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.	)))))	**Case No. WR-2015-0301**

STAFF'S WATER UTILITY RATE DESIGN ANALYSIS

COMES NOW the Staff of the Missouri Public Service Commission, by and through counsel, and hereby files the *Water Utility Rate Design Analysis* undertaken at the request of Commissioner Daniel Y. Hall.

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of the foregoing has been served, by hand delivery, electronic mail, or First Class United States Mail, postage prepaid, to all parties of record on the Service List maintained for this case by the Data Center of the Missouri Public Service Commission, on this 16th day of June, 2015.

/s/ Kevin A. Thompson

Water Utility Rate Design Analysis

In the June 11, 2015, Commission Agenda, during a case discussion regarding Case No. AW-2015-0282, a Working Case to Consider Revenue Decoupling Mechanisms, Commissioner Hall indicated that prior to Missouri-American Water Company's (MAWC) filing its 60-day notice of intended filing for a general rate increase he asked Staff to perform a general rate design analysis applicable to water utilities. As he further indicated, once MAWC filed its notice, there were no further communications between Commissioner Hall or his office and Staff. The following analysis is Staff's reply to Commissioner Hall's request, as also articulated during the open Agenda. This analysis does not represent Staff's position on any current or pending case and, and should not be construed as indicative of the position Staff will take in a future case. It is only to be considered as responsive to the request outlined above.

Background

Rate design, be it water, electric, gas or any other industry, is more art than science. Rate design is the process of taking a utility's Commission-approved revenue requirement and determining which customer class contributes to that requirement. Depending upon the goals of the designer, rate design can take many paths. One path to explore is the determination of how much each customer class will contribute to the utility's revenue requirement. In the water industry, small entities generally only have one customer class, i.e. residential. Large water utilities can have multiple customer classes which could include residential, commercial, industrial, other public authorities, and sale for resale. This is not necessarily an exhaustive list of potential customer classes. The rate design analysis must take the revenue requirement and allocate costs to those various classes based upon a method that generally tries to match the principles of cost causation to cost payer. But even with this goal in mind, beauty (or in this case, costs) are in the eye of the beholder. Different analyses can assign or allocate costs to different classes and thus, it is up to the decision-maker to make the ultimate determination as to the appropriate level of class revenue responsibility.

Another path to explore is the determination of how much any given service territory should contribute to the utility's revenue requirement. Water systems, unlike the majority of electric systems, are not interconnected. Small and large water utilities can provide service to various and distinct service territories. Some of the costs for these distinct areas are easy to assign to each area. However, corporate overhead costs are not as easily allocated. Further, there is a debate as to whether all of the utility's customers should be at the same rate (single-tariff pricing), or if each district should pay its own costs (district-specific pricing). For a detailed analysis of the pros and cons of this debate, please review Docket No. SW-2011-0103.

Once these two paths have been explored and determined, the final path to consider is rate structure. Rate structure is the building of the actual rate that any given customer will ultimately be charged. In the water industry, rate structure is generally composed of two components. The first component is a flat monthly customer charge. This amount is charged to every customer each and every month and does not fluctuate with usage. This amount may or may not have a minimum level of usage built into the rate. In most cases in Missouri, where a minimum usage level is still included in the monthly charge, the usage level is around 2,000 to 3,000 gallons. The second component is the usage charge. This component is generally stated in price per 1,000 gallons. In some extreme circumstances where meters are not present at the customer's property, only a flat monthly rate is charged to the customer. This, inherently, means that the customer can use as much water as it wants with no additional charge. This scenario is not ideal and is remedied as quickly as practical where conditions allow.

Within the rate structure path, another trail to explore is the determination of the commodity charge. Generally speaking, there are three types of commodity charges. Those types are uniform, declining, and inclining. A uniform rate means that the commodity rate remains the same regardless of the amount of usage. Declining block rates mean that the commodity rate decreases as the consumer uses more water. Inclining block rates mean that the commodity rate increases as the consumer uses more water. In either of the latter two cases, the rate design analysis must determine the size of the blocks and the level of decrease or increase to build into the structure.

