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DATE: APRIL 1, 2008

TO: APPROVED WELL TESTERS
GROUND WATER ASSOCIATIONS
ASSOCIATION CONSULTANTS

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SUBJECT: MEASUREMENT RULE POLICY 2006-03.2A

- ◆ ALLOWABLE VARIANCE TO AMENDED MEASUREMENT RULE 3.2: SYSTEM STABILIZATION
- ◆ **EFFECTIVE DATE: APRIL 11, 2008**

PURPOSE

This MEASUREMENT RULE POLICY pertains to RULE 3.2 of the AMENDED RULES GOVERNING THE MEASUREMENT OF TRIBUTARY GROUND WATER DIVERSIONS LOCATED IN THE ARKANSAS RIVER BASIN (AMENDED MEASUREMENT RULES). RULE 3.2 states that before a TEST to rate the **POWER CONSUMPTION COEFFICIENT (PCC)** can be conducted, the PUMPING SYSTEM must be stabilized. PUMPING SYSTEM STABILIZATION is demonstrated when the **PUMPING DRAWDOWN** and the **OPERATING PRESSURE** remain within a limited range over a specific period of time.

This POLICY clarifies the methods to be used in measuring PUMPING DRAWDOWN and OPERATING PRESSURE and describes a VARIANCE that may be used if the PUMPING DRAWDOWN and OPERATING PRESSURE cannot be measured. This POLICY repeals and replaces all previously-issued POLICIES pertaining to the PUMPING DRAWDOWN and OPERATING PRESSURE, in particular:

- ◆ MEASUREMENT RULE POLICY 2006 03.2A "ALLOWABLE VARIANCE TO AMENDED MEASUREMENT RULE 3.2: SYSTEM STABILIZATION"
 - Dated February 15, 2006 Repealed and Replaced in its entirety

APPLICABLE AMENDED MEASUREMENT RULES:

- ◆ AMENDED MEASUREMENT RULE 3.2 states, in part:
"The State Engineer may adopt standards and specifications for power coefficient testing. As a minimum, **power coefficients shall:** be determined utilizing rating procedures approved by the State Engineer and conducted under the supervision of an individual or entity annually approved by the State Engineer to do such tests; **be conducted when the pumping system has stabilized, i.e., both operating pressure and pumping drawdown has not changed more than 10% in the last hour; ... "**

DETERMINING SYSTEM STABILIZATION

- ◆ Before beginning a TEST to develop a POWER CONSUMPTION COEFFICIENT (PCC), the WELL TESTER must demonstrate the PUMPING SYSTEM has stabilized. Both the PUMPING DRAWDOWN and OPERATING PRESSURE **must not change more than 10% per hour**.
 - **PUMPING DRAWDOWN** is defined as the difference between the STATIC WATER LEVEL and the PUMPING WATER LEVEL. Measurements are made in the WELL CASING and the depth is measured from the CENTERLINE OF THE DISCHARGE.
 - After determining the STATIC WATER LEVEL, the PUMP is turned on and the PUMPING WATER LEVEL is measured a minimum of four times at 15-minute intervals.
 - Once the PUMP is operating, the **OPERATING PRESSURE** is measured at the WELL HEAD. A minimum of four measurements made at 15-minute intervals is also required.
- ◆ Both the **PUMPING DRAWDOWN and OPERATING PRESSURE must not have changed more than 10%** per hour in order to demonstrate SYSTEM STABILIZATION.
 - The one-hour period “rolls” forward until the above criteria is met.

ALLOWABLE VARIANCE TO STANDARD SYSTEM STABILIZATION METHODS

- ◆ There are two frequently-occurring conditions that prevent adherence to the above requirements:
 - The PUMP is running prior to the WELL TESTER’S arrival, therefore the WELL TESTER is unable to determine STATIC WATER LEVEL and/or
 - PUMPING WATER LEVELS cannot be obtained due to lack of access to the WELL CASING.
- ◆ The following ALLOWABLE VARIANCES were developed to address these conditions:

PUMP RUNNING PRIOR TO WELL TESTER’S ARRIVAL

The following criteria must be met in order to assure a STABLE OPERATING SYSTEM

- ◆ The PUMP must run a minimum of two-hours prior to beginning the testing process.
 - The WELL TESTER needs to make every effort to determine how long the PUMP has been operating. However, it is the WELL OWNER/USER’S responsibility to provide that information to the WELL TESTER and failure to do so may prolong the time needed to conduct the TEST.
- ◆ The PUMPING SYSTEM will be considered stable when the change in PUMPING WATER LEVEL does not exceed one-foot per hour.
 - PUMPING WATER LEVEL MEASUREMENTS taken at 15-minute intervals must demonstrate that the change in PUMPING WATER LEVEL from one interval to the next is less than or equal to 0.25-feet OR
 - PUMPING WATER LEVEL MEASUREMENTS taken at one-hour intervals must demonstrate that the change in PUMPING WATER LEVEL from one interval to the next is less than or equal to 1.00-feet
- ◆ **For ALLUVIAL WELLS and other SHALLOW WELLS in the ARKANSAS RIVER BASIN ONLY:**
 - A minimum of two measurements of PUMPING WATER LEVEL, made 15-minutes apart, is sufficient.
- ◆ **For ALL OTHER WELLS**, a minimum of five measurements taken 15-minute apart OR a minimum of two measurements taken one-hour apart is required.

LACK OF ACCESS TO THE WELL CASING

If PUMPING WATER LEVELS cannot be obtained due to lack of access to the WELL CASING, a STABLE DISCHARGE RATE can be used as the indication of SYSTEM STABILIZATION. The following criteria must be met in order to qualify for use of this alternative method:

- The PUMP must run a minimum of two-hours prior to beginning the testing process.
 - *See comments above about determining how long the PUMP has been running.*
- The PUMPING SYSTEM will be considered stable when the change in DISCHARGE RATE, as measured in GALLONS PER MINUTE (to the nearest 0.00 GPM) does not exceed 2.5% over a 15-minute interval.
 - DISCHARGE RATES must be determined a minimum of five-times at 15-minute intervals until the change in DISCHARGE RATE does not exceed 2.5% over a 15-minutes.

| Time | Flow Rate | Time | Flow Rate |
|-------|-----------|---|-----------|
| 01:00 | 326.63 | 01:45 | 314.8 |
| 01:15 | 323.27 | 02:00 | 309.51 |
| 01:30 | 318.51 | $(309.51 - 314.80) / 314.80 = -1.7\% < 2.5\%$ | |