Jun 26th, 3:00 PM - 3:20 PM

Long Term Water Management in Alberta's Southern Athabasca Oil Sands Region – Using Modelling Tools to Evaluate Sustainability

Louis-Charles Boutin P.Eng.
Matrix-Solutions Inc., lboutin@matrix-solutions.com

Paul Martin M.Sc. P.Eng.
Matrix-Solutions Inc., pmartin@matrix-solutions.com

Richard Simms M.A. Sc.
Matrix-Solutions Inc., rsimms@matrix-solutions.com

Mike Brewster M.Sc. P.Geol.
COSIA / Devon Canada, Mike.Brewster@dvn.com

iEMSs International Congress on Environmental Modelling and Software

9th International Congress on Environmental Modelling and Software
Fort Collins, Colorado, USA, Mazdak Arabi, Olaf David, Jack Carlson, Daniel P. Ames (Eds.)
https://scholarsarchive.byu.edu/iemssconference/2018/

Long Term Water Management in Alberta's Southern Athabasca Oil Sands Region – Using Modelling Tools to Evaluate Sustainability

Louis-Charles Boutin[a], Paul Martin[a], Richard Simms[a] and Mike Brewster[b]
a Matrix Solutions Inc. lboutin@matrix-solutions.com, pmartin@matrix-solutions.com, rsimms@matrix-solutions.com
b Project Lead COSIA Regional Groundwater Solutions Project, Devon Canada
Mike.Brewster@dvn.com

Abstract: Extraction of natural resources in Canada's Southern Athabasca Oil Sands (SAOS) region requires water in different processes. While every individual application to utilize water undergoes a strict approval process, cumulative impacts from multiple users are also a concern. Management of water resources is of primary concern for the regulators and the industry, which has formed the Canada's Oil Sands Innovation Alliance (COSIA) to help lead such initiatives. Over the past 5-years, COSIA has undertaken the Regional Groundwater Solutions (RGS) project to evaluate the potential cumulative effects resulting from groundwater withdrawals and disposal associated with future in-situ bitumen production in the SAOS region. A numerical model of groundwater flow was developed and refined to evaluate potential impacts associated with future production growth scenarios, which explored operational uncertainty. Recognizing that hydrogeologic parameter values applied in the numerical model are based on spatially limited data and a regional conceptualization, prediction uncertainty from parameterization was explored using a null space Monte Carlo approach. A total of 300 realizations with independent parameter sets were developed to evaluate the likelihood of unacceptable cumulative drawdown and highlight areas of potential concern. This case study will provide an overview of the different methods and result that are helping decision-makers to quantify uncertainty to responsibly manage water resources in the SAOS region and help to ensure their sustainability into the future. Challenges associated with defining predictive scenarios and spatial visualization of the uncertainty will also be discussed.

***Keywords**:* Uncertainty; Hydrogeology; Regional Groundwater Management