In Missouri, the Public Service Commission regulates just over 50 water utilities. These utilities either provide water service only or provide both water and wastewater service to customers. Among these 50 or so water utilities, there are over 80 different service territories with distinct water rates. Of these rate groupings, the vast majority have only a single class of customer, that being residential customers. Except for a few service areas with a customer charge only structure, the majority of systems have a uniform commodity charge as well as the monthly customer charge. The rest of the rate groupings have declining block rates. These groupings with declining block rates generally are for the larger systems and are for the larger customer classes. No rate grouping has an inclining block rate structure at this time.

When determining an appropriate rate design and rate structure, it is imperative to have the appropriate level of data and time to evaluate the various factors that are used to determine the ultimate rate. Without proper analysis, unintended consequences are inevitable. The analysis for this Report is not the result of a thorough, detailed examination of rate structures as would be included in a class cost of service study, nor should it be considered representative of Staff's position or recommendations in any current or future proceeding for any water utility. This analysis is an examination of a water utility rate structure that is not currently being utilized or proposed in the state.

Rate Structure

As discussed above, rates are generally structured with a fixed component and a variable component. If the analysis was to create an initial rate structure, one of the first areas to investigate would be the level of fixed costs and variable costs that are inherent in the provision of service. A general rule of thumb is that the fixed component would consist of the fixed costs and the variable component would consist of the variable costs of providing service. However, in situations where rates have been in place for years, other aspects must be considered, not least of which is the current structure. Understanding the operating characteristics of the utility in context of the existing rate structure is important for the analysis. Without that understanding, changes could be made that could be detrimental to the utility, the customer base, or both.

According to the American Water Works Association's Manual of Water Supply Practices, Principles of Water Rates, Fees, and Charges (AWWA M1), fixed costs are generally associated with capital costs and are defined as costs that do not change with the amount of usage. Variable costs are those costs that do vary with usage and include, but are not necessarily limited to, chemicals, electricity, etc. However, when actually creating the customer charge and commodity charge, the analysis must take into consideration many factors and the ultimate costs that are used to determine each component may differ than those described above.

In Missouri, it has been claimed by some utilities that approximately 75 – 80% of all costs of providing water service are fixed. On the other side, most fixed charges that are established for water systems account for only 15 – 35% of revenues. Thus, it could be argued that a higher fixed charge could be justified. This change, however, may not lead to an equitable result, especially when comparing customers within a given customer class. Shifting revenue collection from a more commodity based rate to a more fixed charge rate could lead to inequitable outcomes to customers within a specific customer class.

One issue with changing the structure is the relatively low level of usage of most residential customers. On average, a residential customer uses approximately 5,000 gallons per month. Through the winter months, December – March, there is very little excess usage. In other words, usage during this timeframe is considered base usage. Even at these base levels of usage, most consumers use 3,000 gallons or so a month. During the summer months, when customers may be filling swimming pools, watering lawns, or washing cars, usage generally tops out around 10,000 gallons per month. Some customer may surpass this level of usage, but many customers do not use much above the 5,000 – 7,000 gallons per month.

Changes to Rate Structure

A brief review of rate structure in the water industry has revealed that certain areas of the United States have made a switch in rate structure. A majority of all areas have commodity based rates. Recently, however, there has been a gradual shift from declining block rates toward inclining block rates. Generally, the areas of the United States where this has occurred are areas where there is either a severe drought or other phenomena that is impacting the availability of water supplies. In areas where supplies are in danger, one way to force consumers to use less is to charge an increasing rate for higher usage.

Another rate structure change that is being discussed throughout the country is a concept generally described as revenue decoupling. This shift impacts not only the water industry but the electric and natural gas industries as well. Again, a quick review of the industry does not reveal that this type of change is prevalent in the water industry at this time. The water industry makes an argument that revenue streams are being impacted by the potential for ever decreasing customer usage, but with the apparent shift to inclining block rates to limit consumption, a change to a higher customer charge is considered the antithesis to that goal of conservation. Higher customer charges would necessarily require a lower commodity rate. This lower commodity rate would send the signal to users that water conservation is not necessary.

One may argue then, that combining the two would help to counteract the negative consequences of a higher customer charge by still creating a higher commodity rate to users. However, due to the relatively low amount of usage that most users exhibit, it may not be possible to create an inclining rate structure that would offset the higher customer rates.

Staff performed two analyses to address the concepts posed by Commissioner Hall. The data that Staff used, as a proxy, is from MAWC's last rate case, although the analysis is not MAWC-specific.

