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ZONETROL XT

Zonal water conformance system

APPLICATIONS

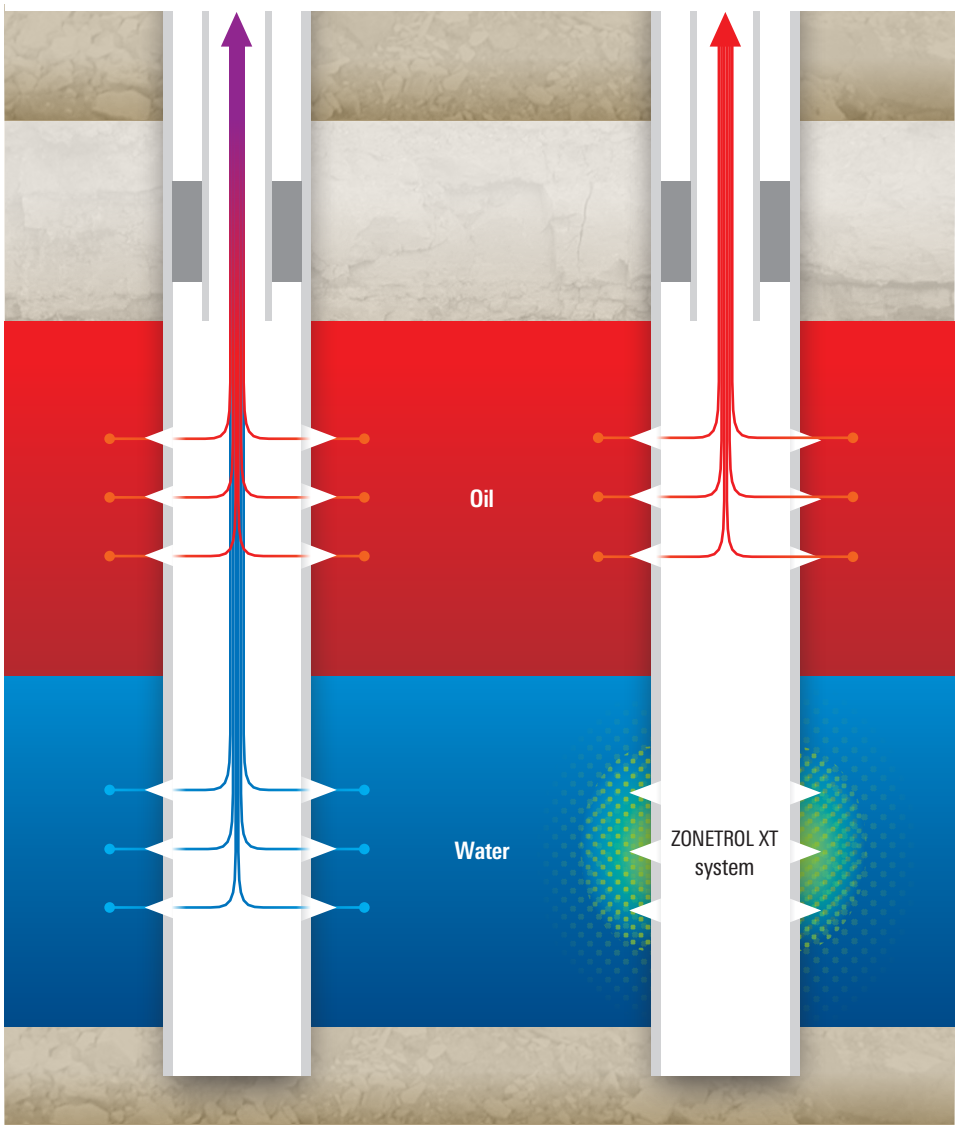
- Multilayer reservoirs with high water cut
- Artificially lifted wells
- Mature fields or brownfields

BENEFITS

- Decreases water production
- Increases oil production in reservoirs that are oil-wet or have mixed wettability
- Low-cost and simple to prepare in the field and pump

FEATURES

- Reduces the formation permeability to water with little effect on the formation permeability to oil
- Has low viscosity that can be bullheaded from the surface
- Has compatibility with acid-based fluids
- Works in temperatures as high as 250 degF [121 degC]
- Works in reservoirs with permeability from 10–2,000 mD
- Works in the presence of heavy oil
- Can model changes in oil and water production following ZONETROL XT system treatments using Petrel* E&P software platform



Using the ZONETROL XT system, right, reduces permeability to water while maintaining permeability to oil.

Lower permeability to water

The ZONETROL XT* zonal water conformance system is a second-generation relative permeability modifier that is soluble in aqueous brine. Injection into the matrix causes adsorption of the polymer to the rock. The polymer adsorption lowers the permeability to water with little change in the permeability to oil, while reducing clay sensitivity to cation exchange. This disproportionate permeability reduction (DPR) is what makes the ZONETROL XT system an effective relative permeability modifier.

The ZONETROL XT system is designed to treat oil/water reservoirs with multiple zones in which water is produced from district intervals. In a multizone treatment, the DPR features can be used to reduce water permeability in the water-producing layers and have minimal effect on the oil-producing layers. The ionic nature of the ZONETROL XT system enhances the adsorption characteristics and minimizes desorption during the production cycle, in both sandstone and carbonate reservoirs, prolonging the effective life of the treatment.

