CONFERENCE PROCEEDINGS

Industrial CO_2 Storage in Mt. Simon Sandstone Saline Reservoir – A Large-Scale Demonstration Project in Illinois

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ABSTRACT

Under the Industrial Carbon Capture and Storage (ICCS) program, funded by the American Recovery and Reinvestment Act (ARRA) of 2009, United States Department of Energy (DOE) is sponsoring three large-scale ICCS projects for demonstration. This paper highlights these three projects and provides an overview of one project, namely, the Archer Daniels Midland Company's (ADM's) project titled "CO_2 Capture from Biofuels Production and Storage into the Mt. Simon Sandstone." The Office of Fossil Energy's National Energy Technology Laboratory manages this project, which receives $141.4 million in ARRA funding and another $66.5 million in private sector cost-sharing. This project, also referred to as the Illinois ICCS project, is under construction in Decatur, Illinois, and is scheduled to begin operations in 2013. The project team members are ADM, DOE, Schlumberger Carbon Services, Illinois State Geological Survey (ISGS), and Richland Community College (RCC).

The Illinois ICCS project will demonstrate an integrated system for collecting up to one million tons of CO_2 annually from ADM's ethanol plant in Decatur and geologically sequestering it in a saline reservoir. The project scope includes the design, construction, and integrated operation of CO_2 compression, dehydration, and injection facilities, and monitoring, verification, and accounting of the stored CO_2. Integral to the Illinois ICCS project will be the formation of an education and training facility, the National Sequestration Education Center, housed at nearby RCC in Decatur. This paper provides an overview and benefits of the Illinois ICCS project, and its current status and future plans.

INTRODUCTION

Carbon dioxide (CO_2) emissions from industrial sources, manufacturing plants, fossil-fuel power plants, transportation sector, and other sources, are linked to global climate change. Wide-spread deployment of large-scale carbon (CO_2) storage technologies at economically-feasible stationary sources, such as power plants and industrial sources, offers significant potential for reducing future CO_2 emissions to the atmosphere and for mitigating global climate change. With this long term view, under the Industrial Carbon Capture and Storage (ICCS) program, the United States Department of Energy (DOE) is collaborating with industry in cost sharing arrangements to demonstrate the next generation of technologies that will capture CO_2 emissions from industrial sources and either sequester those emissions or beneficially re-use them (referred to as carbon capture, utilization and storage or CCUS). The technologies included in the ICCS program have progressed beyond the research and development stage to a scale that can be readily replicated and deployed into commercial practice within the industry.

In October 2009, DOE selected 12 projects in Phase 1 of its ICCS program to test large-scale industrial CCS technologies. In Phase 1, the recipients performed the following project definition activities: preliminary design, teaming arrangements, host site commitments, environmental information collection, project cost estimates, and project financing. Depending on the merits identified in the project definition phase, some of the Phase 1 recipients applied for Phase 2 funding for detailed design, construction, and operation of the ICCS projects. Through a competitive process, DOE selected the following three projects in June 2010 to receive continued (Phase 2) funding.

1. Archer Daniels Midland Company (ADM) - CO_2 Capture from Biofuels Production and Sequestration into the Mount Simon Sandstone.

2. Air Products and Chemicals, Inc. (APCI) - Demonstration of CO_2 Capture and Sequestration of Steam Methane Reforming Process Gas Used for Large-Scale Hydrogen Production.
3. Leucadia Energy, LLC - Lake Charles CCS Project.

An outline of each of these three projects is given below:

1. ADM: The objective of this project is to demonstrate an integrated system for collecting up to 3,000 metric tons per day of CO_2 from the ADM ethanol plant in Decatur, Illinois and geologically sequestering it (deep underground storage) in a saline reservoir. At the ADM facility, the CO_2 is produced as a byproduct during the processing of corn to fuel-grade ethanol. The project scope includes the design, construction, demonstration, and integrated operation of CO_2 compression, dehydration, and injection facilities, and monitoring, verification, and accounting (MVA) of the stored CO_2. The project team members include ADM, Schlumberger Carbon Services, Illinois State Geological Survey (ISGS), and Richland Community College (RCC). The total project cost is $207.9 million (DOE cost share $141.4 million). This project is under construction and is scheduled to begin the operations phase in summer 2013.

