eReport

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ANLEC R&D Report Summaries

The following reports are available from the ANLEC R&D website:

Surat Basin - Regional seal characterisation of the Evergreen Formation

This project is complementary to an earlier ANLEC R&D study of the Precipice Sandstone as a geosequestration target in the Surat Basin. The objective of this new work is to characterise the Evergreen Formation, which is the regional seal to the Precipice Sandstone.

Interpreted results indicate lithological variation across the basin that gives further insight on Evergreen Formation as a reservoir-seal. This knowledge improves the quality of stratigraphic variation up-section and potentially provides the basis of a secondary storage reservoir within the lower part of the Evergreen or the Boxvale Sandstone.

Full report: Precipice Sandstone outcrop study

Raman Spectroscopy – CO_2, SO_X and NO_X groundwater monitoring in Precipice Sandstone

It is important to be able to accurately quantify the concentration of CO_2 and ancillary gases SO_x and NO_x if CO_2 from power generation flue gases is to be stored in saline aquifers. This work is designed to analyse the applicability of adapting Downhole Reservoir Raman Spectroscopy (DRRS) to detect solubilised CH_4, N_2, CO_2 and associated dissolution products.

- Several reaction products for SOx, NOx had a unique Raman spectrum when dissolved in water that could theoretically be used to differentiate and quantify those species in a mixture.
- The dissolved CO_2 concentration measured by Raman spectroscopy within a double-windowed pressure cell was in excellent agreement with the theoretically expected concentration at the reservoir pressure and temperature.

Full report: Raman Spectroscopy - detecting SOx and NOx in Precipice Sandstone

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Surat Basin - Near surface CO_2 characterisation of Glenhaven CCS site

CTSCo is implementing a process-based soil vapour monitoring methodology for CO_2 storage in the Surat basin. The main focus of the project was to provide an initial characterization of the geochemical signatures at the site and to test the quality of monitoring installations and data collection systems. A preliminary assessment of the isotopes signatures was also undertaken. The study concluded the approach and monitoring installations at Glenhaven are robust and adequate for leakage detection. Brief conclusions are:

- The vadose zone geochemistry at Glenhaven is simple.
- CO_2 sensors are accurate and precise at low concentrations.
- Even when CO_2 and O_2 are not precise or accurate, N_2 calculated by difference can be fortuitously precise and accurate.
- Methane sensors appeared to overestimate the methane in the system.
- The system is extremely sensitive to leakage signals, even with sensor error.

Full report: Initial near surface CO_2 characterisation at Glenhaven

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Carbon Capture Shift Reactor

This project focused on the development of sorbents to capture CO_2 from a syngas stream in coal gasification processes. The double salts (DS) sorbent developed by the end of 2015 proved to meet the project targets for 90% CO_2 capture and were used for the final experimental milestone of scale-up and 2000 hours long term testing. However, the DS sorbent developed is unstable in wet gas streams, thus requiring condensers and water desiccant columns to maintain a long and stable operation. As syngas streams contain water, the sorbent developed did not meet the industrial requirements for capture coal fired flue gas systems. This does not preclude use of the sorbent in other applications where capture is required in drier gas conditions.

Full report: Carbon Capture Shift Reactor

Impurities in oxy-fuel CO_2 compression; stability, disposal and utilisation

This report quantifies the emissions of NO_X, SO_X and mercury gases from condensates formed during CO_2 compression while providing options for their stabilisation and disposal. The study concludes:

> With suitable design of the compression flowsheet, the compression of oxy-fuel flue gases containing mixed acid gases may prove to be a cost-effective alternative for impurity control of CO_2 for storage.

Full report: Impurities in oxyfuel CO_2 compression; stability, disposal and utilisation

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ANLEC R&D is a member of the following IEA implementing agreements. For access to their reports, please contact admin@anlecrd.com.au

IEA Clean Coal Centre Reports

Mills, S., 2017, Combining solar power with coal fired power plants or cofiring natural gas, CCC/279

Reid, I., 2017, Coal beneficiation, CCC/278

IEAGHG R&D Program Reports

Report: 2017-08, *CO_2 Migration in the Overburden*

Report: 2017-07, *CCS deployment in the context of regional developments in meeting long-term climate change objectives*

Report: 2017-06, *Proceedings from the US DOE Energy-Economic Modelling Workshop*

Report: 2017-TR11, *IEAGHG 2017 Peer Review of US RCSP Phase III Projects*

Report: 2017-TR8, *Understanding the cost of retrofitting CO_2 capture to an integrated oil refinery*

Report: 2017-TR7, *Reducing Emissions from Natural Gas Supplies*

Report: 2017-TR6, *CCS industry Build-Out Rates – Comparison with Industry Analogues*

Report: 2017-TR5, *RECAP Project*
