

Geological Characterization for the IEA GHG Weyburn-Midale CO₂ Monitoring and Storage Project: Past Successes and Future Challenges

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Abstract

In July 2000, a major research project was initiated to study the geological storage of CO₂ as part of a 5000 tonnes/day EOR project planned for the Weyburn Field in Saskatchewan, Canada. Major objectives of the IEA GHG Weyburn CO₂ monitoring and storage project included: assessing the integrity of the geosphere encompassing the Weyburn oil pool for effective long-term storage of CO₂; monitoring the movement of the injected CO₂, and assessing the risk of migration of CO₂ from the injection zone (approximately 1500 metres depth) to the surface. Over the period 2000-2004, a diverse group of 80+ researchers worked on: geological, geophysical, and hydrogeological characterizations at both the regional (100 km beyond the field) and detailed scale (10 km around the field); conducted time-lapse geophysical surveys; carried out surface and subsurface geochemical surveys; and undertook numerical reservoir simulations. Results of the characterization were used for a performance assessment that concluded the risk of CO₂ movement to the biosphere was very small. By September 2007, more than 14 Mtonnes of CO₂ had been injected into the Weyburn reservoir, including approximately 3 Mtonnes recycled from oil production. A "Final Phase" research project was initiated (2007- 2011) to contribute to a "Best Practices" guide for long-term CO₂ storage in EOR settings. Research objectives include: improving the geoscience characterization; further detailed analysis and data collection on the role of wellbores; additional geochemical and geophysical monitoring activities; and an emphasis on quantitative risk assessments using multiple analysis techniques. In this talk a review of results from Phase I will be presented followed by plans and initial results for the Final Phase.