

# Solution Profile

## GeoTap® Formation Tester Allows Torque Reduction While Dramatically Improving ROP

**Location: West Malaysia**

### Operator's Challenge

An operator drilling an 8,817-foot directional well in West Malaysia encountered high drag while running to bottom and required 60,000 - 80,000 lbs of string compression before sliding could occur. Other areas of concern included the differential pressure on the drilling motor, which varied from 50 to 200 psi, and a slow rate of penetration (ROP) from 30 to 50 ft/hr with a drilling torque of 11,000 to 12,000 ft-lbs.

### Halliburton's Solution

Sperry Drilling Services recommended its GeoTap formation pressure tester to directly and accurately measure subsurface pore pressure while drilling. Real-time GeoTap pore pressure tests determined that formation pore pressure was significantly lower than expected. As a result, the operator pulled the bottomhole assembly (BHA) back to the shoe and reduced the mud weight from 710 pounds per thousand feet (pptf) to 670 pptf before continuing drilling.

### Economic Value Created

With the recommended mud weight of 670 pptf, as established by the GeoTap real-time pore pressure test, the well reached total depth (TD) earlier than initially projected, with complete well control. The ROP was approximately 100 ft/hr, double the original rate, and drilling torque was reduced to 10,000 ft-lbs. The total economic value created was more than \$163,000, based on savings from the Halliburton procedure, as well as increased oil and gas production.



## GeoTap® Slimhole LWD Formation Tester and Geo-Pilot® Rotary Steerable System Get Pressure Answers In High-Risk Sidetrack

**Location: Gulf of Mexico**

### Operator's Challenge

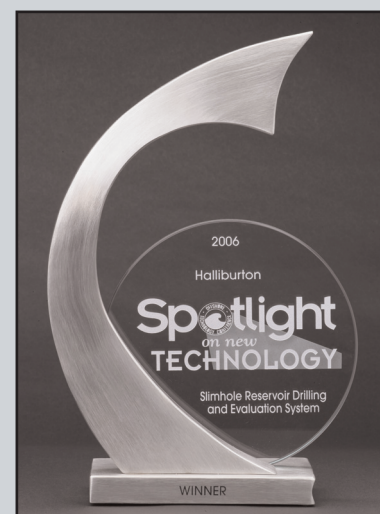
After the completion failed on the original well, this operator needed to re-drill a reservoir. To confirm the reservoir model, the operator required real-time formation pressure sampling, but high wellbore inclination made wireline logging risky and potentially expensive. To further complicate matters, conventional steerable motors faced a high risk of differential sticking and tool-face control problems, due to drilling through depleted sands.

### Halliburton's Solution

Sperry ran its new 4-3/4-inch GeoTap logging-while-drilling (LWD) formation pressure tester, along with the Geo-Pilot 5200 slimhole rotary steerable system and a complete slimhole quad combo LWD package. The addition of the 4-3/4-inch GeoTap, the first slimhole pressure tester in the industry, makes this the most comprehensive slimhole LWD sensor suite available.

### Economic Value Created

The GeoTap LWD tester achieved 100 percent success on 11 tests and withstood wellbore pressures that exceeded the tool's specifications. The Geo-Pilot system provided 100 percent rotation, reducing risk and the directional control difficulty associated with depleted sands. The pressure tests carried out by the GeoTap sensor confirmed the accuracy of the reservoir model and the associated reserve estimates.



## GeoTap® Tester Increases Reservoir Section and Adds \$13 Million of New Oil Production

**Location: Norway**

### Operator's Challenge

Uncertain pore pressures, due to nearby producing wells, limited an operator's original plan to drill a longer reservoir section to just 1,200 meters. The thin reservoir zone made the early detection of changes in pore pressure essential and required precise drilling solutions to keep the wellbore in the payzone.

### Halliburton's Solution

Sperry ran its GeoTap LWD formation tester in real time and acquired 13 pore pressure points along the wellbore. Sperry also used its Geo-Pilot® rotary steerable system, together with the ALD™ azimuthal lithodensity sensor, making it possible to calculate dips and geosteer precisely while drilling.

### Economic Value Created

The combination of the GeoTap formation tester, Geo-Pilot rotary steerable system and ALD sensor allowed the operator to maximize payzone length, safely extending the reservoir section from 1,200 to 2,069 meters (869 meters more than specified in the authorization for expenditure). The Geo-Pilot system, using a Security DBS FM3731C FullDrift® drill bit, also set performance records. The system drilled the shoe and 2,069 meters of formation in the longest single run in a reservoir section on this field. The “technical limit” ROP target was 480 m/day. Sperry Drilling Services exceeded this target on two consecutive days with daily totals of 514 meters and 530 meters. The total economic value created was approximately \$13,000,000, based on increased oil production.



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