

**ENHANCED COAL BED METHANE PRODUCTION AND  
SEQUESTRATION OF CO<sub>2</sub> IN UNMINEABLE COAL SEAMS**

**Semi-Annual Technical Progress Report  
April 1, 2002 through September 30, 2002**

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## **ABSTRACT**

This is the second semi-annual Technical Progress report under the subject agreement. During this report period, progress was made in completing the environmental assessment report, securing land and coal rights, and evaluating drilling strategies. These aspects of the project are discussed in detail in this report.

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## INTRODUCTION

The availability of clean, affordable energy is essential for the prosperity and security of the United States and the world in the 21<sup>st</sup> century. Carbon dioxide (CO<sub>2</sub>) emissions to the atmosphere are an inherent part of energy-related activities, such as electricity generation, transportation, and building systems. These energy-related activities are responsible for roughly 85% of the U.S. greenhouse gas emissions, and 95% of these emissions are dominated by CO<sub>2</sub>.<sup>(1)</sup> Over the last few decades, an increased concentration of CO<sub>2</sub> in the earth's atmosphere has been observed. Many scientists believe greenhouse gases, particularly CO<sub>2</sub>, trap heat in the earth's atmosphere. Carbon sequestration technology offers an approach to redirect CO<sub>2</sub> emissions into sinks (e.g., geologic formations, oceans, soils, and vegetation) and potentially stabilize future atmospheric CO<sub>2</sub> levels. Coal seams are attractive CO<sub>2</sub> sequestration sinks, due to their abundance and proximity to electricity-generation facilities. The recovery of marketable coal bed methane (CBM) provides a value-added stream, reducing the cost to sequester CO<sub>2</sub> gas. Much research is needed to evaluate this technology in terms of CO<sub>2</sub> storage capacity, sequestration stability, commercial feasibility and overall economics.

CONSOL Energy, with support from the U.S. DOE, is conducting a seven-year program to construct and operate a coal bed sequestration site composed of a series of horizontally drilled wells that originate at the surface and extend through overlying coal seams in the subsurface. Once completed, the wells will be used to initially drain CBM from both the upper (mineable) and lower (unmineable) coal seams. After sufficient depletion of the reservoir, centrally located wells in the lower coal seam will be converted from CBM drainage wells to CO<sub>2</sub> injection ports. CO<sub>2</sub> will be measured and injected into the lower unmineable coal seam while CBM continues to drain from both seams. In addition to metering all injected CO<sub>2</sub> and CBM produced, the program includes a plan to monitor horizontal migration of CO<sub>2</sub> within the lower seam.

This is the second Technical Progress report for the project. Progress to date has been focused on pre-construction activities; in particular, attaining site approvals and securing property rights for the project. This report provides a concise overview of project activity this period and plans for future work.

## EXPERIMENTAL

A well site has not yet been constructed; therefore no experimental work has begun.

## **RESULTS AND DISCUSSION**

### **STATUS OF COOPERATIVE AGREEMENT**

Quarterly project status reports (DOE F 4600.6) were issued to DOE on April 23 and July 12, as required. CONSOL met with David Hyman, DOE's Contracting Officer's Representative for the project, on May 16 and August 28 to review current progress and discuss future plans.

### **CORRESPONDENCE WITH NETL**

An NETL letter dated February 19, 2002, posed five questions concerning the integrity of the interburden with regard to future mining activities. CONSOL issued a formal response to NETL on April 23.

### **PROGRESS ON ENVIRONMENTAL ASSESSMENT**

In response to DOE feedback, CONSOL compiled additional quantitative information for the environmental assessment draft. The information was emailed to NETL on May 17. On August 30, NETL advised CONSOL that additional input was requested by two agencies. Specifically, the West Virginia Division of Culture and History (WVDCH) required both a topographical map depicting the project area and ground level photographs to complete their review. In addition, the U.S. Fish and Wildlife Service (USFWS) requested a survey of the project area that focused on two endangered species. A topographical map and ground level photographs were prepared and issued to the WVDCH on September 13. A survey of the project area was conducted on September 10 and the findings were issued to the USFWS on September 26. CONSOL awaits final NEPA approval (*Finding of No Significant Impact*) of the environmental assessment report so that project groundbreaking activities can commence.

### **PROGRESS ON LAND ISSUES**

CNX Land completed land use agreements with three separate land owners. These agreements will enable CONSOL to proceed with the surface construction activities necessary for the project. In July, CNX Land filed a partition suit at the Marshall County courthouse in Moundsville, West Virginia. The suit was necessary to secure subsurface coal rights that were partitioned through multiple heirships. A hearing date was set for September 13. At the hearing, a court ruling awarded the outstanding coal rights to CONSOL. Subsequently, all surface and subsurface property rights necessary for the three project well locations have been secured.

### **PROGRESS ON DRILLING STRATEGY**

Separately from this project, CNX Gas completed horizontal drilling at a well site in May. This well was completed with the alternative sump design mentioned in the last report. Over the past four months, the new sump design has proven to be very effective at removing water from the subsurface. While dewatering and evaluation continue at this site, CNX Gas plans to complete two additional horizontal wells using the same design. The new CNX Gas wells are scheduled for completion in November. At present, CNX Gas recommends the same approach for the DOE project wells.

## **PROGRESS ON WELL PERMITS**

Prior to commencing any drilling activity in West Virginia, a well permit application must be prepared and approved by the West Virginia Department of Environmental Protection (WVDEP). CNX Gas solicited bids and selected a contractor to perform the required engineering services to obtain the necessary well permits. In August, CNX Gas contracted CME Engineering, Inc. of Somerset, Pennsylvania, to prepare permit applications for the proposed DOE project wells in Marshall County. CME was instructed to initially focus on the four wells that compose the north corner of the DOE project. WVDEP approval for these four well permits is expected in late October.

## **CONFERENCES**

Gary Cairns and Shiaw Tseng attended a forum relevant to the project in Washington, Pennsylvania, on April 25. The forum was entitled "North American Coalbed Methane Forum – Spring 2002 Session".

## **CONCLUSION**

CONSOL has provided NETL with additional input required to finalize the environmental assessment report. Commencement of project construction activities is contingent upon final NEPA approval of the environmental assessment report. CNX Land has secured both surface and subsurface property rights needed for the selected locations of the project. CNX Gas has demonstrated the dewatering capabilities of the alternative sump design. Consequently, the alternative sump design is recommended for the DOE project wells. CNX Gas has engaged a contractor to prepare well permit applications for the project wells.

Site preparation and drilling of four (4) wells is projected to begin following NEPA approval. These construction activities are seasonal and cannot be conducted during winter weather. An extended delay in achieving NEPA approval for the project will postpone construction activity until next spring.

## **REFERENCES**

- (1) U.S. Environmental Protection Agency, *2000 Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1998*, EPA 236-R-00-001, April 2000.