

## Case Study of a Large Conventional Oil Pool Discovery in a Mature Basin: the Upper Mannville of the Western Canada Sedimentary Basin

The Western Canada Sedimentary Basin has a complex depositional and structural history and hosts many hydrocarbon deposits in numerous horizons and play types. The Basin has been explored and exploited for over a century and has over 600,000 wellbore penetrations. Some of the producing horizons have been exploited more than others, with the Albian aged Upper Mannville (UM) zone being one of the least exploited units. Since the advent of MSF horizontal well drilling technology, the UM has dominated the basin in terms of new significant discoveries. In the southern portion of the basin, the UM was dominantly deposited in a coastal plain environment, making it difficult to map and predict due to the inconsistent and unpredictable log-based marker horizons. In the central to northern portion of the basin, the reservoirs are more predictable in their correlations but still have a subtle log characteristic due to the lithic nature of the sands. Heavy oil production dominates in the north while gas production is characteristic of the western portion of the basin.

Large oil pool discoveries are continuing to be made and, in this talk, the focus will be on the Altura Energy discovery in central Alberta. The discovery well was drilled in July 2016 with the drilling of the horizontal well 13-15-48-26W4 located 20 miles southwest of Edmonton, Alberta in the Leduc-Woodbend (LWB) field. This field was the site of the first large commercial oil pool discovery (Frasnian aged Leduc formation) in the Basin by Imperial Oil in 1947 and heralded the birth of the modern oil and gas industry in Western Canada. Hundreds of wells were drilled in the field in the 1940s and 1950s and by 2016 there were approximately 2400 wells in the field. The 13-15 well was drilled to a depth of 1350m TVD based on the geological mapping of many of these old wells with almost 900 of them penetrating the UM sand, all with missed pay indications. In the LWB area, the UM transitions from a channelized coastal plain environment into a marginal marine environment to the north. This provides the perfect setup to trap hydrocarbons updip against the sand pinchout edge. In this area, the sand body maps as a large wave dominated delta system roughly 130 square miles in size. This oil pool has remained undetected for so long because of a combination of subtle log characteristics, poor correlation relationships for mapping purposes and a relatively inactive area for competitors. The key to successfully exploiting this zone is the implementation of horizontal drilling and multistage fracturing. The pool is approximately 1000mm barrels OOIP, making it one of the largest conventional oil pools in the Western Canadian Sedimentary Basin.