

Carbon Sequestration Technology Takes to the Field

Researchers from DOE's Los Alamos National Laboratory, Sandia National Laboratories and the National Energy Technology Laboratory, and from Strata Production Company have begun an experiment to see if underground geologic formations can be used to entrap and permanently sequester carbon dioxide gas from the atmosphere. The experiment is the first major field carbon sequestration experiment in the United States and part of an intensive 3-year scientific effort to trace the movement of CO₂ and determine whether it is likely to safely and permanently remain in the oil reservoir. Success of the approach might make it an option for President Bush's Global Climate Change Initiative.

"Oil and gas reservoirs are considered promising targets for CO₂ sequestration for a number of reasons," said Rajesh J. Pawar, a Los Alamos scientist working with the project. "Because the oil and gas that naturally accumulated in these reservoirs did not escape over geological time, the reservoirs should also be natural containers for CO₂. Also, because the geologic structure and physical properties of most oil and gas fields have been extensively characterized, that data should lower the cost of implementing the CO₂ sequestration projects."

From December 2002 until February 2003, researchers injected approximately 2,100 tons of CO₂ into Strata Production Company's West Pearl Queen reservoir near Hobbs, New Mexico. That quantity is comparable to a single day's CO₂ emission from an average coal-fired power plant.

At the start of the project, an extensive three-dimensional geophysical survey was conducted to provide an image of the reservoir. As the CO₂ was pumped into the reservoir at a rate of about 40 tons per day, project scientists used highly sensitive equipment to obtain microseismic signals useful in tracking the CO₂ plume's movement. Researchers have been monitoring the post-injection pressure in the field now for several months. A post-injection, three-dimensional geophysical survey will be performed in early July. This survey will be compared with the pre-injection survey to determine extent of injected CO₂ plume in the reservoir. After the survey is finished, injected CO₂ will be allowed to escape and researchers will monitor the amounts and types of fluids coming out of the well. Researchers will also be collecting samples of these fluids for analysis of their compositions and the data will provide them with information on how CO₂ may have reacted with the reservoir. Finally the field and laboratory experimental data will be integrated with numerical models to provide insights into the long-term capacity and impacts of such CO₂ sequestration options.

The Hobbs project complements another field test underway in southeastern Canada where nearly 5,000 tons per day of CO₂ is being shipped from the Dakota Gasification Company's Great Plains Coal Gasification Plant outside Beulah, North Dakota to the Weyburn oil field. The Weyburn field's operator is injecting the CO₂ in order to extend the field's productive life another 25 years and extract as much as 130 million barrels of oil that might otherwise have been abandoned.

Submitted by [Los Alamos National Laboratory](#)

ORNL RESEARCHER OUT TO MAKE A DIFFERENCE

Rebecca Efrogmson from DOE's Oak Ridge National Laboratory isn't looking for fame, but she is looking to make a difference to the environment and in people's lives.



Rebecca Efrogmson

That quest to make things better was evident early, as Rebecca tutored prisoners in mathematics while earning a bachelor's degree in biology and English from La Salle University.

"Math comes easily to me, but it isn't easy for everybody," says Rebecca, who received master's and doctorate degrees in environmental toxicology from Cornell University. "I was also intrigued by the prison environment – what it feels like to have the door shut behind you, the social hierarchy of prisoners – and by the main person I tutored."

She is a co-author of *Ecological Risk Assessment for Contaminated Sites*, has published about 20 papers and dozens of reports and has played a significant role in developing a multimedia model for assessing risk from hazardous air pollutants. The task combined her interests in the application of mathematical modeling to environmental problems.

Rebecca recently saw her dedication and talent rewarded as she received the Environmental Sciences Division Distinguished Scientific Achievement Award for 2002 where she was cited "for excellence in ecological risk assessment."

What makes for a good day, Rebecca says, is learning something new, synthesizing new information or "writing a good chunk of a paper." All of this is driven by her desire to ensure that the best science is available to support policies that affect the environment and people's lives.

Where remediation is concerned, for example, we need to do a better job of evaluating risks and benefits of a particular action, Rebecca says. Sometimes digging up a site and hauling off dirt does more harm than good because it destroys vegetation, can cause erosion and can lead to longer recovery times than it would take the chemical contaminants to degrade.

Submitted by [DOE's Oak Ridge National Laboratory](#)