result from aspects of the Company's rate design proposal which are unrelated to the shift to uniform volumetric rates.

VII. CONCLUSIONS

Q. Please summarize your conclusions and the positions of DE.

A. The Company proposed consolidated customer charges for all of its current districts, many of which would lead to increases across its current districts. DE opposes this proposal, as well as the inclusion of non-customer-related fixed costs in the Company's proposed customer charges – specifically, uncollectible accounts. While, in principle, DE supports MAWC's proposal to move towards uniform volumetric rates in order to encourage customer efficiency, DE opposes the Company's specific rate design in this case given the potentially inequitable impacts within and between districts. These conclusions are supported by my bill frequency and bill impact analyses.

Consequently, DE respectfully requests that the Commission reject the Company's specific rate design proposals in this case while requiring it to implement uniform rates in this case as an initial step in eventually transitioning to inclining block rates.

Q. Does this conclude your Direct Testimony (Rate Design) in this case?

A. Yes.