

Creating Opportunity

October 16, 2008

Field tests of carbon capture and storage to begin

Edmonton... Three test wells will soon be drilled for a ground-breaking, long-term, large-volume CO₂ sequestration project in Alberta. The Government of Alberta, through the Alberta Energy Research Institute (AERI), is providing \$6.6 million in funding for the three-year \$20-million project near Shell Canada's Scotford facility. Information from the field tests will support Alberta's Climate Change Strategy.

"We're taking the technology to the field to demonstrate CO₂ storage in different kinds of geological formations," said Advanced Education and Technology Minister Doug Horner. "It's very exciting to take this important step on the road to commercializing technologies that improve environmental practices in Alberta, open new markets for clean technology and help address the world-wide challenge of climate change."

The wells will examine the CO₂ injection capability and storage capacity in formations deep beneath the surface. The field test phase is expected to be completed by June 2010. This \$6.6 million investment by AERI will expand the knowledge base of the geologic formations in Alberta that are well suited for carbon sequestration. The funding is separate from Alberta's \$2 billion carbon capture and sequestration fund, which will support 3-5 commercial-scale projects that will reduce carbon emissions in the province by up to five million tonnes annually by 2015.

"We're backing up our commitment to pursue these technologies. Alberta's strategically investing in the science and technology needed to find global environmental and energy solutions," said Horner. "This research project is right on track with Alberta's Climate Change Strategy."

The United Nations Intergovernmental Panel on Climate Change and the International Energy Agency have recognized CCS as a safe, viable climate change solution.

The Government of Alberta through AERI and other publicly-funded research and innovation organizations, moves new technologies forward through partnerships with industry and post-secondary institutions in priority areas for the benefit of Albertans and world markets. AERI advises the Minister of Advanced Education and Technology on energy research and innovation and supports applied research to secure the future sustainability of Alberta's diverse energy resources.

For more information on Alberta's Climate Change Strategy please visit www.environment.alberta.ca.

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Examples of Alberta's ongoing leadership in carbon capture and storage initiatives

The Government of Alberta, through the Alberta Energy Research Institute (AERI), has provided funding to a number of carbon capture and storage research initiatives to help reduce emissions and encourage the necessary investment from industry to make commercial-scale carbon capture and storage viable in Alberta.

CO2 Sequestration in Deep Geologic Formations in Alberta

Research Organization: Shell Canada, AERI

Objective of Project: Deep saline geologic formations are attractive candidates for long-term, large-volume CO2 sequestration. This project will address CO2 injectivity and storage capacity into a deep saline formation on the Precambrian platform of the Western Canada Sedimentary Basin.

Expected Outcomes: Positive results could lead to a commercial-scale project that would store one million tonnes plus of CO2 per year, over the life of the Shell Scotford upgrader.

Weyburn-Midale CO2 Project

Research Organizations: Petroleum Technology Research Centre, Alberta Research Council, University of Alberta, University of Calgary, AERI and others

Objective of Project: The objective is to compile a Best Practices Manual to guide all aspects of future CO2 storage projects including:

- **Technical Components:** Site characterization, monitoring and verification, wellbore integrity and performance assessment
- **Policy Components:** Regulatory issues, public communication and outreach and the business environment

Expected Outcomes: To deliver the framework necessary to encourage implementation of CO2 geological storage on a worldwide basis.

CO2 Storage, Monitoring and Verification Program

Research Organizations: Penn West, Alberta Research Council, University of Alberta, University of Calgary, Alberta Geological Survey, AERI

Objective of Project: Research is focused on mapping and assessing the condition of the existing wells and the geology and hydrogeology of the reservoir.

Expected Outcomes: There is a huge potential for expansion of safe, long-term CO2 storage to the entire Pembina Cardium field, the largest oil field in North America.

Long Lake CO2 Capture Initiative

Research Organization: OPTI Canada Inc., Nexen Inc., AERI

Objective of Project: The objective is to implement the capture and storage of CO2 from the Opti-Nexen Long Lake project.

Expected Outcomes: The capture and storage of a significant portion of CO2 emissions at the commercial Opti-Nexen Long Lake project in northern Alberta.

Reducing Emissions from Oil Sands Upgrading: The Redwater Opportunity - also known as the Heartland Area Redwater Project (HARP).

Research Organizations: Alberta Research Council, ARC Resources, AERI

Objective of Project: The Alberta Research Council (ARC) and ARC Resources Ltd. (ARCRL) proposed the initial development of the aquifer portion of the Redwater Reef as a CO₂ storage site. Given the proximity of existing and proposed upgraders, refineries and chemical plants, this represents a significant opportunity to demonstrate the geological storage of carbon dioxide.

