

MEMORANDUM

TO: Missouri Public Service Commission Official Case File Case No. WO-2017-0012
Missouri-American Water Company

FROM: Kofi Boateng, Auditing Department
Scott Glasgow, Consumer and Management Analysis

/s/ Mark L. Oligschlaeger 03/31/17
Auditing Department / Date

/s/ Lisa Kremer 03/31/17
Consumer & Mgmt. Analysis / Date

/s/ James Busch 03/31/17
Commission Staff Division / Date

/s/ Jacob Westen 03/31/17
Staff Counsel's Office / Date

SUBJECT: Staff Report Regarding the Investigation of Missouri-American Water Company ("MAWC") with Respect to MAWC's Faulty Water Meter and Negative Reserve Balance Issues as Disclosed during Rate Case No. WR-2015-0301

DATE: March 31, 2017

On July 12, 2016, the Missouri Public Service Commission ("Commission" or "MPSC") authorized the Staff of the Commission ("Staff") to open an investigation into certain matters related to Missouri-American Water Company's ("MAWC") faulty metering and negative reserve balances issues that first came to light in the course of MAWC's previous general rate request Case No. WR-2015-0301. A joint motion filed by the Commission's Staff and MAWC, resulting from an approved stipulation and agreement in that case initiated this proceeding. The Commission issued an Order opening this investigation into MAWC's faulty water meters and the practice of maintaining negative reserve balances. In approving the opening of the investigation concerning these matters, the Commission stated as follows:

The Commission will open this case to facilitate that investigation. In addition, an open case will afford Staff an opportunity to report to the Commission as appropriate. This is only a fact-finding investigation and is not a contested case. The Commission will not take any action regarding Missouri-American's practices within the confines of this investigation. If the investigation reveals that any such action is appropriate, Staff may file a formal complaint or other appropriate pleading within a new file to institute contested case procedures.

As part of this investigation, Staff had several discussions with MAWC personnel in-person and over the phone, with follow ups through emails. Staff met with MAWC personnel at its office in St. Louis on two separate occasions and also met at the Commission's Governor Office Building in Jefferson City. Staff submitted data requests to gain a clear understanding of the issues. Staff also reviewed informal complaints submitted against MAWC in the Commission's Electronic Filing Information System. MAWC cooperated fully with Staff and provided adequate information to discovery questionnaires.

Executive Summary

Beginning in 2012 until summer 2015, MAWC installed Mueller Systems LLC ("Mueller") water meters that, unknown to MAWC, were potentially defective. Some of the defective meters were quickly identified by Mueller or American Water Works Company Inc. ("AWW") subsidiaries, and quickly addressed. The remaining meters otherwise appeared to function as well as past water meters previously used by AWW subsidiaries and MAWC. However, beginning in August 2015 continuing through December 2015, MAWC, along with other AWW subsidiaries, determined that problems with Mueller water meters were more extensive than first realized, with the meters failing due to several different kinds of defects. All of the defects prevented the meter from accurately reading the amount of water flow passing through the meter. Over the course of August 2015 to December 2015, MAWC replaced 23,833 meters.

As explained more fully throughout this report, Staff is of the opinion that MAWC: (1) should have provided the Commission notice of the ongoing problem during its previous rate case, and (2) should address this matter in direct testimony in the next rate case; and, Staff (3) will propose ratemaking adjustments as necessary in the next rate case to address any concerns related to the metering issues experienced by MAWC and its customers.

Background From MAWC Case No. WR-2015-0301

During February 2016, in meetings to discuss a material increase in costs that MAWC had experienced for overtime and use of outside contractors primarily during October 2015, Staff first learned about a significant metering problem that MAWC had been experiencing. During those meetings, MAWC representatives informed both Staff and The Office of Public Counsel ("OPC") of, as described by both MAWC and Staff, a potentially significant and widespread problem with regard to premature failure rates associated with approximately 99,500 meters that it had acquired from Mueller Systems LLC ("Mueller"). The American Water Service Company, Inc. ("Service Company") had an agreement with Mueller to purchase meters and related equipment, and MAWC was listed as a designated purchaser of the goods, which allowed MAWC to purchase directly from Mueller affording it the benefit of volume discounts that the agreement provides. Mueller provided water meters for installation in most of MAWC's water districts over a period of time ranging from 2012 through very early 2015. Depending upon the district, either MAWC employees or its contractors installed the Mueller water meters that are

the subject of this investigation. MAWC explained to Staff and OPC that some of the Mueller water meters had either a defective magnetic design or problems with other components of the meter. This resulted in many occurrences of either no recorded usage by the meter or lower than actual usage meter readings. Upon learning about this situation, Staff expressed concerns regarding MAWC's delay in notifying Staff about the significant problems MAWC was experiencing with some of its water meters.¹

