

Effect on SAGD Performance of Horizontal Well Orientation with Respect to Inclined Shale Layers and Point Bars

Amir Zamani¹ and Ron Zakariasen¹

¹*Suncor Energy, Inc., Calgary, AB, Canada*

Abstract

This paper describes geomodel preparation and results of simulation studies on the effect on steam assisted gravity drainage (SAGD) performance of horizontal well orientation in inclined heterolithic stratification (IHS) units in point bar systems.

Simulation results from models with inclined shale layers show that as the fraction of shale volume increases, the role of wellbore orientation with respect to the shale layers becomes important. At high shale volume fractions (e.g. 10%), the recovery factor for wellbores oriented across the inclined shale layers is higher than the recovery factor for wellbores oriented along the shale layers. It was found that modeling a reservoir that has inclined shale layers but is modeled using horizontal shale layers underestimates the performance of the SAGD process. This difference increases as the shale volume fraction increases.

A 3D point bar system was modeled using non-orthogonal grid systems and a deterministic object base approach. Simulation results of the model show that horizontal wells across the dip of point bar beds yield higher SAGD recovery compared to horizontal wells that are parallel to the strike of the point bar beds.