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September 19, 2022

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120
Re: Proposed revisions to Water Audit

Proposed Water Audit Methodology Regulation
52 Pa. Code § 65.20
Water Conservation Measures
Docket No. L-2020-3021932

Dear Secretary Chiavetta:

Attached for electronic filing are the Comments to the above proposed regulation from the below interested parties working to promote the best practice water audit methodology advocated by the American Water Works Association (AWWA).

George Kunkel, Kunkel Water Efficiency Consulting
Edward Osann, Natural Resources Defense Council
David Sayers, Black & Veatch
Gary Trachtman, Arcadis
Steve Cavanaugh, Cavanaugh
Will Jernigan, Cavanaugh
Drew Blackwell, Cavanaugh

Very truly yours, on behalf of the AWWA Committee Members

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Enclosures:

cc: James A. Mullins, Law Bureau **(email only)**
Stephanie A. Wilson, Law Bureau **(email only)**
Karen Thorne, Regulatory Review Assistant Law Bureau **(email only)**

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Proposed Revisions To Water Audit: Methodology 52 Pa. Code § 65.20: Water Conservation Measures - Statement of Policy	Docket No. L-2020-3021932

INTERESTED PARTIES – MEMBERS OF THE AWWA WATER LOSS CONTROL COMMITTEE
COMMENTS TO THE
NOTICE OF PROPOSED RULEMAKING

Interested members of the American Water Works Association's (AWWA) Water Loss Control Committee (collectively AWWA Committee Members) submit these Comments in response to the Public Utility Commission's (PUC's or Commission's) November 18, 2021, Notice of Proposed Rulemaking Order (NOPR). The Commission's Order was published in the Pennsylvania Bulletin on August 6, 2022. 50 Pa. Bull at 4406-4411. In the NOPR, the Commission asks stakeholders for comments on proposed language that will serve as a replacement of the Policy Statement at 52 Pa. Code § 65.20 with a Commission Regulation which will "develop a more comprehensive codified water audit method as a tool to increase the efficiency of a water public utility's efforts to conserve water, account for lost water, increase water supply sustainability, remediate infrastructure, and improve overall service reliability." 52 Pa. Bull. at 4407.

Note that the AWWA Committee Members (all members except Gary Trachtman) provided extensive comments to the Advanced Notice of Proposed Rulemaking (ANOPR) on November 24, 2020, and November 25, 2020. As set forth below, the AWWA Committee Members provide the following comments to the NOPR.

I. COMMENTS

The AWWA Committee Members are greatly pleased with many aspects of the proposed regulation, including the strong focus on the AWWA Water Audit Methodology and AWWA Free Water Audit Software. As proposed, the regulation includes several important elements of the water audit process that we previously recommended, including:

- Use of the AWWA water audit methodology and reporting software as the default method for compiling a water audit;
- Reporting the volumes of both real losses and apparent losses and their cost impacts, as both types of loss are integral to the calculation of Non-revenue Water;
- Reporting annually, which is critical for embedding the audit process in a utility's business practices;
- Completing and filing an audit for each discrete water system, which avoids averaging across systems and obscuring the levels of losses occurring system-by-system;
- Filing audit reports in working electronic spreadsheet format, allowing the Commission and the public to make more effective and efficient use of compiled data, and;
- Requiring that reports be "verified" by a water company officer, which equates to our recommendations that reports be attested to by an officer, to ensure that a utility's management if fully aware of the water audits findings and takes responsibility for the process by which it is compiled.

Nevertheless, the proposed regulation falls notably short in several provisions. Unfortunately, as written, the rule is not expected to make the progress in actually reducing water losses in the Commonwealth as set forth in the objectives of the proposed Commission Regulation noted above.

