



SUSQUEHANNA RIVER
BASIN COMMISSION

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NY ■ PA ■ MD ■ USA

September 13, 2022

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: Comments on Proposed Water Audit Methodology Regulation
52 Pa. Code § 65.20a – Water conservation measures; Docket No. L-2020-3021932

Dear Secretary Chiavetta:

The Susquehanna River Basin Commission (SRBC) appreciates the opportunity to comment on the Pennsylvania Public Utility Commission's (PA PUC) Proposed Water Audit Methodology Regulation published in the *Pennsylvania Bulletin* on August 6th, 2022 (52 Pa.B. 4406).

I. Introduction

The SRBC is a federal-interstate compact commission created among the states of Maryland, New York, the Commonwealth of Pennsylvania, and the federal government, and is responsible for coordinated management of the water resources of the 27,510-square-mile Susquehanna River Basin (Basin). The mission of the SRBC, which is defined in the Compact, is to enhance public welfare through comprehensive planning, water supply allocation, and management of the water resources of the Susquehanna River Basin. To accomplish this mission, the Commission works to: reduce damages caused by floods; provide for the reasonable and sustained development and use of surface and ground water for municipal, agricultural, recreational, commercial and industrial purposes; protect and restore fisheries, wetlands and aquatic habitat; protect water quality and instream uses; and ensure future availability of flows to the Chesapeake Bay.

The PA PUC's mission is to ensure reliable utility service, protect the public interest, and foster new technologies in an environmentally sound manner. The SRBC believes these goals align with its mission to enhance public welfare through comprehensive water resource management. The PA PUC's proposed water conservation measures rulemaking and, generally, its inclusion of the American Water Works Association (AWWA) Water Audit Methodology

helps advance our common goals. In support of the PA PUC's proposed water conservation rulemaking, the SRBC offers the subsequent comments. However, the SRBC does note that the AWWA methodology is primarily used to assess water loss in the water distribution system and therefore does not typically account for water loss in raw water transmission systems. While the SRBC recognizes that reducing distribution system losses promotes water conservation at raw water sources through potential reduced water withdrawal demands, assessing water loss in raw water transmission systems can also improve utility service reliability and enhance water conservation. Therefore, the SRBC recommends that where applicable, raw water loss be included in audit methodologies to accomplish a comprehensive assessment of the water resource.

II. Comments

Comment No. 1: The SRBC recommends the PA PUC define Class A, Class B and Class C in Subsection 65.20a(b) – Definitions.

The proposed language in Annex A does not define Class A, Class B or Class C water utilities. The 52 Pa. Code § 65.16. *System of accounts*. defines water utilities based on their annual operating revenue. For example, a Class A water utility is defined as “a public water utility having annual operating revenue of \$750,000 or more...” However, 52 Pa. Code § 56.2. *Definitions*. defines a Class A water utility as “[a] water utility with annual revenues greater than \$1 million.” The SRBC recommends the PA PUC include or incorporate by reference the definitions for Class A, Class B and Class C water utilities.

Comment No. 2: The SRBC supports the PA PUC proposed subsections 65.20a(a) *General*; 65.20a(c) *Water loss audit for Class A water public utility*; 65.20a(e) *Leak Detection*; 65.20a(h) *Efficiency plumbing fixtures*; 65.20a(i) *Education*; and 65.20a(j) *Water audit for a large nonresidential customer*.

The American Water Works Association (AWWA) or similar water audit software, including the PA PUC's identified metrics and report criterion, can assist public water suppliers with more efficient use of water. This software, along with the PA PUC's proposed public water supplier requirements to deploy leak detection systems, provides useful annual information on plumbing fixture efficiency and water use practices. The collected information also offers clarity on large water user audit procedures and encourages public water suppliers and their users to more thoroughly adopt long-term water conservation best practices. The SRBC encourages water conservation through its planning efforts and specifically its regulations under *18 CFR § 806.25 Water conservation standards*. For example, the SRBC's regulations under *18 CFR § 806.25(a)* requires public water suppliers to establish a program of water conservation that includes the “installation of water conservation devices, as applicable, by all classes of users” and “[p]repare and distribute literature to customers describing available water conservation techniques.” The PA PUC's language in the proposed subsections further encourages water conservation practices and therefore the SRBC supports the inclusion of these proposed subsections into § 65.20a. To further encourage water conservation, the SRBC recommends that the PA PUC require reporting standards and methodologies that include raw water transmission.

