

# A Study on Polymer Flooding

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**Abstract-** In this paper we are presenting a study on polymer flooding. Polymers are blended with solvent water and structure polymer arrangement. The reason for adding polymers in water is to build the clear consistency of water (dislodging liquid) which brings down the portability proportion. This condition augments oil-recuperation clear proficiency, making a smooth flood front with less goeey fingering. Numerous examinations and executions of polymer flooding in fields have been finished with most encouraging differing accomplishments. A polymer is a long chain of linked monomers. “The polymer should have a molecular weight greater than 200 and at least 8 or more repeating units”. The types of monomers conforming it, their arrangement as well as the length of the monomers chain then decide the properties of the polymer.

**Index Terms-** Polymer, Flooding, Water, Solution, Ratio, Viscous.

## I.INTRODUCTION

A polymer is a long chain of linked monomers. “The polymer should have a molecular weight greater than 200 and at least 8 or more repeating units”. The types of monomers conforming it, their arrangement as well as the length of the monomers chain then decide the properties of the polymer. There are two most common type of polymer are used, which is classified as either synthetic polymers (polysaccharide) or biopolymers (Polyacrylamide). While biopolymers viscosity better in high salinity waters, Polyacrylamides, a type of synthetic polymer, gives better results in low salinity waters.

Notwithstanding having promising outcomes, polymers are costly and the flooding procedure is restricted by supply temperature, make-up brackish water saltiness and hardness because of compound corruption of the polymer. Likewise, as polymer constrained through development there is a noteworthy decrease in polymer focus because of adsorption and stopping which can change supply

porousness and influence recuperation either emphatically or contrarily. Along these lines the focal point of this examination will base on exploring the degree of the impacts of polymer properties as far as oil recuperation in various repository porousness through store reproduction. The principle objective is to set up the amount and nature of polymer to be infused so as the nature of the store properties as far as penetrability. It is done as the assurance of the screening criteria reasonable for polymer flooding planning to give best yield of oil recuperation. Repository recreation will be finished by utilizing Petrel programming (running ECLIPSE in Petrel programming) on the three layered store with 300 cells. Four cases with various penetrability are created. Two cases will have homogenous penetrability one with low and the other with high piousness. Another two cases will have heterogeneous piousness with low and high penetrability too. Polymer slugs with distinctive focuses through different infusion time are injected for each case and the outcomes are looked at. The oil consistency ranges from 0.6 to 1.04 cP while piousness ranges from 500mD to 2250mD. The oil recovered after water flooding for Homo\_low, Homo\_high, Hetero\_low and Hetero\_high are 35.03%, 42.16%, 43.51% and 43.87% separately. Polymer have been infused after 1, 2, 3 and 4 years for a long time of creation and the polymer focus have been tried in the scope of 0.1, 0.2, ... , 1.7 lb/lb. Hetero\_high porousness case is gotten to be reasonable for polymer flooding. It give the oil recuperation of 47.53% after flooding 0.8 lb/STB polymer focus for 1 year which is 4.02% augmentation recuperation from water flooding. The generally speaking oil recouped in all cases demonstrated that high penetrability is the central point contrasted with heterogeneity/homogeneity appropriation. While for the dispersion, heterogeneous is the appropriate possibility for

polymer flooding than homogeneous case. Distinctive adsorption esteems have been tried with reference to various estimations of lingering obstruction factor while polymer focus was set as 0.8lb/STB for all cases.

## II. DIFFERENT TYPE OF OIL RECOVERY

During the delivering of an oil field, diverse generation stages are experienced. At first, when the store is brought into creation, oil streams normally to the surface because of a weight of the present supply in the essential stage. As repository weight drops, water is ordinarily infused to support the strain to dislodge the oil in the auxiliary stage. Finally, the rest of the oil can be recuperated by upgraded oil recuperation (EOR) phase.[4] Recovery of hydrocarbons from an oil repository is ordinarily perceived to happen in a few recuperation stages. These are

1. Primary recovery
2. Secondary recovery
3. Tertiary recovery ( EOR)

## III. WATER FLOODING

Water infusion routinely, in view of the sort of creation and nature of supply the accompanying patters are pursued an infusion well. When the essential vitality of the repository will in general exhaust it winds up important to keep up the weight inside the store to accomplish ideal creation and expand extreme recuperation. In such condition the weight upkeep should be possible by infusing water into the oil and gas store which is perfect to the arrangement water present in the repository through a few water infusion wells. Such sort of activity is known as water flooding/Water injection[7].

