



POLICY MEMORANDUM 2015-01

(Policy effective February 1, 2015)

DATE: February 1, 2015

TO: Approved Well Testers and **Tributary** Well Users within the South Platte River Basin

FROM: Division of Water Resources, South Platte River Basin, Division 1

SUBJECT: Measurement Rule Policy for **RULES AND REGULATIONS GOVERNING THE MEASUREMENT OF GROUND WATER DIVERSIONS LOCATED IN THE SOUTH PLATTE RIVER BASIN WITHIN WATER DIVISION NO. 1, Court Case 11CW292 (Rules)**

EFFECTIVE DATE: February 1, 2015

NOTE: A Rule provision does not apply where application of the provision would be inconsistent with or conflict with a specific term or condition of a water court decree that existed prior to the Rules (December 31, 2013), in which case the term or condition of said existing decree shall control. In the event the water court decree is silent, the Measurement Rules shall control. Further, any stipulations entered into with Opposers to the Rules will be recognized and followed in administration of the Rules.

Rule 2.1.22 of the Rules defines “Well User” to mean any person diverting ground water from a Well. This may include, but is not necessarily limited to, the owner of a water right or well permit which allows the diversion of ground water and any person having the right to use such a water right or well permit owned by another, including all agents, employees, lessees, assigns or successors of the same.



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I. General

Rule 3.1.1 of Rules Governing the Measurement of Ground Water Diversions by Wells Located in the South Platte River Basin within Water Division No. 1 (Rules), states that “the State Engineer may adopt written standards and specifications for the installation, calibration, testing, repair, and maintenance of Totalizing Flow Meters (TFM).” This Measurement Rule Policy document is intended to provide such written standards, clarifications and guidance. In particular, this policy is intended to clarify items discussed in **Rule 3.1 – Measurement Devices, Rule 3.2 – Power Conversion Coefficient Alternate Measurement Method, Rule 6 – Data Submission, and Rule 11 – Variances.**

II. Totalizing Flow Meter Policies (Rule 3.1)

The following items are intended to clarify items discussed in Rule 3.1 of the Rules in accordance with Rule 3.1.1 of the Rules.

A. TFM and Installation Requirements (Rules 3.1.1, 3.1.2, 3.1.2.3, 3.1.4, & 3.1.5.3)

1. New TFM's purchased or installed after December 1, 2014 must prohibit the totalizer of the TFM from moving backward or reducing the total amount registered on the TFM (this would include anti-reverse gears in mechanical TFM's). Existing TFM's purchased or installed prior to December 1, 2014 do not require anti-reverse mechanism until future replacement.
2. Installations of an electrically powered TFM dependent upon batteries as their principal source of power are not allowed.
 - a) Batteries may serve as a backup power source only.
3. TFM dependent upon electricity for operation must be hardwired to the same electric panel box as the well that the TFM measures.
 - a) There can be no splices, disconnects or switches between the TFM and the electric box that would allow water to be diverted without simultaneous recording on TFM totalizer (due to power disconnect).
 - b) It is recommended that the wire between the electric box and the TFM be encased in conduit or otherwise routed and attached in such a manner as to prevent breakage from livestock, wildlife and the elements. This may be required in the event that damage to unprotected wiring occurs.
4. Any wire between a TFM and a remote register:
 - a) Must be a continuous wire with neither splices or disconnects.
 - b) It is recommended that the wire be encased in conduit or otherwise routed and attached in such a manner as to prevent breakage from livestock, wildlife and the elements. This may be required in the event that damage to unprotected wiring occurs.



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5. All mechanical TFM must be equipped with a totalizing feature on the TFM and attached to the direct drive of the impeller. This includes TFM utilizing a remote readout sensor installation.

6. If a previously verified TFM is used to measure a different well due to relocation of a TFM assembly, the TFM is required to be re-certified in the new installation/configuration to assure meter accuracy in its modified location and configuration.

7. If a previously verified TFM is used to measure the well for which it was verified but the plumbing configuration has been modified, the TFM is required to be re-certified to assure the meter accuracy in its final installed configuration. For example if the previously verified TFM has been placed in new piping such as a new center pivot riser pipe, a new verification test is required.

B. TFM Maintenance, Replacement, and Repair Requirements (Rules 3.1.4, 3.1.5.3, 3.5.1)

1. All TFM replacement, repair and maintenance must be in accordance with the manufacturer's recommendations and with the Rules and Measurement Rules Policies regarding accuracy.