2. APCI: The objective of this project is to design, construct, and operate a CCS system for two steam methane reformer (SMR) process gas streams and deliver the CO_2 to a nearby oil field for sequestration in an enhanced oil recovery (EOR) application. The project demonstrates a retrofit application of a Vacuum Swing Adsorption (VSA) system to concentrate CO_2 from SMR process gas streams and transport the captured CO_2 via pipeline for injection into the West Hastings oil field in eastern Texas for sequestration and improved oil production. The VSA process uses adsorbents to selectively remove one or more components, in this case CO_2, from the feed stream at high pressure. The process then ultimately swings to a vacuum to regenerate the adsorbent material. The process removes more than 90 percent of the CO_2 from the feed stream with greater than 98 percent purity for delivery to the pipeline. Approximately one million metric tons of CO_2 per year will be delivered for sequestration and EOR (1.6 to 3.1 million barrels of oil per year). The project is located at Valero's Port Arthur refinery in Texas. Team member Denbury Resources, Inc. is tasked with CO_2 transport, injection, and MVA activities. The total project cost is $430.6 million (DOE cost share $284 million). This project is under construction and is scheduled to begin the operations phase in late 2012.

3. Leucadia: The objective of this project is to design, construct, and operate a large-scale CCS system using the CO_2 from a methanol-producing petcoke gasification plant and to transport the captured CO_2 for EOR in the Gulf Coast region. The project will employ the Rectisol® process to separate CO_2 produced in a petcoke-to-chemicals gasification plant being developed by Lake Charles Cogeneration, LLC (a Leucadia Energy, LLC affiliate). The Rectisol® process operates selectively to recover the CO_2 as a separate stream that will be purified to remove contaminants and compressed to a pressure suitable for commercial pipeline transport to oil fields in Texas for EOR (6 million barrels of oil per year). The project is located in Lake Charles, Louisiana. The project team members include KBR (design engineering for Rectisol® & CO_2 compression systems), Denbury Onshore, LLC (CO_2 transport and injection), and University of Texas (MVA). The total project cost is $435.5 million (DOE cost share $261.3 million). This project is in design phase.

This paper provides an overview of the Illinois ICCS project.

BACKGROUND FOR THE ILLINOIS ICCS PROJECT

The Office of Fossil Energy's National Energy Technology Laboratory (NETL) manages the Illinois ICCS project. NETL is part of DOE's national laboratory system and it is owned and operated by the U.S. DOE. NETL supports DOE's mission to advance the national, economic, and energy security of the Nation. NETL implements a broad range of energy and environmental research and development (R&D) programs. NETL has expertise in coal, natural gas, and oil technologies, carbon sequestration, contract

and project management, analysis of energy systems, and international energy issues. In addition to research conducted onsite, NETL's project portfolio includes R&D conducted through partnerships, cooperative research and development agreements, financial assistance, and contractual arrangements with universities and the private sector. NETL is developing a portfolio of safe, cost-effective, commercial-scale CO_2 capture, storage, and mitigation technologies for commercial deployment.

The Illinois ICCS project is located at ADM's Agricultural Processing and Biofuels Production Complex, Decatur, Illinois. ADM's Decatur plant is the host site for the following two DOE-sponsored CCS projects, and both projects are in progress on ADM property which sits atop the Mt. Simon Sandstone saline reservoir.

