

### BACKGROUND

Los Alamos National Laboratory (LANL) is a multidisciplinary research and national security facility owned by the U.S. Department of Energy's (DOE's) National Nuclear Security Administration and managed by the University of California (UC). LANL is located in north-central New Mexico and covers 37 square miles of the Pajarito Plateau in a series of finger like mesas separated by deep canyons with perennial and intermittent streams running from west to east. ❁

### ENVIRONMENTAL REMEDIATION & SURVEILLANCE PROGRAM

DOE's environmental restoration efforts began in 1989. The Environmental Remediation and Surveillance Program is LANL's contribution to a nationwide DOE program. LANL investigates the presence of chemical and radioactive waste resulting from past LANL operations and cleans up and restores such sites to protect human health and the environment. ❁



Drilling a well in Mortandad Canyon

### GROUNDWATER MONITORING AT LANL

The communities of Los Alamos, Española, Santa Fe, and neighboring pueblos obtain drinking water from the regional groundwater aquifer. LANL monitors the groundwater beneath the Pajarito Plateau to ensure that contamination from LANL operations does not impact human or ecosystem health. Currently, LANL monitors 190 sampling locations for the quality of water in the regional aquifer. These locations include deep groundwater wells (reaching 600 to 2000 ft below the ground) and springs. In addition, LANL has 100 groundwater wells 40-600 ft deep that it monitors for the shallow and intermediate groundwater located between the surface and the regional aquifer water table. LANL also monitors the drinking water wells of the neighboring communities.

The two types of regional groundwater monitoring wells at LANL are single screen and multiscreen. The screen is the portion of the well where water enters from the surrounding rock formations. Single-screen wells produce water at only one location below ground level. Multiscreen wells can have two to nine screens below ground level. ❁

### GROUNDWATER CHARACTERIZATION PROGRAM

From 1998 to 2005, LANL expanded its groundwater monitoring network as part of an effort to understand the groundwater systems. The ultimate goal was to design an appropriate groundwater monitoring network. A total of 33 deep groundwater wells were drilled under an agreement (called the Hydrogeologic Workplan) between DOE, UC, and the New Mexico Environment Department (NMED). Deep well locations were chosen to identify (1) important geologic zones, (2) the location and depth of groundwater, (3) the presence of contaminants in different groundwater zones, and (4) the direction of water flow (and thus the flow of contaminants). All parties to the agreement understood that when characterization activities were complete, not all wells would be required for an appropriate monitoring network. ❁

# Groundwater Drilling Fluids

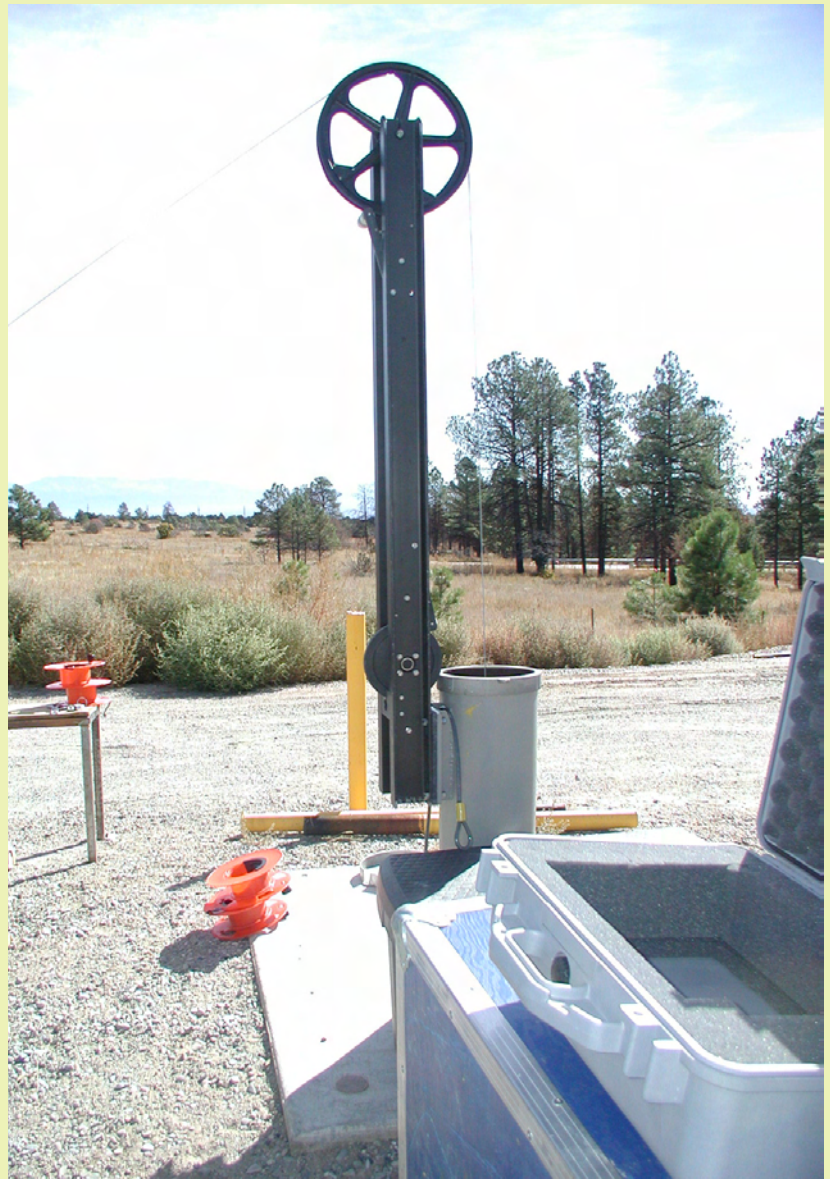
## GROUNDWATER WELL CONSTRUCTION

Because of the complex nature of the geology, drilling to the regional aquifer of the Pajarito Plateau requires the use of drilling fluids, such as foams or drilling muds. For example, drilling fluids keep the boreholes from collapsing during the tests needed to select the specific depth for a characterization well.

Well development is a process at the end of well construction whereby the drilling fluids are scrubbed out of the wells. High-pressure water and specially designed scrubbing tools are used to remove drilling fluids. In some wells at LANL, the drilling fluids were not completely removed during well development.

## SOLUTIONS TO PROBLEMS CAUSED BY RESIDUAL DRILLING FLUIDS

Leftover drilling fluids can mask the presence of some, but not all, LANL-derived contaminants. Sixteen of the 33 characterization wells show some impacts from residual drilling fluids. LANL is planning corrective actions to ensure that sampling from all wells in the monitoring network can accurately identify contamination. These actions will include (1) creating a pilot test for redeveloping two groundwater wells, (2) evaluating the pilot test results, and (3) developing corrective actions for the remaining wells. Depending on the pilot test results, corrective actions might include redeveloping wells, replacing multiple screen wells with single screen wells, and/or replacing wells. The pilot test will be completed during the summer and fall of 2006. The proposed corrective actions will be submitted to NMED for approval. ❁



R-15 Drilling Rig

## COMMUNITY INVOLVEMENT, INFORMATION, AND ASSISTANCE

LANL is committed to gathering community input, involvement, and assistance in our groundwater monitoring program. Presentations and other communications venues on groundwater monitoring are available to interested persons. ❁

**Opportunities  
For Public  
Involvement** →

Phone: (505) 667-2211  
Fax: (505) 665-8190  
Email: [envoutreach@lanl.gov](mailto:envoutreach@lanl.gov)  
Web site: [www.lanl.gov/community/environment](http://www.lanl.gov/community/environment)