2. TFM Component replacement, repair or general maintenance of a TFM requires that a new Meter Verification Test¹ be performed and submitted (Form 3.1 - Notice of Totalizing Flow Meter Verification, Re-Verification, or Replacement) unless a Variance is approved by the Division Engineer prior to such maintenance event in accordance with Item II.B.5. below. General Maintenance and repair that does not require a new Meter Verification Test to be conducted, or a Variance (see item II.B.5 below), is limited only to those instances that do not require the removal or replacement of any component(s) of the TFM or breakage of the Register Seal or TFM Seal. This may include but not be limited to the following:

- a) Removal and replacement of register weather cover;
- b) Removal and replacement of TFM canopy lid or lid spring;
- c) Inspection of TFM propeller (mechanical propeller meters) without removal of any components of meter or propeller (requires a variance);
- d) Inspection of TFM magnetic or ultrasonic sensors without removal of any components of meter or sensor (requires a variance);
- e) Temporary removal of TFM with prior DWR approval (outlined in paragraph II.B.6) requires a variance.

¹ Meter Verification Test is defined as an independent field test performed by a Qualified Well Tester to determine the accuracy of the installed Totalizing Flow Meter. Reporting and submittal of all required information for the Meter Verification Test is accomplished on a Form or format as required by the Division Engineer (currently Form 3.1 - Notice of Totalizing Flow Meter Verification, Re-Verification, or Replacement)



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3. When performing TFM component replacement, repair or general maintenance a Meter Verification Test must be performed before any water is diverted by the well/pump, other than to accomplish the TFM Verification test. Additionally, form 3.1 – Notice of Totalizing Flow Meter Verification, Re-Verification, or Replacement must be submitted to Division of Water Resources, Division 1 before any water is diverted.

a) In addition to Form 3.1, the Qualified Well Tester² or the Well User³ must supply the following information to DWR by verbal or written communication:

(1) Notification of intent to remove the factory seal prior to commencement of work.

b) In the event that water will be diverted for purposes other than, and prior to, a Meter Verification Test the above notification shall also include the following:

(1) The name of the person performing the replacement or repair, along with a brief statement of that person's qualifications if not a Qualified Well Tester;

(2) Reading from the TFM register being replaced or repaired (if possible) and the beginning reading of the new or repaired register on the submitted Form 3.1.

4. Under certain circumstances, a TFM may be temporarily removed and reinstalled without requiring a new Meter Verification Test if no maintenance and/or alteration is done to the TFM in accordance with Rule 3.1.5.3. Temporary removal and reinstallation of the TFM must be documented on Form 3.1 Meter Verification Test (new test not required) and submitted by a Qualified Well Tester and the policy addressing Tamper-Resistant Seals (outlined in paragraph II.D.) must be followed. The Well User must submit and have an approved Variance Request for such circumstances prior to removal. Failure to obtain a Variance Request approval may require that the Well User perform a new TFM Verification and submit Form 3.1 for approval.

5. Variance allowing TFM Maintenance, Component Replacement, and Repair Requirements, without a Meter Verification Test requirement:

a) A Variance may be granted by the Division Engineer to allow specific Maintenance and Repair actions to occur without the requirement for a new TFM Verification Test to be performed. Following are the conditions that such a Variance may be considered:

² Qualified Well Tester as defined by the Rules: "a person who is currently certified by the State Engineer as qualified to determine the accuracy of a TFM and perform a Power Conversion Coefficient test on a well," or as specifically defined in a court decree prior to entry of Rules.

³ Well User as defined by the Rules: "any person diverting ground water from a Well. This may include, but is not necessarily limited to, the owner of a water right or well permit which allows the diversion of ground water and any person having the right to use such a water right or well permit owned by another, including all agents, employees, lessees, assigns or successors of the same."



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- (1) The current Meter Verification Test must have a Correction Factor⁴ within $\pm 5\%$ to allow Maintenance and Repair actions to occur without the need for a new TFM Verification Test to be performed.
- (2) Proposed TFM Maintenance, Component Replacement or Repair will not **significantly** modify the TFM accuracy (Correction Factor).
- (3) Person performing the TFM Maintenance, Component Replacement or Repair must be certified by the TFM Manufacturer to perform such action.
- (4) An approved Maintenance, Component Replacement or Repair Form must be approved as part of the Variance approval. Upon completion of any Maintenance, Component Replacement or Repair, the approved form must be submitted to the Division Engineer within 30 days of completion of such action. The Form shall contain at a minimum the following information:
 - (i) Variance approval number, as assigned by DWR
 - (ii) Name of Person or Entity performing action
 - (iii) TFM Serial Number
 - (iv) Well WDID and Permit Number
 - (v) Date of action performed
 - (vi) Description of action performed
 - (vii) Qualification of person performing action (Decree, Qualified Well Tester, Manufacturer's Certification, etc.)
 - (viii) Verification that TFM is operable upon completion of action. Ideally this would be a quick verification of actual water through the meter compared to the register. However, if water cannot be diverted a simple visual/audio verification that the flow meter operates quietly and rotates freely (no binding).
- (5) Under certain circumstances a Variance may be granted on a continuous ongoing basis with or without an expiration or review date.