Comment No. 3: The SRBC recommends the PA PUC simplify Subsection 65.20a(d) *Unaccounted-for water.*

The proposed language in Annex A states that “[l]evels of UFW shall be kept within reasonable amounts. Levels above 20% have been considered by the Commission to be excessive.” To encourage water conservation, and until such a time when the PA PUC establishes water loss benchmarks, the SRBC recommends the PA PUC maintain the 20% water loss standard. The SRBC also recommends the PA PUC simplify the proposed language to read “Levels of UFW shall not exceed 20% of the total volume of water produced or purchased.”

Comment No. 4: The SRBC recommends the PA PUC incorporate Subsection 65.20a(f) *Metering in its final rule making.*

To further encourage water conservation, the SRBC recommends the PA PUC maintain the proposed language in § 65.20a(f) *Metering* in its final rulemaking. The Notice of Proposed Rulemaking Order states that § 65.20a(f) “would require a comprehensive metering program reflecting a water public utilities obligations under [§] 65.8 relating to metering that includes metering sources of supply, metering service to customers, and regular testing and maintenance of meters in service.” Per the SRBC’s review, § 65.8 appears to pertain to customer meters and therefore may be inadequate for metering of sources of supply. The SRBC recommends the PA PUC consider developing metering requirements specifically for sources of supply, as source meter infrastructure can differ from that of customer meters. To assist the PA PUC in development of any additional metering requirements for sources of supply, the SRBC has attached its policy “Guidance For The Preparation Of A Metering Plan & A Groundwater Elevation Monitoring Plan for Water Withdrawals, Consumptive Uses, and Diversions”.

III. Conclusion

The proposed rulemaking represents an advancement in addressing the conservation of water resources. The SRBC encourages the PA PUC to consider including raw water loss in its audit methodologies.

Thank you for your consideration of these comments. Should the Pennsylvania Public Utility Commission have any questions or concerns, please do not hesitate to contact the SRBC.

Sincerely,



Executive Director
Andrew D. Dehoff, P.E.

Enclosures:

cc: James A. Mullin, Law Bureau [jamullins@pa.gov – if emailing comments]
Stephanie A. Wilson, Law Bureau [stepwilson@pa.gov – if emailing comments]
Karen Thorne, Law Bureau [kathorne@pa.gov – if emailing comments]



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**GUIDANCE FOR THE PREPARATION OF A METERING PLAN &
A GROUNDWATER ELEVATION MONITORING PLAN FOR
WATER WITHDRAWALS, CONSUMPTIVE USES, AND DIVERSIONS**

Policy 2020-02

March 13, 2020

*A water resource agency serving
the Susquehanna River Watershed*

GUIDANCE FOR THE PREPARATION OF A METERING PLAN & A GROUNDWATER ELEVATION MONITORING PLAN FOR WATER WITHDRAWALS, CONSUMPTIVE USES, AND DIVERSIONS

March 13, 2020

This document provides guidance for preparation of the metering plan required as part of a project application under 18 CFR § 806.14(a)(6) and (c)(5), CFR § 806.22(e)(4), CFR § 806.22(f)(4) that adheres to the standards in 18 CFR § 806.30 for the methodology for monitoring water withdrawals and consumptive uses. It also provides guidance for the groundwater elevation monitoring plan (GWEMP) required for groundwater withdrawal applications under 18 CFR § 806.14(b)(2)(iv) that adheres to the standards in 18 CFR § 806.30. Specifically, this guidance applies to projects with surface water sources or groundwater sources for new, renewal, major modification, minor modification (as applicable), consumptive use, and diversion applications.

In general for all projects, these plans should reflect the most up-to-date information for an entire facility's metering and groundwater elevation monitoring needs and requirements. Specifically, the plans should concisely describe a facility's source(s) of water, consumptive use(s) of water (except Approval by Rule hydrocarbon projects), diversion of water (import and/or export), existing or proposed monitoring equipment, infrastructure, and measurement or monitoring methodologies that are or will be used.

