

WAG Injection Compared to Waterflooding and Gas Injection

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Abstract

Two commonly-used EOR methods in the Iranian reservoirs are waterflooding and gas injection. Early breakthrough of the injected fluid in the production wells is the major problem associated with these processes. A solution to this problem is an alternative process called water-alternating-gas (WAG). In recent years there has been an increasing interest in WAG processes, both miscible and immiscible. Many of the Iranian fractured reservoirs are located in the inclined reservoirs. So, WAG injection could increase the recovery by contacting the upswept zones, especially recovery of attic or cellar oil by exploiting the segregation of gas to the top or accumulating of water towards the bottom. The WAG process has been proved beneficial in re-pressurizing the reservoir when compared to a waterflood only process. This higher pressure is caused by the gas slug being injected at an extremely high voidage replacement rate because of its high mobility. WAG injection increases the efficiency of the plain gas injection, too. By alternating the gas injection with water injection, the gas relative mobility in the reservoir is reduced over gas injection only. Therefore, less gas breaks through to producing wells, reducing gas handling requirements. Furthermore, the lower producing GOR associated with WAG injection over straight gas injection results in less erosion of the production equipment.

Keywords: Displacement, Sweep Efficiency, Gravity Segregation, Mobility

1-Introduction

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