



## Wellbore Cleanout / Displacement

### Displacement optimized with BaraKlean®-648 casing cleaner delivers successful wellbore cleanout with restricted pump rate

Location: North Sea Sector, United Kingdom

#### Overview

During a displacement, adequate pump rates positively support the cleanup process. Any restrictions in pump rate (transmitted as annular velocity) can create challenging conditions.

On a North Sea platform well, pump rates were restricted during the cased-hole displacement due to the transfer restriction from rig to supply vessel. On a previous cleanout operation, a competitor's product failed to clean the well properly. The operator had to pull the completion and conduct a secondary cleanup.

The end goal was to displace ENVIROMUL™ oil-based mud (OBM) to 10.0-ppg sodium chloride brine with less than 0.05% solids and no visible oil.

| CHALLENGE  | SOLUTION   | RESULT  |
|--|--|---|
| Limited pump rates during displacement threatened to complicate the wellbore cleanout process. | The optimized design incorporating BaraKlean®-648 casing cleaner could deliver efficient OBM displacement to clean brine with minimal interface. | A clean wellbore was achieved on the first attempt, minimizing waste disposal and saving the operator 2-4 days of rig time. |

#### Halliburton's Solution

As this was the first operation of this type for the customer in this field, the Critical First Well Execution Process was implemented, ensuring that performance criteria were identified before the operation and measured during the displacement.

Using the Baroid technical and black book design processes, the team identified restricted pump rates as a specific challenge. As a result of lab testing, BaraKlean®-648 surfactant-based casing cleaner was selected for the job due to its strong solvent action and high cleaning capacity at lower annular velocities.

BaraKlean-648 cleaner proved to be more powerful than many other cleaners and was ideally suited to the technical constraints presented by this application. It is also a CEFAS-approved product, and is on the Offshore Chemical Notification Scheme (OCNS) list without a substitution warning.

**2-4  
DAYS  
SAVED  
IN RIG TIME**

The displacement design was optimized using Baroid's CFG™ proprietary software package, which simulates the effects of critical parameters such as pump rates, circulating pressures, and annular velocities. No displacement simulation had been conducted by the initial cleanup chemical supplier for the first, failed cleanup.

The challenges presented by the low pump rates and restricted pit space were overcome by careful planning, preparation, and execution of the operation. The wellbore cleanup operation was executed as planned, and the target cleanliness standards were achieved after minimum over-displacement.

The drillpipe and all components of the string were found to be clean when the assembly was pulled to the surface. The successful completion reinforced the high quality of the whole campaign and the part that BaraKlean-648 cleaner played in the process.

### **Economic Value Created**

The design and execution of the displacement using BaraKlean-648 cleaner provided a series of benefits for the customer. The efficient displacement created clearly identifiable interfaces that maximized mud recovery and minimized over-displacement. Brine usage was reduced, while rig time and waste disposal were minimized.

This equated to an estimated savings of 2–4 days of rig rate, as there was no requirement to conduct a secondary cleanup operation and to rerun the completion.