- Illinois Basin-Decatur Project (IBDP) led by ISGS, under the Midwest Geological Sequestration Consortium (MGSC): IBDP is a large-volume, saline reservoir sequestration test that will inject one million metric tons of CO_2 over a period of three years. MGSC, one of the seven DOE Regional Carbon Sequestration Partnerships, was established in 2003 to assess geologic carbon sequestration options in the Illinois Basin. IBDP has completed construction of the 1,000 metric tons per day CO_2 compression and dehydration facility, drilled and completed the associated injection and deep monitoring wells, and established an extensive MVA program. The injection well is located adjacent to the ADM ethanol plant in Decatur. CO_2 injection into the Mt. Simon Sandstone began in November 2011 and will continue at a rate of 1,000 metric tons per day over a three-year period, followed by three years of post-injection monitoring.
- Illinois ICCS Project led by ADM: ADM's experience in the IBDP project facilitated expanding the CO_2 storage capability to that of a commercial-scale operation (i.e., one million tons per year) in this second project. ADM will integrate the IBDP compression and dehydration facilities with the new facilities constructed under the Illinois ICCS project upon completion of IBDP injection operations in fall 2014. A significant benefit of these two complimentary projects is the unique opportunity to better understand the interaction between the CO_2 plumes and pressure fronts emanating from two injection wells in the same sandstone.

Both projects are using cutting-edge sequestration technologies. The Illinois ICCS project adapts approaches of the IBDP and nearly triples the operations to better emulate the sequestration capacity necessary for commercial biofuel and power generating facilities.

ILLINOIS ICCS PROJECT OBJECTIVES

This project will demonstrate an integrated system for collecting CO_2 from an ethanol plant and geologically sequestering it in a saline reservoir:

- Conduct required geologic site surveys, and site characterization and modeling.
- Design, construct, and operate a new CO_2 collection, compression, and dehydration facility capable of delivering up to 2,000 metric tons of CO_2 per day to the injection site.
- Integrate the new facility with an existing 1,000 metric tons per day CO_2 compression and dehydration facility to achieve a total CO_2 injection capacity of 3,000 metric tons per day or one million tons annually. Design, construct, and operate a storage site capable of accepting up to 3,000 metric tons of CO_2 per day. Implement deep subsurface and near-surface MVA of the stored CO_2.
- Develop and conduct an integrated communication, outreach, training, and education initiative.
- Demonstrate the cost advantages and economic viability of implementing CCS at ethanol production facilities.

PROJECT DESCRIPTION

The Illinois ICCS project will sequester industrial CO_2 in the Mt. Simon Sandstone, an extensive saline reservoir in the Illinois Basin with the capacity to store billions of tons of CO_2. Saline reservoirs are

layers of porous rock that are saturated with brine (a concentrated salt solution). Mt. Simon Sandstone is a clean sedimentary rock dominated by silicate minerals and lacking significant amounts of clay minerals (which typically clog pores and reduce porosity), resulting in highly favorable porosity and permeability features for CO_2 storage. Supercritical CO_2 fluid will be injected into the saline reservoir at a depth of approximately 7,000 feet at a site adjacent to the ADM ethanol plant. Nearly 50 years of successful natural gas storage in the Mt. Simon Sandstone indicates that this saline reservoir and overlying seals should safely contain the sequestered CO_2.

Carbon Dioxide Compression, Dehydration, and Transmission

The CO_2 will be collected at atmospheric pressure from ADM's corn-to-ethanol fermentors via a 36-inch pipeline. The fermentor outlet gas stream is a high purity CO_2 stream (greater than 99% purity on a moisture free basis), with water content less than 3% by weight. See Figure 1 for a simplified project flow diagram. This gas stream will be compressed and dehydrated to deliver supercritical CO_2 to the injection wellhead for storage. In this process the CO_2 will be compressed to 35 psia using a 3,000 hp gas blower and sent via a 24-inch, 1,500-foot pipeline to a dehydration and compression facility. At this facility, the CO_2 will be compressed and dehydrated to approximately 1425 psia and 95°F using a 3,250 hp, 4-stage reciprocating compressor and a dehydration system that uses tri-ethylene glycol contactor (absorber)-regenerator columns. The CO_2 gas stream is also processed through various inter-stage coolers and knock-out vessels to decrease temperature and to remove moisture, respectively. Finally, the dehydrated CO_2, which has less than 0.005% moisture by weight (>99.9% CO_2 purity), will be further compressed up to 2,300 psia using a 400 hp centrifugal booster pump and transported about one-mile through an 8-inch pipeline to the injection wellhead. The injection operations will be conducted on a 200-acre site adjacent to the ethanol plant, which is also owned by ADM. The injection wellhead conditions will comply with the permit requirements.

