



US carbon capture project starts to bury one million tonnes of CO2

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An ambitious US carbon capture and storage (CCS) project has begun a three-year trial to pump one million tonnes of CO2 underground.

The Midwest Geological Sequestration Consortium (MGSC) has begun injecting carbon dioxide (CO2) for the first million-tonne demonstration of carbon sequestration in the US.

The CO2 will be stored permanently in the Mount Simon Sandstone more than a mile beneath the Illinois surface at Decatur.

The MGSC is led by the Illinois State Geological Survey (ISGS), part of the Prairie Research Institute at the University of Illinois.

"Establishing long-term, environmentally safe and secure underground CO2 storage is a critical component in achieving successful commercial deployment of carbon capture, utilization and storage (CCUS) technology," said Chuck McConnell, Chief Operating Officer for the U.S. Department of Energy (DOE) Office of Fossil Energy (FE). "This injection test project by MGSC, as well as those undertaken by other FE regional partnerships, are helping confirm the great potential and viability of permanent geologic storage as an important option in climate change mitigation strategies."

MGSC is one of seven regional partnerships created by the DOE to advance technologies nationwide for capturing and permanently storing greenhouse gases that contribute to global climate change.

"I want to congratulate the Midwest Geological Sequestration Consortium, the Prairie Research Institute, ADM, and the other partners on this leading-edge demonstration project that has brought the future of clean energy research and technology to the state of Illinois today," said Illinois Governor Pat Quinn. "We are poised to reap the economic and environmental benefits that this public-private partnership has produced. This successful project gives Illinois a competitive advantage to attract green businesses and address our climate change responsibilities."

"We are enthusiastic as we reach the operational stage of our project. The analysis of data collected beginning in 2003 indicates that the lower Mt. Simon Sandstone has the necessary geological characteristics to be an excellent injection target for safe and effective storage of CO2," said Robert J. Finley, PhD, director and leader of ISGS's sequestration team. The \$96 million Illinois Basin - Decatur Project was funded in 2007 and now marks the beginning of the injection of 1 million metric tonnes of CO2 over the next three years.

"Reaching the injection phase of this project is a major milestone in sequestration technology world-wide and for the State of Illinois," said Prairie Research Institute Executive Director, William W. Shiels, PhD. "Four years of effort are coming to fruition at a site with unique capabilities, some of them first-in-the-world with respect to the extensive subsurface monitoring system. It's a strategic investment in Illinois' future." Visitors from Australia, China, Norway, Spain, and Japan have already visited the Illinois Basin - Decatur Project and they expect to welcome more of the international sequestration research community over the next several years, Shiels noted.

The CO2 is being captured from the fermentation process used to produce ethanol at Archer Daniels Midland Company's (ADM) corn processing complex. It is compressed into a dense-liquid to facilitate the injection process and permanent storage at a depth of 7,000 feet, according to Finley. The Mt. Simon Sandstone is the thickest and most widespread saline reservoir in the Illinois Basin, which covers two-thirds of Illinois and reaches into western Indiana and western Kentucky. The estimated CO2 storage capacity of the Mt. Simon is 11 to 151 billion metric tonnes, and it is below several layers of shale that serve as an impermeable cap rock to hold the CO2 in place, Finley added.

This demonstration project is part of the Development Phase of the Regional Carbon Sequestration Partnerships program, a DOE Office of Fossil Energy initiative launched in 2003 to determine the best approaches for capturing and permanently storing greenhouse gases that can contribute to global climate change.

The Illinois State Geological Survey manages the MGSC project. ISGS characterized the regional geology that led to selection of the Decatur site and is investigating the characteristics of the Mt. Simon reservoir and the overlying shale seal that retains the CO2. The Survey is conducting one of the most extensive environmental monitoring programs of any sequestration site in the world. The project is permitted under requirements of both the Illinois and the U.S. Environmental Protection Agencies as the first large demonstration-scale injection of CO2 from a biofuel production facility anywhere in the U.S.



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Schlumberger Carbon Services is providing full project management for the design and construction of all wells associated with the storage and deep monitoring parts of the project. Drilling of the injection well in 2009 confirmed suitability of the site and was followed by a seismic survey, a geophysical monitoring well, and a pressure and fluid sampling (verification) well, all in 2010. Completion of the verification well was followed by two rounds of initial fluid sampling to thoroughly document pre-injection reservoir conditions.

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