Successful Reservoir Management for Thermal EOR Implementation for Sudanese Oil Fields- FNE

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Abstract

Thermal Enhanced Oil Recovery (TEOR) is a popular enhanced oil recovery process that is applied in the heavy oil reservoirs to reduce oil viscosity and make the oil mobile. In addition to viscosity reduction steam can evaporate the hydrocarbon components in the crude and carry along in the gas phase.

Fula North Field (FNE) reservoirs are highly porous (~30%), permeable (1-2 Darcy) and unconsolidated sand in nature. the fluid properties include viscous crude from 15 to 17.7 API with corresponding viscosity average of 845 cp at reservoir conditions. The reservoir pressure and temperature are given to be 527 psig and 44 °C.

The main objective of this study was to show the good reservoir management used to improve the oil production from FNE Oil Field, the performance of cyclic steam stimulation and steam flood in a Sudanese oil reservoir will be illustrated.

The first pilot phase 31 wells by 2010 to 2012 from 2012 to 2103 11 wells has been added and then 49 wells has drilled as CSS wells from 2014 to 2016, the average oil daily production for this field has been increase from 5,300 bbl/d as of Dec. 2014 to 8,300 bbl/d as of Sep., 2016 the peak production has recorded on 2016 as 9000 bbl/d.

After the successful implementation of CSS as full field in FNE Oil Field the plan is to go steam flooding and a pilot has been started since September, 2015 and still under evaluation, The result showed that the CSS is very successful and the average oil rate is almost 1.6 times compared to cold production, the CSS only can increase the recovery percent from 32.5 - 34.2% which makes it more attractive method as development scenario for FNE oil field.

The suggested way forward for this field considering the CSS and SF scenarios has been proposed

Keywords
Thermal EOR, Steam Injection, Reservoir Management, Sudanese Oil Field.

Biography

Dr. Husham A. Elbaloula is a Simulation Engineer at Petro-Energy-E&P and Lecturer & Researcher in Sudan University of Science and Technology, He has ten (10+) years of diverse experience in oil and gas field development planning, Performance review, Reservoir Simulation, Reservoir Management and IOR/EOR, He earned BSc, Msc and P.hD In Petroleum Engineering from Sudan University of Science and Technology.
He has participated in more than 15 local and international Technical workshops, Conferences and symposium in (Sudan, KSA, UAE, India, Bahrain, Morocco, Indonesia, Thailand and Canada), He has published about (15) journal and conference papers, and participated in (6) Enhanced Oil Recovery projects in Sudanese Oil fields, and Conduct more than 20 training courses in the area of IOR/EOR for different training centers and companies.

Dr. Tagwa A. Musa is an Associate Professor, and Dean of College of Petroleum Engineering & Technology-Sudan University of Science and Technology, she earned BSc in Petroleum Engineering from Sudan University of Science and Technology, Masters and PHD in Petroleum Engineering from China University of Geosciences, Wuhan, China, she has more than 10 published journal and conference papers. She supervised many Postgraduate Students (Bsc. 20 groups, Msc. 16 Students and 3 PHD Students). She is member of SPE, SAPEG, SES, and SWPI.