In instances where MAWC had customers with no recorded usage, it billed the customers based upon a prior year's measurement of same period usage.² Based on Staff's review, MAWC did not attempt to adjust customer bills for meter readings that produced lower than actual usages. At the February 2016 meeting, MAWC explained that an estimated level of 22,000 meters were replaced during the period covering August 2015 through January 2016, with the most significant number of replacements occurring during October 2015. Further, MAWC stated that it was storing the Mueller defective meters that had been replaced. In Case No. WR-2015-0301, all the costs such as overtime and outside contractor costs that were incurred to replace these meters were excluded from the revenue requirement calculations that were used to determine customer rates.

Decision by MAWC and AWW to Purchase Meters from Mueller

In 2012, MAWC through AWW, awarded a contract to Mueller Systems to supply all of MAWC's residential water meters. AWW's contract with Mueller also included AMR (automatic meter reading) meter reading transmitters and receiving equipment. At the same time, AWW awarded a contract to another meter manufacturer, Sensus to supply all AWW subsidiaries with commercial and industrial meters. Sensus meters were equipped with Mueller AMR transmitters. AWW selected Mueller Systems after a lengthy selection process that included both internal and third-party testing and reference checks. AWW selected Mueller meters and equipment for MAWC for several reasons. First, it was the lowest cost supplier. Second, Mueller's composite meters are lead free and also could withstand higher static pressures than equivalent bronze meters.³ Third, laboratory testing of Mueller meters indicated accuracy levels that were at least as good as other meter supply options. Finally, AWW chose to purchase Mueller equipment because there was opportunity for AWW to open Mueller System's AMR equipment architecture to efficiently allow AWW and its subsidiaries to read meters from multiple manufacturers as part of a single AMR installation.⁴

¹ MAWC Case No. WR-2015-0301, Busch Surrebuttal testimony, pages 6-8; Cassidy Surrebuttal testimony, pages 7-8.

² MAWC's response to Staff Data Request No. 1.E

³ Standard meter regulations allow for a weighted average of no more than 0.25% lead content in meters. Reduction of Lead in Drinking Water Act, effective January 4, 2014.

⁴ MAWC's response to Staff Data Request No. 8

According to MAWC, shortly after AWW began to purchase water meters from Mueller Systems, Mueller was made aware of some defective magnets received from its supplier used in the Mueller meters. Mueller contacted AWW in the summer of 2012 to inform them of the issue and of a corrective action Mueller was implementing to prevent a recurrence of the issue.⁵ Beginning with this issue and continuing to the present, AWW worked with Mueller to understand and correct the sources of the premature failure of Mueller meters.

In May 2013, AWW implemented a new business systems software program (SAP) for customer service, billing, and field service activities.⁶ This new system also allowed AWW to track meter related data in much more detail than the previous software system. With the help of the SAP tracking, from August 2012 through August 2015, MAWC determined the failure rate of new Mueller meters being placed into service was only slightly higher than historical experience with the Neptune Technologies (“Neptune”) meters that had previously been used.⁷ AWW continued to work with Mueller to improve meter quality.

Chronological Recap of Faulty Metering Issues

In summer of 2012, Mueller became aware of an increasing number of fracturing magnets when assembled to the engagement arm of the water meters. The fracturing occurred during the assembly of the magnet to the engagement arm within the meter. According to Mueller, the magnet fracturing prevents the meter from recording any water consumption at all. Mueller stopped using the component that it suspected of causing the magnet fracturing in the meter and designed a new magnet. Mueller notified AWW and subsequently MAWC of possible meter problems and corrective measures on August 3, 2012. Mueller identified meters that it suspected to have the defective magnets in its communication with AWW.