As background, in the previous case, Staff proposed to merge the various operating districts into three hybrid districts, each with similar rate structures, but different fixed and commodity charges. Staff is using the data from one of those hybrid districts for this analysis to show what was proposed at that time based on generally accepted rate structure principles concerning the customer charge and the commodity charge for an average residential customer with a 5/8" meter. In its two analyses, Staff shifted into the fixed charge, 50% of fixed costs in the first analysis and 75% of fixed costs in the second analysis. These percentages were chosen for analysis purposes, and not necessarily as the actual percentages that should be used in a proposal for any specific water utility.

Results

Based on Staff's analysis, here are the resulting customer charges and commodity charges. The first amounts are from Staff's direct testimony in the previous MAWC rate case for comparison purposes.

Table A

Analysis	Customer Charge	Commodity Charge ($/1,000 gallons)	Average Bill (6,000 gallons)
Base Case	$12.94	$5.1727	$43.98
50% Fixed	$22.96	$3.6010	$44.57
75% Fixed	$34.44	$1.8005	$45.24

As can be seen, the shifting of more of the fixed costs into the customer charge causes that portion of the bill to increase significantly. The customer charge, even at the 75% level, is not necessarily an extremely high rate compared to other fixed charges throughout the state. But a nearly 300% increase at one time is dramatic. Obviously, the higher customer charge is somewhat offset by the lower commodity charge; however, as can be noted in the average bill calculation, an average user will pay more for the same water service under the higher fixed charge scenario then under the more current approach.

The 6,000 gallon average usage point also happens to be the turning point in the winner vs. loser debate. From zero usage to 6,000 gallons, the current system is the most cost effective for the customer. However, once a user reaches the 7,000 gallon usage level, the higher fixed charge structures are more beneficial.

Part of the requested analysis was to look into creating an inclining block rate structure to offset the impacts of changing to a higher fixed charge. At this point, care must be taken in determining the appropriate break point for each block of usage. Since this would apply only to residential customers, it would seem, without the benefit of significant study and analysis, that a two-block inclining block rate would be most appropriate. Based upon Staff's general knowledge of average usage among Missouri customers, Staff created a two-block inclining block rate such as 0 – 5,000 gallons and greater than 5,000 gallons. This split was chosen because throughout the state, the average use customer uses approximately 5,000 gallons of water per month.

The next step would be to determine the dollar amount for each block. A properly designed rate structure would need to take into account customer usage and the various costs of providing service for those various usages. However, with inclining block rates this is not necessarily the case. Generally, once the fixed costs have been accounted for, providing more water is cheaper as usage increases, or at least uniform. Thus, when developing inclining block rates a more generic reasoning must be chosen

to determine the different block rates. There may be various reasons for choosing the percent difference. In this analysis, Staff chose a split base on the second block having a rate that is 50% greater than the first block.

The results of this change are as follows:

Table B

Analysis	Customer Charge	Commodity Charge ($/1,000 gallons)	Average Bill (6,000 gallons)
Base Case	$12.94	$5.1727	$43.98
50% Fixed	$22.96	$3.2502 (0-5,000) $4.8752 (over 5,000)	$44.09
75% Fixed	$34.44	$1.6251 (0-5,000) $2.4376 (over 5,000)	$45.00

The results in Table B are very similar to the results in Table A. Once a user uses more than 6,000 gallons of water per month, the monthly bill will be cheaper under the higher fixed charge scenario rather than the base case.

Based upon this hypothetical example examined by Staff, the shift to an inclining block rate does not impact the overall effects of moving to a higher fixed charge versus a lower fixed charge.

Commercial and Industrial Rates

Most water systems that are regulated by the PSC only have residential customers. The only company that has rates for commercial and industrial customers is MAWC. Some of the small companies have some commercial customers, but the rate structure is generally the same as residential customers, with customer charges varying by meter size. For the larger systems with commercial and industrial customer classes, as well as other customer classes, the predominant rate structure is a declining block usage rate. Each has a fixed component that is based on meter size and then a corresponding declining rate structure. It is a fair assumption that these larger types of customers have a load factor that is relatively stable from day to day. In other words, these customers are placing a constant strain on the system and are not subject to the peaking strains that are more typical from residential customers. Therefore, the declining block rate structure is a better reflection of the costs of providing service to these classes of customers.

