

Data Integration is Critical to the Challenges in Heavy Oil Reservoirs

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Summary

The Athabasca Oil Sands are a large deposit of bituminous hydrocarbon located in Alberta, Canada. Because of the very low API of this oil, steam injection techniques are often used for recovery. However, these techniques are expensive and it is becoming increasingly important to model and simulate these reservoirs in order to understand how to optimize the steam to oil ratio. There are many key challenges that have to be considered in an integrated approach when characterizing these reservoirs. Facies heterogeneity, identifying the upper gas and perched water thief zones, and efficient well pad placement and well design are critical in optimizing the steam to oil ratio. There are key facies in these reservoirs that can act as barriers to the steaming process and it is crucial to be able to identify these facies. Seismic data can be used in conjunction with the well data to gain a good handle of the facies distributions. The gas geobodies, that are common at the top of these reservoirs, can be extracted from the seismic and sampled into our geological model. The water zones can be accurately modeled with the well log data and geological knowledge of the area. Lastly, the structural interpretation, reservoir properties, and surface restrictions need to be considered for the well pad locations and design of the horizontal well pairs. Reservoir simulation of each well pad will give the domain experts an understanding of the implications of the challenges in order to optimize the steam to oil ratio.