Assessment of Surfactant Flooding With Variations of Slug Injection Strategies in Waterflooded Reservoir

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***Abstract*—Injection of surfactant into waterflooded reservoir which has considerably high water saturation may cause a reduction in surfactant efficiency by means of surfactant dilution and adsorption. Therefore, to maintain expected lowest interfacial tension (IFT) condition, large amount of surfactant, which leads to higher cost, is inevitable. Several studies have observed that reduction in surfactant concentration slug at the late time can cause a shift in surface equilibrium, resulting in desorption of retained active surfactant agents and therefore, it is possible to obtain benefit from this phenomenon to achieve longer period of the lowest IFT condition while maintaining the amount of surfactant used. Hence, this study aims to evaluate effects of two-slug surfactant flooding compared to single-slug while maintaining amount of surfactant used constant in waterflooded reservoir. The performance is evaluated based on additional oil recovery using STAR® reservoir simulation program. Simulated results indicated that two-slug surfactant injection yields better oil recovery than conventional single-slug surfactant flooding due to benefit of sacrificial adsorption and desorption process of active surfactant. Selecting type of two-slug surfactant flooding strategy would depend on surfactant concentration of single-slug which is chosen for modification; whereas, the selection of magnitude of concentration contrast between two slugs would depend on placement of surfactant mass ratio.**

***Index Terms*: Surfactant adsorption, surfactant desorption, surfactant flooding**

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