In September 2014, Mueller provided AWW with a report that identified some meter problems relating to engagement arm fracturing and discussed corrective measures that it was taking to resolve the problems and also improve meter quality.

Another issue arose involving “sticking” dials in 2015. The resolution to this second issue was to start using digital registers as the measuring device.⁸ Then in August 2015, MAWC became aware that potential wide-spread meter issues existed, due to meters recording no customer usage (“dying” or “dead” meters) or under-registering (“reading slow”) meters, at levels much greater than normal. These problems primarily involved meters obtained from Mueller.

⁵ The corrective action Mueller proposed would encase the defective magnet in a plastic “basket,” to avoid damage to the magnetic device. AWW had to return the meter to Mueller for the repair.

⁶ MAWC’s response to Staff Data Request No. 8.

⁷ MAWC’s response to Staff Data Request No. 8

⁸ While initiated to solve a quality concern, the use of the digital registers was also an important step toward use of AMI (advanced meter infrastructure), as these registers provided the necessary higher precision to support hourly reads in an AMI environment.

These problems were also highlighted during pre-installation testing by Indiana-American Water that indicated two new issues. First, a shipment of bronze body meters was found to have a high number of failures during low flow testing. Second, one of the first shipments of meters with digital registers was tested and several meters were found to reset to zero during testing.⁹ Both of those issues were immediately reported to Mueller and a “stop ship” was implemented to prevent shipment of any additional defective meters until the problem could be resolved.

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Each of these issues prevented the correct amount of an affected customer’s water consumption to be accurately recorded. By this time, MAWC had purchased approximately 99,500 new meters for use in its service districts. At the direction of the senior Missouri Leadership team and based on an analysis performed by Mr. Tom Deters, then-Director of Business Performance, the team identified the possibility that meters were prematurely dying and possibly under-registering. Mr. Frank Kartmann, then-President of Missouri-American Water Company, and Mr. Phil Wood, then-Vice President, Operations, ultimately made the decision to start a change-out of meters that had a higher potential of being defective.¹⁰

During the period covering September 2015 through December 2015, Missouri-American Water Company removed about 23,833 Mueller water meters that it had installed on its systems over the period of time ranging from early 2012 through the middle of 2015. The removals were due to possible imperfections, including magnet design defects and engagement arm fracturing, bronze body failures, and SSR resetting that in many situations prevented water consumption

⁹ This brought the total number of major problems with defective meters to four: (1) Magnet fracturing, (2) engagement arm fracturing, (3) bronze body accuracy failures, and (4) SSR resetting. All issues prevented an accurate measurement of water flow.

¹⁰ MAWC’s response to Staff DR No. 2

from being recorded correctly. According to MAWC, these meters had been in service as little as few months or as long as three (3) years before they were removed from service.

MAWC Meter Replacement Program

According to MAWC, other than the criteria set out in the Sections (37) and (38) of the Commission Rule 4 CSR 240-10.030 Standards of Quality, MAWC does not have a written policy regarding when meters are to be changed, replaced, or rebuilt. However, for all districts other than the St. Louis district, the practice is that 5/8" meters are changed or replaced on a ten-year program. St. Louis district replaces 5/8" meters on a fifteen-year program. For all sizes other than 5/8", meters are changed or rebuilt as prescribed in 4 CSR 240-10.

Criteria Relied Upon to Determine Whether or Not a Meter Was "Dead" or "Reading Slow"

To determine whether or not a meter was "dead" and not registering any water usage, MAWC compared the prior readings of the meter with the current reading at the time of the meter removal to determine if there was any significant reduction of registered water flow. If significant reduction was noted, then a new meter is installed and if the newly installed meter is noted as registering as water passes through it, then the old meter is identified as a dead meter. Based upon MAWC's current processes, only meters removed from service and coded as "dead" go through a billing review process to determine if a back bill should be issued.¹¹

In the case of determining whether a meter is reading slowly, MAWC field service representatives would have to carry out what it terms as "bench testing" of the meters, which involves removing the meter from service to run a number of tests in the meter shop. MAWC indicated that a sample of meters that were tested in the Fall of 2015 in the St. Louis and St. Joseph water districts reflected a percentage of meters that registered slow to low, medium and/or high flow rates. According to MAWC, its meters are tested at the high flow (10 gallons per minute or gpm) and medium flow (2 gpm) and are considered accurate if the results are 98.5% to 101.5%. The low flow (1/4 gpm) results are considered accurate if the results are between 95% - 101%. MAWC states that the medium flow test is the controlling test.¹² No back billings were issued to customers whose meters that were noted as reading slow.

