

## **A STUDY ON THE EFFECTS OF CRUDE OIL/BRINE /ROCK INTERACTION ON OIL RECOVERY DURING LOW SALINE WATERFLOODING IN A PART OF GELEKI OIL FIELD OF UPPER ASSAM BASIN**

Prof. Minati Das & Mr. Nayan Medhi

*Department of Petroleum Technology @ Department of Petroleum Engineering  
Dibrugarh University*

*E-mail: minatidas@yahoo.com, nmedhi.duiet@gmail.com*

### **Abstract**

The extra oil recovery obtained when flooding a sandstone reservoir with low saline water is due to Low Sal Effect. The injected water must have lower salinity than the initial formation water to promote significant desorption of oil from the rock surface which is due to the wettability modification towards more water-wet conditions. Alteration of wettability is found to be an important parameter in changing the oil recovery efficiency during low saline waterflooding. Desorption of oil components in a low salinity environment makes the rock more water-wet which enhanced the oil productivity.

The petroleum industries have observed that wettability contrasts in sedimentary reservoir rocks are largely correlated to the presence of illite and/or kaolinite in the rock's intergranular space. There is also a considerable amount of data which shows that oil recovery can be dependent on polar components in the crude oil, divalent cations in the formation water, like  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$ , and active clays in the sandstone. Thus the oil recovery in petroleum reservoirs is greatly affected by fluid-rock and fluid-fluid interactions. The present study discusses about the effects of Crude Oil/Brine / Rock interaction on oil recovery during Low Saline Waterflooding in a part of Geleki Oil Field of Upper Assam Basin.

Based on the analysis of crude oil composition, reservoir brine as well as injected water composition and types of clays present in the reservoir rock, the study shows that, the polar components in the crude oil, divalent cations in the formation water, salinity of the injected water and active clays in the Tipam reservoir sands of Geleki oil field plays a vital role on oil recovery in that oil field.

So, the proper study of the crude oil composition, injected water as well as formation brine salinity and reservoir rock composition is of utmost importance for understanding the complexity of crude oil/brine/rock (COBR) interactions and to know the uncertainty assessments of wetting behavior of a reservoir.

*Key words:* Saline, waterflooding, wettability, illite, kaolinite, polar components, sandstone, brine.