

APPENDIX K

SPECIFICATION FOR FLOW METER CERTIFICATION AND DATA LOGGING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The work to be performed under this specification includes the furnishing of all labor, materials, equipment, and all other facilities and incidentals necessary for well discharge flow rate data measurement and logging over the course of up to a 72-hour aquifer pumping test. Additionally, SUBCONTRACTOR will make a reasonable attempt at certification of existing flow meters or power consumption coefficients (PCC) at wells in accordance with State of Colorado Division of Water Resources (State) regulations. The SUBCONTRACTOR shall be responsible for providing the following: (1) continuous well discharge flow rate record, and (2) flow meter or PCC certification (if possible) or written recommendation of the variance required or modifications to well discharge system necessary to certify the existing meter or PCC.
- B. SUBCONTRACTOR is only authorized to perform the work identified in and authorized by ENGINEER under this Agreement. Any work performed by the SUBCONTRACTOR that is beyond the scope of work authorized in this Agreement is at SUBCONTRACTOR's sole risk. SUBCONTRACTOR may undertake other work directly for the cooperating well owner provided that: 1) SUBCONTRACTOR informs cooperating well owner that ENGINEER and OWNER have no responsibility for such work; 2) such work for cooperating well owner is not performed while SUBCONTRACTOR is performing its services under this Agreement and 3) SUBCONTRACTOR shall defend, indemnify and hold harmless the ENGINEER and OWNER from any claims that the cooperating well owner may assert against ENGINEER or OWNER which arises from the work the SUBCONTRACTOR performs for the cooperating well owner.

1.02 SUBMITTALS

- A. The SUBCONTRACTOR shall maintain a record of the pre-pumping static water level and pumping water level (if a measurement port is available at the pumping well), manually recorded discharge rates and times, times of water all level measurements, pump startup and shutdown, and a record of any events which may affect the pumping rate or discharge. Measurements are to be submitted to the ENGINEER within one week of completion of a test or a group of tests, to be determined by ENGINEER.

The data format for electronic data should be ASCII format provided on a 3.5-inch floppy disk, CD-ROM or other method, as approved by ENGINEER. A description of data fields (time and flow rate) on the electronic deliverable shall also be provided. Field notes with other data and copies of certifications submitted to the State may be submitted on paper. All equipment shall be properly calibrated and in good working order; evidence of calibration will be provided to the ENGINEER.

1.03 MEASUREMENT AND PAYMENT

- A. Payment for mobilization, flow measurement, and certification, and demobilization of all of the necessary equipment tools and personnel to conduct the operations as specified herein shall be at the unit prices bid per aquifer test.
- B. Payment for setting up permanent piping will be made at the unit price bid per hour with 30-minute intervals as the smallest unit of recorded time. Any activities requiring additional costs will only be performed with prior approval of ENGINEER.
- C. Payment for flow meter certification and flow data logging will be made only after the complete record of flow for the duration of the aquifer test has been provided to ENGINEER and the flow meter or power consumption coefficient certification have been submitted to the State.
- D. No payment will be made for (1) tests for which a complete record of flow is not provided to ENGINEER; or (2) lost, stolen or broken equipment.

PART 2 PRODUCTS

2.01 FLOW MEASUREMENT DATA LOG

- A. The SUBCONTRACTOR will provide an electronic log of well discharge flow rate measurements collected at approximately 15-minute intervals for the duration of an aquifer pumping test lasting up to 72 hours. The data format should be ASCII provided on a 3-inch disk or a standard spreadsheet file format as approved by ENGINEER. All equipment shall be properly calibrated, and in good working order; evidence of calibration will be provided as requested by the ENGINEER.

2.02 WATER LEVEL MEASUREMENT

- A. If a water level measuring port is available at the pumping well and measurements can be made without endangering safety or equipment, water level measurements will be made at the pumping well before the pump is activated, at a time between one and two hours after starting the pump, and at the end of the test just before the well is shut down. Water level measurements will be made to the nearest 0.1 foot. The date and time will be recorded with all water level measurements.

2.03 FLOW METER OR PCC CERTIFICATION

- A. SUBCONTRACTOR will collect all appropriate information for certification of existing flow meters or power consumption coefficients (PCC) at wells in accordance with State of Colorado Division of Water Resources regulations. A certification will be submitted on the appropriate form provided by the State. In the event that conditions are not suitable to certify an existing flow meter or determine a PCC, written recommendation of the variance required or modifications to well discharge system necessary to certify the existing meter or PCC will be provided to ENGINEER.

PART 3 EXECUTION

3.01 WELL DISCHARGE FLOW RECORDING AND FLOW METER OR PCC CERTIFICATION

- A. The SUBCONTRACTOR shall commence work at a time mutually agreeable to ENGINEER, SUBCONTRACTOR and the cooperating well owner, who will start and shut down the well.

Temporary modifications may be required to the well discharge to allow valid measurement of flow according to State regulations.

- B. Perform flow meter or PCC certification in accordance with State regulations.
- C. Obtain a record of flow measurements at a minimum interval of every 15 minutes.
- D. At the conclusion of the test, return to the well, shut down the data logger and provide the data to ENGINEER, provide certification documentation to State.

END OF APPENDIX K