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Carbon Capture and Storage (CCS) is a key means of mitigating climate change and is the only option currently available to decarbonize industries such as cement, steel, petrochemicals and LNG. As opportunities in oil and gas decline, they are growing in CCS. Human activities now generate about 35Gt of CO2 (1 gigatonne=1 billion tonnes) per year. As more and more countries adopt carbon pricing schemes, the potential opportunity becomes enormous, both in new business revenue and in repurposing old assets and delaying decommissioning costs. Mitigation of the worst effects of climate change will require storing billions of tonnes per year, with an industry to match. In the US alone, the National Petroleum Council estimates that CCS could employ ~230,000 people, similar to the current oil industry. This course provides a quick look into the business models for a CCUS project starting by outlining the regulatory, policy, and financial drivers and constraints for CCUS. Design a workflow and perform the key tasks for defining, developing and permitting a CCUS project, including site selection, characterization, risk assessment, and monitoring for operational and post-operational phases. In addition, we will review new concepts in transitioning from CCUS(EOR) to CCS and achieving net zero goals by looking carbon life cycle around the system boundaries.

Course outline:

- **Part 1: Introduction**
    - Climate change and CO_2
    - The scale of the challenge
    - The role of CCS
    - How CCS works
    - Incentives
    - Building a business
    - Regulations
    - History and current state of CCS
    - Analogs
    - Class VI review*
- **Part 2: Highlights**
    - Fluid flow modeling

- Induced seismicity

- Transitioning an EOR project to CCS

- Area of review

- Capacity estimation

- Storage cost model

- Risk Assessment and Monitoring

- Considerations for Monitoring Design.

- Environmental Monitoring

- Safety and Environmental Impacts

- Finding Leakage – Soil Monitoring*

- Case Study: Allegation of a Leak near the Weyburn-Midale Project*

*If time allows