Recommendation: Given that crucial flaws are believed to exist in the NOPR in its present form, the AWWA Committee Members recommend that prior to finalizing the regulation, the Commission should convene a working group of stakeholders to draft improved language to offer to the Commission. The AWWA Committee Members support comments provided to the ANOPR by NAWC/Aqua (November 24, 2020, pg. 9) that "the Commission should convene a working group of stakeholders to review the Statement of Policy and draft an appropriate regulation regarding water loss by public utilities." Specifically, the working group would work to identify recommended performance indicators and benchmarks (in lieu of the %UFW approach),

compliance requirements, and consequences for utilities that exceed the benchmarks. The format of water audit submittals, transparency, and data validity are also paramount concerns that should be discussed by the working group. Once the working group has reached consensus on its work products and gains agreement with Commission staff on its recommendations, the Commission can proceed to finalize the rulemaking. The AWWA Committee Members believe that the working group tasked with review and analysis described below would be able to improve upon the language of the current NOPR in four areas:

1) Water audit submittal format, transparency, and accessibility to the public;
2) Unaccounted-for Water/Benchmark approach;
3) Data Validation, and;
4) Water Audit Training.

Discussion in these areas follows.

1. Water Audit Submittal Format, Transparency, and Accessibility to the Public

Data submitted to the Commission is only useful if it is complete and in a format that can be easily analyzed by Commission staff. The AWWA Free Water Audit Software and its companion tool, the Compiler Software, exist in user-friendly spreadsheets and are designed to easily extract, compile, organize, and analyze data. In the first years under the Commission order (starting in 2008) water companies routinely submitted water audits for individual water systems in the working version of the AWWA Free Water Audit Software for each and every one of the systems under their management, and these were available to the public. Unfortunately, in recent years, submittals that are available to the public include only photo-copied or .pdf copies of various worksheets of the AWWA Free Water Audit Software instead of the working spreadsheet versions. It is believed that the Commission may water audits in the working versions of the Software but is not releasing them to the public.

Also, a review of the most recent submittals for the calendar year 2021 found many that provided incomplete submittals available for download to the public, providing only a single worksheet (of several) of the AWWA Free Water Audit Software. Data is not easily extracted for analysis from these non-working formats, and incomplete submittals impair the transparency of

the data from the specific water companies. The limited accessibility to and content of submittals should not be continued under the new rule.

The AWWA Committee Members are pleased with the Commission's language that "*use of the AWWA Free Water Audit Software Version 6.0 (2020) would satisfy the annual water loss reporting requirements* (NOPR pg. 9)." The AWWA Committee Members are also pleased with the proposed language that "*the results would have to be verified and provided in a working electronic format to the PUC* (NOPR pg. 8)." However, to remedy the degraded water audit submittal practices of recent years, additional language should be included to explicitly state that "working electronic format" means that the "working spreadsheet Software version" of the AWWA Free Water Audit Software should be provided (for those companies that choose to submit in this format). If a format other than the AWWA Free Water Audit Software (FWAS) is used, that format should also allow for ease of data extraction to facilitate data analysis. The electronic spreadsheet software for any water system employing a format other than the FWAS should be made accessible to the public.

The AWWA Committee Members agree with the NOPR language that "*the annual water loss report would be completed for each discrete water system.* (NOPR, pg. 8)." This should mean each public water system, with a discrete PWSID number, should have an annual water audit compiled and submitted for its operations. In recent years at least one water company has submitted "grouped" water audits with composite data from multiple systems in each of several regions. This practice should not be permitted by the new rule.

The AWWA Committee Members agree with the ANOPR comments provided by the Office of the Consumer Advocate (OCA) that "The OCA submits that the Water Audit Methodology report should also be easy to find on the Commission's website. The OCA suggests that the Water Audit Methodology be added to the Document Type on the search page. This addition to Document Type would permit stakeholders to look for the submissions more easily, including all submissions (document type) for a broad look at the data, or for a specific utility (utility code or name)." The AWWA Committee Members agree with these recommendations by the OCA, and additionally recommends that the annual water audit data of each water system submitted to the Commission be extracted and placed in a single spreadsheet format in a manner

similar to that conducted by the State of Georgia's Environmental Protection Division, and made available to the public in an easy-to-find manner such as found at the below link:

https://epd.georgia.gov/watershed-protection-branch/water-efficiency-and-water-loss-audits

The Commission should include the water audit data as shown in the Georgia weblink as well as data grading and the utility answers to the Interactive Data Grading questions in the AWWA Free Water Audit Software. Compiling the data in a form similar to the Georgia webpage can be facilitated by employing the AWWA Compiler Tool, a free companion tool to the AWWA Free Water Audit Software.

