



DIVISION OF WATER RESOURCES

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DATE: APRIL 1, 2008

TO: APPROVED WELL TESTERS
GROUND WATER ASSOCIATIONS
ASSOCIATION CONSULTANTS

FROM: CHRISTINE M. LYTLE, GROUND WATER OPERATIONS COORDINATOR
DIVISION OF WATER RESOURCES, DIVISION 2

SUBJECT: MEASUREMENT RULE POLICY 2008-03.1A

- ◆ CLARIFICATIONS TO AMENDED MEASUREMENT RULE 3.1: TOTALIZING FLOW METERS:
 - EQUIPMENT, INSTALLATION AND REPAIR & MAINTENANCE OF TFMS
 - REPORTING REQUIREMENTS
- ◆ **EFFECTIVE DATE: APRIL 11, 2008**

PURPOSE

This MEASUREMENT RULE POLICY pertains to RULE 3.1 of the AMENDED RULES GOVERNING THE MEASUREMENT OF TRIBUTARY GROUND WATER DIVERSIONS LOCATED IN THE ARKANSAS RIVER BASIN (AMENDED MEASUREMENT RULES). RULE 3.1 concerns STANDARDS AND SPECIFICATIONS for TOTALIZING FLOW METERS (TFMs), including INSTALLATION, CALIBRATION, TESTING, REPAIR and MAINTENANCE.

This POLICY addresses **EQUIPMENT STANDARDS, INSTALLATION STANDARDS and REPAIR and MAINTENANCE** of TFMs. This POLICY repeals and replaces the following previously-issued POLICIES:

- ◆ MEASUREMENT RULE POLICY 2006-03.1A "CLARIFICATIONS TO AMENDED MEASUREMENT RULE 3.1: TOTALIZING FLOW METERS"
 - Dated February 15, 2006 Repealed and Replaced in its entirety

Changes from previous policies related to this issue include:

- ◆ Clarification of the conditions under which accuracy must be confirmed.

BASIC STANDARDS

- ◆ RULE 3.1 specifies basic requirements for all TOTALIZING FLOW METERS (TFMs):
 - "Any meter designed and manufactured for the purpose of measuring the flow of water, and which has a totalizing feature, shall be considered to be acceptable ..."
 - "... totalizing flow meters shall ... contain sufficient recording digits to assure that "roll over" to zero does not occur within three years ..."

- ◆ STATE STATUTE authorizes DIVISION STAFF to access all MEASURING DEVICES to monitor compliance with the AMENDED MEASUREMENT RULES and the AMENDED RULES AND REGULATIONS GOVERNING THE DIVERSION AND USE OF TRIBUTARY GROUND WATER IN THE ARKANSAS RIVER BASIN, COLORADO (AMENDED USE RULES). Therefore, in addition to the basic requirements stated in RULE 3.1, **TFMs must be accessible and readable** when an inspection is made.

TFM ACCURACY:

- ◆ AMENDED MEASUREMENT RULE 3.1.1 states:
 - " ... **An installed flow meter shall be determined to be in accurate operating condition when the indicated flow of the meter is within plus or minus 5% of an independent field measurement** made using calibrated test equipment. ... "
 - Therefore, **TFMs shall be deemed to be in accurate operating condition when the flow measured by the installed meter under ALL TYPICAL FLOW CONDITIONS is within plus or minus 5%¹ of the flow measured by the test equipment.**
- ◆ The WATER WELL METER TESTER should evaluate:
 - Whether FULL-PIPE FLOW CONDITIONS at the INSTALLED TFM can be expected to occur under ALL TYPICAL FLOW CONDITIONS
AND
 - Whether ALL TYPICAL FLOW CONDITIONS are within the MANUFACTURER'S RECOMMENDED RANGE for the INSTALLED TFM.
- ◆ Should further observation by DIVISION 2 find that the INSTALLED METER is not accurate throughout ALL TYPICAL FLOW CONDITIONS, the DIVISION can require that different or additional TFM(s) be installed to provide the required level of accuracy.

SUFFICIENT RECORDING DIGITS:

- ◆ The "**ROLL OVER**" frequency of a TOTALIZING REGISTER is based **actual use**, not maximum potential use.

REPLACEMENT OF TFM REGISTERS:

Anytime a REGISTER is changed on a PREVIOUSLY-VERIFIED TFM, the following procedure must be followed:

- ◆ REPLACEMENT of a TFM REGISTER must be performed by the MANUFACTURER or the MANUFACTURER'S REPRESENTATIVE or by an approved WELL TESTER.
- ◆ Before a REGISTER is changed, the MANUFACTURER must be contacted to determine the proper gear ratio so that the installation is in compliance with MANUFACTURER'S RECOMMENDATIONS and with the AMENDED MEASUREMENT RULES and MEASUREMENT POLICIES requirements for accuracy.
- ◆ A verification of the TFM, with the new REGISTER in place, must be performed before any water is diverted by the WELL/PUMP.

