

Case study: Aberdeen, Scotland, United Kingdom

# Mechanical pipe cutter successfully cuts high chrome tubing under HP/HT conditions



Tubing after cutting and retrieving

Total E&P UK Limited has a high-pressure/high-temperature (HP/HT) gas condensate producer well in the North Sea with bottom hole temperatures of 380°F (193°C) and 30,000 psi. They completed it using 5-in tubing from surface to 17,543 ft (5,347 m).

A little over a decade later, the well developed casing and tubing integrity issues, causing several leaks across the annulus and the company killed it.

Within a few months, abandonment operations started retrieving the tubing from 14,436 ft (4,400 m) to surface with the intent of opening windows in the production casing and cementing to isolate the well.

However, the original plan to cut the tubing with drill pipe mechanical cutters encountered complications. The mud system viscosities, yield point, and solids percentage were much higher than anticipated, which required deployment of mechanical cutters with a tractor conveyance system.

Baker Hughes suggested the new 392°F (200°C) 3¼-in **Mechanical Pipe Cutter (MPC) tool** and performed a stack up test at the Aberdeen UK facilities with an example of the tubing and a tractor.

Once confident that this method would work, Baker Hughes transported the tool to the offshore site by helicopter where it was deployed using the tractor conveyance system. Despite the mud properties of 2.05 SG and more than 35% solids, the drill team made the first cut in approximately one hour at 12,719 ft (3876.8 m) at over 330°F (166°C).

After retrieval of the 5-in tubing and a wiper trip to circulate the mud, the drillteam deployed the MPC again and made the second cut in 35 minutes at 13,635 ft (4156 m) at over 340°F (171°C).

The client was very pleased with the fast response and efficient operation that resulted in a clean cut of high chrome content tubing in a hostile environment without damage to outer strings.

## Challenges

- 5-in 23.2 lb/ft 4.04-in inside diameter
- Heavy viscous mud system with high percentage of solids

## Results

- Two runs with first cut at 12,719 ft (3,876.8 m) made within one hour and the next cut at 13,635 ft (4,156 m) made within 35 minutes during the second run
- Provided a non-ballistic, nonchemical solution for cutting downhole tubulars
- Transported MPC tool via helicopter with minimal mobilization time
- Efficient cut of high-chrome content tubing eliminated debris and damage to outer strings

## Tool Specifications

<b>Tool length</b>	18.16 ft (5.54 m)
<b>Two sections</b>	8.33 ft (2.54 m) and 9.83 ft (3 m)
<b>Weight</b>	141 lb (64 kg)
<b>Tool diameter</b>	2 1/8-in (54 mm) tool cuts 2 7/8-in (73 mm) to 4-in (102 mm) pipe 2 1/2-in (64 mm) tool cuts 4-in (102 mm) to 4 1/2-in (114 mm) pipe 3 1/4-in (83 mm) tool cuts 4-in (102 mm) to 7-in (178 mm) pipe
<b>Rating</b>	392°F (200°C) and 20,000 psi (1,379 bar)
<b>Current pipe cutting sizes</b>	2 7/8-in (73 mm) to 7-in (178 mm) pipe
<b>Maximum wall thickness</b>	0.5-in (12.7 mm) - 2 1/8-in (54 mm) tool 0.68-in (17.3 mm) - 2 1/2-in (64 mm) tool 0.75-in (19.1 mm) - 3 1/4-in (83 mm) tool



The cutting end of the MPC tool



The cut results