For a proposed renewal of an existing project, the project sponsor's plan should reflect the facility's as-built condition for monitoring methods. At the time of application for renewal, if a plan does not accurately describe the as-built condition, an updated plan will be required to be submitted that accurately describes the as-built condition. The project sponsor should use this guidance document to update the plan. Plans that have been approved by the Commission and accurately describe the as-built condition do not have to be revised per this guidance document.

For a proposed major or minor modification to an existing project, the project sponsor should include a description of the as-built condition and, if appropriate, update(s) to the existing plan(s) clearly describing and illustrating the changes as a result of the proposed modification.

For a project seeking an approval for consumptive use of water related to unconventional natural gas and other hydrocarbon development through the administrative Approval by Rule in CFR § 806.22(f)(4), the metering plan should conform to the prescribed *Consumptive Use Metering Plan For Approval By Rule 18 CFR § 806.22(f)* available at the Commission's website (<https://www.srbc.net/>). For consumptive use projects seeking approval through the Approval by Rule at 18 CFR § 806.22(e), the metering plan should follow the guidelines below.

I. Metering Plan – Suggested Outline for All Projects

Per 18 CFR §§ 806.30 (a)(1-7), a project sponsor is required to:

- Measure and record, on a daily basis, the quantity of all withdrawals, using meters or other methods approved by the Commission.
- Certify, at the time of installation and no less frequently than once every 5 years, the accuracy of all measuring devices and methods to within 5 percent of actual flow.
- Maintain metering to provide a continuous, accurate record of the withdrawal or consumptive use.
- Measure groundwater levels in all approved production and other wells, as specified.
- Measure groundwater levels at additional monitoring locations, as specified.
- Measure water levels in surface storage facilities, as specified.
- Measure streamflows, passby flows or conservation releases, as specified.
- Perform other monitoring for impacts to water quantity, water quality, and aquatic biological communities, as specified.

The metering plan should concisely describe the equipment and methodologies that will be used to satisfy these requirements and should include, but may not be limited to, the following:

A. General Description of Project Facilities¹

1. Describe the operations that are conducted at the facility.
2. Describe how water is used at the facility.
3. Identify all withdrawal sources and consumptive uses at the facility.
4. If applicable, identify any diversions of water into and/or out of the basin by the facility.
5. Provide a water flow diagram illustrating the processes that use the water withdrawn from the sources or diverted into and/or out of the basin, all water flow pathways, and the locations in the flow pathway of all meters used to account for the withdrawals, consumptive uses, and diversions.
6. Provide a topographic map or aerial photograph depicting the locations of all withdrawal sources, water storage or treatment units, discharge points, and meters used to account for the withdrawals, consumptive uses, and diversions. This map may be combined with the flow diagram described in item 5 above, if appropriate.

B. Description of Meters, Associated Equipment and Measurement Procedures

1. Indicate the make, model, size, serial number, flow range, and accuracy of all proposed or existing flow meters or measurement equipment. It may be helpful

¹ Facility, as defined in 18 CFR § 806.3, includes, but is not limited to, the site where the water from the source will be used and where any appurtenances necessary for the withdrawal, control, collection, storage, treatment, transmission, sale, or exchange of water are or will be located.

to summarize these details in table format. Please include the manufacturer's specification information for the meter. Please do not include manufacturer's operation manuals.

