Sandia National Laboratories and OYO Geospace Corp. have developed seismic receivers rugged enough to be lowered nearly 3 miles underground. The receivers are now on the market. Los Alamos National Laboratory is developing a new seismic source that would use explosives to generate sound waves deep in a wellbore. Both laboratories are working with private companies to develop a hydraulically-powered vibrator tool as a downhole source of sound waves.

To link the seismic system of tomorrow, several firms are working with national laboratories to develop a fiber optics data communications system that can transmit enormous amounts of data to the surface much faster than conventional logging cable. For areas where wells don't already exist, a national laboratory-industry team is developing miniature seismic sensors that can be inserted into"micro-holes" less than an inch in diameter. "Micro-holes" may be a very inexpensive way to probe a formation to learn its oil or gas potential before drilling more expensive wells.

The Lomax field test, showed that a properly conducted waterflood would work in the Uinta Basin. The key was technology that could locate previously undetected natural fractures in the reservoir.

A New Way of Thinking in Utah's Green River Formation

Throughout its production history, the Green River Formation in the Uinta Basin has baffled oil producers. Its complex geology, laced with hundreds of discontinuous oil-bearing zones, its waxy oil, and its lack of sufficient reservoir pressures made traditional oil field production technology ineffective. Or so producers thought.

A DOE-cosponsored oil recovery field demonstration project proved conventional wisdom wrong. The initial project began in 1992 when Lomax/Inland Resources of Denver, CO, with cost-sharing from DOE, began a high-risk waterflooding project near Roosevelt, UT. Injecting water under pressure to force more crude oil through a reservoir is used in hundreds of thousands of oil fields throughout most of the United States. But operators in the Uinta Basin were skeptical. Many had been unable to maintain economical production, and as the flow of oil slowed, several had shut down operations, even though only 5 percent or less of the Basin's oil had been produced.

The Lomax field test, however, showed that a properly conducted waterflood would work in the Uinta Basin. The key was technology that could locate previously undetected natural fractures in the reservoir. Often these fractures would