CO_2 Injection

The Illinois ICCS project will initially inject CO_2 into the Mt. Simon Sandstone at a rate of 1,500 metric tons per day. The IBDP will also inject CO_2 at a rate of 1,000 metric tons per day during this period. The Illinois ICCS project's injection rate can be increased up to 3,000 metric tons per day once the IBDP project completes injection operations in the fall of 2014. Each project will have a separate injection well and the distance between the two wells will be approximately 3,700 feet.

At the injection location, the top of the Mt. Simon Sandstone is at a depth of approximately 5,500 feet below the surface and has a thickness of 1,500 to 1,600 feet. The CO_2 will be injected into the lower Mt. Simon at a depth of about 7,000 feet where the IBDP project identified a high permeability zone with porosities up to 25%. Carbon dioxide injection will occur at depths far below the Underground Source of Drinking Water (USDW) level thus ensuring the safety of these water sources.

The Mt. Simon Sandstone is overlain by the 500-foot thick Eau Claire formation, of which the bottom 200 feet is primarily shale. The low-porosity Eau Claire Shale acts as the primary cap rock seal preventing upward migration of CO_2 from the Mt. Simon Sandstone. Two other shale formations, the Maquoketa Shale and the New Albany Shale, are present at shallower depths and act as secondary and tertiary seals, respectively. The base of the Mt. Simon Sandstone is underlain by Precambrian igneous bedrock (granite basement).

MVA of the Stored CO_2

The Illinois ICCS project will implement a robust MVA plan to monitor CO_2 migration and to protect groundwater sources. The MVA efforts will employ methods to provide an accurate accounting of the stored CO_2 and a high level of confidence that it will remain permanently stored deep underground. The MVA plan includes near surface and deep subsurface activities. Near surface monitoring includes aerial infrared imagery to monitor vegetative stress, an electrical resistivity survey of the soil to identify the

geophysical nature of the near surface bedrocks, soil CO_2 flux to monitor changes in CO_2 concentrations, and shallow groundwater sampling for geochemical analysis. The shallow groundwater geochemical analysis and monitoring may include evaluation of the following parameters: pH, specific conductance, temperature, dissolved oxygen, total dissolved CO_2, alkalinity, bromide, calcium, chloride, sodium, and total dissolved solids.

Deep subsurface monitoring includes geophysical (seismic) surveys and passive seismic surveys in the above cap rock seal locations and geophysical surveys, geochemical sampling, and pressure and temperature monitoring in the injection zone. A monitoring well (approximately 7,200 ft. depth) and a geophysical well (approximately 3,500 ft. depth) will be drilled for deep subsurface monitoring through direct and indirect measurements of the storage reservoir conditions.

A baseline 3-D surface seismic data acquisition was conducted in February 2011 over a period of 16 days. Under an agreement with Schlumberger Carbon Services, WesternGeco conducted a 3-D seismic survey of about four square miles area covering the project CO_2 storage site. The data analysis was performed by ISGS and Schlumberger Carbon Services and the data quality was found to be excellent. The seismic survey data analysis combined with well borehole data helped to determine the geologic lithology and heterogeneity. The data were used in the application of reservoir simulation model to improve certainty of geologic characterization around the injection site and to predict plume development and interactions. Figure 2 shows interpretation of a north (left of the diagram) to south seismic line. Overlaying IBDP project injection and monitoring well data indicates higher porosity areas of lower Mt. Simon Sandstone. Distinct layers of granite basement, lower Mt. Simon, top of Mt. Simon, and top of Eau Claire are identified in this seismic plot.