By implementing the above recommendations, the Commission will improve the data collection and presentation process and ensure that completeness and transparency of water audit data is achieved.

2. Subsection 65.20a(d) – Unaccounted-for water

The NOPR language on page 10 states that *"Class A, Class B, and Class C water public utilities would have to report unaccounted-for water using Schedule 500 of the public utility's Annual Financial Report to the PUC. Levels of unaccounted for water would have to be kept within reasonable amounts. Levels above 20% have been considered by the PUC to be excessive. By continuing to monitor unaccounted-for water and comparing it to the water loss information, we can evaluate the two measurements. Until we have a benchmark for water loss, the unaccounted-for metric provides continuity in evaluating performance without jeopardizing the reliability of systems."*

The AWWA Committee Members believe it to be wholly inappropriate for the Commission to continue to employ an %UFW approach and 20% UFW benchmark and disagrees with the rationale put forth by the Commission in the above paragraph. The %UFW approach originated in 1957[1] and over the past twenty years has been found imprecise and misleading; with AWWA recommending against its use in 2020.[2] The %UFW approach is outdated and archaic and is gradually being abandoned by regulatory agencies across the United States and replaced by the AWWA performance indicators.

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[1] Revenue-Producing vs. Unaccounted-for Water: AWWA Annual Conference Proceedings, May 13, 1957. AWWA.
[2] Kunkel, G., G. Trachtman, A. Wyatt, W. Jernigan. 2020. Water Loss Control Committee Report: Key Performance Indicators for Nonrevenue Water—AWWA's 2020 Position.

The AWWA Committee Members also disagree with the Commission's (and NAWC/Aqua) assertion "that that there is not an adequate empirical foundation for establishing a benchmark using the water audit methodology." The AWWA Committee Members provided several examples of regulatory agencies establishing benchmarks that employ multiple AWWA performance indicators and avoid use of percentage performance indicators (ANOPR comments pgs. 8-16).

Indeed, the AWWA Committee Members believe that it is the %UFW approach that lacks empirical and scientific legitimacy and argues that its use for many years by the Commission has not correlated with measurable and actionable reductions in Non-revenue Water. Even the Commission, in the NOPR (pg. 14), refers to the "uncertainty involved with the use of the unaccounted-for water method" when discussing transparency of the regulatory process. If the Commission continues to employ a %UFW approach, it will undermine its mission to "develop a more comprehensive codified water audit method as a tool to increase the efficiency of a water utility's efforts to conserve water, account for lost water, increase water supply sustainability, remediate infrastructure, and improve overall service reliability" as stated in the NOPR.

As early as 2004 the Commission began investigating the AWWA water audit methodology and issued a Tentative Opinion and Order in 2008. In issuing the final Opinion and Order on January 27, 2012, in which all Class A water utilities (over $1,000,000 in annual revenues) were required to implement the Water Audit Methodology, the Commission concluded: "*Based upon this Commission's* ***tradition of establishing groundbreaking regulatory tools****, such as the DSIC or single tariff pricing, we will order the implementation of this Water Audit methodology which will help achieve a number of public interest benefits, such as increased infrastructure reliability, help preserve water resources, limit water leakage, reduce overall company risk, and enhance customer service.* ***We believe that this practice is a better tool than the current unaccounted-for-water method and in the public interest.***"

Unfortunately, by retaining a %UFW requirement in the proposed rule, the Commission is retaining "archaic" rather than "groundbreaking" regulatory tools. This will be a significant step backwards in the management of drinking water supplies in the Commonwealth and will result in growing costs to water suppliers and consumers.

