

Surfactant-Alternate-Gas (SAG) Injection Process as a Novel EOR Technique-- A Laboratory Investigation. Category: Reservoir Modeling and Characterisation

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The ultimate oil recovery after primary and secondary recovery is less than 40% of the Original Oil in Place (OOIP) in most reservoirs. Suitable EOR methods need to be chosen to improve oil recovery by injecting fluid materials that are absent in the reservoir. Nowadays, each EOR method has been modified to suit the requirements of specific reservoir conditions. A study was carried out to evaluate the feasibility of immiscible Surfactant-Alternate-Gas (SAG) injection at laboratory scale for Limbodara field of Ahmedabad Asset, ONGC, Ahmedabad.

Surfactant alternate gas (SAG) is an immiscible gas injection process using a method for mobility control to improve sweep efficiency. The main factors which contribute towards incremental displacement efficiency are entrapment of gas due to hysteresis and the effect of the 3 phase flow further contribute to increase recovery by injecting immiscible gas in SAG manner. SAG injection can thus lead to improved oil recovery through combination of factors such as mobility control, contact of unswept zones, improved microscopic displacement efficiency and oil vaporization due to mass transfer between reservoir oil and injected gas due to vaporization process.

The concept of SAG process as an enhanced oil recovery technique is relatively new, with very little experimental and theoretical work available on the subject. Displacement efficiency from SAG experiments are comparable to ASP core flood experiments carried out under similar conditions. Experimental data show a strong synergic effect of alkali-surfactant and ultra-low oil-water IFT on oil recovery. It is observed that, on immiscible single cycle & two cycle SAG process an incremental displacement efficiency of 27.79% & 29.01 % were achieved over and above water flooding. Indicating feasibility of additional oil recovery by SAG process in areas in the field where early breakthrough of the ongoing injection water occurs.