The geophysical analysis of the aforementioned 3-D seismic data did not indicate any seismically resolvable faults in the reservoir or in the cap rock seal at the proposed Illinois ICCS injection site. A lack of geologic faults offers greater certainty that the injected CO_2 will be stratigraphically trapped in the Mt. Simon Sandstone. Other trapping mechanisms such as solubility trapping (dissolution of CO_2 in the brine solution) and residual trapping (CO_2 held in the pores) could also securely retain approximately 50% of the injected CO_2 in the sandstone.

National Sequestration Education Center (NSEC)

Outreach activities in CCUS are an integral part of the Illinois ICCS project. The project team has developed and is conducting an integrated communication, outreach, training, and education initiative, which is engaging stakeholders in understanding CCUS and the Illinois ICCS project. Knowledge sharing and training in CCUS and related technologies are the prime objectives. These outreach activities are:

- Disseminating state-of-the-art and safe CCUS practices based on the demonstration of the industrial-scale, integrated CO_2 capture, transportation, storage, and MVA technologies in the Illinois ICCS project,
- Providing an opportunity to ask questions to improve understanding of the CCUS technologies,
- Engaging the general public to discuss concerns and to present the benefits of the CCUS technologies, and give a general overview of the CCUS technologies and MVA of stored CO_2. The project progress and results will be made available through websites, conference presentations, press releases, etc.
- Providing valuable information on the process, tools, and technologies needed to implement a large scale CCS project which can be shared with other developers.

Integral to the Illinois ICCS project will be the formation of an education and training facility, the National Sequestration Education Center (NSEC), housed at RCC in Decatur. The 15,000 sq. ft. center will contain classrooms, training and laboratory facilities. Richland shares the NSEC facilities with

project partners and other stakeholders for conducting CCUS training and educational programs. The project partners will be providing the necessary expertise to develop these programs.

As sequestration technologies continue to advance as an industry, the NSEC will provide associated economic development opportunities to local and regional communities. RCC has received additional funding from other sources to add renewable energy features, i.e., wind turbine, solar, geothermal, aerobic digestion, and biomass technology to NSEC. These renewable energy features will serve as student laboratories, and also offset the energy needs of the NSEC. The NSEC reflects a sustainability-oriented design and construction of this facility is scheduled to be completed in summer 2012.

RCC is implementing new associate degree programs with an emphasis on CCUS (i.e., Associate of Applied Science (AAS) in Engineering Technology with Sequestration specialty….and Associate of Science (AS) with Sequestration Concentration, a university transfer degree). RCC will begin offering the AAS degree program in fall 2012. RCC is in discussions with several universities in Illinois for connecting the sequestration degrees with appropriate four-year degree programs at these universities. Several universities in Illinois have already reviewed and accepted the Richland sequestration courses as electives in their degree program(s). This recognition will allow the students obtaining their 2-year degree from Richland to receive credits for the sequestration courses when they transfer to a 4-year degree program at these universities.

ABOUT PROJECT PARTNERS

- Archer Daniels Midland Company (ADM) global headquarters is located in Decatur, Illinois. Its more than 265 processing plants and 30,000 employees convert corn, oilseeds, wheat, and cocoa into products for food, animal feed, chemicals and energy uses. The net sales of ADM in fiscal year 2011 were $81 billion. www.adm.com
- Schlumberger Carbon Services provides technologies and services for the long-term geologic storage of CO_2. Experience and a detailed understanding of the varied challenges posed by CO_2 storage, gained by participation in many carbon capture and storage projects worldwide, is backed up by a corporate history of over 80 years in the oil and gas industry. www.slb.com/carbonservices
- Illinois State Geological Survey (ISGS) leads the MGSC and is part of the Prairie Research Institute at the University of Illinois, Urbana-Champaign, Illinois. The objective of the MGSC is to determine the technical and economic feasibility of using geologic formations for long-term CO_2 storage. IBDP is the work of the MGSC. www.sequestration.org.
- Richland Community College (RCC), located in Decatur, Illinois, features a main campus and four major extension sites and offers over 150 degrees and certificates. The college has established itself as a vital asset to the community during its 40-year presence in Decatur-Macon County region. http://www.richland.edu/
- National Energy Technology Laboratory (NETL) is owned and operated by the U.S. Department of Energy (DOE). NETL has expertise in coal, natural gas, and oil technologies, carbon capture, utilization, and storage, contract and project management, analysis of energy systems, and international energy issues. http://www.netl.doe.gov/

