SMITH BITS
A Schlumberger Company

Rolling Diamond Element Bits Cut Drill Time up to 75% in Exploration Wells

EnduroBlade 360 bit reduces planned runs from seven to three in high-UCS formations

EnduroBlade 360* rolling diamond element bit and an EnduroBlade 360 bit incorporating strategically placed Stinger* conical diamond elements accomplished what the operator called "astonishing" benchmark performance in a drillbit graveyard.

IGas Energy's goal

Drill two vertical exploration wells designed with an 8½-in section through a highly interbedded formation.

What was tried first

A half-dozen offset wells were drilled in the area several decades ago—as a result, their bit records could not be used for a bit recommendation. However, the section of interest was known as a drillbit graveyard that proved to be extremely challenging. This was confirmed by another operator whose recent nearby drilling suffered low ROP and required multiple bit runs.

Thus, the current operator expected low ROP due to several short runs and similar bit and BHA failures.

Our solution

The DBOS* drillbit optimization system processed the available data, analyzing offset well mud logs coupled with sonic and gamma ray data. The output was a lithology interpretation giving an overview of the rock unconfined compressive strength (UCS) to optimize cutting structure selection.

Based on the DBOS system output, Schlumberger recommended using EnduroBlade 360 bits, which feature rotating diamond elements that maintain overall cutting edge sharpness. This increases bit durability to extend run length and improve ROP.

Then the DRS* drilling record system was used to locate all 8½-in EnduroBlade 360 bit runs worldwide. The most similar cases were compared with the local synthetic DBOS system log to verify compatibility of the proposed bit options.

Well 1: IGas Energy planned a three-run section. Smith Bits, a Schlumberger company, proposed a solution using an 8½-in EnduroBlade 360 bit followed by an EnduroBlade 360 bit incorporating strategically placed Stinger elements to complete the section through the extremely hard Carboniferous limestone formation.

Stinger conical elements enact a higher concentrated point load on the formation than conventional PDC cutters. This means greater impact strength and wear, helping bits increase footage and ROP in hard formations.

Well 2: IGas Energy planned a four-run section. Smith Bits proposed a solution using an 8½-in EnduroBlade 360 bit to drill the interbedded formation to core point. Compatibility was proved through the previous Well 1 offset well that set a new performance benchmark.

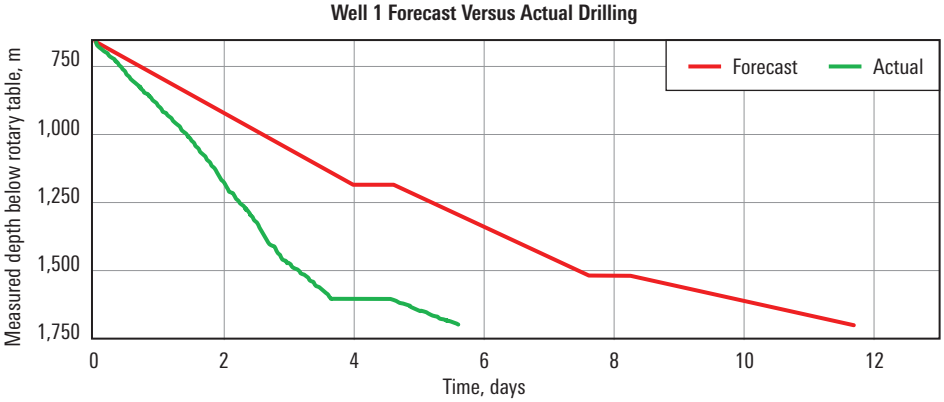
What was achieved

Drilling confirmed that the wellbores were as expected, highly interbedded claystone, sandstone, siltstone, and coal.

Well 1: Drilling the 8½-in section was reduced from 12 days to 6 days. Three bit runs were planned, but Schlumberger drilled the 997-m interval in two runs—the first run used the EnduroBlade 360 bit and the second run used the EnduroBlade 360 bit incorporating Stinger elements.

The 8½-in EnduroBlade 360 bit achieved 13.46-m/h average ROP for 905 m of the 2,000- to 21,000-psi UCS highly interbedded formation. Then the bit achieved 3.74-m/h average ROP for 93 m through the 10,000- to 45,000-psi UCS Carboniferous limestone formation. The two bit designs not only enhanced performance but also showed impressive dull condition with minimal wear.

Well 2: Drilling the 8½-in section to core point was reduced from 12 days to 3 days. Four bit runs were planned, but EnduroBlade 360 bit drilled the 780-m interval from shoe to core point in one run, averaging 7.04 m/h through the 5,000- to 25,000-psi UCS formation.



The EnduroBlade 360 bit and EnduroBlade 360 bit fitted with strategically placed Stinger elements delivered the 8½-in section in half the forecasted time for Well 1, saving 6 drilling days.

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