- C. TFM Register (Readout) Replacement and Repair Requirements (Rules 3.1.5.3, 3.5.1)
Any time a register is changed or repaired on a previously verified TFM, the following procedure must be followed:

⁴ "Correction Factor" is a ratio representing the flow as measured by a test meter compared to the flow as measured by an installed TFM. A correction factor must be verified and submitted to the Division Engineer by a Qualified Well Tester in accordance with the Rules.



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1. All TFM register replacement and repairs must be in accordance with the manufacturer's recommendations and with the Rules and Measurement Rules Policy regarding accuracy.
2. A Meter Verification Test of the TFM with the new register in place must be performed before any water is diverted by the well/pump, except to perform the TFM Verification test. Additionally, form 3.1 – Notice of Totalizing Flow Meter Verification, Re-Verification, or Replacement must be submitted to Division of Water Resources, Division 1 before any water is diverted.
3. TFM registers must at all times be secured with a tamper-resistant cover. The tamper-resistant cover shall be “sealed” in place by means of a factory seal or a wire cable secured in place by a clamp or other mechanism. If a factory seal is replaced with a wire and seal clamp, the seal clamp shall be in accordance with item II.D below.
4. In addition to Form 3.1, the Qualified Well Tester or the Well User must supply the following information to DWR:
 - a) Verbal or written notification of intent to remove the factory seal prior to commencement of work;
 - b) In the event that water will be diverted for purposes other than, and prior to, a Meter Verification Test the above notification shall also include the following:
 - (1) The name of the person performing the replacement or repair, along with a brief statement of that person's qualifications if not a Qualified Well Tester;
 - (2) Reading from the TFM register being replaced or repaired (if possible) and the beginning reading of the new or repaired register on the submitted Form 3.1

D. Tamper Resistant Seals (Rules 3.1.2.3, 3.1.2.4)

1. Typically, a Qualified Well Tester or APA will install or replace broken tamper resistant seals on behalf of the Well User during a Meter Verification Test or approved maintenance program. It is the Well User's responsibility to ensure that tamper resistant seals are installed and maintained at all times.
2. Register (Readout or Canopy) Seals



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- a) All programmable TFM registers must at all times be secured with a tamper resistant cover. The tamper resistant cover shall be “sealed” in place by means of a wire cable that is threaded through cross-drilled holes in at least four cover bolts and secured in place by a clamp or other approved mechanism. The seal clamp shall be appropriate for outdoor use and be preprinted with a five to seven digit numeric identifier to be recorded on Form 3.1. In order for the cover and seal to be considered tamper resistant by the Division of Water Resources, it must not allow any modifications to the programmable functions of the flow meter without the breakage of the seal.
- b) All mechanical TFM registers must at all times be secured with a tamper resistant cover. The tamper resistant cover shall be “sealed” in place by means of a factory seal or a wire cable secured in place by a clamp of other approved mechanism. If a factory seal is replaced with a wire and seal clamp, the seal clamp shall be appropriate for outdoor use and be preprinted with a five to seven digit numeric identifier to be recorded on Form 3.1. *Other seal identifiers may be allowed if approved prior to use by the Division of Water Resources.* In order for the cover and seal to be considered tamper resistant by the Division of Water Resources, it must not allow any modifications to the flow meter without the breakage of the seal.

3. Saddle or Insert Type Meter/Sensor Seals

- a) All saddle or insert type mechanical meters and magnetic/ultrasonic sensors must at all times be secured in place with a tamper resistant seal around the pipe including a numeric identifier as described above. *Other seal identifiers may be allowed if approved prior to use by the Division of Water Resources.* The seal must be secured such that removal or movement of the TFM will break the seal.
- b) Meters that are temporarily removed and replaced in the same pipe and pipe configuration in accordance with II.B.2, II.B.4, & II.B.5 contained herein can be sealed with a new seal without re-testing the meter. Form 3.1 shall be completed and submitted by a Qualified Well Tester indicating the type of meter for which seal was replaced, new seal number, old seal number, and the TFM reading. No water shall be diverted while the meter is removed.

