Reservoir Characteristics and Architecture of the Cypress/ Merryflat Pool, Southwestern Saskatchewan and Southeastern Alberta

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The Cypress/Merryflat Pool straddles the southern Alberta and southwestern Saskatchewan border (TWP 5 to 8 and Ranges 28W3 to 2W4). Gas is hosted in late Cenomanian-early Turonian sandstone of the upper Belle Fourche Formation (Second White Specks Sandstone and Mosby/Upper Phillips Sandstone equivalents); currently there are 13 active gas wells. The pool was discovered in 1971, but due to lack of infrastructure was not put on production until 1994. The original gas in-place (OGIP) was obtained from the Geoscout well ticket, which is placed at 35.09 Bcf. The recoverable gas is only estimated at 17.24Bcf (49.13%) and the remaining recoverable gas in place is 1.66 Bcf. These values are based on public data supplied by the Alberta and Saskatchewan governments. Our objective is to reevaluate the reserves by using volumetrics and production analyses.

Detailed core and well log correlations show the reservoir sandstones were deposited during the early part of the Greenhorn transgression. The Cypress/ Merryflat Pool reservoir sandstones overlie a major regional unconformity, which to the north and east truncates progressively older Belle Fourche strata. Reservoir sandstones were likely derived from transgressive reworking of the unconformity related lowstand deposits.

The reservoir sandstones are sealed by calcareous shales and marlstones of the overlying Second White Specks Formation. Structure does not appear to be a major control. The Cypress/ Merryflat pool is orientated NWW-SEE parallel with the orientation of the overlying Second White Specks shoreline; this is similar to other Second White Specks/Belle Fourche pools in SE Alberta and SW Saskatchewan.

Detailed evaluation of core analysis indicates that within the Belle Fourche reservoir permeability increases with grain size. This means that the upper portion of the Belle Fourche reservoir is the main reservoir and is approximately 2 m thick. The permeability and porosity cross plots reveal a second potential reservoir in the lower “silt” unit found below the Belle Fourche sand. The heterogeneities within these reservoirs (bioturbation, mud/shale laminations, and calcite cemented intervals) all contribute in restricting fluid flow. Intergranular porosity dominates the upper portion of the Belle Fourche reservoir and micro-porosity is common in the lower portion.

