Rock Properties Division

AGAT Laboratories

Carbon Capture, Utilization, and Sequestration

CCUS at AGAT Laboratories

Carbon capture, utilization, and sequestration (CCUS) is quickly gaining popularity as a means to leverage carbon tax incentives to increase oil recovery and/or sequester greenhouse gases. The evaluation of these projects is complex, requiring a deep understanding of the geological formation and the potential chemical reactions that can help or hinder storage capacity, injection, and sealing efficiencies. AGAT Labs offers a full suite of Geological and Engineering services to support these projects, in order to help assess project feasibility.

Enhanced Oil Recovery

Injection of CO_2 into mature oilfields can lead to enhanced oil recovery, particularly when reservoir conditions are suitable for miscibility of CO_2 in the formation oil. AGAT Labs provides advanced PVT studies, such as Minimum Miscibility Pressure determination, Swelling tests, and Angle (Forward and Backward) to characterize the CO_2-oil interactions under reservoir temperature and determine the potential for EOR under the expected pressure range of the reservoir. AGAT also provides coreflooding tests in our Special Core Analysis Laboratory. Experiments can be designed to determine the increased oil recovery from CO_2 injection and characterize in situ flow properties such as relative permeability, for reservoir simulation software inputs.

Storage Capacity

The storage capacity of a reservoir is a dynamic value that is dependent on mechanical and chemical properties over a wide range of pressures. To evaluate the mechanical properties for storage capacity, AGAT Labs provides measurement of in situ petrophysical properties, fluid saturations, and pore volume compressibility on selected representative core samples throughout the proposed storage zone. These measurements will afford an understanding of the total storage capacity of the reservoir from current reservoir pressure, to maximum pressure at the end of the injection process.

CO2 dissolution in formation water will further contribute to the total storage capacity of the reservoir. Gas solubility in formation water will increase as pressure increases throughout the gas injection process, which can be quantified with a multi-pressure PVT experiment with sampled or supplied CO2 gas and formation water. Further, if the reservoir is known to contain shaly sands or organic matter, it is recommended to run Adsorption Isotherm tests, to evaluate the contributing adsorption of gas onto these species.

Cap Rock Integrity

The candidacy of a reservoir for subsurface CO2 storage and sequestration is also dependent on the ability of the cap rock to seal in the injected gas. AGAT Labs has a full-service Rock Mechanics lab to provide mechanical strength tests to determine the quality of the cap rock and failure criteria to guide the maximum injection pressures. We also provide measurements of permeability and threshold pressure on cap rock samples at various in situ stresses to evaluate the sealing ability of the cap rock to CO2 migration.

For more information please contact info@agatlabs.com