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Effective in high temperatures

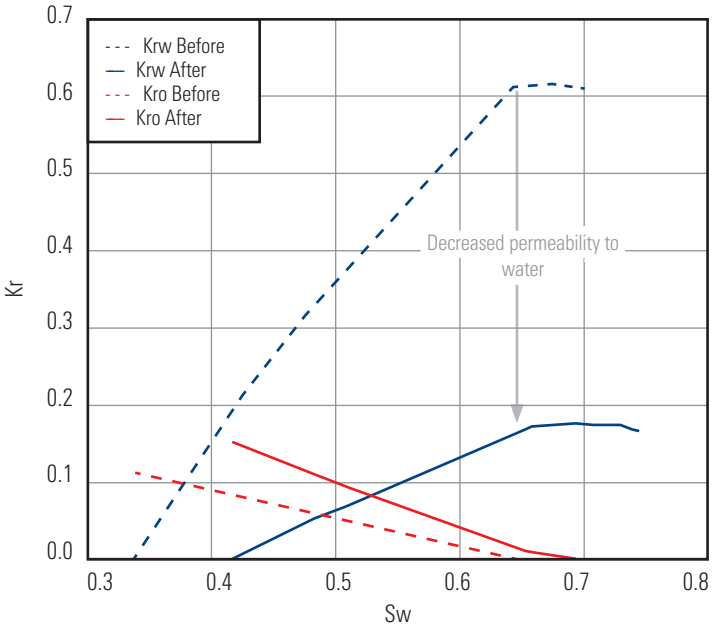
The ZONETROL XT system has proven to be effective in reservoirs with temperatures as high as 250 degF [121 degC], and in reservoirs with permeability as high as 2,000 mD or as low as 10 mD. These properties are due to the low viscosity and molecular weight of the polymer.

The ZONETROL XT system is soluble in water or light brines and is generally used at concentrations of 0.16 to 0.5 wt% of the injected solution. For critical wells, a coreflood test can be used to determine the optimum concentration.

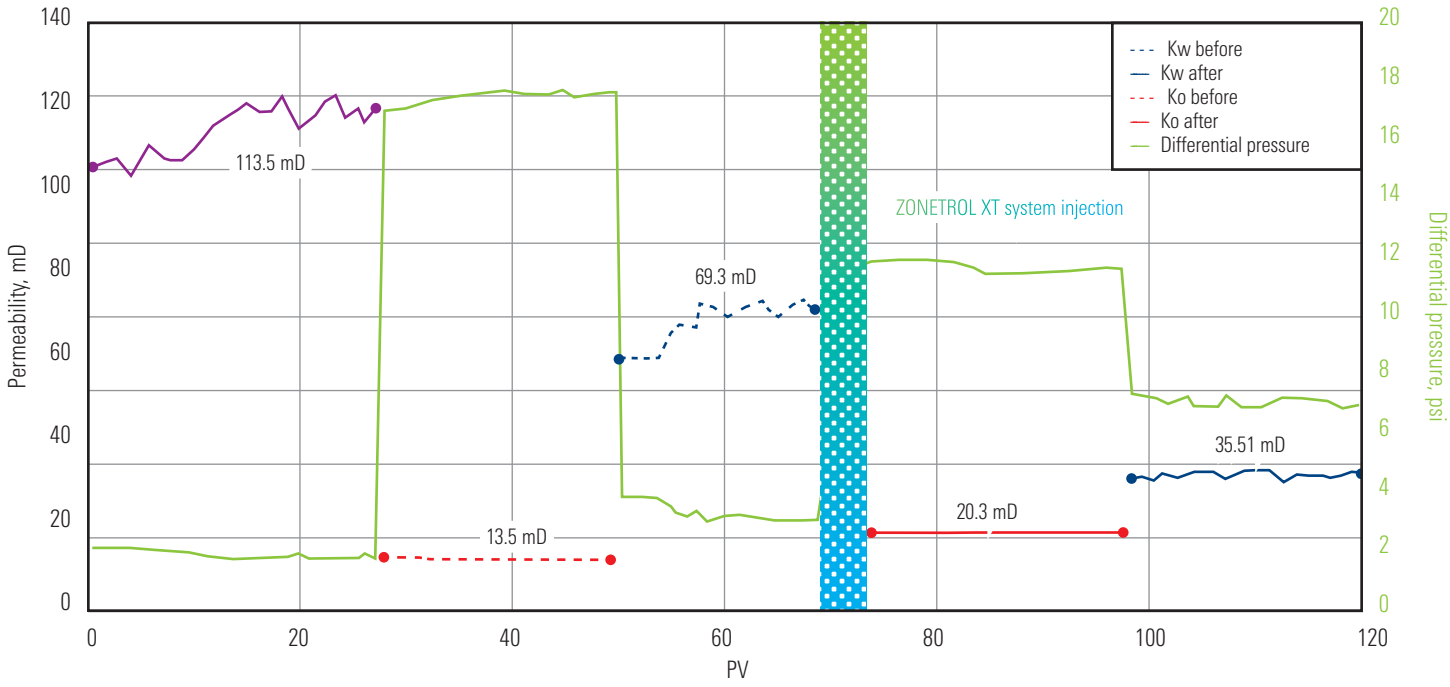
Oil/water reservoirs that are potential candidates for the ZONETROL XT system treatment will, in many cases, have multiple zones where

- the zones do not communicate with each other and where small, near-wellbore treatments can be effective in the absence of communication
- one of the zones has high water cut exceeding 40%
- one of the zones has economical, producible oil reserves justifying the cost of the treatment.

Fluid in the ZONETROL XT system has consistently outperformed similar systems from competitors and has been successfully used in Colombia, Ecuador, and Mexico. Fluid in the ZONETROL XT system is a low-cost, low-risk solution to improving the economics of brownfields producing with high water cut.



As indicated in this graph, the ZONETROL XT system reduces the relative permeability of the reservoir to water by up to 75% with little if any change in the permeability of the reservoir to oil.



In this instance, the ZONETROL XT system increased the permeability to oil (Ko) by 48% while effectively reducing the permeability to water (Kw) by nearly 49%.

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