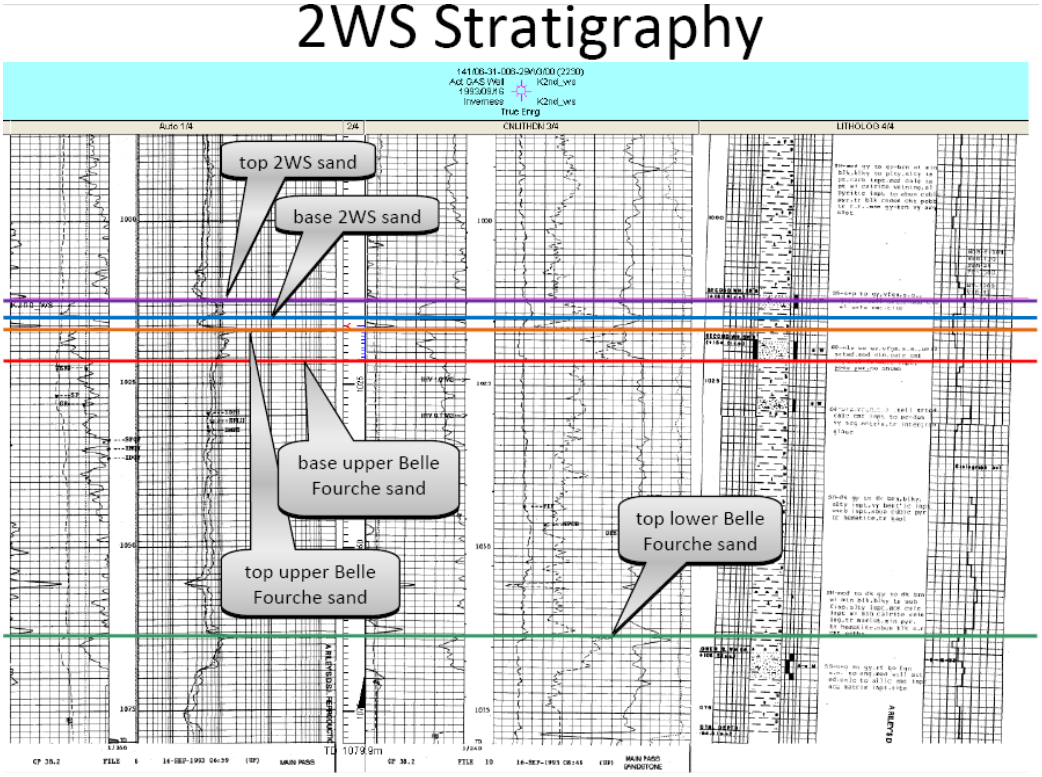

Figure .1
Second White Specks (2ws) and Belle Fourche Sands: Log signatures

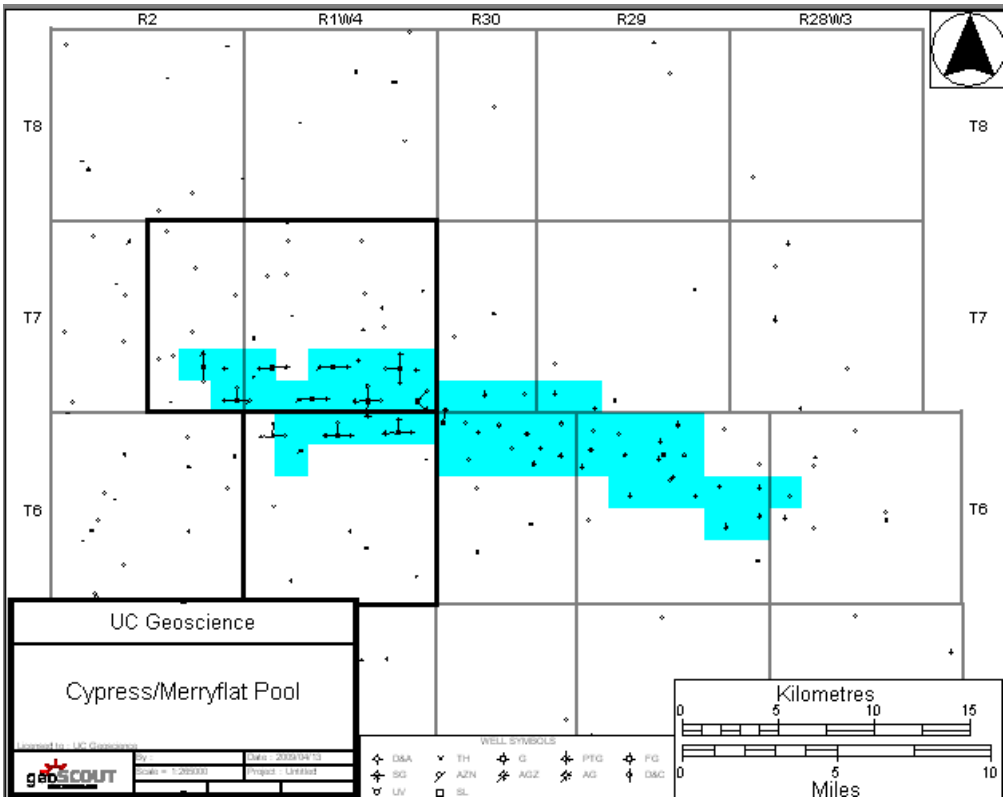

Figure .2
Cypress/Merryflat Pool, Southwestern Saskatchewan and Southeastern Alberta