4. Broken register seals can be replaced by a Qualified Well Tester without re-testing the well by submitting Form 3.1. This will be allowed with the seal breaks due to environmental conditions (i.e. wire fatigue associated with the weather) and the Qualified Well Tester is able to accurately attest to no modifications being made to the installed TFM.

5. For programmable register seal replacement, submittal of the meter k factor will be required as part of the 3.1 submittal. Meter verification (Form 3.1) will not be considered complete by DWR unless all new and removed seal numbers and k factor (when applicable) are provided on Page 1 of Form 3.1.



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6. Any seal that is replaced for any reason (meter replacement, meter verification, etc.) should be documented as described above on Form 3.1 by checking all boxes that apply. For example, for a re-verification of a previously verified TFM that requires removal of the register seal, check the box for "Re-verify Previously Verified TFM" and also the box for "Register seal replaced due to:" and include new and old seal number.

E. Remote Readouts or Registers (Rule 3.1.2.2, 3.1.2.3, 3.6)

1. Remote registers must be accessible and readable at any reasonable time.
2. In the event that a TFM is connected to a remote register, and the remote register is a secondary reading device to the TFM register, the remote register reading must display a direct numeral duplication of the TFM register, in accordance with ANSI/AWWA C706-10 Standard, Effective October 1, 2010 or as modified. The Well User shall verify that the TFM register and the remote register readouts are duplicative OR report the register reading from the actual TFM register but NOT the remote readout.
 - a) During a meter certification test, the remote register reading must be duplicative of the TFM's totalizing reading, and the information must be reported on form 3.1.
 - b) Note that a TFM's accuracy is being tested during a meter certification test, not the remote register's accuracy.

III. Test Procedures (Rule 3.1.5)

A. General Test Procedures

1. All test meters should be located and operated in accordance with the manufacturer's recommendations and specifications. If the existing piping configuration does not allow for this, the Qualified Well Tester should clearly note this on Form 3.1.
2. Measurement Device tests being performed on wells not in compliance with the Rules must be accomplished in accordance with Rule 5 – Water Not to be Withdrawn. Any water withdrawn pursuant to Rule 5 from a Well with no legal means to operate, such as an approved augmentation or substitute water supply plan, must be immediately returned to the same stream system without application to beneficial use.
3. All wells shall be pumped continuously a minimum of 15 minutes before any TFM verification measurement readings are recorded (start-up time).
4. A minimum of three separate volume readings, each spanning a minimum of 5 minutes or a single volume reading spanning a minimum of 15 minutes from both the installed and test meters totalizing feature (excluding Collins Meter) must be obtained for a test to be considered valid.
5. All time increments, including start-up time, must be documented on Form 3.1 for test to be considered valid.



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6. The smallest allowable increment for the readings from the totalizing feature is at least one revolution of the smallest moveable digit. (For example: if the smallest digit recorded by the totalizing feature is 0.1 acre-feet, the smallest allowable volume reading is the time for 0.1 acre-feet to be recorded (i.e. moves from 0.1 to 0.2))
7. The calculated flow rate (volume/time) shall not change more than 2.5% between any readings.
8. All calculations should be adequately documented on Form 3.1 including, but not limited to, beginning and ending totalizer reading on both installed and test meters with corresponding start and finish times.
9. Instantaneous readings are not allowed for the test meter (except for Collins type testing equipment)

B. Mechanical TFM Test Procedures

1. For field verification of a mechanical TFM, instantaneous readings are not allowed on either the installed TFM or a mechanical test meter.
2. For field verification of a mechanical TFM, the totalizing feature of both the installed and test meters must be used. The only exception to this would be for a Collins-tube type test meter that measures the velocity directly.

C. Magnetic- or Ultrasonic-Type TFM Test Procedures

1. For field verification of a magnetic- or ultrasonic-type TFM, the totalizing feature of both the installed and test meters must be used unless the time for the totalizing feature on the installed flow meter to advance the smallest increment exceeds 15 minutes. In such case, instantaneous readings of the installed TFM may be allowed in-lieu of the totalizing feature readings. The TFM instantaneous flow readings must consist of a minimum of 10 separate instantaneous readings taken at documented even intervals over a minimum time period of 15 minutes not including the start-up time. The instantaneous flow rates taken shall not vary by more than 2.5% between any readings. The Totalizing feature of the test meter must be used (no instantaneous observations will be allowed).
2. For tests utilizing instantaneous readings, the test meter reading shall span the concurrent time interval as the installed meter test.