In this procedure, the essential goal is to fill the void age made by the created oil parts along these lines keeping away from the store strain to diminish with the expanded generation rate of oil. At the point when the water is infused in the repository, it will in general push the oil upwards, in this way expanding the production life and a definitive recuperation of the oil store. Water infusion and flooding both are very comparative terms the main contrast being the dimension at which infusion water is being released and the dislodging wonders. More often than not in

these ventures, we will have greatest recuperation after 2 to 5 years. These strategies includes the infusion of water at the base of a repository to the-

1. Maintain the oil and gas reservoir pressure
2. Displace/ Push the oil (usually with gas and water) towards the production wells.

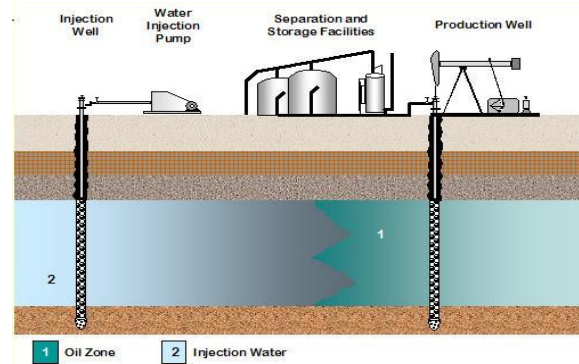


Figure- 2 water injection (Internet Source) [1]

## IV. CHEMICAL FLOODING

The chemical flooding process relies on the addition of one or more chemical compounds to an injected fluid either to decrease the interfacial tension between the reservoir oil and the injected fluid or to improve the sweep efficiency of the injected fluid. There are two general methods in chemical flooding process, which are following-

1. Polymer Flooding and
2. Microbial Injection

## V. DIFFERENT TYPE OF POLYMER

Biopolymers and engineered polymers are the two fundamental groups of polymers typically thought to be through the oil business when endeavoring to improve the water thickness and to improve the breadth effectiveness of the oil reservoir[6-3]. Synthetic Polyacrylamides are long atoms with a little compelling distance across. In this manner, they are powerless to mechanical shear. High rates of course through valves will now and again break the polymer into littler atoms and decrease the thickness of the arrangement. The decrease in thickness can likewise happen as the polymer arrangement endeavors to press through the pore openings on the sand face of the infusion well. An injection plan ought to be painstakingly structured is fundamental. Polyacrylamides are additionally much delicate with

salt. The substantial convergences of salt (i.e., more noteworthy than 1– 2 wt %) will in general make the polymer atoms twist up and lose their consistency building effect. Biopolymer or Polysaccharides are less helpless with both mechanical shear and salt. Since, Biopolymer are delivered organically, care must be taken to counteract natural debasement in the store. When in doubt, polysaccharides are profoundly costly contrast than with polyacrylamides. However, a specific center will be coordinated to engineered polymers, which are the most normally utilized polymers by the oil business, essentially because of their accessibility, simple to task and cheap costs. These sorts of polymers will be quickly portrayed in the accompanying sections.

Polymers are chemical compounds composed of repeating units called monomers [6-3]. They have long chain organic molecules made from joining together small molecules called monomers. They are flexible with high molecular weight ranging from  $2 \times 10^6$  to  $21 \times 10^6$  g/mole. There are main two types of polymers mostly used for Enhancing Oil Recovery (EOR)-

- Biopolymer/ polysaccharide
- Synthetic or Polyacrylamide (HPAM),

## VI. POLYMER FLOODING

Polymer flooding is the primary method, in which a large chained macromolecule is utilized to build the uprooting liquid thickness. This prompts improved compass effectiveness in the supply liquids. The expansion of vast atomic weight particles called polymers to an infused water can frequently build the viability of a regular water flood. Polymers are normally added to the water in fixations running from 250 to 2000 sections for every million (ppm). A polymer arrangement is thicker than a saline solution without polymer. Since the utilization of polymers does not influence the tiny removal proficiency, the improvement in oil recuperation will be because of improved breadth productivity over what is gotten amid a regular water flood. Normal

- Increasing water viscosity (polymer floods)
- Decreasing the relative permeability to water (cross-linked polymer floods)
- Increasing their relative permeability to oil (micellar and alkaline floods)

- Decreasing S or (micellar and alkaline floods)
- Decreasing the interfacial tension between the oil and water phases.

## VI. CONCLUSION

During the delivering of an oil field, diverse generation stages are experienced. At first, when the store is brought into creation, oil streams normally to the surface because of a weight of the present supply in the essential stage. Polymers are chemical compounds composed of repeating units called monomers. They have long chain organic molecules made from joining together small molecules called monomers. Biopolymers and engineered polymers are the two fundamental groups of polymers typically thought to be through the oil business when endeavoring to improve the water thickness and to improve the breadth effectiveness of the oil reservoir.

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