The AWWA Committee Members provided detailed and extensive comments in the ANOPR explaining the weaknesses of percentage performance indicators for Non-revenue Water

assessments. Benchmarks such as the Commission's 20% UFW were established in arbitrary fashion without reference to actual loss volume and cost data and are ineffective.

Non-revenue Water Percentage Performance Indicators

The NOPR's proposed language of "Subsection 65.20a(d) – Unaccounted-for water" proposes continued use of the %UFW approach and the calculation of a "Percentage Unaccounted-for Water" (%UFW) as shown in the example Schedule 500 in Figure 1. This is problematic because Non-revenue Water percentage performance indicators such as %UFW:

- are unduly skewed by year-to-year changes in the levels of customer consumption that are unrelated to water losses and their underlying contributing factors.
- do not reveal the volumes of apparent and real (leakage) losses in a water utility or their cost impacts. Loss volumes and costs are the variables that can be ***managed*** by water companies. Percentages can be ***gamed*** by water companies.
- are not actionable[3]: actions taken that reduce apparent or real losses may or may not be reflected by corresponding changes in the percentage. In some cases, measured volumetric loss reductions have occurred yet the %UFW increased!
- are not supported by the American Water Works Association, the drinking water industry's leading trade association in North America. AWWA advocates against use of such percentages and the Commission – in requiring a %UFW – will be exposed to water company claims of illegitimacy of the approach when companies are confronted with compliance requests.
- Additionally, the %UFW approach is flawed in trying to represent – as a single metric – the varying types of losses (apparent, real) and cost impacts that occur in water systems. Simply put, a single performance indicator cannot reliably represent the multiple losses and cost impacts that occur in drinking water utilities.

Instead of the NOPR continuing to employ the archaic and misleading %UFW, the Commission has the opportunity to update its methodology and embrace the array of AWWA Non-

[3] AWWA (American Water Works Association). 2019. *Assessment of Performance Indicators for Nonrevenue Water Target Setting and Progress Tracking,* Denver, CO: Prepared for AWWA by Arcadis and Alan S. Wyatt.

revenue Water performance indicators calculated by the AWWA Free Water Audit Software. Collectively, these indicators are superior to %UFW because there are specific indicators for apparent losses and real (leakage) losses; and certain indicators represent operational performance and while others financial performance. Some are most effective for performance tracking and others more appropriate for benchmarking (comparing) with the data of other systems. Knowledge of the volume and value of apparent and real losses enables a water utility to make informed decisions when developing it cost effective water loss control plan. The recommended indicators are a more complete, representative, and accurate means of assessing the Non-revenue water standing of a water system and tracking its success in controlling losses.

Problematic Use of Schedule 500: aggregated data from multiple water systems

Figure 1 shows a completed Schedule 500 report as part of the Annual Report to the Commission by Aqua Pennsylvania, a large water company that owns and operates dozens of water systems in the Commonwealth. As shown, a value of 20.5% percentage unaccounted-for water is listed at the bottom of Figure 1. This percentage is calculated based upon the composite data of all of the systems under the management of Aqua Pennsylvania.

The AWWA Committee Members recommend that the Commission not recognize a "grouped" performance indicator as shown in Figure 1. The AWWA Software calculates performance indicators for discrete systems and each system should be assessed using its own performance indicators. Water companies should be required to report performance indicators as generated by the FWAS for each individual system, and not use data from groups of systems. A grouped indicator such as shown in Figure 1 inevitably masks the performance indicators of Aqua Pennsylvania's high loss individual water systems, making it less obvious where to direct loss control activities and track their performance in controlling losses.

Aqua Pennsylvania, Inc. For the Year Ended December 31, 2021

(Company Name)

500. WATER DELIVERED INTO SYSTEM DURING YEAR

Every estimated value shall be supported by such detailed information as will permit a ready identification, analysis, & verification of all relevant facts. The Company shall be prepared to furnish to the Commission this detailed information.