The Commission's rules provide that a meter should not be allowed in service when it "shows an error in the measurement in excess of 5% when registering water at stream flow equivalent to approximately one-tenth (1/10) and full normal rating under the average service pressure." Regulation 4 CSR 240-10.030 (37) Standards of Quality.

The period between meter reads, according to MAWC, is one (1) month for districts other than St. Louis and three (3) months for the majority of the St. Louis customers. Given the time period

¹¹ MAWC response to Staff Data Request No. 1.I

¹² MAWC's response to Staff Data Request No. 1

between reads, MAWC asserts that it is not possible to determine the exact date that a meter began to fail. The assumption is that the meters were registering correctly before the meter died or started reading slowly, but there is no way to definitively prove the exact time period of the default.

Reasons Why Slow Meters Did Not Receive Back Bills

MAWC indicated that it did not issue back bills to customers served by slow read meters. MAWC states that it is not able to verify that any meters are running slowly until they are pulled and bench tested. MAWC further indicated that it was impossible for them to know exactly when the meter began to run slowly; therefore, it was not possible to provide the customer with an accurate back bill.¹³ Ultimately, since the meter would have registered less usage than was actual used by the customer, the decision not to back-bill would only negatively impact the Company.

How MAWC Issued Estimated Meter Reads and Quantifies the Number of Estimated Reads

Generally, the meter reading obtained by the field resources for purposes of cycle billing is used for billing customers unless the reading / meter is suspected to be incorrect, or because data discrepancies exist, and the situation cannot be validated or corrected in a timely manner for billing. Reasons why the meter reading obtained may not be used for billing include: (1) meter installed backwards, (2) truncated meter reading (too few or too many digits in the reading), (3) meter suspected to have been changed in the field, but new meter information is not yet in the billing system, (4) extremely high usage indicated and service order results are inconclusive, and (5) technical anomalies with sending the meter reading results to the Fathom software¹⁴ which renders it unusable for billing purposes.

If a meter is coded as being “stopped” in the field, MAWC’s practice is for its Billing Department to review the historical reads. If prior readings were the same as the reading at the time of removal, and the new meter was noted as registering as water passed through it, then the old meter was identified as a dead meter and a back bill was created. When MAWC discovered in early 2015 that it had not been back-billing its customers with stopped meters, it immediately began an effort in May of 2015 to back-bill customers for usage not previously billed due to a stopped meter. Meters that were identified as being dead were back-billed for the amount of time the meter was suspected to be dead up to a period of 12 months. In May 2015, MAWC issued about 1,208 back-bills to customers, mostly for dead meter related issues. Estimated usage was based on a similar period of time when the meter was registering and a daily average from that period was applied to the period the meter was dead. See Schedule KAB-1, *SAP*

¹³ MAWC’s response to Staff Data Request No. 35.1

¹⁴ Fathom is MAWC’s meter data system software for billing purposes. Source: MAWC’s response to Staff DR No. 4

Estimation Logic, provided by MAWC in response to Staff Data Request No. 4, for a detailed explanation of the billing estimation procedures utilized by MAWC Call Center.

While MAWC indicated that it does not usually track the amount of back-bills related to stop meters, it provided to Staff that the average amount of back-bill was \$289, based upon its manual computation. It is important to note that back-billing was issued to all meters that were determined dead irrespective of the manufacturer of the meter. And MAWC estimates that roughly 5,685 accounts received back-bills over a period of twelve months for dead or stopped meters. MAWC has stated that it offered payment plans with extended payment terms to all of the affected customers.

