

N553: Monitoring Geologic CO₂ Storage Sites

Instructor(s): Susan Hovorka and Katherine Romanak

Format and Duration

Classroom - 2 Days

Virtual - 3 Sessions

Summary

Business Impact: Carbon capture and geologic storage CCS is a recognized technology for mitigating CO₂ emissions. **Monitoring geological CO₂ storage sites is a critical element of a CCS project and is required to gain emissions reduction credits and to ensure environmental protection.** Monitoring is generally required over all phases of a project and throughout the entire stratigraphy from reservoir to surface. The choice of tools and approach is highly specific to site conditions, project goals and regulatory requirements with important technical nuances specific to CO₂ storage.

This course is based on the international ISO standard for CO₂ geological storage and empowers attendees to implement the many phases of CO₂ storage monitoring in saline reservoirs, depleted fields and active CO₂ EOR fields. Delegates will learn the basic requirements for gaining a permit for CO₂ storage, and how to develop monitoring programs to attain permits and achieve long-term project success. Attendees will be guided through the life-cycle of a CO₂ storage project with an emphasis on technical considerations, key concepts, processes, and workflows of the permitting process. Focus will be on providing applicable skills to real-world project development.

Learning Outcomes

Participants will learn to:

1. Describe why, how, and where monitoring is accomplished.
2. Delineate the different monitoring challenges of the various reservoir types (saline, depleted fields, EOR).
3. Outline the different goals and strategies for monitoring over the lifecycle of a project and within the different zones of a project area stratigraphy.
4. Recognize the elements of a permit and the various strategies for fulfilling regulatory requirements.
5. Use risk assessment to aid in choosing monitoring strategies using an ALPMI method.
6. Design a workflow and perform the key tasks for defining, developing and permitting a CCUS project, beginning with characterization, risk assessment, and monitoring for operational and post-operational phases.

Training Method

This is a classroom or virtual interactive classroom course comprising presentations, discussions, case studies and interactive exercises.

Who Should Attend

This course is aimed at project developers, regulators, subsurface oil and gas professionals who are familiar with CCUS as a technology and would like to further develop their skills for CO₂ storage project development. It is recommended specifically for:

- Geologists, geophysicists, reservoir engineers and other technical subsurface professionals working in CCS who are interested in CO₂ storage monitoring
- Consultants in related fields who want to understand the nuances of CO₂ storage monitoring
- Professionals developing geologic storage for CCUS projects

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- Recent graduates in petroleum geoscience and reservoir engineering who want to develop skills in CCUS monitoring

Prerequisites and Linking Courses

An understanding of the basic concepts of CCUS with general knowledge of geology, petroleum geology and/or engineering.

Course Content

Day 1: Overview of CO₂ storage concepts

- Why do we monitor?
- Regulations, guidance and emissions accounting
- Overview of geological storage reservoirs (depleted reservoirs, saline reservoirs and CO₂-EOR monitoring)
- Importance of well infrastructure
- Overview of Monitoring zones and phases
- Risk assessment and the monitoring plan - ALPMI
- Attribution and environmental monitoring - Kerr Farm Case study
- Environmental impacts and underground sources of drinking water, soil, and the biosphere
- Safety and public perception

Day 2: The elements of a storage permit

- Monitoring and verification program objectives and plan design
- Monitoring to the risk assessment
- Site characterization/baseline monitoring
- Conformance monitoring
- Monitoring for assurance
- Seismic and geomechanical monitoring
- Injection period monitoring
- site closure criteria and plan

Day 3: Putting it all together

- Permitting exercise
- Attribution game
- Wrap up