

# Wellbore Damage

## ✘ PROBLEM

Formation damage exists in many oilfields around the world. This damage refers to any process that causes a reduction in the natural productivity of hydrocarbons in the porous media in an oil and/or gas well. It is present at any phase during drilling, completion or production and is attributed to several factors.

Formation damage may originate from fluid invasion into the surrounding rock during drilling operations, organic deposition from the reservoir hydrocarbon system, oily debris left downhole, adsorption of additives such as surfactants and polymers used as completion fluids, and/or incompatibility of fluids (in-situ water-in-crude oil emulsions or sludge formation).

Currently and historically, multipurpose industrial cleaning products are used to remove and/or clean and remediate these oily contaminants. These chemicals are often based on organic solvent solutions and blends of organic solvent products having relatively low flash points. However, the use of these non-aqueous fluids may not render the oil contaminated surface clean enough and sufficiently water wet and additional aqueous surfactant washing procedures, pills and spacers may be required following the use of such an organic washing pill.

## ✔ SOLUTION

An approach to treat these wells is to use specialty formulations that remove formation damage in the near-wellbore region. The treatment fluids diffuse into the perforated rock matrix, spontaneously solubilize oil and remove the blocking material in the pore rock. The fluid simultaneously water-wets and fluidizes solids in the damaged porous media to prepare them for easy removal during production operations. This system needs to provide a fast separation when evaluated in emulsion tests with crude oil. The high oil solubilisation, high diffusion through porous media, and the reduction of interfacial tension between organic and aqueous phases to near zero, make these formulations excellent candidates for removing formation damage. However, they must be formulated based on their specific application.

### **Filter Cake Removal:**

Our one-step oil-based filter cake clean-up technology uses a single-phase formulation and in-situ acids, in a single blend, to solubilize the oil into the product, reverse the wettability of the filter-cake solids, and simultaneously decompose their acid-soluble components.

### **Wellbore Clean-up:**

Our formulations produce a uniform wellbore clean-up in horizontal and highly deviated open-hole wells restoring the water-wet condition of the rock and increasing injectivity or productivity of the wells.

### **Displacement Fluid:**

Fluid incompatibility is a major issue when oil and gas operators have directly displaced the oil-based drilling fluid from a wellbore with an aqueous fluid such as brine and/or cement after running a casing string. Our formulated displacement fluids prevent viscous sludge at the fluids interface, remove all the oil from the surfaces, and make the wellbore surfaces and near-wellbore region water-wet.