Regarding MAWCs zero usage meters, Staff has concerns regarding the length of time it took MAWC to rectify this problem. The following chart was provided to Staff from MAWC's Brian LaGrand representing the breakdown of the 1,208 back-billed customers in May 2015. The chart represents the length of the back-bill and the breakdown of quarterly and monthly billed customers. Of the 1,208 customer bills, 363 (311 quarterly billed customers and 52 monthly billed customers) received zero usage for over a year. (See row one of the graph on the following page):

Back-bill Days		Total Customers	Frequency		Percentage	
From	To		Quarterly	Monthly	Quarterly	Monthly
365		363	311	52	86%	14%
330	364	43	24	19	56%	44%
300	329	114	90	24	79%	21%
270	299	372	351	21	94%	6%
240	269	22	11	11	50%	50%
210	239	24	18	6	75%	25%
180	209	42	29	13	69%	31%
150	179	20	4	16	20%	80%
120	149	29	4	25	14%	86%
90	119	144	35	109	24%	76%
60	89	23	0	23	0%	100%
30	59	12	0	12	0%	100%
Totals		1,208	877	331	73%	27%

Staff asked MAWC to explain the process for addressing zero usage meters. MAWC responded with a description of the following process:

- If a meter read is the same for three consecutive billing periods, a BPEM (Business Process Exception Management) is generated. MAWC asserted that it is very difficult to assume that a meter is stopped during the first or even second period. (Before January 2016, it took four consecutive identical billing period meter read results for a BPEM to be generated.)
- If the meter is inside, a letter is sent to the customer to arrange a time to inspect the meter.
- If a meter is outside, a service representative will inspect the meter.
- If the meter is not accessible, the customer must be contacted for correction.

- Zero consumption meters are worked depending on workload. If workload does not permit inspection of zero consumption meters, the inspection may be pushed to the next billing period.

MAWC also stated that zero consumption meters are sometimes not inspected for reasons beyond MAWC's control:

- After a letter is sent to the customer, many times the customer never responds and the situation extends into the next period.
- Many customers leave their homes for months or sometimes years without closing their account in order to have access to water upon their return. It is not uncommon for inspections completed after multiple consecutive periods of zero usage to result in a meter that is functioning properly.

As a result of the BPEM process in St. Louis County, some customers received estimated bills for a period up to and over one year due to zero usage meter readings and MAWC processes that were in place. MAWC has asserted that as of September 22, 2016, "zero usage" orders were being worked once they were generated, resulting in most accounts not reaching 12 months of zero usage.

Initial Remedy as Proposed by Mueller

As a general practice, when a meter stops working early within the warranty period, that meter is returned to the meter vendor for a replacement. MAWC had entered into meter return transactions of this nature previously with Mueller Systems and Neptune. Upon identifying the defective magnet issues as well as other issues, Mueller instructed AWW and its operating subsidiaries to return all of the defective meters that they held in stock based on a list of serial number ranges determined to have the problems. For the problems that occurred in the summer of 2012 related to the magnet fracturing, the initial remedy by Mueller was to stop shipment of those meters that had the defective magnets. Mueller also redesigned the defective magnets to prevent recurrence. The problem with the engagement arm fracturing as identified by Mueller was resolved on September 1, 2014. In the case of the bronze meter accuracy failure, on September 16, 2015, Mueller's remedy included halting production and shipment of model 420 bronze meters with plastic bottoms, rebuilding of new chambers with new designs, returning meters to Mueller. . Finally, on September 2, 2015, in the case of SSR resetting, Mueller stopping production and shipment of SSR, and requested AWW to return all SSR meters to Mueller.

MAWC replaced defective Mueller meters primarily with Neptune meters. Additionally, MAWC, via AWW, entered into a contract with Badger meters to install some meters on a limited basis in MAWC's St. Louis district.¹⁵ The exchange and replacement of the defective Mueller meters continued for several months during 2015 before AWW reached a decision to negotiate a complete settlement with Mueller Systems. The settlement, discussed later in this report, focused on addressing not only the replacement of the defective meters in the applicable serial number ranges, but also to receive compensation for the cost of removing and replacing all the meters.

