

## Time-Saving and Effective Cleanup for North Sea Abandonment Project Saves Operator Millions

### TETRAClean 205™ Surfactant Treatment Renders Brine and Tubing Contaminant-Free for Environmental Discharge and Fluid Reclamation

North Sea

#### SEEKING A MEANS TO CLEAN TUBING AND DECONTAMINATE BRINE

In 2012, a major operator initiated an abandonment campaign in the North Sea. After awarding TETRA the contract to provide the brine, clean-up chemicals, and filtration services, the operator expressed concerns about possible oil contamination of the fluids and tubing that had been downhole for an extended period of time. The operator sought a means to clean the tubing before it was pulled to the surface, and treat the contaminated fluid so that it would meet environmental regulations ahead of discharge.

#### APPLYING THOROUGH FILTRATION AND TETRACLEAN

TETRA provided the operator with a dedicated filtration package of two twin-vessel cartridge units tied directly into the well-test package, routing fluids to stock tanks for treatment and sampling. Fluids requiring more time to settle out were routed to two additional 100-barrel stock tanks equipped with oil skimmers. Throughout the process, TETRA engineers sampled and tested the fluids to determine oil levels, green-lighting discharge only when the fluids were cleaned to specifications.

To reduce the contamination of the tubing, a neat pill of TETRAClean™ 205 was pumped and followed by a kill-weight brine. TETRAClean 205 is a proprietary blend of non-ionic surfactants designed to rapidly and effectively remove all types of muds and contaminants from metal surfaces. A second high-viscosity pill composed of TETRAClean 205 and BioPol™ L viscosifier was used to remove the oil residue and contaminants from the casing. BioPol L is a liquid polysaccharide polymer of high molecular weight in a light oil; it is used as a primary viscosifier and suspending agent.

#### HELPING THE OPERATOR SAVE £60 MILLION

The first well was abandoned in March 2012 and the final well in May 2015 — TETRA maintained a permanent presence on the rig for the duration of the campaign. In all, TETRA filtered more than 13,800 barrels of sodium bromide brine and seawater, much of which had high levels of oil residue. The treatment, however, was effective at greatly reducing oil-residue levels and rendering the fluids suitable for either environmental discharge or reclamation.

Additionally, 29 wells were cleaned up with TETRAClean pills, enabling the tubing to be pulled out and safely handled at the surface as well as ensuring the casing walls were residue-free and water-wet — thereby leaving the wells ready for logging operations and cementing.

The job represents the first use of TETRA filtration and wellbore clean-up services in an abandonment campaign. The TETRA solution proved to be so effective and efficient that it greatly contributed to completing the work five months ahead of schedule and £60 million (US\$74 m) under budget.

#### Challenge

- Oil residue cleanup in a major abandonment campaign
- Contaminated fluids
- Contaminated tubing

#### Solution

- BioPol™ L viscosifier
- Filtration system
- Wellbore clean-up services

#### Results

- Filtered over 13,800 bbl
- Cleaned up 29 wells
- 5 months ahead of schedule
- ≈US\$74 million under budget

*“The TETRA contribution to our fluids management was considerable. The TETRAClean pills made for a clean pull of the tubing and more efficient cement barrier placement, and filtering the contaminated sodium bromide was very cost effective. Additionally, TETRA personnel both onshore and aboard the rig were proactive and flexible, making for a highly efficient project with industry-leading safety metrics.”*

*Operator Drilling Superintendent*