D. Collins-Type Meter Test Procedures

1. Use of any Collins or other types of manometers shall follow manufacturer recommendations and specifications in completing TFM certifications. Deviations from manufacturer recommendations and specifications shall be noted and submitted on the prescribed test forms.



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2. For a Collins tube, a Two-Point Test shall be accomplished by taking a front and back reading on both sides of the pipe at a distance equal to $0.354 * \text{I.D}$ (inside diameter) from the center of the pipe. The readings from each side of the pipe shall be averaged separately. If the difference between the average velocities from each side of the pipe is greater than one foot per second (1 fps), a Ten-Point Test must be performed. A Two-Point Test will not be accepted.
3. With a Collins Meter test, every effort shall be made so that the test is performed a minimum of three pipe diameters upstream or one pipe diameter downstream of the existing installed flow meter. Written documentation on Form 3.1 of flow rate recorded by the installed TFM should be made after the removal of the Collins Tube to confirm that the Collins Tube obstruction during the test does not cause inaccuracies to the installed flow meter.
4. If the Collins Meter is located less than 3 pipe diameters from any obstruction (i.e. flow meter, bend, valve, reduction, etc.) a Ten-Point Test is required.
5. For Flow Constants (gallons/minute/foot/seconds) not listed on the Collins Meter chart the appropriate equation below should be used. (Note: The following equations can always be used):
 6. Pipe sizes up to 10-inch NPS (Nominal Pipe Size): $(2.55 * D^2) - D$
 7. Pipe sizes over 10-inch NPS: $(D^2 * 2.45)$
 8. Where D = Inside Diameter (inches)

E. Volumetric Test Procedures

1. Use of volumetric test will be considered on a case by case basis. Any Tester that proposes to utilize a volumetric test must contact the Division of Water Resources prior to commencement of the test to propose measurement technique. Failure to obtain preliminary approval may result in denial of test and require re-testing. The following guidelines are recommended:
 - a) A minimum test time of one minute is required for a single volumetric measurement. This means that the minimum volume allowable in gallons is equal to the well flow rate in gallons per minute (gpm). For example, a 50 gpm well would require a minimum single vessel volume of 50 gallons for a one minute test.
 - b) Three separate tests shall be performed in using a volumetric test method, and the results of the three separate tests shall be averaged together and entered on Form 3.1.
 - c) The volumetric vessel shall be calibrated by weight using the value of 8.34 lbs per gallon for cool water or dimensionally using the value of 7.48 gallons per cubic foot.



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d) The scale used for vessel calibration shall be accurate for the calibrated weight of water and shall be documented on Form 3.1. Any available scale certification documentation such as scale tickets should be submitted with Form 3.1.

IV. Totalizing flow meter accuracy and variances (Rule 3.1.3)

A. Totalizing flow meters shall be deemed to be in accurate operating condition when the flow measured by the meter is within plus or minus 5% of an independent field measurement made using calibrated test equipment, by a Qualified Well Tester as defined by the Rules.

B. TFM's that fail to meet the accuracy standard of paragraph 3.1.3.1 of the Rules will use a Correction Factor pursuant to Rules 3.1.3.2 and 3.1.3.3 as summarized on the table below.

% of Field Measurement	Correction Factor	Requirements
±5%	0.950 to 1.050	No Request for Variance is required, no Correction Factor applied
±5 to 8%	0.949 to 1.051 OR 0.920 to 1.080	No Request for Variance is required, Correction Factor applied, good for four years
±8 to 10%	0.919 to 1.081 OR 0.900 to 1.100	No Request for Variance is required, Correction Factor applied TEST WILL BE VALID FOR ONE YEAR ONLY ⁵ . No later than one year from the date of this test, a new measurement test must be conducted and the accuracy of the new Test must be within at least ±8.0% or better.
Above ±10%	<0.900 OR >1.100	UNACCEPTABLE; Meter/System must be repaired/replaced unless a variance is approved by the Division Engineer ⁵ .

⁵TFMs installed prior to the effective date of the Rules (December 31, 2013) providing evidence of stable and accurate measurements that are greater than ±8% but no more than ±15% of an independent field measurement(s) made by a Qualified Well Tester using calibrated test equipment may be granted a variance by the Division Engineer. See Paragraph IV.E. below for conditions.



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C. The Correction Factor must be calculated by a Qualified Well Tester as defined by the Rules

D. If the flow measured by the TFM is within 5% - 10% of an independent field measurement made with calibrated test equipment, a Correction Factor will be applied to calculate all well diversions through the TFM until a new 3.1 form is submitted and approved by the Division of Water Resources.