2. Indicate the type of meter displays or transmitters, the display capabilities, and the number of digits capable of recording and displaying. Meter displays and transmitters should be capable of displaying both a maximum instantaneous flow rate and a totalized flow quantity, recordable to at least 8 digits to prevent frequent rollover (see example photographs in Appendix B).
3. Indicate where the meters and meter displays are or will be located and how Commission staff will have access during routine compliance inspections. The proposed or existing meters should be installed so that they cannot be easily bypassed, zeroed, or reset.
4. Describe the equipment and methods (e.g., valve controls, variable frequency drives, pump capacity) that will be used to adhere to the proposed or approved individual and combined/total system withdrawal limits and maximum instantaneous withdrawal rates.
 - a) For projects that use the pump capacity as the flow-limiting device, pump curves should be provided to demonstrate that the pump will not exceed the proposed or approved withdrawal rates.
5. Provide photographs of all installed meters showing the meter display, including the piping before and after the meter to document that the meter has been installed in accordance with the appropriate straight-run requirements, and close-up detail (i.e., make, model, and serial number).
 - a) For meters that have not been installed, provide a proposed schedule for installing the metering equipment and initiating flow monitoring.
 - b) Following installation of the meter(s), submit date(s) of meter(s) installation and photographs of the installed equipment.
6. If applicable, describe how the consumptive use of water at the facility will be measured or calculated.
 - a) Please note that the Commission prefers the simplest methods be implemented to measure or calculate consumptive use, which is generally the sum of the sources less the discharge (i.e., $CU = \text{Total of Sources In} - \text{Discharge}$). It may be appropriate to calculate certain consumptive uses in place of direct measurement with meters, particularly when metering is not feasible. Include an equation that clearly describes the components and assumptions that are used in the calculation.
 - b) Evaporative losses (e.g., from storage ponds or open-top storage units) may need to be considered and included in the calculation. A sample calculation for evaporative losses is provided in Commission Form SRBC #74 (<https://www.srbc.net/regulatory/application-process/>).

Briefly describe how the surface area used in the calculation was derived.

7. It may be appropriate to use equipment other than meters, procedures, or calculations to measure certain withdrawals or consumptive uses, particularly when metering is not feasible. All assumptions used in calculations must be provided and clearly explained.

C. Monitoring Procedures and Record Keeping

1. Describe the procedures recording daily flow and consumptive use data from the measurement equipment during daily operations.
2. Describe the methods for maintaining an accurate record of daily water withdrawals, consumptive use, and diversions (e.g., handwritten daily logs, electronic spreadsheets) Please note that all withdrawal data collected by the project sponsor and submitted to the Commission must be maintained by the project sponsor for the duration of the approvals and subsequent renewals as required by the Commission-issued docket or approval.

D. Calibration/Certification of Metering Equipment

Per 18 CFR § 806.30(a)(2), a project sponsor is required to maintain flow measuring devices accurate to within 5 percent of actual flow to provide an accurate record of withdrawals, consumptive use, and diversions. For existing meters, current meter certifications should be included in the metering plan. For new meters, the manufacturer's specification sheet should be provided. Once the meter has been installed, the manufacturer's calibration report or accuracy certification sheet must be provided to the Commission.

Project sponsors are required to certify, at the time of installation and no less frequently than once every five years, the accuracy of all flow measuring devices and methods, unless otherwise specified by the Commission. The Commission does not require specific methods for certifying the accuracy of flow measuring devices; however, it is expected that the devices be maintained to the standards of their respective manufacturers. Common methods for certifying meter accuracy are provided as options in Appendix D.

II. Groundwater Elevation Monitoring Plan - Suggested Outline

Per 18 CFR §§ 806.30(a)(4) and (a)(5) a project sponsor is required to measure and record groundwater levels in all approved production wells and other wells and monitoring locations, as specified by the Commission. The GWEMP should concisely describe the equipment and methodologies that will be used to satisfy these requirements and should include, but may not be limited to, the following:

- A. Indicate the location, type², make, model, serial number, and accuracy for all proposed or existing manual and/or automated groundwater elevation monitoring equipment. If data loggers are installed to measure and record water level data, please indicate the depth at which the data logger is set and its position relative to the pump intake. It may be helpful to summarize these details in table format. Please provide the manufacturer's specification sheet and calibration reports for existing (if available) and new water level monitoring equipment. Please do not include manufacturer's operation manuals.
- B. Indicate the frequency at which water level data will be collected. The Commission prefers that the lowest daily water level data be reported. If measuring and reporting the lowest daily water level is not practical or feasible, water level measurements should be collected at the same time each day. Please note that staff may consider alternative data collection frequencies if collection of daily water level data is not feasible for your project. Please contact Commission staff to discuss possible alternative data collection frequencies, if needed.
- C. Provide a description of the reference points used to calculate groundwater elevations from water levels measured at each production well and/or other monitoring locations. Groundwater elevations should be reported in feet above mean sea level. Reference point elevations can be obtained using standard surveying techniques, handheld global positioning system unit, LiDAR data, or topographic maps. It may be useful to include the reference point elevations in the table with the information requested above in item A.
- D. Describe the procedures for reading and recording water level measurements from all groundwater monitoring locations.
- E. Describe the methods for maintaining an accurate record of groundwater elevation data. All groundwater elevation data collected by the project sponsor and submitted to the Commission must be maintained by the project sponsor for the duration of any approvals and subsequent renewals as required in the Commission-issued docket or approval.
- F. Provide photographs of any existing water level monitoring equipment or photographs showing installed equipment, if applicable.