Due to the massive amounts of water required by some of these customers, the fixed costs are higher, but as usage increases those fixed costs are satisfied through the higher initial blocks. As the relatively less expensive higher gallons are consumed,

the rate drops accordingly. Since these large users are going to demand water through the initial blocks on a consistent basis, those initial blocks act as a de facto customer charge.

When moving from a declining block rate to a uniform rate, high demand users would necessarily see a reduction in their initial usage costs, but would see an increase in their late block usage. Lower demand users who do not generally reach the higher blocks would ultimately pay much less.

In order to perform a proper analysis of the change to these classes, Staff would have to study the individual usage patterns of the large users in order to determine if additional classes would have to be created with different rates to account for the different usage patterns. The declining block rate structure generally performs this task already and thus seems to be the best practice at this time. The additional cost and resources necessary to complete the analysis during the course of each rate case would likely be greater than the benefit.

Modified Test Year

Another potential area to explore would be a modified test year. In this scenario, the modification is not a future test year in which all costs and revenues would be estimated on some future time frame. The modification as proposed is a review of customer usage on an estimated basis with rates based upon customer usage as projected rather than on historical usage.

A reason for this proposed modification is the theory that customer usage is trending lower and the trend will continue in the foreseeable future. Trends seem to show that residential per usage rates have declined over a period of time. One reason for this decline is an increased effort for conservation in in-home usage. Low-flow toilets, low-flow shower heads, and more efficient washing machines are some of the reasons why usage may have declined in the past. Also, with the economy going through a recession over the past few years, outside water usage may have waned. An improving economy may see usage decline offset and customer usage may increase due to more homes having sprinkler systems built into lawns. Staff does not agree that declining customer usage will continue indefinitely, as installation of water conserving devices and appliances will necessarily encounter diminishing returns. There is a limit to how much water can be saved in washing clothes, cleaning dishes, etc.

Regardless of the debate of declining customer usage, what would be the effect of this type of modified test year? A modified test year that takes into account the lower demand would lead to a higher commodity charge, ceteris paribus. An initial analysis would suggest that this change would violate the matching principles generally accepted in rate regulation. Further, there are many factors that cause fluctuations from estimates, whether those estimates are used as a look back or a look forward.

These fluctuations can lead to higher levels of collections or lower level of collections for the utility. It is this inherent volatility, or business risk, that is taken into account in the company's return on equity.

Thus, there could be two ways (if not more) to address the modified test year approach. One manner would be to establish a tracker.

Trackers generally are created to allow for the over or under recovery of revenues. In this scenario, with the company having the ability to create rates based upon a potential future trend, the tracker would be built solely for the benefit of the consumers. In this way, if the estimate was too low, that actual usage was even less than anticipated; the company would not be able to collect any additional revenues through the tracker. However, if the usage was greater than anticipated and the company over-collected; those amounts would be tracked and refunded to the customers in a future proceeding.

A one-way tracker approach would seem to be the fairest way to address the situation of a modified test year, if a modified approach is going to be considered. However, this approach will be difficult to administer. The main issue with this approach is to determining whether revenues were actually hindered by declining usage based upon customers using less on a per unit basis or hindered by some other factor. There are various reasons why usage may fluctuate from one year to the next. The argument that overall usage per customer is dropping is due to advances in better water conservation technologies. Isolating those instances will be difficult and could lead to serious issues of over or under collection. Care would have to be taken to ensure that a proper change in usage was utilized and proper parameters established to make this concept work.

The other way to address the modified test year concept is through an acknowledgment of its impact on return on equity. Below is Staff's analysis:

Should The Allowed ROE for Water Companies Be Adjusted if Cost Recovery is Shifted from Variable Rate Component to the Customer Charge?

Staff is not aware of much debate/research on this issue for the water utility industry. In Missouri, rate designs designed to "decouple" fixed costs and variable costs were introduced in two gas utility rate cases in 2006, Missouri Gas Energy and Atmos Energy, Case Nos. GR-2006-0422 and GR-2006-0387, respectively. In these cases, Staff recommended the Commission adopt straight fixed-variable rate designs. Although Laclede Gas Company did not adopt a direct straight-fixed variable ("SFV") rate design, due to its weather normalized rate design, it does not have much volatility in its earnings. Staff did not make a specific adjustment to its recommended ROE in Case Nos. GR-2006-0422 or GR-2006-0387 as a result of Staff's proposal to the Commission to adopt a SFV rate design in these cases. Staff suggested to the Commission that if it believed some consideration should be made to the allowed ROE

if it chose to adopt a SFV rate design, it should award an ROE in the lower half of Staff's recommended ROE range. Due to a non-unanimous settlement of the revenue requirement in Case No. GR-2006-0387, the Commission did not make a specific allowed ROE determination. In Case No. GR-2006-0422, the Commission determined that the allowed ROE should be adjusted downward by 32.5 basis points in consideration of the SFV rate design.