1. TFM's that are verified to measure within $\pm 5\%$ of the actual flow by calibrated test equipment DO NOT apply a Correction Factor in the computation of the diversions by a well.
2. TFM's that are verified to measure $\pm 5-10\%$ of the actual flow by calibrated test equipment WILL apply a Correction Factor in the computations of the diversions by a well.
 - a) The Correction Factor for a TFM will be applied in the computation of diversions by a well by applying the Correction Factor from the date of the test forward until the date of a subsequent test.

Correction Factor = $(Q_{\text{test meter}}) / (Q_{\text{installed meter}})$

Diversion = Meter Reading * Correction Factor

E. TFM's installed prior to the effective date of the Rules (December 31, 2013) showing stable measurements that are greater than $\pm 8\%$ but no more than $\pm 15\%$ of an independent field measurement(s) made by a Qualified Well Tester using calibrated test equipment may be granted a variance by the Division Engineer provided the following:

1. The TFM must be installed in a plumbing configuration existing prior to the effective date of the Rules, as evidenced by documentation (i.e. affidavit) submitted by applicant supporting the variance request and approved by Division Engineer
2. A Qualified Well Tester or other person authorized to perform a certification test must perform an initial certification test demonstrating that the flow measured by such TFM is more than plus or minus 8% but no more than plus or minus 15% of an independent field measurement using calibrated test equipment. The Qualified Well Tester or other person authorized to perform a certification test must also calculate a Correction Factor based upon this initial test.
3. A Qualified Well Tester must perform a second certification test of the TFM at a date more than one year but less than two years subsequent to the date of the initial certification test for the TFM. This second certification test must demonstrate that the flow measured by such TFM is no more than plus or minus 15% of an independent field measurement using calibrated test equipment. In addition, the Correction Factor calculated based upon this second certification test must be within 4% of the Correction Factor calculated based upon the initial certification test.



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4. Subsequent certification tests for the TFM shall be performed within four years of the date of the initial certification test and each subsequent certification test (other than the second certification test), as provided for in the Rules. These subsequent certification tests must demonstrate that the flow measured by such TFM is no more than plus or minus 15% of an independent field measurement using calibrated test equipment, and the Correction Factors calculated based upon such subsequent certification tests must remain within 4% of the Correction Factor for the initial test. If these conditions are not met, the Division Engineer may cancel the variance, and the TFM may not be used until certified to be within Accurate or Acceptable Operating Condition under the Rules or until a subsequent variance is granted.
5. An alteration to the plumbing configuration, including relocation of the TFM, may result in the Division Engineer cancelling the variance, and the TFM may not be used until certified to be within Accurate or Acceptable Operating Condition under the Rules or until a subsequent variance is granted.
6. The Division Engineer may, at his discretion and in accordance with 37-92-502 (6) C.R.S. and Rule 3.6, field inspect the plumbing configuration for the TFM or test equipment to confirm that the discrepancy between the flow as measured by the TFM and as measured using calibrated test equipment may fairly be attributed to the plumbing configuration, and that the error introduced by the plumbing configuration cannot be remedied by a simple relocation of the TFM to a more suitable location within the plumbing configuration.

V. Power Conversion Coefficient Alternate Measurement Method Policies (Rule 3.2)

The following items are intended to clarify items discussed in Rule 3.2 of the Rules.

A. General Test Procedures (Rule 3.2.1)

1. At least five measurements of both pumping level and operating pressure taken at the beginning and end of at least four consecutive 15 minute periods showing both operating pressure and drawdown have not changed by more than 10% per hour when operated at a constant discharge rate.
2. In situations where the pumping level cannot be obtained:
 - a) The reason is provided on Form 3.2: no access hole, well is pumping air, non-vertical well bore, and permission not granted by Well User, etc.
 - b) The pump has run a minimum of two hours prior to the beginning of the test, and
 - c) Neither the operating pressure nor discharge rate change by more than 2.5% over a 1 hour period, determined by at least five measurements of both operating pressure and discharge taken at the beginning and end of at least four consecutive 15 minute periods.
3. Must maintain a full pipe of water during testing and be performed during normal operating conditions.



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- a) If the system does not have a full pipe of water and has to be adjusted with a valve or temporarily modified to achieve a full pipe (squeezed down) at any point during the year (irrigation year) and/or in order to perform a PCC, a TFM will be required. Any required modification during the testing to obtain a full-pipe MUST be noted on the test form submitted.
- b) If the system has been re-nozzled, a new PCC is required.

