



Dr. Ben Rostron

Professor Emeritus, Earth & Atmospheric Sciences
University of Alberta
President of Isobrine Inc.

2024 Birdsdall-Dreiss Distinguished Lecture – Part 2

Geology and hydrogeology at AQUISTORE: Canada's first CO₂ storage project associated with a commercial-scale coal-fired power plant

Thursday, May 16th 2024, 11:30 am, Building 50.41, Room 045/046

Institute of Applied Geosciences: Hydrogeology, Engineering Geology, Geochemistry and Economic Geology, Structural Geology, Technical Petrophysics

The Aquistore research project is part of SaskPower's Boundary Dam Integrated Carbon Capture and Storage project in Estevan, Saskatchewan, Canada. Carbon dioxide is captured from the Boundary Dam coal-fired power generation station and transported via underground pipeline to both the Weyburn oil field for EOR, and to a 3400 m deep injection well at Aquistore. Initial CO₂ injection at Aquistore took place in April 2015, and through August 2023 more than 500,000 tonnes have been injected.

Geology and hydrogeology have played a key role in the entire project using both pre-existing and newly-acquired data. Hydrogeological characterization efforts were divided into four parts: regional hydrogeological and hydrochemical mapping of the site; hydraulic characterization of the storage zone during drilling/testing of the 3400 m deep injection and nearby 3400 m deep observation well; installation of an extensive shallow groundwater monitoring network; and on-going hydrogeological and hydrochemical monitoring of the shallow groundwater in the area.

All of the geological and hydrogeological characterization results indicate strongly favorable conditions for geological storage at the site: there are no significant faults in the immediate area of the storage site; the regional sealing formation is continuous in the area; the reservoir is not adversely affected by knolls on the surface of the underlying Precambrian crystalline basement; and the shallow groundwater and soil gas horizons do not appear to be hydraulically connected to the deep injection horizons in the subsurface. These results were subsequently used for project planning, risk assessment, and permitting of the site; demonstrating the overall storage integrity; and for Measurement, Monitoring, and Verification of CO₂ storage for regulatory and public assurance.

This talk will highlight some of the geology and hydrogeology results from Aquistore, and provide an update on a couple of the more interesting outcomes of the project thus far.