



Characterizing ground-water flow and contaminant transport in fractured-rock environments is technically challenging and requires sophisticated instruments and analysis techniques. Environmental practitioners (and regulators reviewing their work) need an understanding of cost-effective techniques available to characterize and monitor bedrock sites. Over-simplified interpretations of ground-water flow at bedrock sites can lead to higher costs in the long run.

This field demonstration will showcase some of the most helpful and newest techniques for characterizing ground-water flow and contaminant transport in fractured rock. The demonstrations will be hosted by USGS scientists currently working at fractured rock sites throughout the northeast. These scientists have authored numerous publications on related topics, and several are pioneers in the development and/or refinement of the techniques being demonstrated.

U.S. Geological Survey

Field Demonstration: **Techniques for Characterizing Ground-Water Flow and Contaminant Transport in Fractured Rock**

Sponsored by the
U.S. Geological Survey
No charge to attendees from local,
state, or Federal agencies or other
USGS cooperators

Thursday, June 4, 1998
Stony Brook-Millstone Watershed
Association, Hopewell Township,
Mercer County, New Jersey



Techniques to be demonstrated/discussed:

Surface Geophysics--standard and azimuthal resistivity, seismic, and electromagnetic surveys.

Borehole Geophysics:

Standard Methods--caliper, gamma, electromagnetic, electric, and fluid logging.

Borehole-Wall Imaging--television and acoustic televiewer for determining the character and orientation of fractures intersected by boreholes.

Borehole Radar--single- and cross-hole methods for imaging fracture zones beyond and between boreholes.

Flowmeter--heat-pulse and electromagnetic methods for measuring flow in boreholes and identifying transmissive fractures.

Geochemical Sampling-- equipment for sampling fractured rock and ultra-clean techniques.

Hydraulic testing-- slug tests, single- and multi-well tests in open or packer-isolated intervals for determining heterogeneous hydraulic properties of fractures.

Tracer Testing -- for determining properties affecting chemical migration in fractures and the rock matrix.

Computer Demonstration -- modeling fluid movement in fractured rock.

Each technique will be demonstrated briefly and explained in non-technical terms. Attendees will be split into groups of no more than 10-12 people to allow for discussion and questions.

Who Should Attend:

Anyone working for a municipal, county, state, or Federal agency in the environmental field as an investigator, regulator, reviewer, or manager. No background in fractured-rock hydrology is necessary, but participants with some knowledge of hydrogeology will benefit the most from the demonstrations.

What You Will Learn:

You will learn about some of the most powerful and cost-effective techniques for characterizing and monitoring ground-water flow and contaminant transport in fractured-bedrock settings. The general approaches necessary to characterize the hydrogeology of fractured rocks will be discussed, as well as specific techniques to determine various properties and characteristics. Attendees will receive a publication describing the demonstrated techniques in greater detail. Methods demonstrations will be supplemented by presentations of results at USGS-cooperator project sites in the northeastern U.S. USGS publications on methods and on successful applications at fractured-rock sites also will be available.

Location:

The demonstration will be held at a research site on Stony Brook-Millstone Watershed Association property in Hopewell Township, near Trenton, New Jersey. Easily accessible from Interstate 95, the Northeast Corridor rail line, and Trenton-Mercer airport, the site is about 1 hour from Philadelphia and New York City and is less than 200 miles from Albany and Washington D.C.

For further information:

see our web page at:

<http://www.pah2o.er.usgs.gov/fracday/>

or contact:

Glen Carleton, W. Trenton, NJ
(609)771-3921 carleton@usgs.gov
Dan Goode, Malvern, PA
(610)647-9008 djgoode@usgs.gov
John Williams, Troy, NY
(518)285-5670 jhwillia@usgs.gov
Allen Shapiro, Reston, VA
(703)648-5884 ashapiro@usgs.gov

To register, contact:

Glen Carleton,
810 Bear Tavern Rd., Ste 206
W. Trenton, NJ 08628-1022
ph.: (609)771-3921
fax: (609)771-3915
email: carleton@usgs.gov

There is no charge to attend this demonstration. Space is limited, however, so **registration by APRIL 30th is required.** If the event is oversubscribed, a limit may be placed on the number of attendees from each agency. Registration: 8:30 to 9:00 a.m. Program: 9:00 a.m. to 5:00 p.m. A box lunch will be available. Hotel and travel information are available from the sources listed above.

The U.S. Geological Survey is the Nation's largest earth- and life-science agency and has the principal responsibility within the Federal government for providing hydrologic information and appraising the Nation's water resources.