² "Type" may include water level meters, airlines, data loggers, etc. If non-vented data loggers are utilized, please indicate how water levels will be corrected for barometric pressure and indicate the location where barometric data loggers will be installed.

1. For equipment that has not been installed, provide a proposed schedule for installing the equipment and initiating water level monitoring. Following installation of the equipment, the GWEMP should be updated, as needed, to include the information requested in this section and photographs of the installed equipment.
- G. The project sponsor is responsible for maintaining and verifying the proper function of all groundwater level monitoring equipment. The plan should provide for periodic back-up measurements from each groundwater monitoring location to check the calibration of the primary measuring equipment and procedures that will be implemented in the event of failure of the primary measuring equipment. The Commission recommends that manual backup measurements be collected at least once per quarter to verify the accuracy and proper function of any water level monitoring equipment installed in the well.

APPENDIX A
GENERALIZED METERING PLAN TEMPLATE

The following provides a generalized template for use by the project sponsor in developing a facility's metering plan. The project sponsor may need to provide more or less detail, as appropriate, to adequately describe the project facilities and water uses.

TITLE OF PLAN
Project Sponsor
Facility Name
Municipality, County, State
Date

General Description of Project Facilities

Insert narrative description including, but not limited to:

- Facility location;
- Water source(s);
- Water use(s);
- Water flow path, including pump usage, location, and meter location(s);
- Consumptive use(s) of the water;
- Discharge location;
- Water flow path schematic (Attachment 1);
- Aerial photograph that depicts locations of the water source(s), flow meter(s), meter readout(s), storage unit(s), and discharge location(s) (Attachment 2).

Meter Information

Insert brief narrative description regarding flow meter location(s) and accessibility. Use Table 1 to provide meter specifications. Include photographs of each meter, and the most recent certifications of meter accuracy as Attachments 3 & 4, respectively.

Insert brief narrative description regarding control of each source(s) flow rate. Include any appropriate information regarding valves and/or locks as related to the approved maximum instantaneous withdrawal rates. Provide pump curves as Attachment 5, if needed to demonstrate compliance with the maximum instantaneous withdrawal rate.

TABLE 1: METER INFORMATION

Location ID				
Make				
Model				
Size (inches)				
Serial Number				
Flow Range (gpm)				
Accuracy (%)				
Date Last Calibrated				
Upstream Manufacturer's Straight Pipe Requirements				
Downstream Manufacturer's Straight Pipe Requirements				
Display Type				
Display Capabilities				
Digits Displayed				

Monitoring Procedures and Record Keeping

Insert detailed narrative description, including but not limited to:

- How meters transmit totalized flow & flow rate data;
- How data is recorded (e.g., SCADA system);
- How data reports are generated and stored;
- Any other manual recording of data;
- The project's daily consumptive use, including the calculation.

Calibration/Certification of Metering Equipment

Insert reference to Attachment 4 – Meter Certifications. Insert sentence regarding the flow meter certification frequency that the project sponsor will adhere to.

Attachments:

- Attachment 1: Facility Water Flow Diagram
- Attachment 2: Facility Features
- Attachment 3: Flow Meter Photographs
- Attachment 4: Flow Meter Accuracy Certifications (or Manufacturer Specification Sheet)
- Attachment 5: Pump Curves

APPENDIX B
METERING PLAN EXAMPLE
(Groundwater Withdrawal and Consumptive Use)

The following provides an example of the information that should be described in the project's groundwater withdrawal and consumptive use metering plan. The sample language provided below (in italics) is intended to provide an indication of the level of detail that should be included in the plan and should be used only as a guide. The project sponsor may need to provide more or less detail, as appropriate, to adequately describe the project facilities and water uses.

