

West Africa

# Plug setting disconnect tool reduces operations more than 130 hours, saves USD 2.3 million

First deployment of BHKA™ plug setting disconnect tool in West Africa improves operational efficiency

## CHALLENGE

- Reduce operational time to abandon target zone, which averages eight days

## SOLUTION

- Incorporate BHKA™ tool into well abandonment design to simplify cement operations and reduce TCO

## RESULT

- Reduced rig time by 132 hours and saved approximately USD 2.3 million
- Operator plans to incorporate BHKA™ disconnect tool into P&A toolbox for four subsequent wells, which could save up to USD 13 million

## Overview

To improve drilling performance, significant resources are dedicated to well design, directional services, bit selection, and drilling fluid, etc. However, operators can achieve significant rig time savings through the simplification of temporary or permanent abandonment programs in exploratory or development wells.

## Challenge

A major operator with shelf and deepwater assets in Sub-Saharan West Africa plans several exploratory and development wells, which require temporary and permanent abandonment programs in various conditions. The operator's standard operational procedures require isolation of each hydrocarbon-bearing zone via conventional cement plug placement with verification after waiting on cement (WOC).

In a previous exploratory well, the operator's final abandonment program required placement of five stacked cement plugs to isolate each target zone. The program was executed without issue over a span of eight days but resulted in USD 3.1 million in overall costs associated with rig time.

## Solution

To reduce the total cost of ownership (TCO), Halliburton proposed incorporation of the BHKA™ plug setting disconnect tool to simplify cement plug setting procedures. With this tool, consecutive stacked plugs to abandon and kick off are replaced with a single, longer cement plug. The BHKA plug setting disconnect tool enables unlimited cement plug length through safe disconnection of the work string from the tail pipe, which reduces the risk of stuck string and eliminates the need for multiple plugs and WOC in between plugs.

## CASE STUDY

### Result

The operator agreed to deploy the BHKA™ tool for a trial operation to analyze the results and evaluate the tool's application in future wells. Halliburton tailored the operational design for two different applications as a proof of concept.

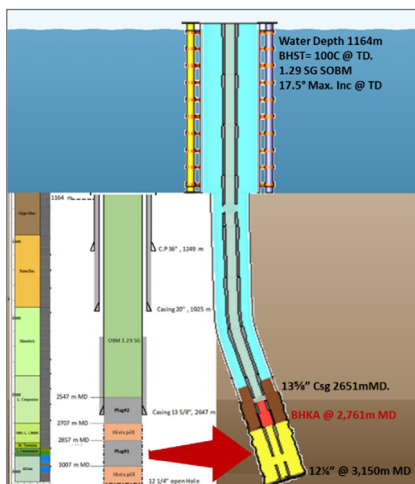
The first application, designed to permanently abandon the 12 1/4-in. pilot hole of a deepwater producer well, consisted of a 5-in. outside diameter BHKA tool with 400 m of 4 1/2-in. sacrificial tail pipe run in hole with a 5 7/8 × 3 1/2-in. combined drillpipe work string. The operation was executed in adherence to the cement program. Halliburton deployed a MCXV releasing dart from the Commander™ 1000 cement head and displaced it to land and operate the single-collet release mechanism at a differential pressure of 2,600 psi. The tail pipe released and planned coverage above the target zones in the pilot hole was achieved.

The next deployment was in an exploratory well where the solution was designed to replace two subsequent

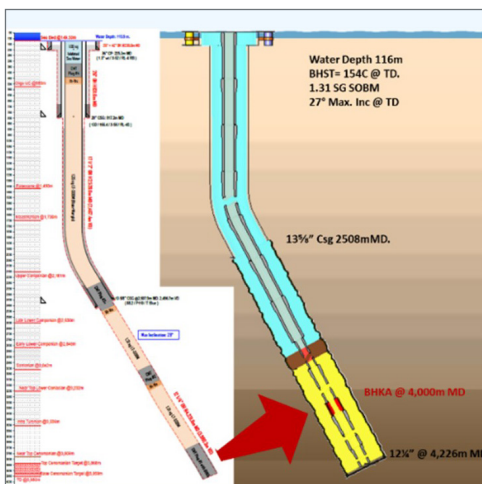
200-m long cement plugs via a single cement operation to achieve required isolation. Similar tubulars and the BHKA tool were used. The cement operation proceeded as planned and was completed with the release of the sacrificial tail pipe and differential pressure of 2,200 psi applied on the landed dart. The objective to provide 100 m of isolation above the target zone was achieved on the first attempt.

The successful proof of concept demonstrated to the operator the reliability of the tool, familiarized the operator with tool procedures, and confirmed the potential savings if implemented in future wells.

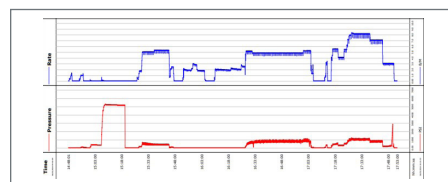
Modification of the abandonment strategy to permanently isolate the pilot hole resulted in an estimated savings of USD 2.3 million and 132 hours of rig time. The operator now plans to use the BHKA tool in four additional wells in the region, which can potentially save up to USD 13 million.



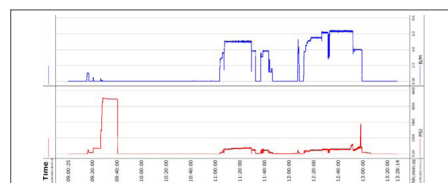
First BHKA™ tool operation  
Producer well



Second BHKA™ tool operation  
Exploratory well



First BHKA™ tool deployment  
release pressure 2,600 psi differential



Second BHKA™ tool deployment  
release pressure 2,200 psi differential

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