How the Different States Handled the Defects

According to MAWC, the guidance initially provided from AWW supply chain to all of the states on how to handle the Mueller faulty water meters was to immediately return all defective Mueller meters to Mueller Systems, regardless of the defect.¹⁶ Once the Bronze Body and SSR defects were identified in August 2015, AWW provided guidance to all states to immediately return all Bronze Body (5/8") and all SSR meters to Mueller Systems, to help Mueller determine the extent of condition of the issues. On September 16, 2015, Mueller Systems provided to AWW an initial range of serial numbers for the meters suspected to have the bronze meter and SSR resetting issues. AWW then provided guidance to all of the states to take this range of serial numbers concerning the bronze body and SSR defects into consideration when running reports in SAP and looking for specific conditions that would be indicative of a failed meter. This list of likely failed meters (in the range of Mueller's provided potentially affected serial numbers) was identified as a logical group of meters to visit in the field and troubleshoot and replace as necessary.

All of the states received the same instructions regarding how to handle the defective Mueller meters, however, the actual actions taken in each state was at the discretion of that individual state subsidiary. This is because each state subsidiary of AWW operates independently from the others. The AWW subsidiaries shared ideas to find the best solutions in dealing with the faulty water meters; however, those ideas were not binding on the affected states. MAWC undertook a more aggressive replacement program than proposed by some of the other American Water subsidiaries.¹⁷

Accounting for Meter Installations and Retirements

In the course of the investigation, Staff learned that MAWC's recording the installation of replacement water meters and the retirement of defective water meters was not a consistent

¹⁵ Neptune and Badgers meters were selected as reliable replacements for the defective Mueller meters based upon thorough selection procedures and recommendations described above.

¹⁶ MAWC's response to Staff Data Request No. 36.

¹⁷ MAWC's responses to Staff Data Request No. 39

practice. In some instances, MAWC recorded removed meters as a retirement during the month that the meter was taken out of service and in other instances the retirement was not recorded until months later. However, in all instances MAWC did not record new replacement meters as a plant addition until months after the retirement date. Ideally, the retirement of the old meter and the addition of the new meter would be recorded at the same time and during the same month that the replacement occurred. By delaying the recording of the replacement meter on its books, MAWC also delayed the recording of depreciation reserve for the meter during the time that water meter was actually in-service, but not recorded on its property records.¹⁸ This delay inappropriately distorts the accumulated depreciation that should have been recorded on the property for the time that it was in service.

MAWC created separate work orders referred to as “Work Breakdown Structure” (WBS) that specifically tracked all costs related to the Mueller faulty meter removals (“retirements”) and new meter installation (“additions”). MAWC further explained to Staff that it recorded all the Mueller meter retirements and installations in batches and not on individual basis. The installation and retirements were all tracked in MAWC’s Power Plant database by USOA account, by district, by month, and by amount. This was done to avoid commingling the costs of retirements and installations with other projects being undertaken by MAWC.

Based on the data¹⁹ reviewed by Staff, MAWC recorded approximately \$6.9 million of new meter investment across its Missouri operating districts during January 2016. However, the vast majority of that metering investment actually went into service during August 2015 through December 2015. Moreover, MAWC indicated that it has only recorded \$452,322 of retirements associated with the meters that it has replaced and most of the retirements (\$416,901 of the total \$452,322) occurred during March 2016. MAWC recorded these retirements after the time that it recorded the meter replacement additions. The total retirement values appear low in comparison with the \$6.9 million replaced meter amount.

Staff has reviewed all of MAWC depreciation reserve balances related to meter accounts. Even though MAWC retired meter investment very early in the depreciable life of those assets, the recorded retirements have not created negative reserve balances in those metering accounts in aggregate following water district consolidations completed during the last rate case. During MAWC’s last rate case, No. WR-2015-0301, Staff observed a number of negative depreciation

¹⁸ Depreciation refers to the decline in asset’s value as it is used up in the business’ operations. In each of the time periods that constitute the asset’s useful lifespan, a portion of its value is deducted as depreciation expense to represent this loss, and those losses are put together as that asset’s accumulated depreciation or reserve. Accumulated depreciation or reserve represents the total portion of the asset’s value that has been lost due to its usage. It is possible for accumulated depreciation or reserve to possess this negative value, which simply indicates that the asset has been used long enough to start incurring depreciation expense and has started to lose its value through usage. The book value of an asset as recorded on the accounts minus its accumulated depreciation or reserve balance should equal to its remaining value.