4. Any system in which a well is physically commingled with another well(s), will exclude the Well User from using PCC as an alternate method of measurement in that system.

5. At least one single volume reading spanning a cumulative elapsed time of no less than 15 minutes must be obtained by the Qualified Well Tester if using calibrated flow measurement testing equipment (excluding Collins Meter) after the system has been proven to be stabilized.

6. If the qualified well tester uses a Collins test meter, three separate instantaneous readings spaced across a 15 minute interval must be determined. The tester will then average the three separate readings. The flow rate shall not change more than 2.5% during the well test.

7. When determining the Average Rate of the Power Demand for the well system, a minimum of 5 readings with the elapsed time of each reading equaling no less than 1 minute must be taken. The average of the five readings will then be used in the Power Demand calculations.

8. In regard to Rule 3.2.3, if the difference between any two congruent PCC ratings is greater than 5%, both ratings shall be considered invalid and a PCC will not be considered an accurate method of measurement from the date of the second test forward, unless the well user or APA submits and obtains approval of a variance providing adequate detail and documentation to explain the differences in ratings. If the PCC is not considered to be an accurate method of measurement, the PCC method will not be allowed and the well must be equipped with a TFM.

9. Instances that may qualify for a variance include but are not limited to the following:

- a) Permanent modifications to the pumping and/or piping systems after the initial rating has been accomplished but before the second rating is completed.
- b) In the event permanent modifications to the pumping and/or piping systems are made, a new PCC rating is due immediately after the modifications have been completed.

B. Application of PCC Rating to Calculated Diversions from a Well (Rule 3.2.2)



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1. A PCC rating shall meet the requirements of Rule 3.2 of the Measurement Rules. Total Diversions shall be applied for the computation of rating and resulting diversions from a well based upon a PCC as follows:

- a) The first or initial rating shall be relied upon to calculate the total groundwater diversions from a well until the second PPC test is conducted.
- b) After the second PCC test is conducted, an average of the first and second PCC ratings will be relied upon to calculate the total groundwater diversion from a well for two years (until the date of a subsequent PCC) after the date of the second test so long as the two tests meet the standards of Rule 3.2.2.3.

VI. Data Submission (Rules 3.1.5.4, 3.2.2.5, and 6)

The following items are intended to clarify items discussed in Rules 3.1, 3.2, and 6 of the Rules regarding the submission of data.

A. Rule 3.1.5.4 and 3.2.2.5 requires written proof of meter certification to be submitted to the Division engineer on a form or in a format prescribed by the State Engineer. Certified well test data shall be submitted on prescribed Form 3.1 – Notice of Totalizing Flow Meter Re-Verification, Installation, or Replacement and Form 3.2 – Notice of Power Consumption Coefficient Rating or Re-Rating. Currently, submittal may be submitted to the Division Engineer by 1) hardcopy submittal through the mail; or 2) by digital email submittal as outlined below.

B. In accordance with Rule 6.1 and 6.2, monthly well diversions shall be submitted on Form 6 – Water Use Reporting Form, or using DWR's online reporter or bulk upload tool. Other submittals of monthly well diversions may be accepted on a case-by-case basis if approved by the Division Engineer. A request must be made to the Division Engineer in writing either providing an example of such submittal or describe in detail how the submittal will be made. When possible it is preferable that augmentation plans submitting individual well diversions or meter readings as part of monthly or annual accounting submittals to the Division Engineer do not need to duplicate submittals under the Rules as the submittal is approved by the Division Engineer. However, at a minimum, the accounting submittals must meet certain standards which may include the following:

1. Meter Serial Number
2. Well WDID (unique Division of Water Resources Structure Identifier)
3. Meter Reading (entire meter reading, all digits, no decimals)
4. Meter multiplier
5. Date of Meter Reading
6. Type of Meter Reading (Actual, Estimated, Calculated, Corrected, Total Diversion, Other)



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C. (Rule 3.1.5 – Meter Certification) An active well is considered out of compliance with the Rules if its meter certification has expired and until the Division of Water Resources has received and approved the TFM or PCC test.

1. An expired meter certification remains expired and may come under enforcement even if a meter certification test has been completed but has not been submitted to the Division Engineer
2. Completed meter certification tests must be submitted to the Division Engineer within and no later than 30 days from the completion of the test. A certification test will be rejected if the test is received by the Division Engineer later than 30 days from the completion of the test.

