Characterizing the Geologic Container at the Weyburn Field for Subsurface CO_2 Storage Associated with EOR

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Long-term CO_2 sequestration in the Weyburn Oil Field is being extensively studied as benefit associated with CO_2 miscible flood for EOR. The International Energy Agency and PanCanadian Corporation are participating in a multi-disciplinary research effort into the viability of long-term subsurface storage of greenhouse gases.

To store CO_2 effectively for geologically significant time, the integrity of the geologic container must be determined from reservoir to regional scale. High-resolution geophysical techniques using shear waves serve to characterize fracture distribution within the reservoir and help predict injected CO_2 movement. Diagenetic processes that affect the sealing capacity around the Weyburn Field are being identified and mapped. A 40,000km^2 region surrounding the 27km^2 injection area within the Weyburn Field is being further investigated by various researchers to provide detailed information on areas of salt dissolution, evaporite deposition, and the identification of fluid migration barriers and pathways. These features and processes will be examined throughout the entire sedimentary column, from the contact with Precambrian basement to glacial sediments at the surface, to identify possible migration conduits. Satellite imagery of surface lineaments will locate potential associations with underlying tectonic elements. Integration of the data obtained from these studies with novel techniques of reprocessed and inverted seismic data will lead to the development of a detailed three-dimensional earth model for a large portion of the northern Williston Basin.

The Weyburn CO_2 Monitoring Project will increase the understanding of mechanisms involved in subsurface storage of CO_2 and also of EOR projects using CO_2 miscible flood techniques.