Unified Petroleum Geology Workflows for Qualifying CCS Reservoir Suitability

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Abstract

Prospective carbon storage operators quickly learn that the rigors of Class VI permitting and ultimately meeting compliance requirements is extremely challenging and these demands may prove to be time and cost prohibitive. Many disposal and storage projects operators will discover that the ability to demonstrate to federal or state governance their ability to meet full compliance with MRV requirements is unwieldy, expensive, and in some cases, impossible, to achieve. These barriers can render a project uneconomic before permit applications are ever submitted, even with the increased Q45 incentives provided by the 2022 IRA tax bill. This presentation will focus on blending well-accepted and widely used reservoir technologies that can be applied at lower costs, in a timelier fashion with higher fidelity for meeting those Class VI MRV compliance requirements. The advantage of using integrated geological technologies is a shortened cycle-time for qualifying the viability of a carbon storage “vessel” for permit applications. Then, ultimately, they are then used in monitoring, reporting and, consequently, fail-safe validation of carbon storage compliance. Assuring MRV compliance is a critical process and ensures that Q45 Carbon Tax Credits are being granted and applied appropriately. Class VI MRV requirements dictate that every CCS operator tracks and reports a project’s success and, perhaps even more importantly, failures. As such, timely project coverage is mission critical to the success of every project. Early detection and responsive mitigation may head off a total project failure and immediate termination at any time in the life of a carbon sequestration project. Unified geological technologies for meeting MRV requirements and assuring any CCS project include:

• Subsurface: 4D seismic and tensor arrays for processing, simulation and storage modeling; fiber deployed DTS/DAS, advanced logging (triple-combo and pulse neutron logs), and chemical tracers for quantitative plume arrival data collected at monitoring wells,

• Near-surface: soil samples using sorbent materials, domestic water wells, aquifers, high-resolution tensors, etc. and looking for evidence of chemical tracers in samples for leak confirmation, and

• Surface: air monitoring sentry systems with carbon dioxide sensors that are currently used for meeting methane emissions compliance requirements in most US jurisdictions, LIDAR, continuous injection of chemical tracers for atmospheric testing sentries.