**METERING PLAN FOR GROUNDWATER WITHDRAWAL AND CONSUMPTIVE
USE**

Project Sponsor
Facility Name
Municipality, County, State
Date

General Description of Project Facilities

The facility is located at 1234 Main Street, Anytown, Pennsylvania. The facility operates three production wells (Well 1, Well 3, and Well 4) that provide water used in the processing of consumer food products.

All water withdrawn from the production wells is pumped to a 20,000 gallon storage tank. The wells operate intermittently on a schedule that is controlled by the level in the storage tank. All production wells are equipped with properly sized submersible pumps. Electromagnetic flow meters are installed on the individual withdrawal sources as described below.

Water from the production wells is used to support various processes throughout the plant which are shown on the flow schematic provided as Attachment 1. Processes in which water is consumptively used are denoted with the symbol "CU" on the flow schematic. Any water not consumptively used is pumped to the wastewater treatment plant where it is treated to meet permitted effluent limits. An electromagnetic flow meter is installed on the discharge line from the wastewater treatment plant to Flowing Creek.

The locations of the production wells, flow meters, storage units, and the discharge location are depicted on the aerial photograph provided as Attachment 2. The equipment and methods used to account for the facility's withdrawals and consumptive use are described below.

Meter Information

Flow meters are installed on the individual withdrawal sources and upstream of the wastewater storage tank. Meter specifications are provided in the table below. Photographs of each meter and the most recent certifications of meter accuracy are provided in Attachments 3 and 4, respectively.

TABLE 1: METER INFORMATION

Location ID	Well 1	Well 3	Well 4	Effluent
Make	<i>Master Meter</i>	<i>Master Meter</i>	<i>Sensus</i>	<i>Foxboro 8000</i>
Model	<i>Octave</i>	<i>Octave</i>	<i>W-350</i>	<i>8010-BTR-6</i>
Size (inches)	8	8	3	10
Serial Number	46502992	16402530	5847265	1754824
Flow Range (gpm)	5 - 2800	5 - 2800	5 – 350	5 - 1500
Accuracy (%)	1	1	1.7	1.9
Date Last Calibrated	11/10/2016	11/10/2016	11/10/2016	11/10/2016
Upstream Manufacturer's Straight Pipe Requirements	16"	16"	6"	20"
Downstream Manufacturer's Straight Pipe Requirements	16"	16"	12"	20"
Display Type	<i>Direct Read</i>	<i>Direct Read</i>	<i>Direct Read</i>	<i>Direct Read</i>
Display Capabilities	<i>Totalizer (gal)/ Flow (gpm)</i>	<i>Totalizer (gal)/ Flow (gpm)</i>	<i>Totalizer (gal)/ Flow (gpm)</i>	<i>Totalizer (gal)/ Flow (gpm)</i>
Digits Displayed	9	9	8	8

The flow rates for Wells 1, 3, and 4 are primarily controlled by properly sized submersible pump-motor combinations that target the approved flow rates (pump curves are provided in Attachment 5). Inline gate valves are used to further adjust flow rates and locks will be placed on the valves to ensure that flow rates do not exceed the approved maximum instantaneous withdrawal rates.

All meters are located inside the individual well houses. Plant personnel will accompany Commission staff to each meter location during routine inspections.

Monitoring Procedures and Record Keeping

The individual meters continuously transmit totalized flow and flow rate data to the programmable logic controller (PLC) located in the wastewater treatment plant. The PLC is connected to a supervisory control and data acquisition (SCADA) system that records data hourly. Daily reports are automatically generated and stored electronically by the software for later retrieval. The totalized flow and flow rate for each meter are also manually recorded once daily at approximately 8:00 am during routine facility inspections. These data are input manually into electronic spreadsheets that are maintained by the plant manager.

The project's daily consumptive use is calculated using the following equation:

$$CU = (TDIF - TDOF)$$

where,

TDIF = Total Daily Inflow (Well 1 + Well 3 + Well 4)

TDOF = Total Daily Outflow (wastewater treatment plant effluent)

The daily records of the withdrawals and consumptive use will be electronically reported on a quarterly basis via the Commission's Monitoring Data Website (MDW), unless otherwise specified. The quarterly monitoring reports will be provided to the Commission within thirty days after the close of the preceding quarter.

Calibration/Certification of Metering Equipment

The most recent certifications of flow meter accuracy are provided in Attachment 4. Flow meters will be certified at the frequency required by the Commission and the results provided to the Commission.

