

Susquehanna River Basin Commission

a water management agency serving the Susquehanna River Watershed



ATTACHMENT A

GENERAL AQUIFER TESTING PROCEDURES

The Commission's Aquifer Testing Guidance (Commission Policy No. 2007-01; December 5, 2007) document is available for download from our website (www.srbc.net) under the "Policies & Regulations" tab. Unless specified differently in the submitted aquifer testing plan, the project sponsor is responsible for completing an aquifer test in general accordance with the following procedures:

1. Aquifer testing should be initiated during asymptotic recessionary trending, or base flow, groundwater and surface water conditions. The background monitoring should demonstrate asymptotic recessionary conditions immediately prior to the start-up of the constant-rate test and must not begin until the aquifer is at least 90 percent recovered following completion of the step-drawdown test. A minimum period of 48 hours of background data should be performed to demonstrate recessionary trending. Background monitoring data that does not demonstrate recessionary surface water and groundwater level trends may result in a failed test.
2. The testing flow rate (gallons per minute) and the cumulative flow (total gallons pumped) should be recorded at a minimum of once per hour. All flow rate adjustments should be documented with measurement of flow before and after adjustment, time of adjustment, rationale for the adjustment, and provided in the hydrogeologic report. The pumping rate of the production well must be monitored with an appropriate flow measurement device that is accurate to within 5 percent. The target flow rate should be established as soon as possible once pumping begins and must be held constant to within 5 percent of the target flow rate for the duration. Tests that fluctuate more than 5 percent or exhibit a declining pumping rate due to excessive drawdown or insufficient pump capacity will be considered a failed test.
3. To verify the accuracy and proper function of the transducer(s) in the monitoring network, Commission staff recommends routinely collecting manual backup measurements at the frequency identified in the Aquifer Testing Guidance and periodically comparing the manual backup data to the real-time water level monitoring data from the transducer in the test well. Any discrepancies that are identified during the test, between the automated water level data and the manual backup water level data, should be clearly documented and resolved in the field. Both the automated water level data and the manual backup water level data should be plotted on hydrographs and included in the hydrogeologic report. Any discrepancies between the manual and automated water level data, and all adjustments made to the transducer during the test, must be documented in the field.



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notes, identified on the hydrographs, and described (timing and rationale for adjustment) in the text of the hydrogeologic report. Verification of proper function may prevent a failed test due to equipment malfunction.

4. A multi-parameter water quality meter should be used to monitor temperature, conductivity, pH, and turbidity in the test well discharge, at a minimum, once immediately after the start of the constant-rate test, once every 2 hours of active pumping during the test, and once immediately prior to pump shutdown. The water quality monitoring data should be presented in the hydrogeologic report with descriptive text and linear scale graphs that show the plotted trends of each recorded parameter throughout the aquifer testing. In addition, any water quality data collected during the test to satisfy any additional permit requirements should be included in the hydrogeologic report.
5. Field parameter measurements of temperature and conductivity should be completed from surface waters proximal to the surface water monitoring locations at a minimum frequency of once prior to the start of the constant-rate test, once every 24 hours of active pumping during the test, once immediately prior to pump shutdown, and once at the end of the recovery monitoring.
6. Any change in the trend of the time-drawdown curve, such as might be caused by a positive/recharge boundary or negative/barrier boundary encountered during the test, must have a record of at least 24 hours. Any boundary condition encountered during the last 24 hours of pumping will require that the test be extended. The absence of 24 hours of test data following a drawdown inflection may result in failure of the test.
7. All weirs and flumes should be constructed consistent with guidance outlined in *Groundwater and Wells* (Driscoll, 2nd edition, pages 541 to 546, or equivalent). Prior to testing, provide detailed specifications for the weir or flume construction (degree of v-notch, width of opening or dimensions of flume, etc.). In order to accurately observe and record any potential pumping-induced impacts to the surface water feature during the well testing, a 10 percent change in the rate of flow within the monitored surface water feature should correspond to a change of at least 0.01 feet (approximately 1/8 inch) in the appropriate weir, flume, or other flow-measuring device. Stage data should be recorded by a data logging pressure transducer installed in a stilling well at an appropriate location with respect to the design of the weir or flume. The transducer should be programmed to measure and record water level on a 10-minute interval (maximum) throughout all phases of the aquifer testing. The level monitoring data should be converted to flow data at each flow-measuring device. Both level and flow data should be presented in graphical form in the hydrogeologic report.
8. Local precipitation data should be collected using on-site instrumentation. Precipitation totals should be recorded at a minimum of at least once every 12 hours throughout all phases of the aquifer testing. An attempt should be made to note the duration (start and stop times) of any precipitation events that occur during the

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aquifer testing. The amount of precipitation that is acceptable during a test varies from one site to the next. Tests impacted by precipitation may need to be retested or extended.

9. The minimum duration of the recovery test is to be 24 hours and data collection should continue until groundwater levels have recovered to 90 percent of pretest levels, minus groundwater recession.