



# **NEW VENUE: FESAus March 2023 Talk**

## ***Seal Integrity for CO<sub>2</sub> Sequestration and Containment***

### ***– Russell Davies***

#### **Description:**

Fault and Caprock seal integrity for CO<sub>2</sub> storage is critical to prevent leakage over a given time threshold. Evaluating the leaking potential requires evaluating the key processes such as capillary controls, diffusion, hydrodynamics, mechanical failure, hydraulic resistant flow and chemical diagenesis. These effects can be evaluated to determine a static sealing capacity based on estimates or measurements of CO<sub>2</sub> capillary threshold pressures, mechanical properties, CO<sub>2</sub> properties such as density, wettability and interfacial tension, for example. The risking of the sealing potential is improved with laboratory measurements from the local injection site, but regional trends and wireline log data are also useful to determine subsurface characteristics. In addition to these methods, however, finite element models for evaluating the mechanical changes with injection and this coupled with simulation adds a dynamic simulation to improve the risk analysis of the processes.

In this presentation, we will discuss the key controls for a static analysis of the sealing potential with methods and data requirements complemented by a description of the numerical tools for top seal characterization including the application of the Visage\* finite element modeling software within Petrel\* to characterize a full mechanics for rock deformation and failure potential coupled with Eclipse\* simulation. The standard practices for fault seal analysis, however, are also applied in risking the cross-fault and along fault flow. These methods have been applied by SLB in CO<sub>2</sub> projects worldwide.

#### **Bio:**

Russell Davies is a structural geology advisor within SLB who joined the company following the acquisition of Rock Deformation Research in 2014 where he spent 15 years working as a consultant on structural geology challenges for the industry. He is responsible for technical consulting on a range of trap and seal problems and coordinating the technical service work on projects for industry clients. Russell has a PhD in structural geology from Texas A&M University and has worked in the oil and gas industry for over 30 years for Shell and Arco, and Rock Deformation Research. More recently he has been applying his expertise on characterizing the seal risk on CCS projects.

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**DATE:** Tuesday March 14, 2023 - 12:00 – 13:00 PM (WAST, GMT+8)  
**NEW VENUE:** [Mercure Perth Hotel \(10 Irwin Street, Perth WA 6000\)](#)  
**COST:** Members \$30.00; Non Members \$40.00; Students/Retirees \$10.00; Remote access also available  
Online registration at [www.fesaus.org](http://www.fesaus.org) by Friday 10<sup>th</sup> March at 11.00 am

