

LPGCD Pump Test Report Guidance Document

The American Society of Testing and Materials (ASTM) documents D4043 and D4050 provide additional guidance for designing and implementation of pump tests, and D4105 or D4106 provide guidance to determine aquifer properties. The applicant can purchase these documents at; <http://global.ihs.com/standards.cfm?publisher=ASTM&RID=Z06&MID=5280> and is encouraged to review them prior to designing and conducting pump tests. This LPGCD pump test guidance document has integrated information from these ASTM documents with consulting experience to be a pump test resource for the District.

If the pump test activity or analysis is found to be flawed or not acceptable by the District's General Manager, the District's General Manager may require the pump test or analysis be repeated in an acceptable manner before the groundwater production permit application may be considered.

The pump test pumping rate will be representative to yield the applicant's permit requested acre-feet per year production or maximum instantaneous rate.

Pump Tests

The applicant will use Texas registered geoscientist (PG) and/or engineer (PE) to oversee the design and implementation of each pump test and associated monitor wells and will evaluate the pump test results to determine aquifer properties will include specific capacity, transmissivity, hydraulic conductivity and possibly storage or storativity values (requires monitor well). The pump test must be conducted using applicant's well or wells listed in Form 100 and/or Form 300.

The District requires pump tests for 200 or more acre-feet per year. Pump tests conducted without prior approval from the District may be deemed noncompliant with LPGCD production permit requirements. The District must be notified at least 30 days in advance of any pump test conducted as part of the hydrogeological investigation. District staff will monitor and assist with the pump test and may provide pump test equipment.

The Applicant may request for the District's General Manager to consider a variation of the above pump test requirements. The District's General Manager has 30 days to review and approve or disapprove the request variance.

Aggregated Permit Pump Test Requirements

If the applicant has requested 5,000 or more acre-feet per year, a pump test may involve two or more wells pumping simultaneously with a number of monitoring wells. The extent and configuration of this pump test will be negotiated between the District Manager and the Applicant.

Pump Test Monitor Wells

A minimum of one monitor well monitor well is required for an applicant's well producing over 1,000 acre-feet per year. A monitor well or wells selected or drilled by the applicant for the pump test must be pre-approved by the District's General Manager. Monitor well(s) may not be actively pumping during the pump test. The use of existing private wells within one mile of the pumping well or wells for a confined aquifer will be acceptable to the District if the well meets the District's monitor well requirements.

Monitor Well Requirements

A monitor well selected for the pump test is required to monitor only the Applicant's aquifer and exhibit a connection with the pumping wells indicated by a minimum of half-foot of drawdown during the pump test. In the case of confined aquifers, the District may also require a monitor well in an overlying aquifer to monitor potential water level fluctuations and to determine if there is communication between the Applicant's aquifer and overlying aquifers.

Pump Test Requirements

Pre-Pump Test

- 1) If possible, the District and/or Applicant will meet with adjacent landowners (if any) with large operating wells >200 gpm and within a 2,500 foot radius of the pump test well or wells prior to the pump test. The District and/or Applicant will determine if the landowner's wells will be active during the scheduled pump test.
- 2) A District staff member will assist the applicant's representative and monitor activities.
- 3) The applicant representatives and District representative will install water level transducers into the pumping and monitor well, calibrate depth, synchronized the transducers (if more than one), and activate for monitoring activities.
- 4) The water level transducer will be programmed to collect water levels every 5 minutes during the entire pump test event which includes: up to 24 hours before required pump test commences, during the required pump test and for a 95% recovery of the initial water level after pump test concludes (water level recovery).
- 5) A step test may be conducted a few days before the scheduled pump test to determine the pumping rate for the pump test. If a step test is conducted, then the pump test well's water level needs to have stabilized before the required pump test is started.
- 6) The applicant will have professional staff monitoring equipment during pre-pump test, during pump test and post pump test activities and record all activities.
- 7) A calibrated flow meter well be installed capable of monitoring the pumping well's groundwater discharge.
- 8) If the pump test is being conducted in an unconfined aquifer, the pump discharge will be redirected at least 250 feet away from well to minimize local recharge.

Pump Test

- 1) A District staff member will assist the applicant's representative and monitor activities.
- 2) Pump test required time-period will vary based on the applicant's requested acre-feet per year. Refer to District Rules for the required time-period of pump test.
- 3) A starting water level will be taken within 10 minutes before the start of the pump test.
- 4) The rotations per minute (rpm) of the pump will be regulated to maintain a near constant discharge rate.
- 5) Pumping well hand measured water levels during pump test will be conducted and recorded at least six times (half hour after beginning, half hour before the end of pump test and at least four other measurements).
- 6) Transducer readings of both the pumping and the monitor well(s) will be reviewed every 6 hours to confirm that they are operational.
- 7) Water quality parameters (pH, temperature, and conductivity) of discharged water should be measured every 8 hours during pump test. The District will provide the necessary equipment and assist with this data collection.
- 8)** The District will pay for the water quality analyses which includes (TDS, SO₄, Cl, Ca, Mg, Na, HCO₃, F, Br, and NO₃) for each pumping well. A water quality sample will be collected prior to and at the end of each pump test.

Post Pump Test

- 1) The recovery phase of the pump test will be 95% of the pumping well's starting water level or 36 hours, whichever is less.
- 2) Applicant's professional staff with assistance from the District's staff will download transducer(s) and assist extracting transducers from the the monitoring tube(s). The applicant will provide digital copies of the pump test data to the field District staff.

Pump Test Report Requirements

- 1) A discussion about the general characteristics of the aquifer: confined or unconfined and if pumping and monitor wells are partially or fully penetrating.
- 2) Pumping and monitor well tables listing water levels collected during the pump test, initial water levels at start of pump test (pumping and monitor wells), pump test date, start time, end time, changes during and final pumping rates, and water quality parameters measured during pump test will be provided in a report appendix.
- 3) A table listing the water level recovery measurements with time for pumping and monitoring wells in a report appendix.
- 4) Copies of field notes collected during pump test(s) (in a report appendix).
- 5) A table listing final estimated aquifer properties for each pumping and monitor well involved in the pump test.

- 6) The pump test report will include a discussion of any observed groundwater quality changes (if any) that occurred during the pump test.

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