

Tullow Oil in Ghana Reduces Costs and Logistics Using TETRA Oil Control Service

TETRA OilFix™ Service With TETRA O-Lok C Treatment Enabled Reuse of NaBr Completion Fluid and Safe Discharge of CaCl₂ Brine

Offshore Ghana, West Africa, South Atlantic Ocean

REDUCING CONTAMINATION OF NABR AND CaCl₂ BRINES

In Ghana, Tullow Oil was experiencing a costly problem with completion fluid contaminated with oil-based drilling mud. The completions were being performed on deepwater wells located in the TEN and Jubilee oilfields off the coast of Western Ghana in the South Atlantic Ocean.

As the operator prepared to switch the completion fluid from calcium chloride (CaCl₂) to sodium bromide (NaBr), they sought, first, a means to reduce contamination of the NaBr fluid so it could be reclaimed for reuse, and second, to treat the CaCl₂ fluid so it would meet environmental requirements for discharge.

APPLYING TREATMENT, MEASURING EFFECTIVENESS

TETRA proposed the application of its TETRA OilFix™ service, which consists of two components, use of the TETRA O-Lok C filter aid to remove oil and grease from aqueous fluids and a portable InfraCal to determine the level of contaminants in the filtered fluid, both before and after filtration. These components can also be used individually as stand-alone services, but are usually applied in tandem.

TETRA O-Lok C is a nontoxic, nonhazardous cellulose material that is added to diatomaceous earth to greatly enhance filtration. The typical application is 1 pound of TETRA O-Lok C for every 3–5 pounds of DE. The minimum amount can be calculated by multiplying the ratio of oil and grease contaminant in milligrams per liter by the volume of fluid to be filtered in barrels and then multiplying that product by 0.000175.

$$lb. \text{ of TETRA O-Lok C} = (mg \text{ of residue per liter}) \times (bbl \text{ of fluid}) \times (0.000175)$$

Initially, the operator expressed some concern about whether TETRA O-Lok C would actually be effective at removing the contaminant and whether the job would interrupt ongoing rig operations. Nevertheless, their personnel were won over by the confidence of the TETRA team and the job proceeded.

Challenge

- Oil-contaminated completion brine
- Reclaim NaBr brine for reuse
- Treat CaCl₂ brine for discharge

Solution

- TETRA OilFix™ filtration service
- TETRA O-Lok C filter aid
- Portable InfraCal

Results

- 36,000+ barrels filtered
- 82.4% reduction in residue
- Reclamation of most NaBr
- Safe discharge of CaCl₂

“The overall cost to recondition our brine returns using TETRA O-Lok C has proved to be a [. . .] low-cost solution to a previously expensive and challenging issue.”
Tullow Representative



REDUCING OIL CONTAMINATION 82.4%

The application of TETRA OilFix proved to be highly effective, and the operator was pleased with the outcome. The InfraCal provided invaluable data, allowing the team to measure the levels of contaminant in the completion fluid before and after treatment.

Filtering a cumulative average of 36,300 barrels, the TETRA O-Lok C reduced oil and grease contaminant in the completion fluid by an overall average of 82.4%, enabling reclamation and reuse of the NaBr fluid and treatment of the CaCl₂ fluid for discharge. The highest-performing well saw an 86% reduction in oil and grease residue.

Of the treatment, a Tullow Oil representative said, "TETRA proposed, engineered, and implemented this solution, which has allowed us to re-use the majority of brine returns from the wellbore, significantly reducing the volumes of untreatable brine [. . .]. The overall cost to recondition our brine returns using TETRA O-Lok C has proved to be a relatively low cost solution, to a previously expensive and challenging issue."

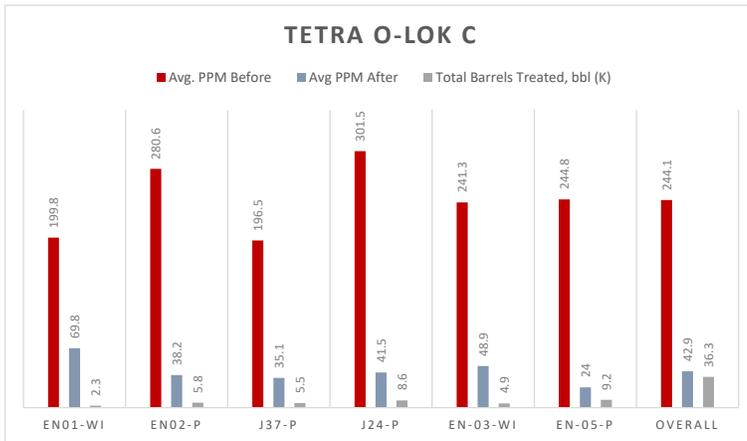


FIGURE 1 illustrates how data collected by the InfraCal enabled a side-by-side comparison of contaminant levels in six wells before and after treatment with TETRA O-Lok C, which yielded an average reduction of 82.4% overall.

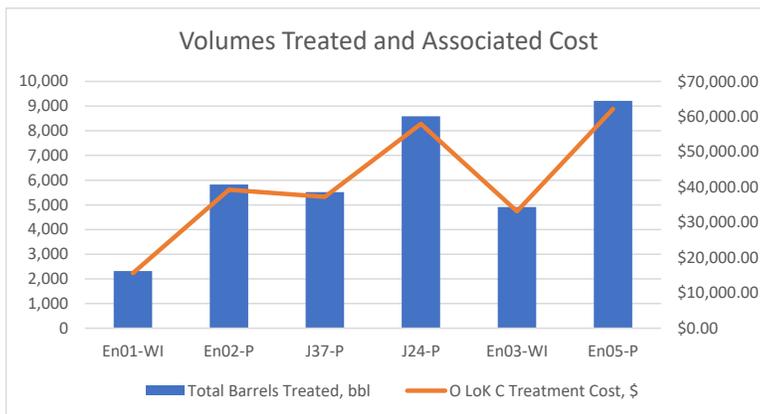


FIGURE 2 shows the cost of TETRA O-Lok C treatment tracking with the total number of barrels of brine treated for each well, revealing that the cost of treatment is significantly less than the cost of replacing the brine.