¹⁹ MAWC response to Staff Data Request No. 40

reserve balances for certain MAWC water districts; however, those negative balances were combined with positive reserve balances that existed in other districts. During the last rate case approximately 19 water districts were combined into three water districts. Staff will continue to monitor depreciation reserve balances for all MAWC property accounts as part of its next rate case and will address any concerns in the context of that proceeding.

As a result of MAWC's approach to record-keeping practices and recording retirements and additions, Staff may propose, in the next rate case, record-keeping changes, as well as propose adjustments to more accurately reflect the actual in service dates for the replacement meters and the retirement of the meters that were replaced.

Analysis of Mueller Meters Purchased and Allocated to MAWC

Between early 2012 through mid-2015, MAWC purchased a total of 99,572 Mueller meters of which 8,733 were identified to be on the list of serial numbers that had the various defective manufacturing designs and components. As indicated earlier, 23,833 of these Mueller meters that had already been installed on MAWC's operating districts were removed from operations as part of the "holistic" approach adopted by MAWC in responding to the faulty meter issues. Among the meters removed by MAWC were 1,016 meters identified to be on the defective serial number list. MAWC also removed a total of 22,817 meters from its systems for varied reasons other than being on the list of defective serial number range.²⁰ MAWC states that, although these meters were not on the serial number list, it determined that the meters had either stopped working or were not recording any water usage at all. MAWC states further that no meters were removed for "reading slow." A total of 850 Mueller meters were returned by MAWC to Mueller Systems. As of March 2016, MAWC reported that 8,460 Mueller meters remained in stock and presumed those to be accurate. MAWC states that it has installed some of the remaining Mueller meters that were on hand and to date it is not aware of any failures of these newly installed Mueller meters. See the table, on the following page, which shows the number of Mueller meters purchased and those removed, replaced and returned by district:

²⁰ These reasons were the previously stated major defects of fracturing bronze body meters and defective SSR, and further included older meters.

Location	District	No. of Mueller Meters Purchased	No. of Meters Removed	On Serial No. List Removed	Removed But Not on S. No. List	On Defect List		
						Magnet	SSR	Bronze
1702	St. Louis	58,406	11,151	708	10,443	3,561	40	4,040
1703	St Joseph	11,861	1,821	2	1,819		160	
1704	Parkville	1,781	200		200			
1706	Warrensburg	2,611	794	2	792	6		
1708	Brunswick	154	134	5	129	6		
1709	St. Charles	7,683	992	3	989			
1710	Mexico	2,875	985		985			
1711	Joplin	10,952	7027	271	6,756	507	4	
1712	Jefferson City	1,376	532	24	508		409	
1722	Ozark Mountain	1,210						
1728	Stonebridge	352						
1733	Tri-States	300	197	1	196			
	Total	99,572	23,833	1,016	22,817	4,080	613	4,040

Mueller Meters Purchased, Removed and Returned (Table 3)

Number of Hours of Overtime Expended on the Mueller Faulty Meter Project

By close of February 2016, MAWC estimated that it had incurred a total of 10,399 in-house man hours of overtime in addressing the Mueller project during the period of September 2015 through December 2015, with 6,068 of those hours spent in October 2015 alone. MAWC's St. Louis district had the major share of the incurred overtime hours at 8,577 as of the end of February 2016. Additionally, MAWC utilized outside service contractors to undertake some of the removal and installation of the new meters on the systems and as a result incurred additional contract labor costs. None of these costs were included in the determination of customer rates in MAWC's most recent rate case, Case No. WR-2015-0301.

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STAFF'S MEMORANDUM

HAS BEEN DEEMED

PROPRIETARY

IN ITS ENTIRETY

The following journal entry shows how MAWC's share of the refund was recorded on its books:

	<u>Debit</u>	<u>Credit</u>
40 Refund from Mueller Systems	\$101,520.91	
Lost Revenue Credit		\$48,013.19
Replacement and Testing Credit		\$21,886.72
Return Meter Credit		\$31,621.00

These credits were later reallocated to the various MAWC districts impacted by the defects.