PROJECT IMPLEMENTATION ROLES

- ADM: Overall project implementation, project host site, construction, operation, and ownership.
- Schlumberger Carbon Services: Site characterization, reservoir modeling, design, construction, and operation of the CO_2 injection and monitoring wells, and the subsurface MVA of the stored CO_2.
- ISGS: Site characterization, USDW and near-surface monitoring, subsurface MVA of the stored CO_2, and education and outreach.
- RCC: National Sequestration Education Center development, CCUS training, community outreach, and development of an associate degree program in sequestration technology.

- NETL/DOE: Provides cost share and collaborates with the industrial team in project management and implementation.

ANTICIPATED OUTCOMES OF THE ILLINOIS ICCS PROJECT

The Illinois ICCS project is the largest saline storage demonstration project under construction in the U.S. This project demonstrates a cost-effective technology for the separation and capture of CO_2 for its transport and long-term safe storage in a saline reservoir. Successful demonstration of this project facilitates the deployment of such technologies through collaborative efforts that address important technical, economic, and environmental issues. This project will also promote awareness of carbon utilization and storage technologies through its outreach component. Specific project outcomes include:

- Demonstration of commercial-scale saline reservoir storage in the U.S. and cost-effective and safe processes and best practices for CCS and corresponding MVA.
- Validate the Mt. Simon Sandstone saline reservoir site for commercial-scale, long-term geologic storage of CO_2.
- Inject and permanently store up to two million metric tons of CO_2 in this project and monitor the impact on a nearby one-million metric ton plume.
- Collect crucial scientific and engineering data in advance of carbon capture requirements to add to the understanding of large-scale CO_2 storage in saline formations.

Specific advantages of the project include:

- Because all of the collected CO_2 is produced from biologic fermentation, a significant feature of the Illinois ICCS project is its "negative carbon footprint," meaning that the storage results in a net reduction of atmospheric CO_2. Additionally:
    - Carbon dioxide concentration in the collected stream is already high, which enhances project economics.
    - Project location is very near the CO_2 injection site, thereby avoids the expense of developing a lengthy pipeline.
- Successful implementation of this project could:
    - Facilitate exploration of long-term CO_2 utilization options, such as enhanced oil recovery and carbonate based chemicals production;
    - Develop a market for the CCS technology in the U.S. for some of the approximately 200 fuel grade ethanol plants that have access to geologic storage.
    - Develop a market for utilization of U.S. geologic saline storage capacity of CO_2 that is estimated to range from 1,700 to 20,000 billion metric tons.
- Demonstration of compression and dehydration technology, as well as CO_2 storage experience, is a public-benefit activity and is applicable to coal-fired power generation and other industries.
- The IBDP and Illinois ICCS projects will provide a unique opportunity to better understand the interaction between the CO_2 plumes and pressure fronts emanating from two injection wells in the same sandstone.
- Establish a National Sequestration Education Center to promote and to offer degree programs in carbon capture, utilization, and storage (CCUS).

PROJECT SCHEDULE AND STATUS

The Illinois ICCS project started in November 2009 and the project definition phase was completed in September 2010. Construction was initiated in May 2011and substantial detailed design of CCS was completed in December 2011. A significant portion of the civil and structural construction work was completed for the following five facilities that house compressors and dehydration equipment, compressor motor control center, compressor switchgear, blower, and blower motor control center.

