ROBERTSON, CHRISTINE A., PanCanadian Petroleum Ltd., Calgary, Alberta; and LISA GRIFFITH and BRIAN A. ZAITLIN, PanCanadian Petroleum Ltd., Calgary, Alberta

The Countess-Alderson trend is a 90 km stretch of a larger Cretaceous (Glauconitic formation) incised valley system that extends northward 500 km from the Kevin-Sunburst Dome in Northern Montana into Central Alberta. 122 pools in the Countess-Alderson trend have produced over 15 10^10 m^3 (100 Mmbbls) of oil and 8.5 10^9 m^3 (300 BCF) of gas. Exploration of the trend began in the 1950's and most of the producing oil pools are mature waterfloods. Optimization of these pools using a multi-disciplinary approach has led to a better understanding of the nature of the incised valleys from which they produce.

The Countess UU Pool (Township 18, Range 16 W4M) discovered in 1989, was placed on waterflood in 1991. It has produced 285 10^6 m^3 (1.8 Mmbbls) of oil and water cut is currently in excess of 90%. While recovery factors along the trend average 45%-50% a reservoir evaluation of the Countess UU pool indicated an expected recovery factor of less than 40%. A study was undertaken to attempt to better understand the geological controls on the pool as a first step to additional optimization of the waterflood.

Analysis of core and detailed cross-section correlations recognized estuarine fills within a compound incised valley system. Seismic time slices showed that the pool was most likely at the junction of two distinct incised valley systems, an older NW-SE trending system and a younger N-S valley system. Further, the production, pressure, and workover histories of the wells, as well as seismic time slices, pointed to the existence of a second channel cut in the younger NW-SE valley system of poorer reservoir quality than the main producing channel. Seismic indicates that what is likely an abandoned channel deposit associated with this second channel, cuts through the pool from north to south, causing communication problems between the injection well in the west part of the pool and the upper producing zones in the wells on the east side of the pool. While the lower channel deposits in the east wells are in good communication with the injection well, carbonaceous laminae associated with estuarine deposition significantly reduce the vertical permeability which hampers the current bottom water flood scenario.

It was only through the integration of the seismic and production data with the geological data from the pool, that a reasonable geological interpretation, allowing a clearer understanding of the relationships between the two compound incised valley systems and the multiple channel cuts within, was possible. The study has resulted in 4 potential delineation wells and 3 workovers including an injection well conversion which are expected to increase recovery in the pool by 10%-15% resulting in an additional 90 10^6 m^3 (.55 Mmbbls) of recoverable oil.