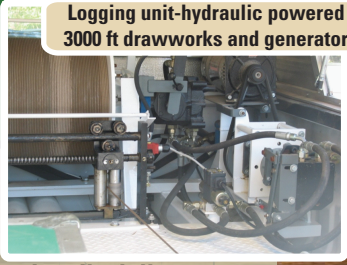
USGS
science for a changing world

Borehole Geophysical Science


Logging unit-hydraulic powered 3000 ft drawworks and generator

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 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

3000 ft portable logger (can be shipped)

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 Televiewer)
- Depth Dependent Sampling of Boreholes

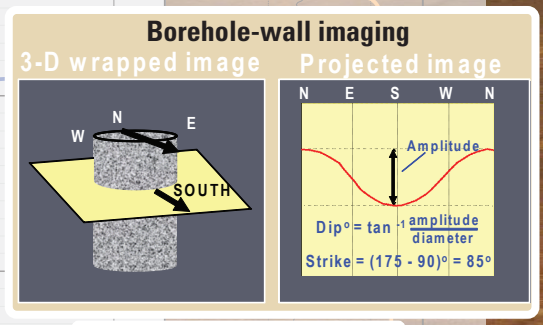
Pumping 1-25 gpm while logging

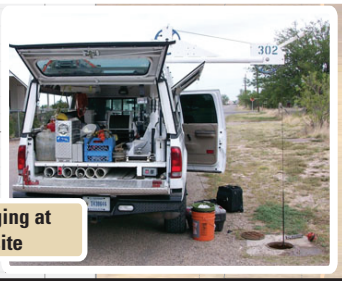
Deep pump deployment with pipe and pump hoist

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




Flowmeter logging at superfund site

Borehole Geophysics Capabilities

Two Loggers Capable of Depths Down to 3000 ft.

Standard Borehole Logging Methods

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

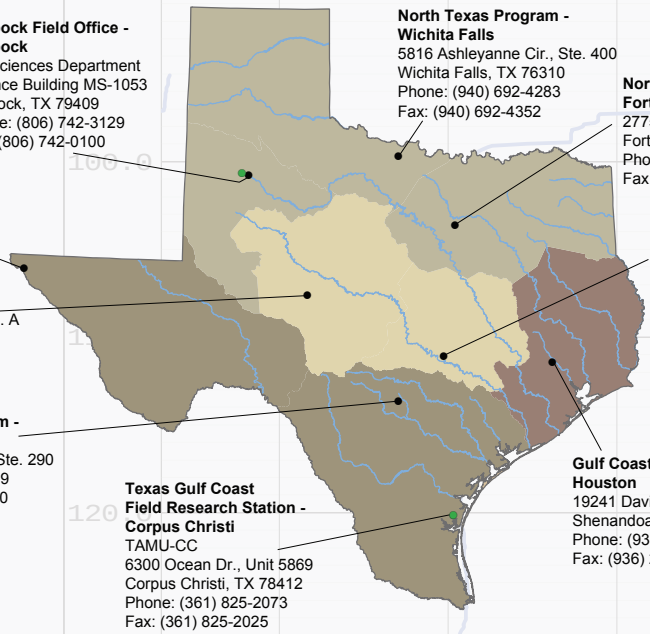
Nuclear Logging

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

Inside logging truck

Pumping 1-25 gpm while logging

Texas Water Science Center Locations



Lubbock Field Office - Lubbock
Geosciences Department
Science Building MS-1053
Lubbock, TX 79409
Phone: (806) 742-3129
Fax: (806) 742-0100

North Texas Program - Wichita Falls
5816 Ashleyanne Cir., Ste. 400
Wichita Falls, TX 76310
Phone: (940) 692-4283
Fax: (940) 692-4352

North Texas Program - Fort Worth
2775 Alta Mesa Blvd.
Fort Worth, TX 76133
Phone: (817) 263-9545
Fax: (817) 361-0459

West Texas Program - El Paso
Gateway Business Center
10737 Gateway Blvd. West, Ste. 350
El Paso, TX 79935
Phone: (915) 534-6308
Fax: (915) 534-6299

USGS Texas Water Science Center - Austin
1505 Ferguson Ln.
Austin, TX 78754
Phone: (512) 927-3500
Fax: (512) 927-3590

West Texas Program - San Angelo
3745 S. Jackson St., Ste. A
San Angelo, TX 76903
Phone: (325) 944-4600
Fax: (325) 942-0495

South Texas Program - San Antonio
5563 De Zavala Rd., Ste. 290
San Antonio, TX 78249
Phone: (210) 691-9200
Fax: (210) 691-9270

Gulf Coast Program - Houston
19241 David Memorial Dr., Ste. 180
Shenandoah, TX 77385
Phone: (936) 271-5300
Fax: (936) 271-5399

Texas Gulf Coast Field Research Station - Corpus Christi
TAMU-CC
6300 Ocean Dr., Unit 5869
Corpus Christi, TX 78412
Phone: (361) 825-2073
Fax: (361) 825-2025

● USGS Water Discipline Office
● USGS Biology Discipline Office

Greg Stanton
Groundwater Specialist
(512) 927-3558
gstanton@usgs.gov