

Sixth Annual Conference on Carbon Capture & Sequestration

Regional CCS Studies

Pilot Study Outreach for Carbon Sequestration: Field Experiences

Sallie E. Greenberg

Illinois State Geological Survey

Midwest Geological Sequestration Consortium

May 7-10, 2007 • Sheraton Station Square • Pittsburgh, Pennsylvania

Multiple Levels of Public Outreach and Education

- Multiple Stakeholders
Multiple Approaches
- General Outreach and
Education
- Technical Outreach and
Education
- Locations Specific Outreach



Seven Step Pilot Outreach Plan

- Initiate plan upon pilot site confirmation
- Meet with project coordinators
- Conduct area specific research
- Contact landowners and community officials
- Create site specific outreach materials
- Public outreach - events planning and delivery
- Technical outreach
- Post-pilot outreach

Meet with Project Coordinators

- Discuss pilot details
- Build support plan
- Materials development
- Weekly updates

Site Specific Research

- Geology overview
- Site overview
- Research local setting
- Build contact list

Contact Landowners and Community Officials

- Pilot tests require local approach
 - Contact surrounding landowners in-person and early
 - Explain project and answer questions
 - Notify of increased activity and presence on site
 - Contact local officials – Sheriff, Mayor
 - Support local business and vendors
 - Balance with requests of Lease Operator and Scientists

Site Specific Outreach Materials

- Brochures
- Pilot posters
- Fact sheets

Geological Sequestration in the Illinois Basin

The Midwest Geological Sequestration Consortium, led by the Illinois State Geological Survey, includes the U.S. Department of Energy, the Indiana and Kentucky Geological Surveys, and several industrial partners to research geological sequestration in the Illinois Basin. Geological sequestration of CO₂ using oil reservoirs, coal seams, and deep brine-filled formations is a promising technology under study around the world. To reduce greenhouse gas emissions, CO₂ may be separated from the emissions of power plants and industrial plants, transported to a storage site via pipeline, injected into geological formations, and monitored for long-term storage.

The Illinois State Geological Survey along with its industry partners will conduct a series of field tests in the Illinois Basin to assess the feasibility of increased oil recovery and enhanced coal gasification. An additional test to determine the potential of CO₂ in deep saline aquifers will be conducted.

Program

To the success of these programs, we encourage you to be part of the program by contacting us if you have questions, or something on site you want to report, or how we can make this project a success.

The Midwest Geological Sequestration Consortium is funded by the U.S. Department of Energy through the National Energy Technology Laboratory (NETL) via the Regional Carbon Sequestration Partnership Program (contract number DE-FC26-05NT42588) and by the Illinois Department of Commerce and Economic Opportunity, Office of Coal Development (contract number ICC0300 02EWS 28F).

Equipment Used on Site During the Sequestration Process

- Drilling rigs and related oil field equipment
- Well logging equipment
- Water and soil sampling equipment
- Carbon dioxide storage tank, pump, and heater
- Staff vehicles and office trailer
- Carbon dioxide tanker delivery trucks

ISGS Staff

- Scientists and staff will visit the site regularly
- Site will be monitored 24 hours a day during injection phase

For additional information please contact:
www.sequestration.org
co2info@sequestration.org

Steven R. Gutzmer
Pilot Coordinator
Field Phone: 217-244-1099
Office Phone: 217-244-9337

Scott M. Fralley
Deputy Project Manager
Field Phone: 217-244-0803
Office Phone: 217-244-2412

Robert J. Finley
Project Manager
Office Phone: 217-244-8389

William W. Shatt, Chief
Illinois State Geological Survey
615 East Peabody Drive
Champaign, IL 61820

Carbon Sequestration Pilot Test Program

Our Goal Is to Leave the Surface Site as We Found It

Midwest Geological Sequestration Consortium and Illinois State Geological Survey



Geological Sequestration in the Illinois Basin

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www.sequestration.org
co2info@sequestration.org

Sally Greenberg
Sequestration Outreach Coordinator
Office Phone: 217-244-4868

Scott M. Fralley
Deputy Project Manager
Field Phone: 217-244-1099
Office Phone: 217-244-7412

