



The “Silver Lining” in Depleted Gas Fields

Off-the-shelf TenarisHydril Wedge 533™ tubing connection is key to solution.

Summary

Overcoming the challenges presented by a depleted South Texas natural gas field led engineers at a major oil and gas exploration and production (E&P) company to find the “silver lining.” A new drilling technique using steel casing in place of drill pipe, coupled with the TenarisHydril Wedge 533™ tubing connection, has reduced drilling costs by 30 percent compared to traditional methods and produced as much as US\$ 100 million of savings since implementation.

Challenges

Older, depleted fields not economical to drill

Over the last decade, squeezing gas out of a depleted 50-year-old South Texas field has become more difficult and less economical. As the field got older and the gas less plentiful, the operator was forced to go after smaller volume reserve targets with increasingly complex well plans. Without a better way of producing gas, the field’s productive days were numbered.

Fields with huge differences in pressure

These same South Texas high-pressure, high-temperature (HP/HT) fields present even tougher challenges. Large variations in pressure are prevalent due to the degree of depletion in some of the produced intervals. Using standard drilling techniques, larger casing hole size programs with additional strings of casing would be required for the pressure changes encountered at different depths. This geological uncertainty creates a more expensive well with high trouble cost.

Solution

The silver lining – drill with the casing

Recognizing that traditional drilling methods would simply be too costly to work in these South Texas fields, innovative engineers at the E&P company analyzed their options and found a silver lining – both literally and figuratively – a steel casing that could be used in place of traditional drill pipe. Inspired by a Mexican drilling operation they had observed using the casing because drill pipe wasn’t

PROJECT PROFILE

Location

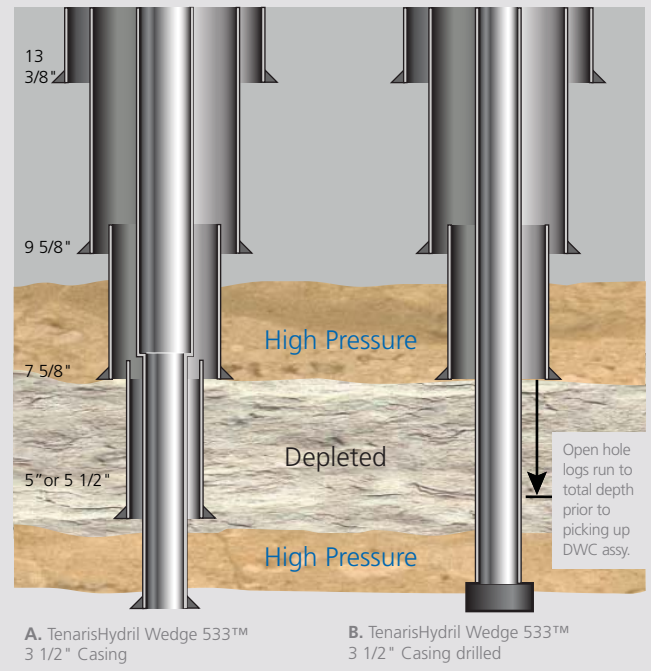
South Texas

Well Environment

Onshore - Natural Gas
HP/HT

Products Provided

- TenarisHydril Wedge 533™



▲ Figure 1 - A. Conventional well plan in offset well.

B. Drill with casing underbalanced well plan

available, they refined the process by drilling with casing underbalanced. The new drilling process applied to HPHT wells enabled the operator to reduce the size of their standard drilling program. E&P company engineers first tested the method using tubing in place of drill pipe in slim reentry wells. Their initial success led the team to add an off-the-shelf TenarisHydril 3 1/2-inch diameter tubing connection. The engineers wanted to see if a 3 1/2-inch connection would be capable of handling high-pressure production after it had served its initial purpose in drilling the well. Because of the durable Wedge Thread™ design – 100% pipe body rating for ten-



▲ 100% internal pressure seal and collapse strength

sion, compression and bending, and 100 percent collapse strength, the TenarisHydril 533™ Tubing Connection stood up to the test of torque. The technique has become standard and the TenarisHydril Wedge 533™ the drilling connection of choice for this South Texas operator.

TenarisHydril connection to be used as bottom hole assembly

Later this year the E&P company plans to begin using the 4-inch TenarisHydril Wedge 533™ tubing connection on specially bored drill collars to improve penetration rates and to produce through the TenarisHydril 533™ drill collars. They expect to be able to double the number of feet that can be drilled in an hour by increasing available Weight on Bit (WOB).

New Application: casing drilling paired with managed pressure drilling

The E&P company's engineers also decided to take the technology one step further in fields without tight rock, pairing casing drilling with managed pressure drilling (drilling with automated chokes) as a way to extend the benefits of both technologies. The final result of the dual process is slimmer and less expensive wells.

Results

New technique with TenarisHydril connection saves dollars and days

The innovative new drilling technique featuring the TenarisHydril 533™ tubing connection has reduced costs by 30%, thus making smaller reserves still economically viable. The savings, which have totaled roughly \$100 million to date, come from multiple sources: safer drilling, a reduction in lost circulation, lower trouble cost and smaller hole sizes.

The average drilling time has been cut in half - from approximately 5 days/1000 feet to 2.5 days/1000 feet. Nearly 100 of the 190 wells drilled over the last five years feature the TenarisHydril 533™ tubing connection, and the connection is a contingency option on the remaining wells. Five rigs continue drilling these wells with the innovative method.

Once an innovation, now a standard procedure

The technique has proven so successful for the E&P company that it is now standard procedure which has been expanded to offshore applications. The technique also is gaining favor in other regions of the company's global operations.



For contact information, please visit our site:

www.tenaris.com