

Polymer Flooding: Chemical Enhanced Oil Recovery Technique

Authors : Abhinav Bajpayee, Shubham Damke, Rupal Ranjan, Neha Bharti

Abstract : Polymer flooding is a dramatic improvement in water flooding and quickly becoming one of the EOR technologies. Used for improving oil recovery. With the increasing energy demand and depleting oil reserves EOR techniques are becoming increasingly significant. Since most oil fields have already begun water flooding, chemical EOR technique can be implemented by using fewer resources than any other EOR technique. Polymer helps in increasing the viscosity of injected water thus reducing water mobility and hence achieves a more stable displacement. Polymer flooding helps in increasing the injection viscosity as has been revealed through field experience. While the injection of a polymer solution improves reservoir conformance the beneficial effect ceases as soon as one attempts to push the polymer solution with water. It is most commonly applied technique because of its higher success rate. In polymer flooding, a water-soluble polymer such as Polyacrylamide is added to the water in the water flood. This increases the viscosity of the water to that of a gel making the oil and water greatly improving the efficiency of the water flood. It also improves the vertical and areal sweep efficiency as a consequence of improving the water/oil mobility ratio. Polymer flooding plays an important role in oil exploitation, but around 60 million ton of wastewater is produced per day with oil extraction together. Therefore the treatment and reuse of wastewater becomes significant which can be carried out by electro dialysis technology. This treatment technology can not only decrease environmental pollution, but also achieve closed-circuit of polymer flooding wastewater during crude oil extraction. There are three potential ways in which a polymer flood can make the oil recovery process more efficient: (1) through the effects of polymers on fractional flow, (2) by decreasing the water/oil mobility ratio, and (3) by diverting injected water from zones that have been swept. It has also been suggested that the viscoelastic behavior of polymers can improve displacement efficiency. Polymer flooding may also have an economic impact because less water is injected and produced compared with water flooding. In future we need to focus on developing polymers that can be used in reservoirs of high temperature and high salinity, applying polymer flooding in different reservoir conditions and also combine polymer with other processes (e.g., surfactant/ polymer flooding).

Keywords : fractional flow, polymer, viscosity, water/oil mobility ratio

Conference Title : ICGPE 2015 : International Conference on Geosciences and Petroleum Engineering

Conference Location : Paris, France

Conference Dates : October 29-30, 2015