

Hydrogeologic assessment in support of the development of the Peace River Oil Sands deposit: a case study concerning a pilot-scale *in-situ* SAGD operation

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Abstract

Steam Assisted Gravity Drainage (SAGD) is common technology for recovering bitumen reserves from the Athabasca Oil Sands Deposit of north-east Alberta. The SAGD process requires a reliable and long term groundwater source and a suitable wastewater disposal zone. Identifying and securing access to aquifers that can be developed either as source water aquifers or as wastewater disposal zones is an important design milestone for companies developing SAGD projects.

The increasing number of SAGD projects in the Athabasca Area has resulted in a growing, publicly available hydrogeologic dataset (i.e.: published reports, pumping tests, detailed hydrostratigraphic mapping, Alberta Energy and Utilities Board (EUB) project updates). Athabasca Area SAGD applications/developments typically rely on the leveraging of this public hydrogeologic data with additional project specific hydrogeologic mapping and testing. By comparison, *in-situ* SAGD oils sands projects have not been widely developed in the Peace River Oil Sands Deposit of north-west Alberta, and as such, there is a comparative lack of publicly available hydrogeologic data available to support detailed hydrogeologic assessments in this region.

Through the review of limited published regional reports, public databases and petrophysical analysis, this study developed a detailed hydrogeologic assessment of the Peace River Oil Sands Deposit in the Buffalo Head Hills of Alberta. This assessment is suitable for an EUB application of a pilot-scale project with limited empirical hydrogeologic data being available. It provides insight on aquifer extent, aquifer deliverability, aquifer salinity and includes an impact evaluation.

Two potential source aquifers and several wastewater disposal zones were identified in this assessment. It was concluded that the Paddy/Cadotte Aquifer and the Bluesky Aquifer were the most feasible units for groundwater sourcing and wastewater disposal, respectively, for a SAGD project proposing development of the Peace River Oil Sands Deposit in the Buffalo Head Hills. In addition, characteristics of the Paddy/Cadotte and Bluesky aquifers in this area are favourable when considering conflicts with other groundwater users and/or negative environmental impacts.

Speaker Biography

William Wilmot is a professional hydrogeologist at Matrix Solutions Inc. and has six years of environmental and groundwater supply experience. He holds a B.Sc. in Applied and Environmental Geology and a B.Sc. in Geography, both from the University of Calgary. He currently provides project management and technical expertise to environmental impact assessments and groundwater resource development projects.