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Geological modeling of the oil sands reservoir by integrating the borehole and seismic data in the JACOS Hangingstone SAGD operation area, Athabasca, Canada.

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Abstract: Three dimensional geological models were constructed in the JACOS Hangingstone SAGD operation area, Alberta, Canada, integrating three dimensional seismic data of 5.4 square kilometers and 76 well data. The objectives of the study were to establish the detailed reservoir distribution and configuration for the reservoir characterization and to optimize the deployment of the SAGD injector/ producer well pairs. Sedimentary environments of the Lower Cretaceous McMurray Formation, which comprises the main layer of oil sands, were considered as fluvial to upper-estuarine channel fill deposits, and oil sands reservoirs were formed as the vertically stacked incised valley fill sands. Sequence analysis using well data was conducted at first, and framework of the stacked incised valley system was established. Further detailed sequence structural model was then constructed using seismic data. Property model which describes the sedimentary facies distribution was constructed through the interpretation of the acoustic impedance inversion and multi-attribute analysis from three dimensional seismic data. Constructed models were used for the actual SAGD horizontal well pairs planning as well as the reserves estimation. Top and bottom depths of the reservoir were estimated in the range of 2.0 meters near the existing wells even in such a channel sands environment which often changes its sedimentary facies abruptly.

Key words: [oil sands](#), [SAGD](#), [geological model](#), [sequence analysis](#), [acoustic impedance inversion](#), [multi-attribute analysis](#), [visualization](#)



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