
Detection of Oil/Condensate droplets in a Gas Reservoir

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Condensate dropout takes place in a gas reservoir whenever the reservoir pressure has declined below the dew point pressure. This paper will describe a case study of a well producing gas and condensate from a giant late Cretaceous carbonate reservoir on land in Abu Dhabi, where the produced gas was recycled and re-injected back into reservoir to maintain the original reservoir pressure.

Open Hole Density-Neutron logs acquired in some wells in particular in the south part of the field, including the case study well, show apparent liquid behavior at the bottom section of the reservoir rather than the gas effect seen in most other wells. Anti-correlation on the Neutron-Density (N-D) overlay usually indicates the effect of gas in the formation. Lack of such anti-correlation on N-D overlay is usually due to effect of either presence of liquids or mud invasion. Other observations support the presence of liquids in the formation rather than mud invasion: 1 - Production data of some wells show decline in Condensate Gas Ratio (CGR) , which may indicate possibility of condensate drop-out the reservoir. 2- Moreover – in spite pressure support by gas injection - Pressure Build Up (PBU) data show a decline in the reservoir pressure in this part of the field.

In order to acquire more data to confirm the presence of liquids in the bottom section of the reservoir, conventional logs and down hole compositional Fluid Analyzer (CFA & LFA) data as well as three PVT samples from top , middle and bottom of the reservoir have been collected and analyzed . The results from PVT samples analysis confirm the results of Down hole fluid analyzer. These results confirm the presence of liquid column , condensate droplets , at the bottom part of the reservoir.