Expected Outcomes: This could be one of the first successful demonstrations of the large-scale geological storage of CO₂ in deep saline aquifers in Canada, and may result in several commercial projects.

Alberta Saline Aquifer Project (ASAP) Phase I Research

Research Organizations: Enbridge, engineering consultants, AERI

Objective of Project: This is the first phase in a three-phase initiative leading to the commercial use of CO₂ sequestration in deep saline aquifers in Alberta to reduce CO₂ emissions. The objective is to identify and prioritize three or more suitable deep saline aquifer locations for a pilot or pilots program to demonstrate the feasibility of CO₂ sequestration in Alberta.

Expected Outcomes: Positive results would move the project to a demonstration phase and then to commercial storage operations.

Wabamun Area CO₂ Sequestration Project (WASP)

Research Organizations: University of Calgary, TransAlta, engineering consultants, AERI

Objective of Project: The objective of this research project is to study available subsurface data provided through wells that were drilled in the Wabamun area. Geophysical seismic data and aerial magnetic data are also being studied to provide a three dimensional understanding of the nature of the sandstones, shales, salts, and carbonate formations underlying the study area.

Expected Outcomes: The Wabamun area was selected based on the presence of several large stationary CO₂ emitters in the area.

Incremental Recovery and CO₂ Storage Potential in Alberta

Research Organizations: Alberta Research Council, Computer Modelling Group, Divestco Inc., Silvertip Ventures, SNC Lavalin Inc., Sproule Associates Limited, AERI

Objective of Project: Previous estimates of CO₂ Capture and Storage (CCS) potential in Alberta have been based on reservoir screening criteria, rather than on detailed reservoir technical and economic evaluation. In order to get more accurate estimates of this potential and to accelerate CCS activities in Alberta, the objective of this project is to study representative pools in detail to predict the incremental oil recovery and CO₂ storage in the pool.

Expected Outcomes: Accurate estimates of CO₂-EOR and geological CO₂ storage potential in Alberta and acceleration of CCS demonstration plants and field pilots in Alberta (both EOR and non-EOR).

Cost estimate for supply of CO₂ in the Fort Saskatchewan area

Research Organizations: Petroleum Technology Alliance Canada (PTAC), SNC Lavalin, AERI

Objective of Project: High-to-medium quality CO₂ is available at refineries, upgraders and other facilities being proposed for the Fort Saskatchewan area. While the CO₂ available at each facility may not be sufficient to support commercial-scale enhanced recovery of conventional oil in Alberta, a centralized collection system would ensure a long-term, risk-free CO₂ supply that would facilitate enhanced hydrocarbon recovery in Alberta.

Expected Outcomes: The expected outcome is that the above-mentioned and other high-to-medium

CO2 suppliers collaborate to build such a centralized facility.

International Test Centre for CO2 Capture

Research Organization: University of Regina, AERI

Objective of Project: To develop the "world's best" CO2 mitigation technologies in select areas through research, development, and demonstration. The aim of the project is to develop technologies that will help Canada meet CO2 emission reduction targets and potentially allow export of such technologies.

Expected Outcomes: The project is expected to reduce the cost of CO2 capture by 50% compared to current systems.

Advanced Hydrogen and CO2 Capture Technology for Sour Syngas

Research Organization: Air Products and Chemicals Inc., AERI

Objective of Project: Technical and economic assessment of a new CO2 capture technology to be used in conjunction with gasification processes. The project will assess technical and economic feasibility of the conceptual commercial plant.

Expected Outcomes: The project is expected to reduce the cost of CO2 capture by over 25% compared to current systems, thus making CO2 capture a more attractive option for operators of gasifiers and similar systems which produce large volumes of CO2 emissions.

What is carbon capture and storage?

Carbon capture and storage (CCS) is a process that captures carbon dioxide (CO2) emissions and stores them in geological formations deep inside the earth. CO2 contributes to greenhouse gas emissions, the bulk of which come from the production and use of fossil fuels - coal, oil and gas - as well as electricity generation. CCS also has the potential to reduce emissions from Alberta's value-added and manufacturing industries, such as petrochemical development.

How does the current AERI-Shell project differ from other carbon capture and storage initiatives announced in the past?

CO2-Enhanced Oil Recovery (EOR) field pilots have been supported through the government's royalty credit program since 2004. These initiatives have also been supported by ARC Resources and the Alberta Research Council, the University of Calgary and TransAlta, and Enbridge. These studies are at the geological characterization and engineering design phase. The next phase would proceed to a point where CO2 would be injected into the ground and help define the CO2 storage capacities at these sites.

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