Considering some adjustment was made to the allowed ROE in MGE's 2006 rate case to consider a complete separation of the collection of fixed and variable costs, it appears that any potential adjustment to the allowed ROE for a proposed rate design for the water industry would depend on the specifics of the proposal. Additionally, each subsector of the utility industry, i.e. electric, gas and water, has different characteristics in the price of capacity as compared to the price of the infrastructure.

To Staff's knowledge, one of the more controversial proposals in the United States regarding a shift of cost recovery from the variable rate to the customer charge occurred last year in Wisconsin for its investor-owned electric utilities. It is Staff's understanding that parties had recommended to the Public Service Commission of Wisconsin ("WI Commission") that it provide some consideration in form of a lower allowed ROE to Wisconsin's electric utilities if the WI Commission allowed higher customer charges. Staff reviewed the testimony sponsored by the Staff of the WI Commission and while the WI Staff did suggest a potential lower ROE to consider the proposed rate designs, the WI Staff did not provide any specific quantitative study to support this recommendation. Although parties supported some consideration by lowering the allowed ROE, the WI Commission did not make any downward adjustments.

Westar, a Kansas utility, has also proposed a fairly dramatic shift of revenue requirement recovery to the customer charge through three rate structures. Westar did not lower its ROE recommendation to specifically consider its rate design proposals. However, other parties to the case have yet to file testimony.

Although Missouri has many investor-owned water utility companies, financial data on many of these companies is fairly limited. Estimating the cost of equity for utilities is highly dependent on being able to select a group of *publicly-traded* companies whose business segments are confined as much as possible to the operations of interest. This is often referred to as a "pure-play" proxy group analysis. There are very few publicly-traded water utility companies to choose from when performing even a generic cost of equity analysis for a water utility company, let alone attempting to choose water companies that have specific rate designs for purposes of determining if investors require a different ROE based on varying rate designs. Again, as Staff noted, Staff is not aware of any publicly-traded water companies that have a rate design similar to that discussed in this report. Staff reviewed American Water's 2014 Annual Report to

determine if any of its subsidiaries had a rate design similar to the one discussed in this report, but American Water's Annual Report did not provide sufficient detail to make this determination. In the event Staff follows-up on this report, Staff could attempt to pursue other avenues to determine if any such rate designs are used in other states and whether any specific consideration has been given to the allowed ROE due to the shift in recovery of the revenue requirement to the fixed customer charge.

Consequently, Staff does not believe it can provide a definitive recommendation of how a restructured water rate design should be considered for purposes of setting an allowed ROE for water utilities. The specifics of the rate design and the resulting pro forma impact such rate design may have on the volatility of the company's cash flows will have to be explored in more detail. For example, although Laclede does not have a SFV rate design, but rather a weather-normalized rate design, the risk of its cash flows and its ability to consistently earn its ROE is fairly low. Even if a company has a low customer charge, if the charges for the variable rates are largely confined to the lower used blocks, then risk of recovery of the revenue requirement should also be fairly low. Consequently, it is important not to place too much weight on whether all of the fixed costs are allowed to be recovered in the customer charge, but rather whether the fixed costs have a high probability of recovery regardless of the title given to the rate design.

Suggestions for future research if further consideration is given to a potential change in water rate designs:

Staff currently subscribes to SNL Energy, which provides financial and regulatory information for the electric and gas utility industries. Staff does not have access to a comprehensive source for information on the water utility industry. SNL is rolling out coverage of the water utility industry, but in order to gain access, SNL is requesting an additional subscription fee. Staff suggests that the Commission request a trial of this service for purposes of further research of various rate designs for water utilities in other states and whether any specific consideration is given to the allowed ROE for these rate designs. SNL's industry coverage would be available to all Missouri Public Service Commission employees.