

## Efficient Balanced Displacement of Synthetic and Oil-Based Drilling Fluids Using TETRA Advanced Displacement System - Solids Free (TADS™-SF)

### Solids-Free System Offers Effective Mud Removal and Water-Wet Tubulars With Minimum Fluid Interface

Gulf of Mexico, USA

#### MAXIMIZE DISPLACEMENT EFFICIENCY; MINIMIZE POST-DISPLACEMENT FLUID SYSTEM CLEAN-UP

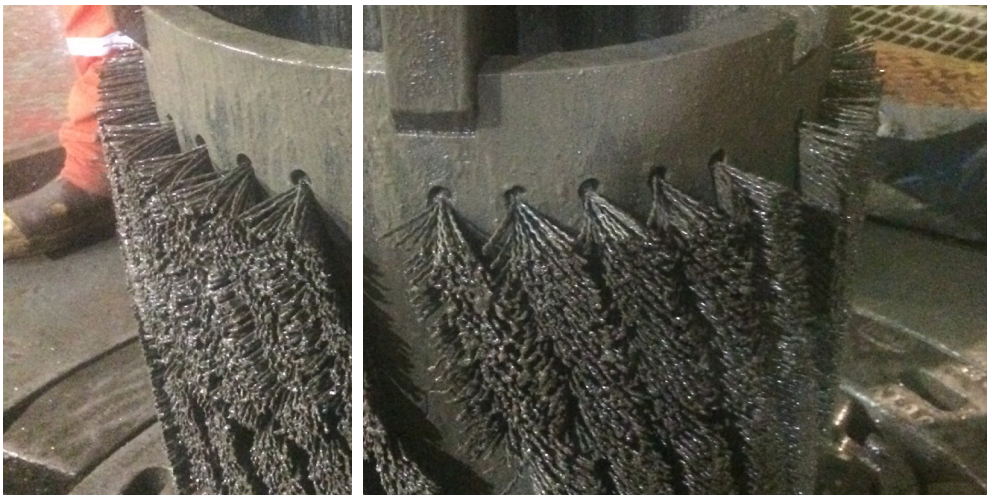
In the Gulf of Mexico, a major operator requested a solution to displace a 10.6 lb/gal ester/isomerized olefin base mud (IOBM) with 10.8 lb/gal calcium chloride (CaCl<sub>2</sub>) completion fluid on a subsea well in 5,422 feet of water. The wellbore consisted of a 9-7/8" liner with a sump packer set at 10,987 feet, tied back to the well head at the mud line, where a set of subsea blowout preventers (BOPs) and 21" marine riser extended up to the drill ship. The well was displaced with a 5" work string, which included cased hole and riser clean up tools to provide for the scraping of the entire wellbore and riser.

In order to reduce risks and operating costs, the operator approached TETRA and requested a solids-free balanced system that would maximize displacement efficiency and minimize post-displacement fluid system clean-up.

#### REDUCED RISKS AND COST USING TADS-SF SPACER SYSTEM

TETRA recommended a solids-free, hydraulically balanced direct displacement using the TADS-SF spacer system, followed by the completion fluid.

The TADS-SF system was designed to separate the IOBM from the completion fluid, clean the casing, riser, and service lines, minimize the mud/completion fluid interface, and leave the tubular surfaces water-wet without exceeding the equivalent circulating density or rig pump limitations.



Effective riser brush clean up using TADS-SF displacement system.

#### Challenge

- Reduce risks and costs
- Maximize displacement efficiency
- Minimize post-displacement fluid system clean-up

#### Solution

TADS-SF system to:

- Separate IOBM from completion fluid
- Clean casing, riser, and service lines
- Minimize mud/completion fluid interface
- Leave tubular surfaces water-wet

#### Results

- Reduced filtration cycles
- Rapid clean-up time
- Minimal interface

### IMPROVED FILTRATION, RAPID CLEAN-UP TIME, AND MINIMAL INTERFACE

The 10.6 ppg IOBM was successfully displaced from the riser, wellbore, and service lines using TETRA TADS-SF spacer system. The system consisted of ester/isomerized olefin base oil, 11.0 lb/gal solids-free TADS-I cleaning spacer, 10.8 lb/gal TADS-II surfactant spacer, 10.8 lb/gal sweep, and supplemented by a third party's cleaning brushes and scrapers.

Following the return of 10.8 lb/gal CaCl<sub>2</sub> to the surface, the work string was short tripped, scraping the entire wellbore. Once back on bottom, the BOPs were jetted and the wellbore, riser, and service lines were then circulated and filtered until the return fluid turbidity reached 16 Nephelometric Turbidity Units and solids content was less than 0.2 percent. When the clean out assemblies were pulled out of the wellbore, they were clean, water-wet, and free of mud. The total displacement time from pumping the first spacer to shutting down the pumps—including the short trip—was 18 hours and 33 minutes.

The clean-up efficiency of the solids-free TADS-SF system reduced the solids loading on the Diatomaceous Earth filtration system, resulting in longer filtration cycle length and reduced clean-up time.



Effective junk basket and riser magnet clean up using TADS-SF displacement system.