AAPG Datapages/Search and Discovery Article #90254 ©2016, GEO-2016, 12th Middle East Geosciences Conference & Exhibition, Manama, Bahrain, March 7-10, 2016

Tar-Mat API Unconventional Next Generation Oil Recovery

Waleed H.Al-Bazzaz[1], Khalifa Bouresli[1]

[1]Petroleum Research Center, Kuwait Institute for Scientific Research, Safat, KUWAIT

ABSTRACT

Tar-mat unconventional tight oil will be put under petroleum production emphasis as future new- generation extreme heavy <5 API oil reserves. These oils are abundant in great amounts yet extremely difficult to produce due to its solid-like physical state locked deep underground. The world will soon move to this type of oil since the conventional and other less-quantitative conventional reservoirs are continuously depleting. Our interest is directed towards a specific type of unconventional oil, carbonate tar-mats. Tar-mat exists in large quantities in Kuwaiti fields and around the globe. This study presents novel discoveries regarding tar-mat characterizations as well as recoveries. All recoveries considered for this study are bench-scale laboratory physical experiments with toluene, de- ionized water and water aided surfactant augmented with 25 C, 135 C, 225 C and 315 C heat treatments.

The main challenge in this research is finding the best EOR efficiency method to extract tar-mat oil in an optimum economic scenario considering the environmental impact. The effect of using toluene, hot water, and water surfactant under different temperatures on tar-mat's recovery (independently) is modeled, and the optimum recovery model is selected for future prediction. Two recovery models are used in this study; Saturate-Aromatic-Resin-Asphaltene (SARA) and pyrolysis. Novel observations such as: insoluble compounds (NSO) and new discovered SARA peak: Resin-To-Asphaltene RAS peak have impacted the fingerprinting as well as the total recoveries. Moreover, from recovery observations, porosity factor yields greater recovery than API gravity classification and hence the net present value.

General summary of results suggest that toluene has yielded greater tar-mat oil recovery than surfactant and water, respectively, but resulted in financial losses, while both the de-ionized water and the de-ionized water aided surfactant are promising methods of recovery despite their lower tar-mat oil yields.