D. All tests not accepted will be returned to the Well User or APA, and the Qualified Well Tester with the address(s) provided on the forms.

E. Only those forms found on the Colorado Division of Water Resources website under <http://water.state.co.us/groundwater/GWAdmin/UseAndMeasurement/Pages/SouthPlatteRBRules.aspx> or forms/formats already approved by the Division Engineer will be allowed.

F. Electronic submittal of all measurement forms (email):

1. Submittal of a completed form may be sent to DWR by email at dnr_div1spgwm@state.co.us
2. Submittals must be complete, including required signatures and completely legible. Submittals not complete or legible will be returned to the same email address as delivered.
3. Emailed submittals shall meet the following criteria:
 - a) One test per email correspondence.
 - b) Subject line of email shall contain at a minimum the WDID or Permit Number of the Well.
 - c) The test documentation file must be included as an attachment to the email. The Well Test, Photos, Documentation, etc. shall be combined and attached to the email as ONE Document/Attachment. The attachment shall be formatted as a PDF file only.
4. Submittals and their attachment should be reduced to the smallest file size while maintaining adequate quality. Typically the file should not exceed 10 MB when submitted by email.

G. Forms other than DWR forms created by others must be pre-approved by DWR personnel prior to submittal. This includes but is not limited to: modified forms, spreadsheets, and digital submittals.



VII. Calibrated testing equipment (Rule 3.7)

- A. All Qualified Well Testers are required to provide evidence verifying their flow measurement testing equipment (excluding Collins Test Meters) have been semi-annually (every 2-years) calibrated, rated accurate within plus or minus 2%, in good working condition, all in accordance with the Rules.
- B. Qualified Well Testers are required to submit copies of their well meter testing equipment certification to the Division Engineer. All meter certification tests and PCCs conducted by calibrated equipment will be rejected if the calibration documentation is not submitted to the Division Engineer.
- C. A volumetric vessel (Bucket) that is used as testing equipment to verify installed flow meters shall be calibrated by weight, using the value of 8.34 lbs per gallon for cool water or dimensionally using the value of 7.48 gallons per cubic foot. The scale used for vessel calibration shall be accurate for the calibrated weight of water, and any available scale certification documentation, such as scale tickets, must be submitted upon request.

VIII. Variance Policies (Rule 11)

The following items are intended to clarify items discussed in Rule 11 of the Rules. Rule 11 of the Rules, allows the Division Engineer to grant variances when the strict application of any provisions of the Rules would cause undue hardship. The intent of this Policy Memorandum is to establish principles, guidelines, and requirements for variance requests.

- A. Variance requests shall be submitted on prescribed Form 11 – Variance Request for review by the Division Engineer. Failure to accurately or completely submit Form 11 may result in the rejection of the Variance Request.
- B. The Division Engineer shall make best efforts to issue a written order on any variance request within 14 calendar days of submission. Any variance not approved by the Division Engineer within 14 calendar days for submission may be deemed a denial of such request for purpose of appeal.
- C. Approval of a Variance Request by the Division Engineer should be obtained by the Well User prior to any proposed modifications or materials being ordered. This is to avoid any difficulty to the Well User in the event the Variance Request is denied.
- D. In interpreting Rule 11 the term “undue hardship” will be broadly construed to lessen the burdens of compliance with the Rules consistent with and not contrary to any term or condition of a water court decree regarding the operation of the Well for which a variance is sought, and is consistent with reliable measurement and reporting of groundwater withdrawals.
- E. Variances will not be granted in the following cases:
 1. Where the measurement device measures water from separate sources including surface and groundwater, but provides only a total measurement of all flows;



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2. Where the measurement device and/or interim water measurement program is inoperable due to being intentionally damaged or destroyed by the Well User or at their direction.

F. The granting of a variance under Rule 11 is solely a variance from certain requirements for the Rules, and is not a substitute for compliance with any other lawful requirements applicable to the withdrawal and use of groundwater, and a variance does not excuse any such non-compliance.

G. A granted variance shall be identified by the WDID number and the date the variance is granted (mm/dd/yyyy).

H. Rule 3.1.5.5 provides for a variance for "a well or wells within a decreed plan of augmentation that has or have not been used and has or have not been Operationally Disabled, where such plan adequately documents such non-use through operational TFM's."

1. Monthly TFM readings shall be submitted annually in accordance to Rule 6 on Form 6 documenting such non-use.

2. Further documentation shall be submitted showing that the TFM remains operable.

Dick Wolfe

February 1, 2015

Dick Wolfe, P.E.

Date

Director/State Engineer