NSEC construction will be completed in summer 2012. Figure 3 shows some construction photos. All long lead equipment was ordered and will be received by September 2012. Installation of equipment was

initiated (e.g., compressor building bridge crane was installed and three transformers were set on foundation pads in January 2012.) The heat exchangers for stages 1 to 3 of the four compressors were installed in February 2012. Three 400-hp booster pumps were received in March 2012. Construction of the electrical infrastructure to provide power for the facility has been initiated.

U.S. Environmental Protection Agency (EPA) Region 5 is reviewing ADM's application for injection well permit approval, i.e., Underground Injection Control (UIC) permit to construct and to operate the ICCS (or CCS#2, IBDP being CCS#1) Class VI injection well for the purpose of geologic sequestration of CO_2. The planned start date for the operation phase is July 2013. Initially the project plans to operate at an injection rate of 640,000 tons/yr, and achieve the target injection rate of 1,000,000 tons/yr in fall 2014 when IBDP completes its operations. Project completion date for the DOE funding period is September 30, 2015.

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DISCLAIMER

LIST OF ABBREVIATIONS

AAS	Associate of Applied Science
ADM	Archer Daniels Midland Company
ARRA	American Recovery and Reinvestment Act of 2009
AS	Associate of Science
CCS	Carbon Capture and Storage
CCUS	Carbon Capture, Utilization, and Storage
IBDP	Illinois Basin-Decatur Project
ICCS	Industrial Carbon Capture and Storage
ISGS	Illinois State Geological Survey
MGSC	Midwest Geological Sequestration Consortium
MVA	Monitoring, Verification, and Accounting
NETL	National Energy Technology Laboratory
NSEC	National Sequestration Education Center
RCC	Richland Community College
USDOE	U.S. Department of Energy
USDW	Underground Source of Drinking Water
USEPA	U.S. Environmental Protection Agency

