Case History

Optimized Hole Enlargement while Drilling with the Geo-Pilot® System and XR™ Reamer Tool Saves Time for PEMEX

Customer: PEMEX
Location: Mexico

CHALLENGE – PEMEX needed to drill and enlarge a hole section while performing sidetrack operations.

SOLUTION – Sperry Drilling services deployed the Geo-Pilot® 9600 series rotary steerable system in tandem with Drill Bits and Services’ XR™ 1200 reamer tool to simultaneously drill and enlarge the wellbore to the target depth.

RESULTS – Time savings of one eight-hour trip saved PEMEX approximately US $83,000.

OPERATOR’S CHALLENGE – PEMEX, the national oil company of Mexico, needed to drill and enlarge a hole section while performing sidetrack operations in an offshore exploratory well in the Bay of Campeche, Mexico. This location has specific formation challenges, as the well path is directly intercepted by a fault. Drilling operations can also be more difficult due to the presence of a lost circulation zone and resistance in the interval drilled, with the danger of a differential sticking always present. A previous drilling contractor had failed to successfully deliver the well as required by the client, making a sidetrack necessary. In this section of drilling, the challenge was to turn in azimuth from 142.12° to 179.36° while dropping the inclination angle from a tangent of 27° to 17.09° and enlarging the hole from 12-1/4” to 14-3/4”.

Sperry maintains a long tradition with directional drilling services in this part of the Gulf of Mexico,” said Lino Vella-Gregory, country manager for Sperry Drilling Mexico. “This has created a strong level of collaboration between our operational and field engineers with those of our client.”

HALLIBURTON’S SOLUTION – Sperry deployed the Geo-Pilot 9600 series rotary steerable system with ABI™ At-Bit Inclination sensor and a Drill Bits and Services’ Geo-Pilot FSFX653Z 14-1/2” bit to drill the sidetrack, for increased rate of penetration, precise wellbore placement and optimal hole quality. Simultaneous hole enlarging from 12-1/4” to 14-3/4” was delivered using the XR 1200 reamer tool, which provides concentric and simultaneous hole enlargement on demand. It is the only tool that can be deactivated after enlarging for drilling ahead and allows full flow circulation while tripping out of the hole.

The ABI sensor in the Geo-Pilot system, located three feet (one meter) above the bit, delivered real-time inclination measurements while drilling, reducing the inefficiency and uncertainty that can sometimes occur when using traditional measurement-while-drilling (MWD) sensors. This enabled the well trajectory to hold the required tangent of 27° inclination angle at 142.12° azimuth for 1190 meters (3904 feet), and then start dropping the angle to 17.09° while turning the azimuth to the right to 179.36° until the target depth of 3262 meters (10,702 feet) was reached. Drilling this hard rock section

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created a considerable amount of vibration which could have been damaging to the other downhole tools in the bottom hole assembly (BHA). Those vibration limits were controlled by real-time monitoring performed by Max BHA™ software and WHIRL™ vibration avoidance software, helping to ensure critical RPM speeds were avoided.

“Our experience matched with our fleet of precise directional equipment delivers the alternatives that our client seeks on many occasions in an environment where the depletion of the reservoir creates new challenges everyday,” Vella-Gregory went on to say.

**ECONOMIC VALUE CREATED** – The optimized drilling performance delivered by the Geo-Pilot system in tandem with the XR reamer tool achieved precise wellbore placement in the location and hole size required by PEMEX.

An estimated eight-hour trip was saved by having the ability to drill and enlarge the wellbore simultaneously to the target depth. This time savings yielded an economic value for the customer of approximately US $83,000.

Efrain Gonzalez Niño, PEMEX operations superintendent, summed it up by saying, “Today’s wells present new challenges for the drilling industry, but with the new generation of tools available from Halliburton, we can achieve success.”