

Reservoir properties and seal efficiency in the Zubair Formation in Euphrates Subzone, Southern Iraq

Rami M. Idan · Dhyaa Al-Rawi · Midhat Elewi Nasser · Dhiya AlDin AlMashaekhy

Received: 24 June 2013 / Accepted: 26 November 2013
© Saudi Society for Geosciences 2013

Abstract The lower cretaceous Zubair Formation in Euphrates Subzone south of Iraq is divided into three members. These members are divided depending on the variation in lithology. The upper and lower members, which consist mainly of shale is known as Upper Zubair Formation and Lower Zubair Formation, respectively. The middle Zubair Formation consists mainly of sandstone. Intra-formation Zubair-shale are primarily seals, as well as source rock. The gained hard and software data are loaded into GeoFrame system. A trial is done to perform the formation evaluation for Zubair Formation on available data for nine wells. The created project contains all the operation of the reservoir properties. The quality of a sealing rock from both upper and lower is determined by the minimum permeability and effective porosity (less than 80 mD and 9 %, respectively). The sealing rock of Zubair formation is mainly the shale rocks, which is an organic-rich elastic rock that may suppose to be efficient. On the other hand, the reservoir sand facies have good petrophysical properties. The average of effective porosity was 18 %; however, the permeability is at least 250 mD. The geological setting may supports the horizontal migration of oil to the western area along Abo-Jir fault to the stable shelf successions.

Keywords Reservoir properties · Seal efficiency · Zubair formation · Euphrates subzone · GeoFrame 36 37

Introduction 38

The Lower Cretaceous Zubair Formation can be considered as an important reservoir in the south of Iraq and some of adjacent countries (Ibrahim 2001) due to good reservoir properties. Zubair Formation is divided in Euphrates Subzone into three units, which are characterized by cyclic mode of deposition as will be mentioned later. It is divided into five or two units elsewhere, wherein this difference in divisions is built up on depositional environment (Idan 2012). Furthermore, the divisions of Zubair Formation in the area of interest were as follows (unpublished reports of OEC and SOC): 39 40 41 42 43 44 45 46 47 48 49

- Upper Zubair Formation (UZbfn) 50
- Middle Zubair Formation (MZbfn) 51
- Lower Zubair Formation (LZbfn) 52

The Euphrates subzone lies to the west of the Mesopotamian zone (Fig. 1), with monoclinical tilting to the NE. Euphrates Subzone is represented by relatively small to medium monoclinical folds, separated with wide synclines between them, similar to box-fold shape. These folds are with NE ward gradual oriented fault system (Jassim and Goff 2006). 53 54 55 56 57 58 59

The primary known reservoir rock in the Zubair Formation are the main sandstone member, in addition, may be in certain places, to the two source-seal members (Ibrahim 2001). Intraformation Zubair shale is the primary seal, which envelops the reservoirs from the same formation (Sharland 60 61 62 63 64

R. M. Idan
College of Science, Department of Biology, Al-Mustansiriah University, Baghdad, Iraq
e-mail: ramisc3@gmail.com

D. Al-Rawi · M. E. Nasser · D. A. AlMashaekhy (✉)
College of Science, Department of Geology, University of Baghdad, Baghdad, Iraq
e-mail: dhiya55@yahoo.com

D. Al-Rawi
e-mail: Prof.dhya_alrawi@yahoo.com

*Reservoir properties and seal efficiency
in the Zubair Formation in Euphrates
Subzone, Southern Iraq*

**Rami M. Idan, Dhyaa Al-Rawi,
Midhat Elewi Nasser & Dhiya AlDin
AlMashaekhy**

Arabian Journal of Geosciences

ISSN 1866-7511

Arab J Geosci

DOI 10.1007/s12517-013-1221-x

