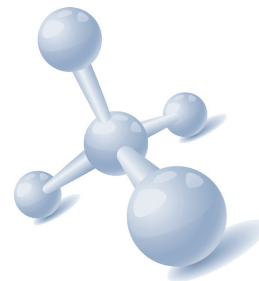


Solutions

for volumetric sweep improvement



APPLICATION

Oil producing reservoirs contemplated for secondary recovery must be studied prior to waterflooding to characterize the rock properties and determine how efficiently the reservoir will flood. Many exhibit a non-uniform permeability contrast and/or produce viscous oils that results in oil and rapid water breakthrough at the offset producing well(s), with resulting inefficient oil recovery. If a reservoir shows a Dykstra-Parsons permeability variation greater than 0.55 or produce oil with a viscosity of greater than 4 cp, then a long-term injection side application of a colloidal dispersion gel (CDG) polymer, BrightWater® technology, or polymer should be considered for the waterflood.

DESCRIPTION

The TIORCO colloidal dispersion gel (CDG) is a gel that forms in-situ after it enters the reservoir. These gels are formed from low concentration polymer augmented drive fluids, capable of entering high matrix permeability reservoirs in-depth, while being adsorbed onto the rock surfaces. Thus, predominate water flow paths are physically altered to reduce flow. Now, the reservoir appears more uniform to the drive fluid, and more low permeability oil bearing rock is contacted. Case history data indicates one may expect recovery improvements up to 10% of original-oil-in-place over and above waterflood recoveries with less water injected.

BrightWater technology is a sub-micron particulate chemistry that is injected in waterflood injection wells to provide in-depth diversion of water flow. The BrightWater technology activates at a pre-determined location in the reservoir. Upon activation, the BrightWater particles begin to expand to many times their original volume, blocking pore throats and directing injection water into trapped, oil-rich zones.

Polymer flooding is designed to improve the mobility ratio of the water and oil in the reservoir. Sweep efficiency is improved by reducing the viscous fingering of the water in the oil. Depending on the reservoir and oil properties, CDG's, BrightWater, or polymer can be used alone or in combination to maximize sweep efficiency.

ADVANTAGES

Colloidal dispersion gels represent the state-of-the-art in in-depth gels. BrightWater is a new in-depth fluid diversion technology. Each technology restricts the flow of water into high permeability thief zones, reduces costly water production, improves sweep efficiency, and increases oil recovery.

CRITICAL DESIGN FACTORS

- Reservoir formation description
- Reservoir temperature
- Injection water quality
- Oil recovery to date
- Waterflood performance