Attachments:

Attachment 1: Facility Water Flow Diagram (not included in example)

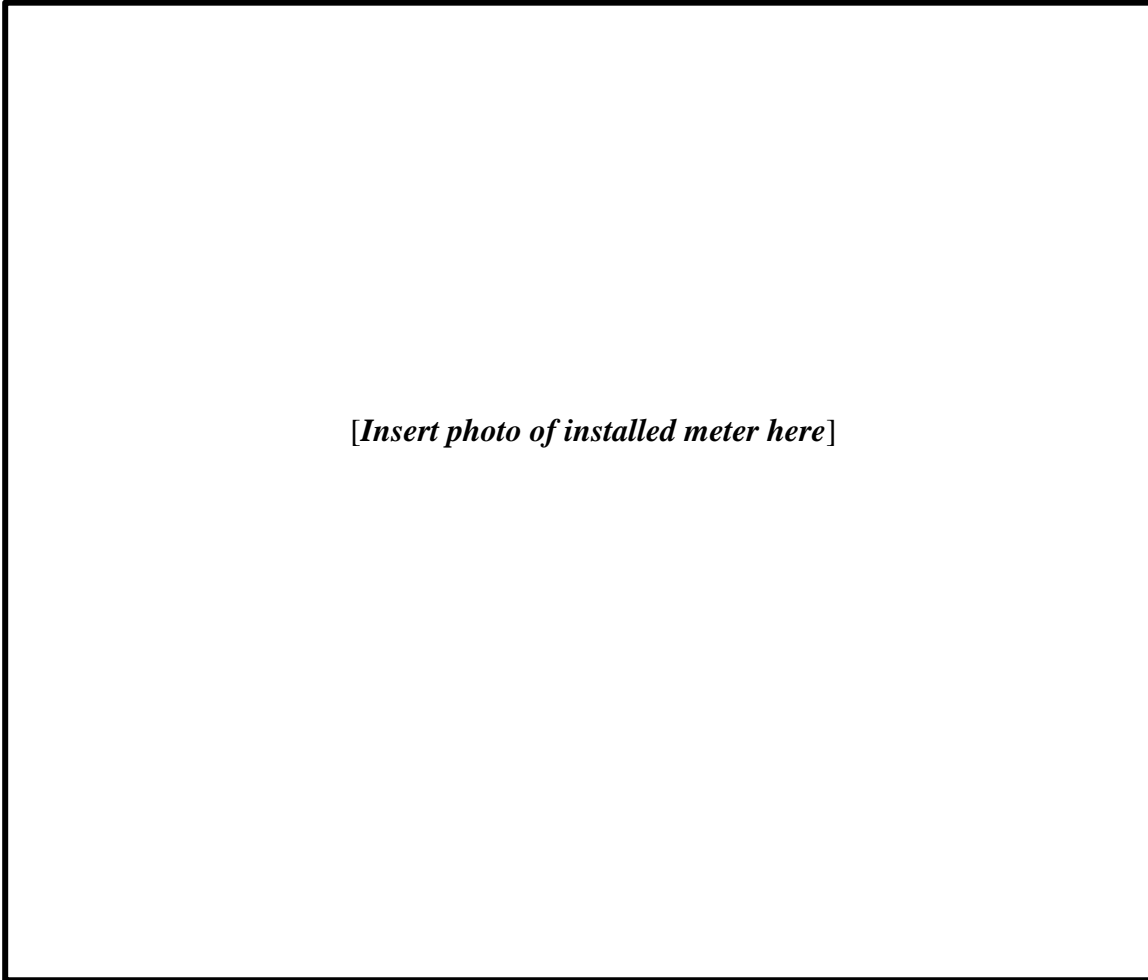
Attachment 2: Facility Features (not included in example)

Attachment 3: Flow Meter Photographs (see example photographs)

Attachment 4: Flow Meter Accuracy Certifications (or Manufacturer Specification Sheet)

Attachment 5: Pump Curves (not included in example)

Attachment 3: Meter Photographs



Well 1: Meter Installed in Accordance with Straight-Run Recommendations

[Insert photo of close-up view of meter display here]

