Republican River Basin Ground Water Measurement Rules
Guideline 2013 - Interim Water Measurement Program for Inoperable or Inaccurate Meters
(Clarification to Rule 16.5. A.3)

1) Requests for The Republican River Basin Policy regarding an Interim Water Measurement Program in the event that a meter is found to be inoperable or inaccurate shall be in accordance with the following:
    a. The owner of the Well shall immediately notify the State Engineer and establish a Specific Interim Water Measurement Program to estimate all diversions of water from the well until the measurement device is replaced or repaired.
    b. If the meter is not replaced or repaired and verified to be in accurate operating condition within 14 calendar days of the Notification to the State Engineer, the Well shall not be operated until the meter is replaced or repaired or the State Engineer grants a variance allowing an Interim Measurement Program beyond 14 calendar days until the meter is repaired or replaced.
    c. The following methods of establishing an Interim Measurement Program to obtain an accurate estimate of diversions from the well that will be considered by the State Engineer include the following:
        i. A PCC may be allowed as an Interim Measurement Program. The PCC must be completed by a Qualified Well Tester. If the PCC is used as the Interim Measurement Program, not as the primary measurement device, it can be an existing backup PCC that was done at the time of the most current primary measurement device accuracy verification test. A new PCC may not be used to estimate water use after the water has been diverted (backward).
        ii. The use of a sprinkler hour clock in conjunction with the most recent flow meter verification test results for all times that the sprinkler is being used to irrigate.
        iii. The use of power records during the Interim Measurement Program to correlate power records to the totalizing flow meter (TFM) during a representative year when the TFM was operable.
        iv. An estimation of the amount of water pumped for irrigation purposes based upon the assumption that the Crop's full Water Requirement was met during the time that the ground water measurement meter was inoperable. The crop's Net irrigation water requirement will be determined based upon the Crop Consumptive Use (Table 1 – Crop Water Requirement) divided by the crop irrigation method efficiency (Table 2).
            - For purposes of estimating the water diverted, it is assumed that the Effective Precipitation is zero inches.
            - If surface water is used in conjunction with the well, the available surface water supply will be subtracted from the crop's full irrigation requirement prior to estimating the amount of water pumped from the well. If surface water is used in conjunction with the well, the available surface water supply will be subtracted from the crop's full irrigation requirement prior to estimating the amount of water pumped from the well.

2) A Variance Request submitted requesting to estimate withdrawals that occurred for all or a portion of the Irrigation Year after they have occurred (retrospectively). The Crop Water Requirement methodology outlined in Item 1.c.iv above for estimating well diversions, will be the standard accepted method for estimating well diversions. In addition, the following conditions may apply to the approval and granting of a Variance to estimate past well diversions as outlined below:
    a. Submittals requests for Variances to Rule 16.5 must be made on Form 11 – Standard Variance Requests. In addition to all data requested on From 11, at a minimum the following information must be included:
        i. 3 years of the following:
            - Power records
            - Crop type and yield
            - Cultivating and harvesting dates
            - Irrigation method (sprinkler or flood)
            - Sprinkler irrigation details including: nozzeling (overhead, drop ,LEPA), ET, etc.
            - Total irrigated acres.
            - Permitted and ALL actual use of well (irrigation, commercial, stock, etc.)
            - Surface water supplied to irrigation (provide evidence)
    b. If the Variance Request is to estimate withdrawals for all or a portion of the Irrigation Year, and a PCC is the approved method of measurement, the Owner ***may*** be required to install a totalizing flow meter (TFM) and not allowed to use the current PCC into the future. **The PCC will not be considered valid and a TFM will be required if upon review of the Variance Request it appears that the PCC is not accurately measuring the annual withdrawl from the well within ±10% (subject to change).**
    c. If the Variance Request is to estimate withdrawals for all or a portion of the Irrigation Year, and a totalizing flow meter is the approved method of measurement the Owner will be required to submit with the Variance Request a meter accuracy verification test (Form 3.1) indicating that the TFM is either 1) inoperable or 2) not accurate within ±5% and the tested accuracy.
        i. In the event that the TFM is inoperable, the Owner may request that the diversion be estimated in accordance with Item 2) above.
        ii. In the event the TFM is operable but not accurate within ±5 % as verified by the Qualified Well Tester, the previous withdrawal may be estimated by applying the Correction Factor to the appropriate TFM readings. The Owner shall not divert water until the meter is replaced or repaired and verified by a Qualified Well Tester to be within ±5% accuracy.
    d. The Engineers retain the discretion to reject any interim water measurement methodology that will not result in a reasonably accurate estimate of ground water withdrawals.
    e. A variance will not be issued if the approved measurement method is inoperable due to being intentionally altered, damaged, destroyed, or any alteration of the pumping system to alter the accuracy by the owner or user of the well or at the discretion/direction of the owner.
    f. A Variance will not be issued if the State Engineer determines that the existing method of measurement that was approved and in-place during the season is reasonably accurate.

Guideline - Republican River Basin Interim Water Measurement Program
(Clarification to Rule 16.5. A.3)

The following Tables and Example provide clarification of estimating well diversions based upon Crop Water Requirement and Irrigation Efficiency in accordance with this Policy:

Table 1 - Crop Water Requirement*
(values in inches)

| | Corn (Grain) | Corn (Silage) | Wheat | Grass Hay | Alfalfa Hay | Sorghum | Dry Beans | Oats | Sugar Beets |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Totals | 28.63 | 25.72 | 23.06 | 29.23 | 36.68 | 18.56 | 16.89 | 19.05 | 27.99 |

*Values obtained from Republican River Basin Compact Computation Spreadsheet. Crop Water Requirement represents the average of all Counties in the Republican River Basin.

**Table 2 - Efficiency Factors for Estimating Pumping In Colorado***

| Sprinkler Irrigation | Flood/Gated Pipe/Furrow Irrigation |
|---|---|
| Maximum Farm Efficiency (%) | Maximum Farm Efficiency (%) |
| (3) | (6) |
| 80% | 65% |

Source:

(3) Estimated

(6) Estimated

*Values obtained from Republican River Basin Compact Computation Spreadsheet.

**Irrigation Water Demand (Water Diverted From Well):**

***[(Table 1 Crop Water Requirement) – (Effective Precipitation = 0)] / (Table 2 Efficiency Factor)***

Note: Effective Precipitation Estimated to be zero (0) inches.

Example: 120 acres of grain corn irrigated with a center pivot sprinkler system.

**[(28.63 inches) * 1 foot / 12 inches) / 0.80] * (120 acres) = 357.88 acre-feet Diversion**