

Logging unit-hydraulic powered  
3000 ft drawworks and generator



**MISSION:** To provide reliable, impartial, timely information that is needed to understand the Nation's water resources.

The Water Resources Discipline actively promotes the use of this information by decision makers to

- Minimize the loss of life and property as a result of water-related natural hazards, such as floods, droughts, and land movement
- Effectively manage groundwater and surface-water resources for domestic, agriculture, commercial, industrial, recreational, and ecological uses
- Protect and enhance water resources for human health, aquatic health, and environmental quality
- Contribute to wise physical and economic development of the Nation's resources for the benefit of present and future generations



3000 ft portable logger (can be shipped)

Geophysical data generated to address local issues are integrated and analyzed with data from other disciplines to address broader regional and national scale issues. Below are examples of site specific geophysical applications that generate data that both characterize local conditions and also contribute to efforts to understand larger scale science issues or research questions.

## Borehole Geophysical Science

- Borehole Geophysical Logging
- Borehole Imaging and Fracture Analysis
- Fluid Profiling—Conductivity and Temperature
- Resistivity/Gamma/Caliper
- Neutron and Gamma-Gamma
- Flow Assessment of Boreholes and Wells During Ambient and Pumping Conditions
- Flowmeter Analysis to Determine Aquifer Hydraulic Properties

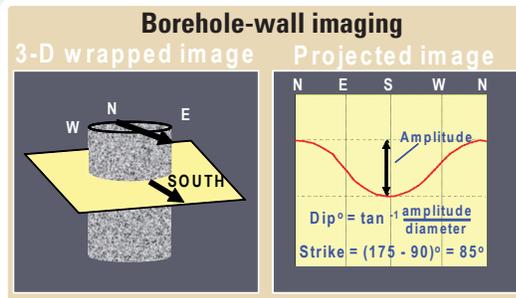
### APPLICATIONS

- Guide Monitoring Well Installation
- Determine Construction Details of Existing Wells
- Characterization of Strata Thickness and Lithology
- Near-Surface Geophysics Ground-Truthing
- Cross-Borehole Flow Experiments
- Formation Porosity and Permeability
- Determination of Water-Quality
- Delineation of Water Bearing Fractures/Zones/Voids
- Delineation of Formation Strike/Dip and Lithologic Contacts (Acoustic and Optical Televiwer)
- Depth Dependent Sampling of Boreholes

Pumping 1-25 gpm while logging



Deep pump deployment with pipe and pump hoist



Flowmeter logging at superfund site



# Borehole Geophysics Capabilities

Two Loggers Capable of Depths Down to 3000 ft.

## Standard Borehole Logging Methods

- |                         |                         |
|-------------------------|-------------------------|
| Caliper                 | Normal Resistivity      |
| Gamma                   | Fluid Resistivity       |
| Single-Point Resistance | Temperature             |
| Self Potential          | Magnetic Susceptibility |

## Borehole Electromagnetic (EM) Induction Logging

- Single Induction
- Dual Induction

## Borehole Flowmeter Methods

- Electromagnetic
- Heat Pulse
- Flowmeter Analysis To Compute Hydraulic Properties of Multiple Zones
- Pump Deployment Down to 2000 ft. with Smeal 6T Pump Hoist for Pumping Flowmeter
- Tests and Aquifer Tests

## Borehole Imaging

- Acoustic Imaging
- Optical Imaging
- Image Processing to Create "Virtual Core"

## Full Waveform Sonic

- Sonic Processing to Calculate P and S Formation Velocities
- Porosity Calculation
- Fracture Detection

## Nuclear Logging

- Single Detector Neutron
- Gamma-Gamma (Relative Density)
- Spectral Gamma

Inside logging truck



Pumping 1-25 gpm while logging



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