Sedimentology and Rock Properties of the Wilrich Formation, Western Alberta

Abstract

The Lower Cretaceous Wilrich Member of the Spirit River Formation (Mannville Group) in western Alberta has been identified as a new source of hydrocarbons in the last few years. Only a few years ago, Zonneveld and Moslow (2004) mentioned that no reservoir quality facies of the Wilrich had been discovered. The Wilrich currently has production from over 20 different pools with IP's up to 20 Mmcf/d and 10-35 bbls/Mmcf.

The Wilrich consists of the first progradational shoreface facies succession above the Bluesky Formation. It has generally been thought to be a dominantly shaly sequence, but numerous shoreface sequences have been identified in the last few years. These shoreface sequences contain abundant hydrocarbon resources. The lowest portion of the Wilrich consists of distal offshore fine grained sediments grading upwards to shoreface sequences. The Wilrich to the south consists of coastal plain successions and deep offshore sediments to the north.

The Alberta Geological Survey has recently completed an evaluation of the resources in the Wilrich in western Alberta (Rokosh et al., 2012). Their estimate of resources (P50) in the Wilrich in western Alberta consist of 47.9 billion bbls oil, 2.1 billion bbls natural-gas liquids, and 246 Tcf gas.

Few (approximately 20) legacy cores exist in the Wilrich in western Alberta. A few (approximately 10) cores have been cut in the Wilrich in recent years. This display is showing two cores from different areas to show the variation in the Wilrich, from the shoreface deposits in the south to the marine shale to the north.

The Wilrich is a liquids-rich-gas play that occurs in tight sands, with good porosity but poor permeability. Consequently large fracs are necessary to increase flow rates from these wells. This display will show the importance of detailed sedimentological, mineralogical, petrographic, petrophysical analyses (porosity and permeability), mercury injection, geomechanical, and fluid sensitivity analyses to understand the reservoir.

References

Rokosh, C.D., et al., 2012. Summary of Alberta's Shale- and Siltstone-Hosted Hydrocarbons. ERCB/AGS Open File Report 2012-06 (October 2012), 327 p.

Zonneveld, J.-P., and Moslow, T.F., 2004. Exploration potential of the Fahler G shoreface conglomerate trend: evidence from outcrop. Bulletin of Canadian Petroleum Geology, v. 52 (1), p. 23-38.