Line No.	Description (a)	(Gallons) (b)	(gpd) (c)
1	**Water Delivered for Distribution & Sale:**		
2	Water Obtained from Company Sources	41,305,000	113,164
3	Water Obtained from Other Independent Utilities	892,000	2,444
4	**Total Water Delivered**	**42,197,000**	115,608
5	**Metered Sales:**		
6	Residential	18,998,653	52,051
7	Commercial	9,640,768	26,413
8	Industrial	2,958,562	8,106
9	Public	811,004	2,222
10	Other Water Utilities	991,442	2,716
11	Private Fire Protection	135,051	370
12	Public Fire Protection		
13	Other Metered Sales Identify Bulk	4,184	11
14	**Total Metered Sales**	33,539,664	91,889
15	**Unmetered Sales:**		
16	Residential		
17	Commercial		
18	Industrial		
19	Private Fire Protection		
20	Public Fire Protection		
21	Other Unmetered Sales Identify		
21	**Total Unmetered Sales**		
22	**Total Sales**	33,539,664	91,889
23	**Non-Revenue Usage Allowances:**		
24	**Authorized Unmetered Usage:**		
25	Main Flushing		
26	Blow-off Use		
27	Others: Identify		
28	Unauthorized Use		
29	Unavoidable Leakage _____ gpd/mile of main		
30	Adjustments:		
31	Located & Repaired Breaks in Mains & Services		
32	Others Identify		
33	**Total Allowances & Adjustments**		
34	**Unaccounted-for-Water**	**8,657,336**	
35	**Percentage Unaccounted-for-Water**	**20.5%**	

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Figure 1: from 2021 Annual Report to PA PUC from Aqua Pennsylvania, Inc.

The AWWA Committee Members believe that it is misleading to represent data of multiple water systems under a composite metric, and especially using an approach as flawed as the %UFW approach. This flawed approach magnifies the peril of a water company not directing resources to small water systems – and small communities – because its remedial investments in larger systems will tend to skew the %UFW indicator closer to the benchmark. This disadvantages small communities and is not equitable.

The Weaknesses of using the %UFW to set a Benchmark

The Commission has long employed a 20% UFW benchmark in its regulations. Aside from the assertion that percentage indicators are inappropriate to employ, it can be argued that 1) the level of 20% is arbitrary in nature, and 2) the Commission's use of this metric and benchmark have not been effective in driving down losses – as represented by the %UFW measures of many water systems over the years that the Commission has been receiving AWWA water audits.

Across the years of data submittal to the Commission, many water utilities have reported volumetric percentage indicator values well above 20% year-after-year with no improvement and seemingly limited ability of the Commission to motivate water companies to significantly reduce losses where needed. For many, the same high percentage values continue to be reported in a "matter-of-fact" manner year after year. Most importantly, to the knowledge of the AWWA Committee Members, the Commission has not documented specific savings based on reduced loss volumes and/or cost savings of water companies who employ the %UFW as a metric.

In its traditional use of a 20% UFW benchmark, the Commission appears to define a threshold of acceptable performance (at or below 20%) vs. unacceptable performance (above 20%). The AWWA Committee Members believe that it is not realistic or helpful for the Commission to set near-term targets based upon perceived optimized low loss levels ("floors") such as the "acceptable/unacceptable" approach historically employed. Instead, at this time, it is believed more appropriate and workable to set benchmarks by establishing realistic and achievable "ceiling" levels of apparent and real losses and/or costs. Water systems with losses and/or costs higher than the ceiling (defined using the AWWA performance indicators) should be considered excessive with water company action needed to reduce losses to the ceiling levels within a specified number of years.

It is recommended that the Commission initially consider high percentile levels (75% or 90%) of the AWWA Water Audit Reference Dataset (WARD) to guide establishment of Commission target levels. For those systems that have excessive losses and/or costs, the Commission should work with the Company to establish a NRW reduction schedule that identifies incremental loss reduction targets over a reasonable period of years to meet the specified target value. This approach should motivate the relatively small number of out-of-compliance systems to take action to bring systems with high NRW volumes and/or costs down to acceptable threshold levels of performance. This approach provides the Commission with a manageable means to track the progress of specific water systems in moving toward their loss reduction target using performance indicators that are actionable and trend with the volumetric reductions of loss.