¹ Or as allowed by DIVISION 2 as a VARIANCE.

- ◆ In addition to FORM 3.1, NOTICE OF TOTALIZING FLOW METER INSTALLATION, CERTIFICATION OR RE-VERIFICATION, the WELL TESTER or the WELL OWNER/USER must supply the following information:
 - The name of the person performing the Replacement, along with a brief statement of that person's qualifications if not an approved WELL TESTER,
 - Documentation MANUFACTURER'S RECOMMENDATIONS and certification that those recommendations were followed and
 - The FORM 3.1 must provide both the FINAL READING from the TFM REGISTER being replaced and the BEGINNING READING of the new REGISTER.

ELECTRICALLY-POWERED TFM'S

The following standards shall apply to **ELECTRICALLY-POWERED TFM'S**:

EQUIPMENT STANDARDS

- ◆ ELECTRICALLY-POWERED TFM'S **must be non-resettable and tamper-resistant.**
- ◆ ELECTRICALLY-POWERED TFM'S dependent upon **BATTERIES** as their principal source of power are **not allowed**.
 - BATTERIES may serve as a backup POWER SOURCE only.
- ◆ The TFM'S DISPLAY must be readable whether or not the WELL/PUMP is running.
 - Specifically, any WELL that discharges without the use of an ELECTRICALLY-POWERED PUMP, such as an ARTESIAN WELL, must have a CONTINUOUS POWER SUPPLY to the TFM'S DISPLAY/REGISTER at ALL times, whether or not the WELL/PUMP is running/flowing.

INSTALLATION REQUIREMENTS

- ◆ TFM'S dependent upon ELECTRICITY for operation must be hardwired to the ELECTRIC BOX.
 - There can be no splices, disconnects or switches between the TFM(S) and the ELECTRIC BOX.
 - The wire between the ELECTRIC BOX and the TFM must be encased in conduit or otherwise routed and attached in such a manner as to prevent breakage from livestock, wildlife and the elements.
- ◆ Any wire between a TFM and a REMOTE READOUT:
 - Must be a continuous wire with neither splices nor disconnects.
 - Must be encased in conduit or otherwise routed and attached in such a manner as to prevent breakage from livestock, wildlife and the elements.
- ◆ **TFM'S must be installed outside of ELECTRICAL CABINETS and/or APPLIANCES.**
 - The TFM'S DISPLAY must be clearly visible without having to open or otherwise access ELECTRICAL CONTROL CABINETS.

EXISTING ELECTRICALLY-POWERED TFM

- ◆ EXISTING ELECTRICALLY-POWERED TFMS that have been previously-verified and approved by the DIVISION may continue to be used for the WELL/PUMP upon which they are currently installed for the remainder of the verification period unless a METER FAILURE occurs.
 - In the event an EXISTING ELECTRICALLY-POWERED TFM that does not meet the above EQUIPMENT STANDARDS and/or INSTALLATION REQUIREMENTS fails either due to battery failure or due to broken or damaged wiring, the existing ELECTRICALLY-POWERED TFM must be replaced.
 - If the replacement METER is an ELECTRICALLY-POWERED TFM, it must meet the above EQUIPMENT STANDARDS and INSTALLATION REQUIREMENTS AND
 - Must be verified by an approved WELL TESTER before any water is diverted from the WELL/PUMPS.
- ◆ As verifications of EXISTING ELECTRICALLY-POWERED TFMS expire, the EXISTING TFMS must meet the above EQUIPMENT STANDARDS and INSTALLATION REQUIREMENT or be replaced by a TFM meeting those STANDARDS and REQUIREMENTS.

REPORTING TFM VERIFICATION (FORM 3.1):

- ◆ **FIELD VERIFICATION OF TFMS** must be reported:
 - By the CERTIFIED WATER WELL METER TESTER who conducted the TEST,
 - Using the most recent "FORM 3.1 - NOTICE OF TOTALIZING FLOW METER RE-VERIFICATION, INSTALLATION OR REPLACEMENT" dated 04/01/08 or later AND specific to the applicable DIVISION AND
 - **Be completed in its entirety**.
- ◆ **Failure to use the latest TEST FORM** required by the applicable DIVISION **or to complete the TEST FORM in its entirety will delay** review and **approval of the TEST**.
 - All non-compliant TEST FORMS will be returned to the CERTIFIED WATER WELL METER TESTER for proper completion and resubmittal.

If you have questions about this or other MEASUREMENT RULE POLICIES, contact DIVISION 2 GROUND WATER OPERATIONS at 719.542.3368: Dan DiRezza (Ext. 2202), Dale Baker (Ext. 2121) or Chris Lytle (Ext. 2108).