

PROJECT facts

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

Sequestration

03/2006



NATURAL ANALOGS FOR GEOLOGIC SEQUESTRATION

Background

Large geologic deposits of high-purity carbon dioxide (CO₂), created entirely by natural geologic processes, occur in many sedimentary basins. They have acted as relatively stable repositories for CO₂ over many thousands of years and prove that geologic sequestration offers a secure, environmentally sound way of storing CO₂. Most importantly, they provide an excellent natural laboratory in which to study the effects of long-term CO₂ exposure on the reservoir minerals. These conditions cannot be replicated by short term laboratory experiments or geologic sequestration tests. CO₂ fields may be viewed as unique "natural analogs" that can be used to assess crucial aspects of geologic sequestration. These assessments include: integrity of storage, candidate site screening and selection, and operational safety and efficiency. Thus, these CO₂ deposits offer considerable potential for understanding and publicizing geologic sequestration and can serve to build public confidence in this CO₂ management technique.

At present, five large natural CO₂ fields in the United States provide a total of 25 million tons of carbon dioxide that is injected into oil fields for enhanced oil recovery (EOR). This project performed a multi-disciplinary geologic engineering study of U.S. CO₂ deposits. The overall objective is to compare the naturally occurring CO₂ reservoirs with the capability of depleted oil and gas fields to securely and economically sequester carbon dioxide.

Primary Project Goal

The overall goal is to study natural CO₂ fields to document empirically, both to the scientific community and the public at large, the capability of depleted oil and gas fields to sequester carbon dioxide safely and securely. The effort also investigates long-term reactions between CO₂ and the various minerals in the reservoir and cap rocks.

Objectives

- Evaluate the safety and security of geologic sequestration
- Adapt specialized CO₂ operations technology to an emerging sequestration industry
- Document analogs for public review
- Evaluation of environmental and safety related factors are made based on the results of a geochemical analysis of CO₂ impacts and geochemical modeling

CONTACTS

Sean Plasynski

Sequestration Technology Manager
National Energy Technology
Laboratory
626 Cochran Mill Road
P.O. Box 10940
Pittsburgh, PA 15236
412-386-4867
sean.plasynski@netl.doe.gov

Charles Byrer

Project Manager
National Energy Technology
Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
304-285-4547
charles.byrer@netl.doe.gov

Scott Stevens

Advanced Resources International
4501 Fairfax Drive
Suite 910
Arlington, VA 22203
703-528-8420



Accomplishments

Literature reviews and collection of geologic and reservoir data have been performed. ARI has completed the first comprehensive analysis of several large natural CO₂ fields including Kinder Morgan's McElmo field in Colorado, Ridgeway's St. John's Dome in Arizona and New Mexico, and Denbury Resources' Jackson Dome field in Mississippi. Existing well log and other geologic information has been collected and is being used to build robust geologic models of these CO₂ fields.

Benefits

This project provides information that can be used to develop technologies for safe and secure sequestration of CO₂ in natural geologic formations. Furthermore, the results of this project provides an opportunity to study CO₂ sequestration in a non-intrusive manner at natural CO₂ sites and has obtained data not otherwise available on the long-term effect of CO₂ on mineral strata.

PARTNERS

Advanced Resources International
Kinder Morgan CO₂ Company, Ltd.
Ridgeway Petroleum Corporation
British Geological Survey
NASCENT Project
Australian Petroleum
Cooperative Research Center

COST

Total Project Value
\$1,736,390

DOE/Non-DOE Share
\$1,123,390 / \$613,000

ADDRESS

National Energy Technology Laboratory

1450 Queen Avenue SW
Albany, OR 97321-2198
541-967-5892

2175 University Avenue South
Suite 201
Fairbanks, AK 99709
907-452-2559

3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
304-285-4764

626 Cochran Mill Road
P.O. Box 10940
Pittsburgh, PA 15236-0940
412-386-4687

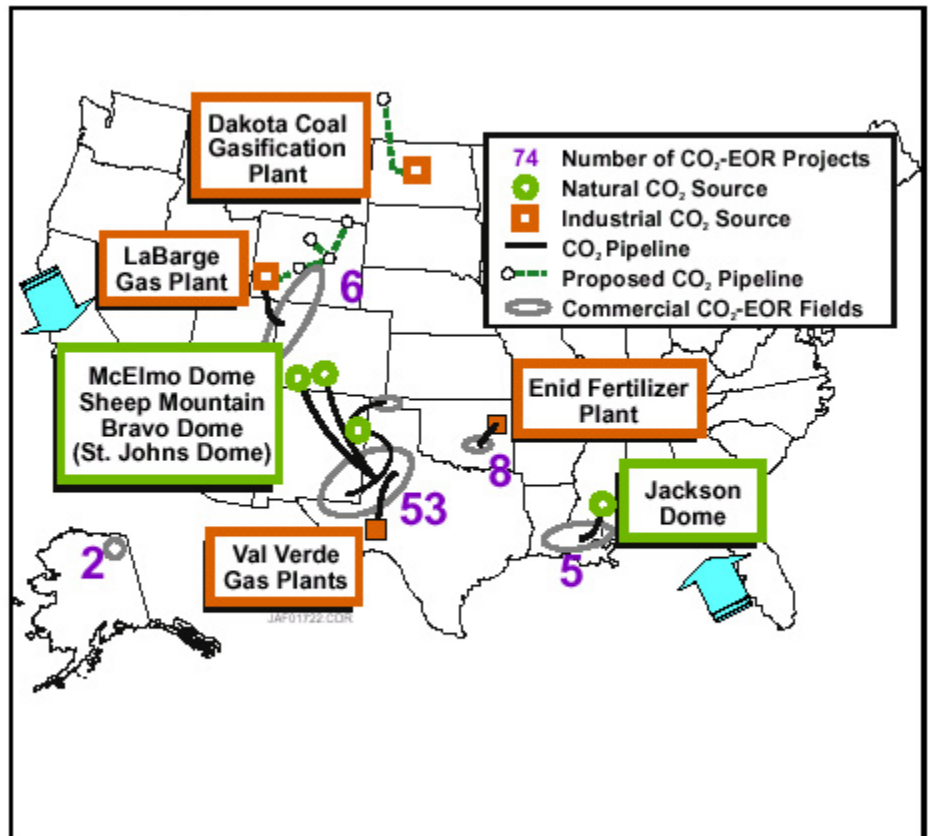
One West Third Street, Suite 1400
Tulsa, OK 74103-3519
918-699-2000

CUSTOMER SERVICE

1-800-553-7681

WEBSITE

www.netl.doe.gov



Location of natural CO₂ study sites in the USA and the CO₂ infrastructure for EOR projects