

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



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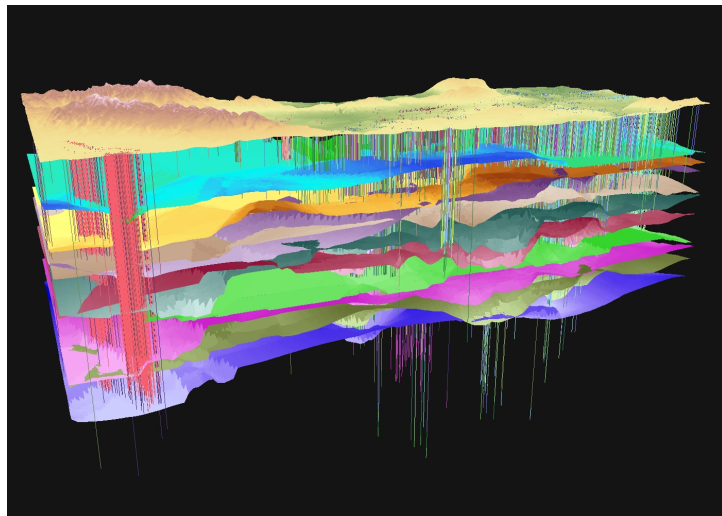
Sequestration

12/2004

DEVELOPMENT OF SCIENCE-BASED PERMITTING GUIDANCE FOR GEOLOGIC SEQUESTRATION OF CO₂ IN DEEP SALINE AQUIFERS BASED ON MODELING AND RISK ASSESSMENT

Background

Geologic sequestration of CO₂ has been recognized as a potentially important way to mitigate the increase in the concentration of CO₂ in the atmosphere. However, if geologic sequestration is to become a reality, procedures to permit geologic sequestration projects must be put in place. Reasonable permitting practices are critical to stakeholders, because overly restrictive permitting could limit the use of geologic sequestration, while lax regulation could result in widespread public objections or negative consequences, should leaks occur. This study will focus on long-term (hundreds to thousands of years) sequestration of CO₂ in subsurface formations in the Texas Gulf Coast and Ohio/West Virginia areas. Not only are there large releases of CO₂ in these areas, but high-quality data are also available from pilot injection projects. This study will build on previous and ongoing studies related to CO₂ sequestration conducted by the Bureau of Economic Geology (BEG) and Pacific Northwest National Laboratory (PNNL). This comprehensive approach to geologic CO₂ sequestration should increase confidence in the applicability of this technology, which is critical for its success and for public acceptance.



Schematic for the concept of geological sequestration

CUSTOMER SERVICE

1-800-553-7681

WEBSITE

www.netl.doe.gov

PARTNERS

University of Texas at Austin

Pacific Northwest National
Laboratory

COST

Total Project Value

\$240,154

DOE/Non-DOE Share

\$179,921/\$60,233

This study will develop guidelines for permitting CO₂ sequestration projects on the basis of a review of permitting procedures in other programs (e.g., deep-well injection, gas storage systems, and high-level radioactive waste disposal), results of research programs on CO₂ sequestration and related projects, reservoir modeling, and risk assessment. CO₂ sequestration is an emerging field in which new results are being produced rapidly; therefore, it is critical to conduct a thorough search of the literature and to analyze the applicability of reported results to permitting issues. The modeling effort will build on modeling studies of the pilot CO₂ injection study in the Texas Gulf Coast conducted by Lawrence Berkeley National Laboratory (LBNL) in collaboration with the BEG. Sensitivity analyses will help identify critical issues and delineate potential leakage pathways. A risk assessment will extend the reservoir simulation results to aquifers, soil, biota, the atmosphere, and surface-waters. The results of these analyses will provide input needed to develop permitting protocols that will provide operators, regulators, and the public with increased confidence that the permitting process will ensure the selection of safe, optimal sites for CO₂ sequestration.

Primary Project Goal

The primary project goal is to develop a guidance document that addresses permitting issues relative to the geologic sequestration of CO₂, including specific recommendations for developing a permitting protocol. This can provide decision makers with a reasonable estimate of the potential future performance of a disposal system and a clearer understanding of how uncertainties affect that estimate.

Objectives

- To develop science-based permitting guidance.
- To perform reservoir and seal modeling.
- To perform risk and consequences assessments.
- To determine the implications of permitting.

Benefits

There is growing concern among climate scientists that the buildup of greenhouse gases, particularly CO₂, in the atmosphere is leading to global warming with potentially serious consequences. This may result in the need to reduce the amount of CO₂ emitted to the atmosphere. One promising technique for accomplishing this is the capture of CO₂ from large point sources, such as power plants, followed by sequestration in geologic formations. However, sequestration projects will not be possible until permitting protocols are in place. This project will develop science-based guidelines that can help government officials develop the required permitting procedures.