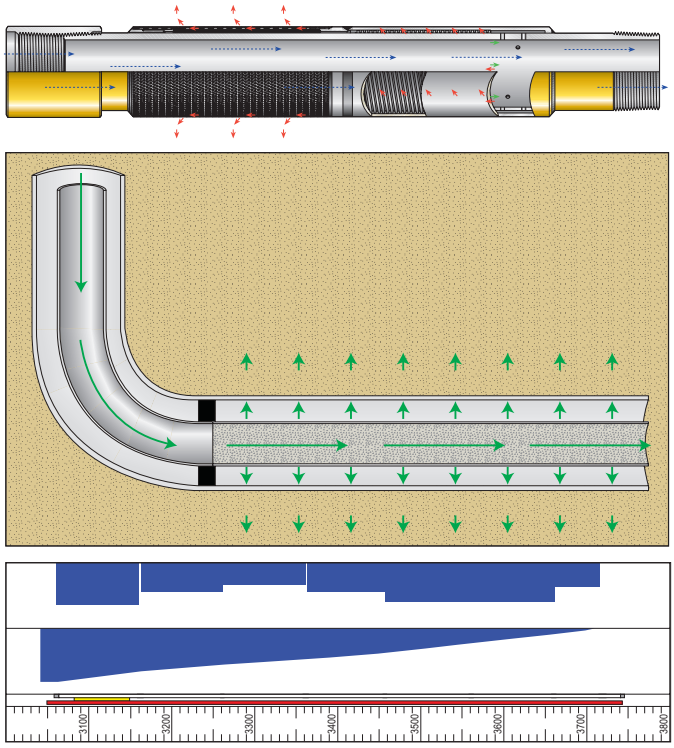
# EQUALIZER Technology Applied to Improve Water Injection Profile in a Deepwater Application

## Benefits

- The technique delivered an enhanced injector well, in less time, with less risk and with a more effective cost expenditure compared to the traditional water injector well completion method
- Improved injection profile compared to a conventional completion method
- Also positive impact on the neighboring producer wells showing an increase in production and improvement in the revovery factor

## Background

In December 2006, an operator wanted to improve injectivity and increase the water sweep efficiency in a water injector well in Campos Basin, Brazil, as well as provide sand control to a highly friable formation.




*Schematic flow path through the EQUALIZER™ screen; equalized injection well diagram; and the real PLT results, showing how EQUALIZER provides a homogeneous flow distribution*

## Baker Hughes Solution and Results

The strategy was to improve water injection for reservoir energy maintenance and to inject water into the oil leg concentrated in the lower portions of the reservoir, while production is concentrated in the upper parts, to delay water breakthrough. It included pressure maintenance and sweep efficiency for 3 adjacent producer wells, avoiding water channeling and earlier breakthrough, by uniform water injecting along the openhole horizontal section of the well.

The EQUALIZER™ screen was the foundation of this project. Although in the past this technology was only applied to increase the oil recovery in producer wells by delaying water breakthrough, at this project, the EQUALIZER screen was used to provide the equalized water injection profile, and to efficiently distribute the acid treatment for a fast and effective removal of the filter cake. Deployed in one trip, not requiring gravel packing and allowing a bullhead pumping for the acid job, this technique added the benefit of significant rig time savings to the completion. The injection rates were from 2,000 to 5,000 $m^3$/day, starting with higher rates to enhance reservoir pressure and displace an oil bank to the target producers.

Injection logging operations were performed to verify the performance of the EQUALIZER screens after the equipment installation. The results were conclusive that the EQUALIZER screen provided a homogeneous flow distribution, balancing the injection across the horizontal section, delivering an improved injection profile compared to a conventional completion method.

The high injectivity index results obtained after the injectivity test conducted in the well confirmed the efficiency of the EQUALIZER screens to perform the acid treatment as well.

Since the water injection started in April 2007, a positive impact on the neighboring producer wells was noticed. The closest oil producer well to the referred water injection well presented good evidence of water injection efficiency, i.e., oil rate increase and water cut decrease after the injector well was brought online.





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