An example of a program that employed a version of the above approach is the Metropolitan Atlanta, GA region. Stemming from regional water resource management concerns, the Metropolitan North Georgia Water Planning District set a two-tiered leakage reduction target for water utilities under its jurisdiction to achieve by the year 2025. The program requirements were initiated in 2017 and include:

- Water utilities with real losses greater than 60 gallons/connection/day (2013 data) must adopt a 2025 goal to reduce to less than 60 gallons/connection/day and demonstrate progress in the interim years toward meeting this goal.
- Water utilities with real losses between 35 and 60 gallons/connection/day (2013 data) must adopt a 2025 goal to reduce to less than 35 gallons/connection/day and demonstrate progress in the interim years toward meeting this goal

Note that the benchmark levels of 60 gal/conn/day and 35 gal/conn/day were based upon several years of validated water audit data of utilities in the Metropolitan Atlanta area, and the range of values of the unit real (leakage) losses occurring in this data. If a process like this were to be utilized, the working group could review data and determine the "ceiling" levels that are appropriate for Pennsylvania water companies.

Since the Commission is a financial regulatory agency, it might consider establishing a similar benchmark structure for apparent losses, the losses that primarily result from unmeasured

water deliveries. Such a structure might draw from the 90th and 75th percentile values of the WARD, as shown below:

- Water utilities with apparent losses greater than 16 gallons/connection/day (2023 data) must adopt a 2028 goal to reduce to less than 16 gallons/connection/day and demonstrate progress in the interim years toward meeting this goal.
- Water utilities with apparent losses between 9.5 and 16 gallons/connection/day (2023 data) must adopt a 2028 goal to reduce to less than 9.5 gallons/connection/day and demonstrate progress in the interim years toward meeting this goal.

The WARD provides a realistic range of loss rate values and can serve as a reliable basis for establishing benchmark levels for apparent and real losses. The working group might start with the WARD percentile indicators and refine these levels to arrive at the levels to be placed in the rule.

The target-setting structure established for the Metro Atlanta area is a good example of a rational approach that employs the AWWA water audit methodology's volumetric performance indicators in a manner that can be closely tracked for the number of water systems that exceed the targets. It tracks water volumes (as reflected by the AWWA Unit Real Loss indicator) rather than a vague percentage.

It should be noted that apparent and real losses can be benchmarked in terms of costs as well as volumes, and the Commission may find a cost-base performance indicator to be of interest. In 2020, the AWWA Water Loss Control Committee adopted a report on key performance indicators that includes a new indicator: the Loss Cost Rate (LCR), which is a financial performance indicator[4] that marries the volumes of apparent losses and real losses with the value of these losses. The highest values for the Lost Cost Rate occur for utilities that have both high losses and high costs associated with these losses. A target-setting structure analogous to the volume-based structure described above should be framed by the working group and considered by the Commission. Either approach can establish an actionable and measurable means of targeting and achieving water loss reductions in the water utilities overseen by the Commission.

[4] Committee Report: Key Performance Indicators for Non-revenue Water – AWWA's 2020 Position, Journal AWWA, American Water Works Association Water Loss Control Committee, January 2020.

The AWWA Committee Members strongly believe that the process of using a working group of stakeholders will be most effective in devising benchmarks that are workable for the water companies to employ, are actionable, and can be interpreted by a wide range of stakeholders. Thus, the recommendation to pause finalization of the regulation, and initiate the workgroup, is urged by the AWWA Committee Members.

3. Data Validation

Water Audit data validation is a valuable quality control process that ascertains whether or not an acceptable level of data quality exists and that the water audit is free from egregious errors. A formal data validation process exists in regulatory agencies in the states of Georgia, California, Indiana, and Hawaii, with numerous other states investigating this practice.

The AWWA Committee Members agree with comments provided to the ANOPR by The Office of Consumer Advocate which "proposes that the Water Audit Methodology submissions be reviewed for consistency and that the data be validated on a regular basis."

