

3D Reservoir Model of an Estuarine Valley-fill based on 3D Seismic and Detailed Sedimentology, Glauconite Fm, Halkirk area, Central Alberta, Canada

Lisa A. Griffith and J. Stuhec
PanCanadian Petroleum Ltd., Calgary, Alberta, Canada
lisa_griffith@pcp.ca

Lower Cretaceous (Albian) Glauconite Fm sandstones produce oil and gas from an estuarine incised valley fill in the Leahurst B Pool, Western Canada Sedimentary Basin. Although 6.6 MMbbls ($1048 \text{ E}^3\text{m}^3$) recoverable oil were predicted under waterflood, steep production decline and high watercuts put recovery of the currently remaining 1.7 MMbbls ($278 \text{ E}^3\text{m}^3$) in doubt. Recent drilling encountered unpredicted reserves on the east side of the pool, prompting a reworking of the geology to establish new reserve numbers and optimize production.

This pool is data rich. Core, thin sections, 3D seismic, digital well logs, and production history are readily available. PanCanadian's 3D visualization center was enlisted to more fully integrate the seismic and geology, and to build and populate grids for export to reservoir simulation.

Based on detailed core and log interpretation, the reservoir can be subdivided into 3 backstepping parasequences within a total valley fill of 25-30m. The containing valley bottomed on Paleozoic carbonates, although valley walls were carved into regional clastics. A deeply incised shale-filled channel sealed the top of the reservoir and introduced interior compartmentalization. The most effective integration of the seismic and geology occurred in imaging the valley geometry and shale channel, defining the present-day structure of the pool, and inferring total sand thickness. Internal reservoir complexities were below seismic resolution.

The power of the resulting 3D model is best displayed in the maps of critical internal geobodies (shale-breccias, bitumen). These volumes can be manipulated to give a better understanding of reservoir performance. Preliminary results from reservoir simulation should be available by March, 2002.