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(12) **United States Patent**
Shapiro

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(54) **BOREHOLE TESTING SYSTEM**

* cited by examiner

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(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(57) **ABSTRACT**

A self-contained, transportable system for conducting any of hydrologic tests or water sampling techniques without the need for retooling or readjusting the system. The system includes a borehole unit for conducting the tests in a borehole, and a data acquisition unit for monitoring and recording the results of the tests. The borehole unit includes, connected in serial relation, a pair of borehole packers for forcing the unit in place in the borehole, several pressure transducers for obtaining hydraulic measurements, a pump located between the borehole packers for withdrawing fluid and a fluid injector for injecting fluid. The data-acquisition system includes flow meters for monitoring fluid injection and fluid withdrawals, a data-acquisition module for monitoring a fluid pressure from the pressure transducers, power source and a computer interface. The overall system includes a pressure manifold for supplying gas to the packers, transducer and injectors, a hand-held electric water-level sounder, and a pressure regulator. The system can be used to measure ambient hydraulic pressure, fluid injection or fluid withdrawal tests for inferring formation properties and tracer tests for inferring properties of the formation controlling chemical migration. Additionally, the system can be used in contaminated groundwater environments because it is easy to decontaminate.

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(52) **U.S. Cl.** 73/152.41; 166/169

(58) **Field of Search** 73/152.39, 152.21, 73/152.02, 152.41, 152.47; 166/250.09, 169

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20 Claims, 5 Drawing Sheets

