



The South West Hub: carbon storage in the southwest of Western Australia

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SUMMARY

The South West Hub (SW Hub) project led by the Department of Mines, Industry Regulation and Safety (DMIRS) in Western Australia has been investigating and characterising the Lesueur Sandstone as a potential target carbon dioxide injection and storage formation since 2007. As expected with an unconfined saline aquifer, the project started with limited data, particularly when compared to sites based in oil and gas field areas.

Working with research institutions and private sector expertise, the project has judiciously acquired data on a stage gated decision basis. Starting with a deep well to 2,945 metres in 2011 and 2D seismic over 110 line-km the project was able to move through various modelling stages and uncertainty tables, before undertaking a complex 3D seismic over 115 km² in 2014 and then drilling three “shallow to intermediate depth wells” (1,350 m, 1,550 m and 1,800 m) in 2015 that gave good areal coverage, significant core and logging data on targeted critical sub-surface formations. As more information became available, so did the level of sophistication and granularity of the models with the Generation 4 model consisting of 1,100 layers and 256 million cells.

Generation 4 model development commenced in late 2017 with further input from re-processed seismic, new core analysis, different analytical techniques and re-interpretation of well log data. The work scope and the key objectives of this model were to: (a) challenge assumptions and conclusions of underlying interpretation work reviewed/performed to date; (b) reduce parametric uncertainties through analogue studies and new laboratory test data; (c) develop scenarios and use a range of cases to test storage performance factors and potential limits (injectivity, containment and capacity) going beyond the decision criteria.

The work has produced confidence in the carbon storage capacity of the Lesueur formation. Further validation of the SW Hub storage concept will substantially increase the number of geologic sites that can be considered for safe storage around the world.

Key words: South West Hub, Lesueur Sandstone, carbon storage, seismic.