

Reservoir Quality of Lower-Middle Jurassic sandstones within the Johan Castberg Field in the SW Barents Sea

ABDUL JABBAR AND JENS JAHRENS^{1,2}

¹*Olav M Troviks Vei 52, House 209. 0864.Oslo. abdulj@student.geo.uio.no*

²*Department of Geosciences University of Oslo, Norway.*

The Johan Castberg Field is located on the western margin of Loppa High in the south-western Barents Sea and comprises a reservoir in Lower-Middle Jurassic sandstones of Stø and Nordmela formations containing both oil and gas. Cored intervals, 15 samples (well 7220/5-1) and wells log data (7219/8-1, 7219/9-1, 7220/8-1 and 7220/7-1) have been used for petrophysical and petrographical study of sandstone reservoirs. Reservoir properties are preserved significantly due to uplifting and erosion of the entire region. Sandstone diagenesis is a function of burial rate, mineralogical composition and texture, climate, and hydrodynamic and geothermal gradients.

X-ray diffraction (XRD), Optical Microscopy, Scanning Electron Microscopy (SEM) and Core logging have been performed to investigate the depositional environment, clay mineralogy, role of sediments composition, facies distribution, and provenance of the reservoir sandstones. Petrographical study has been carried out to find the diagenetic clay and microquartz coatings, quartz cementation and its distribution in the sandstone reservoirs.

The estimation of porosity and Intergranular Volume (IGV) values reflecting mechanical compaction of sandstone reservoirs were the main objectives during this research work. Quartz cementation has very limited effect on the porosity loss. In addition to mechanical compaction, the authigenic kaolinite and depositional matrix filling the pore space caused some porosity reduction.

Lower-Middle Jurassic sandstones are moderate to well sorted, fine to medium grained and are mineralogical mature. Sandstones are deposited in prograding coastal regime whereas shale interval indicates regional transgressive pulses during deposition. The porosity and IGV values of sandstones range 6-26% and 25-34% respectively. The porosity is still well preserved and reservoir quality of Lower-Middle Jurassic sandstones in well 7220/5-1 is very good.

Keywords: IGV, authigenic clays and porosity, facies distribution, quartz cementation, SEM, XRD