Staff's Overall Assessment of MAWC's Handling of the Mueller Faulty Meters

For many years, MAWC has used Mueller meters that are acquired through its parent company AWW and service company AWWSC after a thorough competitive bidding process. In the summer of 2015, when MAWC became aware that there were some problems with Mueller bronze body meters and the digital registers, it had at the time purchased 99,572 of those types of meters from Mueller. A majority of those meters had already been installed on MAWC system while the rest were sitting in inventory. Mueller's initial response to the problem was to stop shipping any of the defective meters until the problem could be fixed. Mueller also gave further guidance to AWW state subsidiaries to return certain range of meters that were noted to have the defects for replacement. MAWC leadership at the time intensified its effort to reach out to the other subsidiaries of AWW to find common and permanent solution to the meter problems. While the leadership of some of the AWW subsidiaries shared ideas on the issue, no one solution was proffered for resolving the issue by the subsidiaries as they operate independently from the other. Some AWW subsidiaries adopted a "wait-and-see" posture in dealing with the issue, while MAWC took a more aggressive approach by removing more of the installed Mueller meters beyond the number range on the list of defective serial numbers.

In summary, in Staff's opinion, MAWC should have notified both the Staff and the Commission upon learning about the extensive nature of the meter defect problem. MAWC was aware of certain metering problems at the time it filed its application to increase rates as part of its previous rate case, Case No. WR-2015-0301, and became aware of the dead/dying meter problems shortly after its filing, but remained silent about the problems in all of its testimony filings during the rate case. It is important for MAWC to be forthcoming with any such related issues that it may encounter in the future. Staff also suggests that MAWC should offer additional explanation in direct testimony regarding this issue in its next rate proceeding and discuss any plans that it may have for installing advanced metering technology in relation to this issue. At this time, based upon the information provided by MAWC during this investigation Staff has found that the vast majority of defective meters have been removed and replaced by MAWC.

Staff will examine MAWC's record keeping processes in the next rate case and recommends that MAWC establish practices and procedures for addressing the replacement and retirement of water meters to ensure a consistent record keeping treatment going forward. As part of MAWC's next rate case Staff may propose ratemaking adjustments to water meter related depreciation reserve balances to correct any unnecessary delays in recording the replacement water meters on its property records. Staff may also propose adjustments to address the value and timing of retirements that were recorded on MAWC's books. Staff will also continue to monitor depreciation reserve balances for negative reserve balance situations and address them as needed.

In addition, to the extent that MAWC experienced unusual or unnecessary costs in connection with addressing this faulty metering issue, Staff reserves its right to propose other adjustments to address those concerns in MAWC's next rate case.

Finally this issue has impacted customer usages by some undeterminable amount. Staff points out that during the time frame of the defective metering issue meter problems have reduced actual customer usage amounts by some unknown degree. MAWC disagrees with Staff's conclusion on this point. Staff reserves the right to use the information learned throughout this investigation and described in this report to argue that any future proposal from MAWC that relies upon customer usage data from the time period where the defective Mueller meters were in use by MAWC customers may be faulty and therefore unreliable.

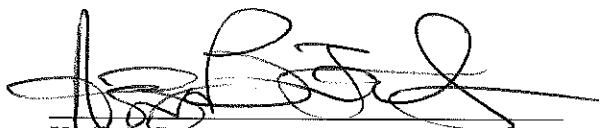
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of an Investigation of Missouri-American)
Water Company with Respect to Certain Issues) Case No. WO-2017-0012
Disclosed During the Recent Rate Case)

AFFIDAVIT OF KOFI A. BOATENG, CPA, CIA


STATE OF MISSOURI)
) ss
CITY OF ST. LOUIS)

COMES NOW Kofi A. Boateng, CPA, CIA, of lawful age, on his oath states: (1) that he is a Utility Regulatory Auditor IV of the Auditing Department, St. Louis Office, of the Missouri Public Service Commission; (2) that he participated in the preparation of the foregoing *Investigation Report*; (3) that information in *the Investigation Report* was provided by him; (4) that he has knowledge of matters set forth in *Investigation Report*; and (5) that such matters set forth in *the Investigation Report* are true and correct to the best of his knowledge, information and belief.


Kofi A. Boateng, CPA, CIA

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the City of St. Louis, State of Missouri, at my office in St. Louis, on this 30th day of March, 2017.


Notary Public