Robert J. Finley
Project Manager
Office Phone: 217-244-8389

William W. Shatt, Chief
Illinois State Geological Survey
615 East Peabody Drive
Champaign, IL 61820-6964

John A. Burg, Director for Research
Indiana Geological Survey
Indiana University
611 North Walnut Street
Bloomington, IN 47405-2288

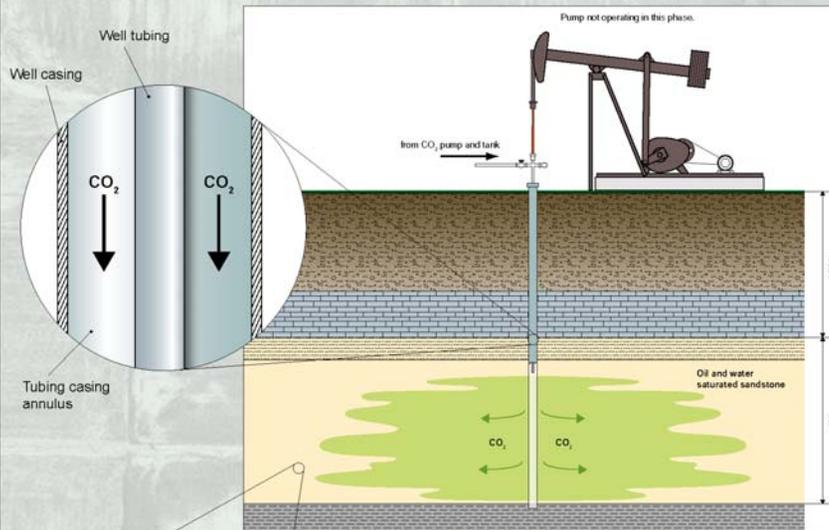
Brandon C. Nettall, Geologist
Kentucky Geological Survey
228 Miner and Mineral Resources Building
University of Kentucky
Lexington, KY 40506-0167

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CO₂ Storage in the Illinois Basin

The Illinois Basin, which includes Illinois, western Indiana, and western Kentucky, is home to industrial activity that releases more than 300 million metric tonnes of carbon dioxide (CO₂) annually from stationary sources like electric power plants, refineries, cement plants, and other industrial facilities. The Illinois Basin is unique because three potential geological storage opportunities (oil reservoirs, coal seams, and brine-filled sandstones) exist in close proximity to substantial CO₂ sources and, in some cases, may be accessed from one site. This geology represents a unique research opportunity to study all three storage options economically and may represent one of the best opportunities for initial commercialization of geological sequestration in the United States.

Key to Subsurface Operations



Enhanced Oil Recovery "Huff 'n Puff"

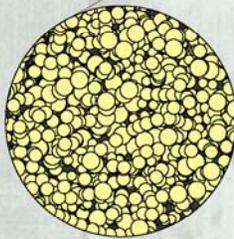
Oil does not always move easily through mature reservoirs, and much oil is left behind after an oil field produces under natural drive mechanisms and waterflood. The well stimulation technique known as "Huff 'n Puff" increases the amount of oil recovered in a mature field by injecting carbon dioxide (CO₂) into a reservoir. Over a period of weeks the CO₂ soaks the oil and water saturated sandstone and decreases the oil's resistance to flow (viscosity), thereby allowing the oil to be produced more easily.

Injection Phase "Huff"

During the injection phase CO₂ from the storage tank is pumped into the Cypress Sandstone and allowed to soak the unit for a period of up to two weeks. The CO₂ is pumped down through the tubing casing annulus.

