



Dynamic Kill With Coil Tubing in Southern Russia



WELL CONTROL

JOB TYPE

Dynamic Kill with Coil Tubing

LOCATION

Southern Russia
(near Krasnodar, Russia)



In a location with extremely limited equipment availability, Wild Well performed a dynamic kill with coil tubing in Southern Russia, where bullheading was impossible.

CHALLENGES

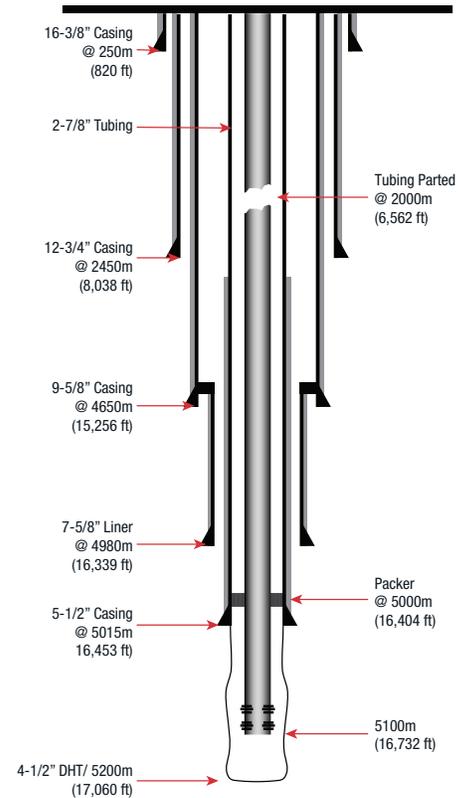
The client purchased a gas production that was drilled and completed in the early 1990s.

When one particular well was shut in for workover operations, a gas leak was observed coming from below the wellhead. Well was producing H₂S with concentrations recorded in excess of 150 ppm at the wellhead. Pressure and flow were recorded on the 2 7/8 in. tubing, 2 7/8 in. x 5 1/2 in. annulus, 5 1/2 in. x 9 5/8 in. annulus, and the 9 5/8 in. x 12 3/4 in. annulus.

SPECIAL CIRCUMSTANCES

Wild Well's well control team performed a fly-by using a helicopter to conduct an initial Equipment availability was extremely limited in this part of Russia. Bringing equipment in from outside of the country was problematic due to customs issues. The only coil tubing unit (CTU) available in the area was a 1 1/2 in. 3800 m coil. Available pumping equipment was also limited.

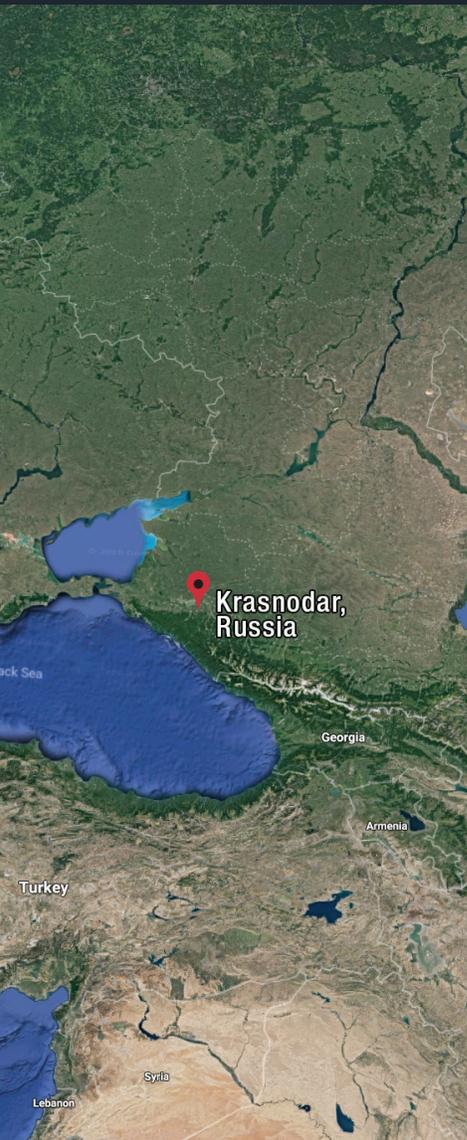
Prior to Wild Well mobilization, the client was dependent on handheld gas monitoring to routinely check for H₂S and SO₂ around the location. Since H₂S was expected around the wellhead when conducting the kill operation, an AreaRAE 5 gas monitoring system was mobilized to the location. Multiple sensors



CONTACT WILD WELL
+1.281.784.4700 // wildwell.com

2202 Oil Center Court | Houston, TX 77073 | CS0027

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were installed around the wellhead and at other critical locations around the site. This allowed remote monitoring of the gas measurements during the kill operation. Additionally, a jet line was constructed to prevent accumulation of H₂S in the cellar during kill operations.

Wild Well worked with the client to implement a T-Card system to monitor personnel coming into the location and establish procedures for using supplied air.

SOLUTION

Wild Well recommended performing a dynamic kill with coil tubing since bullheading was not possible. Maximum coil size was limited to 1 ½ in. due to a 2 7/8 in. safety valve installed in the tubing with an ID of 1.875 in. compared with the 2.441 in. ID of the 2 7/8 in. tubing. Using SPT Group's OPGA Advanced Blowout Control 2.0 simulator, Wild Well determined the appropriate kill weight mud and required mud volumes to perform the dynamic kill. From analysis of the simulation results, 1.25 SG brine was chosen as the kill fluid.

Simulations conducted using SPT Blowout Control software indicated that a minimum rate of 180 lpm was required to kill the well at 3800 m. Conducting the kill on bottom (5000 m) required a minimum of 120 lpm. The maximum pump rate was limited to 180 lpm due to pressure limitations of the coil.

There was substantial uncertainty concerning the gas flow rate and flow path due to parted tubing and suspected holes in the casing. It was determined that the kill operation was likely to be unsuccessful if attempted with the 3800 m coil tubing unit due to the kill rate requirements of an off bottom kill. There was also significant concern about the reliability of the equipment and competency of the crew. Due to these factors, a 5000 m CTU from another provider was mobilized from the Netherlands. The well was flowed and monitored until the CTU arrived on location.

The 5000 m CTU was rigged up and coil was run into the hole to 4950 m (above X landing nipple in tubing). Pumping was commenced at 60 lpm and the rate was gradually increased to 180 lpm. Gas flow ceased and brine was observed returning from the tubing and all previously flowing annuli. Pump was shut down and lined up across the top of the well to monitor fluid level. After the well was confirmed dead and the fluid level remained stable, the client was able to resume remedial operations.