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Photo: Jane Whaley

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GEOLGY

GEOPHYSICS

RESERVOIR MANAGEMENT

FireFly® Goes Commercial



The first commercial deployment of ION's FireFly® was challenged by a tight timeline and rough topography that at times actually required professional climbers to position equipment.

After two successful field trials of cableless seismic acquisition, along with modifications, the Durham Ranch project in northwestern Colorado put the system to its first commercial test.

The 'Durham Ranch' survey encompassed about 93 km² where 10,500 receiver points of full-wave seismic data were acquired. Over 7,000 dynamite shot points were used as the source that took only 20 days from first to last shot. Geokinetics, a leading geophysical services company headquartered in Houston, served as field acquisition contractor. The project was reported to be completed on time and under budget in this remote and environmentally sensitive area.

Improvements after field trials

"We learned a lot from our first two field trials with BP and Apache in late 2006 and early 2007," says Jim Hollis, Chief Operating Officer of ION Solu-

tions. "From these field trials we knew we had to reduce the size and complexity of the entire system, improve the toughness of the equipment at the same time making the infrastructure more reliable, conserve power, and finally provide for better quality control tools."

"While we did not abandon the basic architecture of our first FireFly system, Version 2.0 incorporates a number of significant changes. As one example, we have redesigned the field station unit to increase reliability," says Jim Hollis. "We moved to an external battery for more flexibility and introduced a new radio design for improved long-distance connectivity. We upgraded the Connex™ command & control software system to deliver faster troubleshooting and to support complex Vibroseis operations. From all accounts, the system performed up to our high expectations and those of our clients."

Challenging Conditions

The Durham Ranch area provides challenging geology along with mixed land ownership (private and government),

steep terrain, and environmentally sensitive areas. This cableless FireFly system allowed the contractors to acquire high station count, full-wave data over a short time window. The operational footprint also needed to be minimal in this area, which included numerous local ranches, wildlife, and access restrictions.

Jim White, Executive Vice President of North American Operation at Geokinetics, commented, "FireFly represents a new approach to land seismic acquisition. This was among the more challenging seismic surveys we've undertaken. After some initial training, our crews became very comfortable with the system and production increased accordingly. Our ability to complete the project within the specified timeline was enhanced using this system."

The primary objective for oil production here is from fractured shale (the Cretaceous Niobrara Formation) along a plunging anticline. The reservoirs in the Durham Ranch area were discovered in the 1950's and are now operated by East Resources Inc., a privately

held, independent exploration and production company. East Resources recently leased the mineral rights in the area and was the primary underwriter of this multi-client survey. With this and many fractured reservoirs, well productivity can be optimized by targeting horizontal wells to connect pockets of highly fractured intervals. Densely sampled, full-wave seismic data is key to mapping fracture intensity in these reservoirs and designing the drilling programs. East Resources will use the data for the planned large-scale re-development of this and surrounding areas.

"We needed to acquire densely sampled, full-wave data to better characterize this fractured shale that we plan to re-develop," says Marty Williams, Geoscience Manager for East Resources Inc. "From some of the early traces, the seismic data looks to be of the highest quality. We couldn't have completed this project without FireFly and the Connex system."

Thomas Smith, Associate Editor