geoconvention
Calgary • Canada • May 15-17 2023

Integrated Reservoir Study for Successful CO2 Storage Planning: An Alberta Case Study of Depleted Gas Pools, Current and Future Readiness

Alex M.D. Renaud
geoLOGIC systems ltd.

Summary

Carbon Capture and Storage (CCS) processes capture CO2 emissions and stores them in geological formations whereby they are permanently and safely sequestered. Alberta's vast number of Devonian and deeper depleted oil and gas pools are ideal candidates for CSS storage. In this paper, an applicability study was performed on several depleted gas pools across Alberta looking at their reservoir quality, injectivity, storage capacity, and cap rock integrity. Candidates were screened based on OGIP, recovery factor, well penetration risk, and proximity to existing infrastructure. Using production forecasting, another layer of analysis was performed to identify future gas pools that will be prime candidates within the next 5 years.

Theory / Method / Workflow

1. Collect public data related to CO2 emissions, depleted gas reservoirs (rock and fluid properties), and historical production data on gas pools across Alberta
2. Identify pools that are first-pass candidates for CCS storage based on OGIP and RF cutoffs
3. Use production forecasts to identify active gas pools that will be prime candidates for CCS within the next 5 years
4. Further screen the CO2 storage capabilities of pools based on geological and reservoir characterization, including cap rock integrity and well penetration risk due to poor casing
5. Highlight major gas pipelines, refineries, oil sands processing facilities, and other CO2 emitting facilities near the screened depleted gas pools
6. Consider all critical factors needed to establish ideal sequestration hubs across the study area

Results, Observations, Conclusions

The author anticipates that the reservoir characterization and work conducted in this study will identify key regions in Alberta that will satisfy the following requirements for successful and permanent CO2 sequestration:

1. Sufficient CO2 injectivity rate that doesn’t exceed the formation parting pressure
2. Secure containment and conformance of the CO2

3. Sufficient capacity to store the delivered CO2 volumes

Novel/Additive Information

The goal of this paper is to identify several Devonian and deeper gas pools that will meet or exceed the requirements for CO2 sequestration, and will ultimately lead to identify CCS hub locations across Alberta that are close to existing infrastructure.

Acknowledgements

References

Reference Style (use Arial 9pt normal)