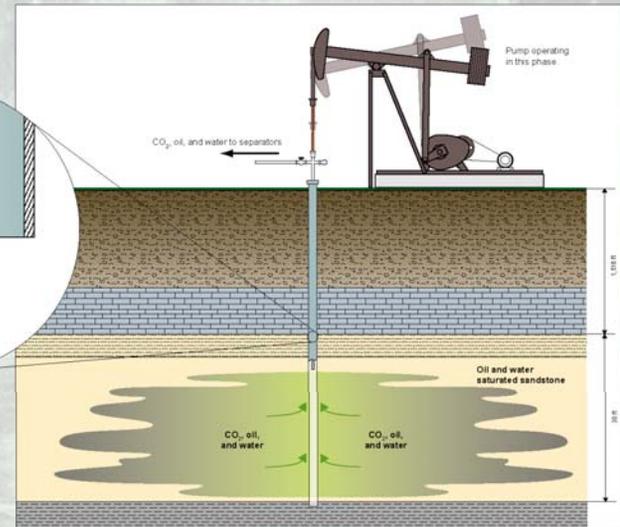
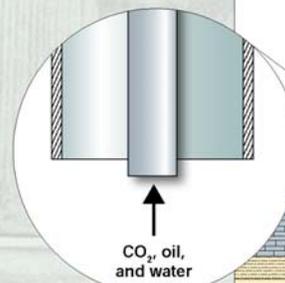
Production Phase "Puff"

During the production phase oil, water, and CO₂ from the Cypress Sandstone are pumped out through the well tubing after the soaking period and then separated.



CO₂: A Natural Solvent

Pore spaces between the grains of sandstone hold oil and water. CO₂ mixes with the oil in these pore spaces, acting as a solvent and reducing the oil viscosity.



The Midwest Geological Sequestration Consortium is funded by the U.S. Department of Energy through the National Energy Technology Laboratory (NETL) via the Regional Carbon Sequestration Partnership Program (contract number DE-FC26-04NT42508) and by a cost share agreement with the Illinois Department of Commerce and Economic Opportunity, Office of Coal Development (contract number ICC0003-DE-V03-2PF).

Key to Site Operations

"Huff 'n Puff" Pilot #1



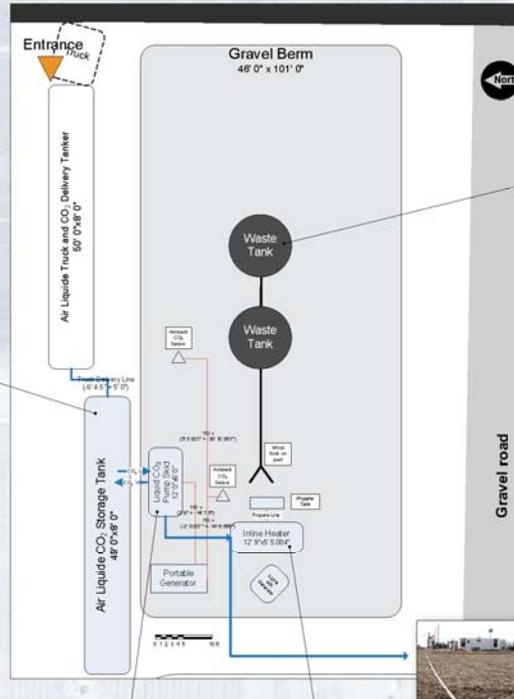
Separator tanks



CO₂ storage tank (50-ton capacity) receives deliveries from 20-ton over-the-road tanker trucks.



CO₂ injection pumps, three on this sled. CO₂ is pressurized to 500 psi and injected during the "Huff" (injection) phase.



Waste tank battery



Corrosion inhibitor prevents corrosion of well casing and tubing.



Well pump located approximately 1,200 feet away from CO₂ staging site.



Inline heater to prevent hydrate formation (ice and CO₂ mixture) during injection.



The pump (right) pulls oil, water, and CO₂ from the subsurface during the "Puff" (production) phase. The separator (left) measures oil, water, and gas (CO₂) content of the mixture that comes out of the well.



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Events planning and delivery

- Public meetings
- Local groups
- General outreach
- Technical outreach



Post pilot outreach

- Leave the site as you found it
- Disseminate results as appropriate
- Thank the landowners
- Thank the community



Technical Outreach



- Building knowledge
- Sharing experience
- Building infrastructure
- Operator newsletters
- PAG

Discussing MMV at Loudon Field Huff n' Puff

Lessons from the Field

- Start early
- Know your site
 - Pilot outreach is very different than general outreach
- Know your stakeholders
 - Local effect
 - Tailor materials for pilots
 - Provide detailed technical information (groundwater reports)
- Plan for the unexpected
- Prepare for drop-ins
- Support scientists in the field
- Prepare staff for outreach activities



www.sequestration.org