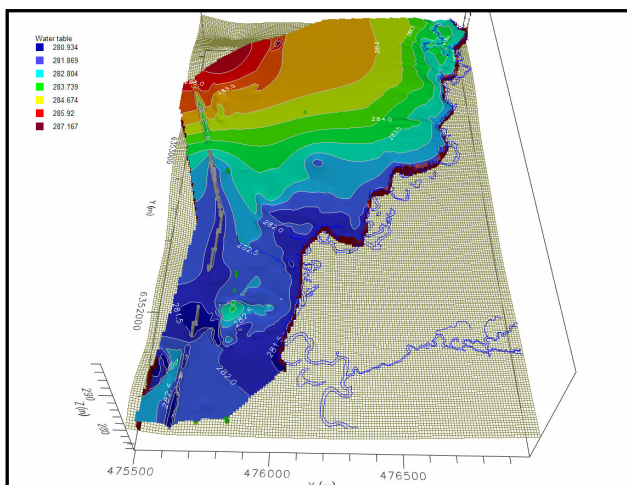
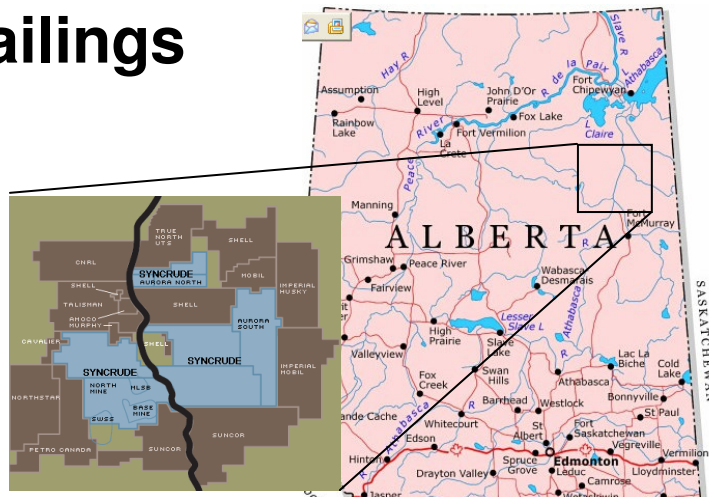


Modelling of Oil Sands Tailings

Overview

Syncrude is one of the world's largest heavy oil producer from the Oil Sands near Fort McMurray, Alberta. The Oil Sand tailings are typically very high in Total Dissolved Solids (TDS) and need to be contained from migrating to the groundwater system. The groundwater flow and transport model developed in this study indicated the existing interceptor trench effectively contain any TDS that may originate from a nearby tailings pile.



Groundwater Flow & Transport

A groundwater flow model was developed in MODFLOW to simulate the groundwater system at the site and its surrounding area. The model was calibrated to both steady-state (long-term average) and transient water levels. The calibrated groundwater flow model was used to develop a contaminant transport model in MT3D for the purpose of simulating TDS flow through the aquifer system. The MT3D simulations included both advection and dispersion processes. For a conservative comparison, MODPATH, advection only particle tracking model was also developed.

Project Results

The results of the transport simulation show the interceptor would effectively contain potential dissolved TDS that may emanate from the proposed tailings pile. The simulated trench show effective capture even in the MODPATH conservative advection only scenario. An additional scenario that used an extraction well instead of the cut-off trench was run to simulation the containment of TDS. Both scenarios show effective capture of the simulated TDS leachate.

The modelling simulations proved to be a very cost effective to test a number hypothetical scenarios when compared to a field-scale testing and assessment program.

