

Preparation and Field Application of a Conformance Control and Water Shutoff Trial in a N-German Oil Field

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Abstract

Most of the oilfields in northern Germany are mature fields with water cut higher than 90%. As such, operating these fields are OPEX intensive due to costs associated with produced water reinjection (high water cycling). One typical example is the Aldorf oilfield discovered in 1955, a multi-layered reservoir occurring at a top depth of ~1100 m (true vertical depth) with reservoir temperature of ~55 °C. Produced water from the field has high salinity and makes up ~98% of the total liquid volume.

To mitigate high water production volumes, Water Shutoff and Conformance Control methods are considered most attractive due to their low cost of application. Although application of these methods is well known, the success rates are unfortunately low. For this reason, published work on field studies are limited.

The extensive research and findings of the DGMK Project 704 "Evaluation of Polymers and Polymergels for Water Shutoff in Oil and Gas Wells" (2009-2016), is the basis of a first Water Shutoff field trial in the watered-out oil production well Aldorf 54. After a screening phase, a cross-linked polyacrylamide (PAM) with relative permeability modifying properties was chosen and injected through the candidate well. The well was set into production again after a defined gelation time.

This paper presentation is discussed under five (5) critical aspects of conducting a Water Shutoff field trial, namely; screening and selection, laboratory tests, field execution including well workover and well monitoring. Other aspects include discussion of results and lessons learned for future trials.