FIGURE 1

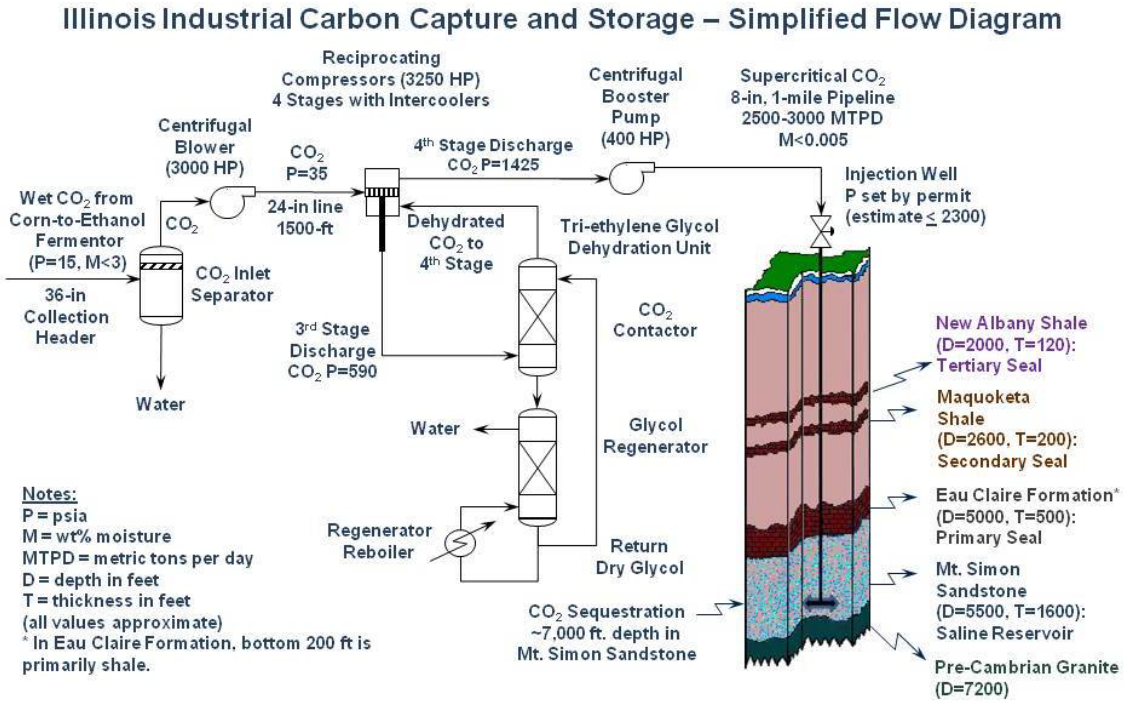
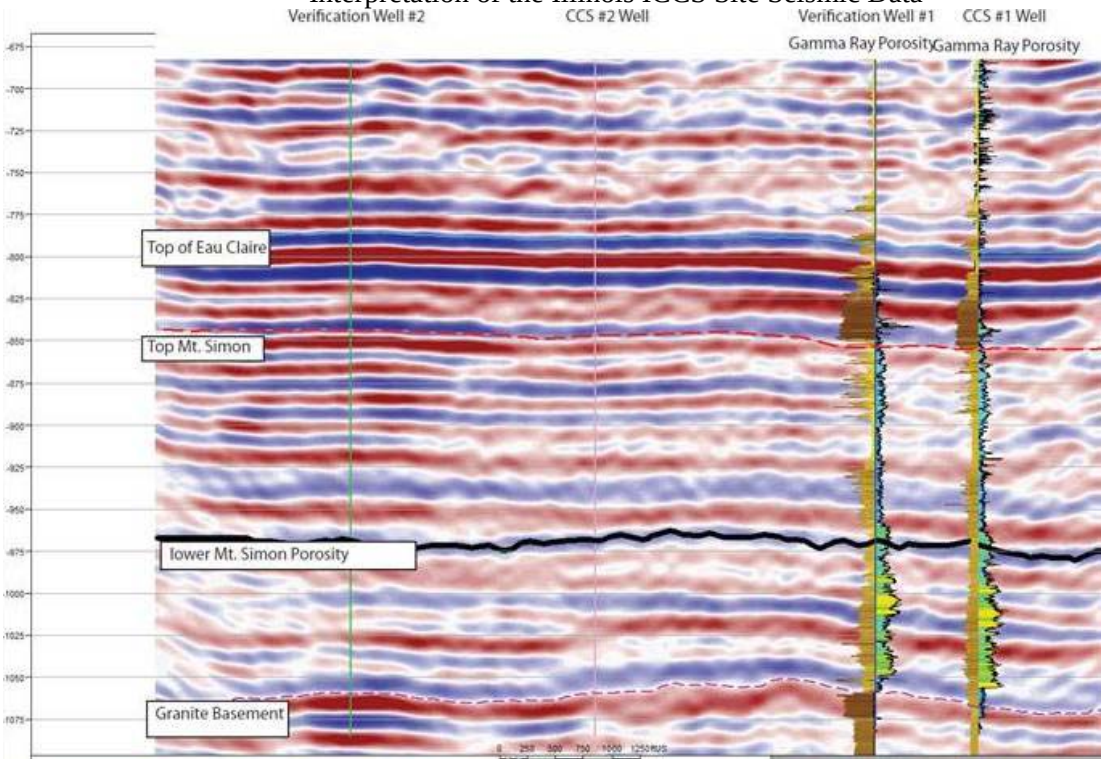


FIGURE 2

Interpretation of the Illinois ICCS Site Seismic Data



(Seismic results - Courtesy of ISGS and Schlumberger Carbon Services)

FIGURE 3. Illinois ICCS Project Construction Photos (March 2012)

Masonry completed – Switchgear building 	Compressor building 
Compressor –View of first stage 	Installation of compressor inter-stage piping 
Drilling of groundwater monitoring well 	National Sequestration Education Center (NSEC) at Richland Community College, Decatur, Illinois 

(Construction photos: Courtesy of ADM, RCC, and ISGS)