Without data validation, data from "self-reported" water audits can have questionable validity. Indeed, many of the water audits submitted to the Commission for the 2021 reporting year (and likely prior years) contain the same data inputs for multiple systems owned by one water company. Every water system's operating conditions, costs, and practices are unique. Applying the same inputs for multiple systems is not representative of actual system performance. One water company with many systems input values of 2.00% meter under-registration for the production flow measurements and customer metering inaccuracies of all of its systems. This would suggest that all water meters in all of their systems perform in exactly the same manner, which is highly unlikely. Not coincidentally, the 2.00% under-registration level reflects a strong level of accuracy, but inputting this value in a rote, repetitive manner, means that the water company is very likely erring in representing its metering inaccuracies, perhaps skewing the data of the entire water audit.

In other water audits, companies listed customer metering inaccuracies as zero year after year. This suggests that all customer meters in their system are perfectly accurate, again highly unlikely. The data validation process flags these suspect data inputs and encourages the water company staff to input more realistic values. In some cases, these type of input issues might also be addressed by providing training to water company staff on a periodic basis.

The Commission is urged to include a formal validation process as part of the new rule. Validation of water audit data would occur after the company auditor compiles the water audit and before the water audit is formally submitted to the Commission. The water audit validator is a person who was not involved with the initial compilation of the water audit data. The validator may be an employee of the Company, or a third-party person certified in the validation process. However, the validator must be trained and certified in the validation process. The validation process must be established with a means to train prospective validators and formalize the process for validation and water audit submittal.

The methodology for such water audit validation is already established and codified in the freely available Water Research Foundation Manual 5057 (2021)[5] which defines and provides procedures for the Level 1 validation process. Three levels of water audit data validation are defined in the Manual. Level 1 validation is a desk-top level of data and utility practices review that reveals general data anomalies and egregious errors. While providing a basic level of data quality control, the Level 1 process does not ensure that the water audit is free of all errors. The Level 2 and Level 3 validation processes get to imbedded errors that exist in the underlying source data that supplies data inputs to the water audit. While more detailed and effective in validating water audit data, Levels 2 and 3 are more labor intensive and costly to conduct. Several US states – notably Georgia and California, and the Province of Quebec, CA – have established validator programs and serve as excellent models for a Level 1 data validation program.

The Level 1 data validation process has consistently proven instrumental in creating a reliable NRW management structure in regulatory agency programs. Water companies/utilities benefit from the guidance and assistance from experienced third-party providers in assessing their practices and data handling processes. The Commission will benefit from knowing that submitted water audit data has been scrutinized for data quality and is free of egregious errors. Invariably, the DVS for many water audits decreases after the data is validated to Level 1 since some water utility staff tend to grade their data in a favorable – but not always representative – way. The successful programs in the States of Georgia and California, and the Province of Quebec serve as strong examples of reliable water audit data collection and Level 1 data validation. The

[5] WRF (Water Research Foundation). 2021. *Level 1 Water Audit Validation Manual, 2nd Edition*. Denver, Colo.: WRF.

Commission can reference information on these programs to learn how they were implemented in various agencies.

4. Water Audit Training

While not addressed in the proposed rule, AWWA Committee Members continue to believe that regular trainings are an important adjunct to water auditing and urge its consideration by the Commission in the appropriate venue. Pennsylvania water companies submit water audits on an annual basis, some for several dozen systems. Training keeps company staff knowledgeable in the water audit method and use of the AWWA Free Water Audit Software. Knowledgeable trainers are available in the industry and training programs can be conducted at a modest cost.

Synergy in sponsoring and organizing training sessions could be gained by collaboration among the regulated water companies themselves and by partnering with other PA regulatory agencies including the Pennsylvania Department of Environmental Protection (DEP), Delaware River Basin Commission (DRBC), and Susquehanna River Basin Commission (SRBC).

II. CONCLUSION

The afore-mentioned AWWA Water Loss Control Committee Members appreciate the opportunity to provide these comments on the Commission's Notice of Proposed Rulemaking regarding 52 Pa. Code 65.20.

Respectfully Submitted for AWWA Committee Members,

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