Well 1: Close-up of Display

Attachment 4: Flow Meter Manufacturer Specification Sheet

[Insert flow meter manufacturer spec sheet here]

APPENDIX C

GROUNDWATER ELEVATION MONITORING PLAN EXAMPLE

The following provides an example of the information that should be described in the project's groundwater elevation monitoring plan (GWEMP). The sample language provided below (in italics) is intended to provide an indication of the level of detail that should be included in the plan and should be used only as a guide. The project sponsor may need to provide more or less detail, as appropriate, to adequately describe the equipment and methods implemented to measure, record, and report water level data for the facility's approved groundwater sources, and other wells and monitoring locations, as specified by the Commission.

GROUNDWATER ELEVATION MONITORING PLAN

Project Sponsor
Facility Name
Municipality, County, State
Date

The facility operates three groundwater wells (Well 1, Well 3, and Well 4), which are the sources for all water used at the plant. Groundwater levels will be measured in each production well using vented data loggers, which are described in the following table.

GROUNDWATER MONITORING EQUIPMENT

Source	Reference Elevation Location	Reference Elevation (ft AMSL)	Data Logger Information		
			Make / Model	Serial Number	Accuracy (%)
Well 1	Top of Casing	1180.36	In-Situ Level Troll 500	455154	0.1
Well 3	Top of Casing	1050.27	HOBO Water Level Logger	465758	0.1
Well 4	Top of Casing	1129.05	Solinist Levellogger Edge	359875	0.05

Each data logger will be programmed to record depth to water levels on an hourly basis. The plant manager will manually download the water level data from the data loggers monthly and will upload the data to an electronic spreadsheet. Groundwater levels for the production wells will be converted to elevations by subtracting the depth to water measurements from the top of casing elevations at each wellhead, which were obtained by professional survey. The lowest daily groundwater elevations will be reported quarterly to the Commission.

To ensure accurate operation of the data loggers, the water level measurements recorded by the data loggers will be manually verified every quarter using a water level meter. If discrepancies are noted, the data logger will be recalibrated or replaced with a new data logger. Manual water level measurements will be collected as needed until the data logger is replaced. The Commission will be informed of any changes in equipment and the GWEMP will be updated to provide the new make, model, serial number, and photographs of installed equipment.

Attachment 1: Water Level Monitoring Equipment Photographs (see attached example)

Attachment 2: Water Level Monitoring Equipment Accuracy Certifications (see attached example)

Attachment 1: Water Level Monitoring Equipment Photographs

[Insert water level monitoring equipment photo(s) here]

Attachment 2: Water Level Monitoring Equipment Accuracy Certification

[Insert water level monitoring equipment accuracy certification here]

APPENDIX D

METER ACCURACY CERTIFICATION METHODS EXAMPLE

Project sponsors are required to certify, at the time of installation and no less frequently than once every five years, the accuracy of all flow measuring devices and methods, unless otherwise specified by the Commission. The Commission does not require specific methods for certifying the accuracy of flow measuring devices; however, it is expected that the devices be maintained to the standards of their respective manufacturers. Questions regarding specific methods for the certification of meter accuracy that may be acceptable to the Commission should be directed to Commission staff. However, several common methods are described below.

1. The existing flow meter is replaced with a meter that has been previously calibrated to manufacturer specifications and certified by the manufacturer or an independent contractor.
2. The existing meter is removed and shipped to the manufacturer or an independent contractor for calibration and certification at their facility.
3. Generally, a qualified independent contractor performs calibration and certification of the existing meter on-site. Calibration and certification by a qualified employee of the project may be accepted as appropriate. On-site meter calibration is often completed in one of the following ways:
 - a) A known quantity of water is pumped through the metering device and compared with the totalizer reading of the known quantity of water.
 - b) A previously calibrated and certified meter is installed on an influent or effluent line common to the existing meter. The pump is operated for a fixed amount of time and the totalizer readings of the two meters (the existing meter being tested and the independent contractor's certified meter) are compared for accuracy.
 - c) A previously calibrated ultrasonic flow measuring instrument is installed (clamped) over the pipe in the vicinity of the existing metering device. The pump is operated for a fixed amount of time and the totalizer readings of the two meters (the existing meter being tested and the independent contractor's certified meter) are compared for accuracy.