Kentucky Consortium for Carbon Storage

CO₂ EOR/EGR Focus Group

January 11, 2008

Warren Anderson          John Hickman
Rick Bowersox            Mike Lynch
Jim Cobb                 Brandon Nuttall
Steve Greb               Marty Parris
Jim Drahovzal            Mike Solis
Cortland Eble            Kathy Takacs
Dave Harris              Dave Williams
Focus Group Meetings

- Initial consortium meeting on Dec. 7, 2007
- Over 100 in attendance
- Expressed desire to organize overall project by geographic area and project type
- 3 focus groups meeting this week:
  - Wednesday: Western Kentucky deep CO₂ storage
  - Thursday: Eastern Kentucky deep CO₂ storage
  - Friday: Enhanced oil and gas recovery
Outline

- HB 1 funding and directives
- Kentucky Consortium for Carbon Storage
- Vision and expected results
- Project organization and structure
- Preliminary budget development
- Discussion and questions
Kentucky HB 1 was passed in a 2007 special session and signed into law August 30.

Provides financial incentives for coal gasification plants

Provides $5 million for carbon sequestration research in Kentucky

“The Kentucky Geological Survey is encouraged to use these funds to match available federal and private funds to the extent possible.”
2007 HB 1 Directives

- Quantify the potential for:
  - Enhanced oil and gas recovery
  - Enhanced coalbed methane recovery
- Test the Devonian shale for CO$_2$ enhanced gas recovery and CO$_2$ sequestration potential
- Drilling of deep wells in the eastern and western coal fields to estimate sequestration potential
Vision

- $5 million is not sufficient to accomplish everything in HB 1
- A joint industry-government consortium is the only way to achieve these objectives
- The Kentucky Consortium for Carbon Storage (KYCCS) has been formed by KGS
Consortium Model

- **Industry involvement is necessary for the success of this project**
  - Cost sharing and well access
  - Guidance and direction of research
  - Provide expertise not available at KGS
  - Justification of the Commonwealth’s investment in carbon management research
Today’s Goals

**Morning**
- Identify likely members of the CO₂ EOR/EGR project
- Create a Project Advisory Committee and define its responsibilities
- Discuss and agree on funding structure, funding levels, deadline for participation, other concerns

**Afternoon**
- Present our initial technical approach
- Discuss preliminary budget??
HB 1 Research Organization:
3 Subprojects

- Western Kentucky Deep Sequestration
  - Rick Bowersox and Dave Williams

- Eastern Kentucky Deep Sequestration
  - Steve Greb and Warren Anderson

- CO$_2$ EGR/EOR
  - Devonian shale CO$_2$ EGR, Brandon Nuttall
  - CO$_2$ EOR, Marty Parris
  - Enhanced coalbed methane production, Cortland Eble

- Public Education and Outreach
  - Mike Lynch
Subproject Integration

- Subprojects will run concurrently
- Communication between teams important
- Efforts will be made to coordinate work schedules and contracts to extent possible for cost savings
  - Seismic acquisition, drilling, logging
EOR/EGR Project Goals

Demonstrate CO$_2$ EOR technology and applications in Kentucky reservoirs.

Test novel EGR concepts in the Devonian black shale.

Refine estimates of CO$_2$ that could realistically be used for EOR/EGR in Kentucky.
Impact of Results

- Kentucky oil and gas fields vary in suitability for CO$_2$ EOR/EGR
- Demonstration sites will be as representative as possible, however, a successful project will not prove that CO$_2$ EOR/EGR will work everywhere
- We cannot guarantee success – there is risk involved
Project Structure

- Industry cost-share to be administered separately by subproject
- University of Kentucky Research Foundation (UKRF) is a not-for-profit 501(c)(3) corporation
- This existing legal structure should suffice for tax benefits to contributors
- Maximum tax benefits may be realized through a gift mechanism, but this would preclude direct benefit or involvement in project decisions
Another Option

- The western Kentucky group has decided to form a separate 501(c)(3) corporation to handle the industry cost share funds. Advantages include:
  - Liability protection
  - Avoid university overhead fees
  - More control/governance on industry money
Project Advisory Committees (PACs)

- Separate advisory committees proposed for 3 subprojects
- Equal representation from major participating companies, the Commonwealth, and KGS
- Advisory committee responsibilities:
  - Major project decision points
  - Major expenditures
  - Main contact point for communications
  - Technical support, guidance, and oversight
PAC

- HB 1 mandates that KGS lead the technical effort with input and collaboration from partners.
- KGS to evaluate sites and develop objectives based on technical merit.
- KGS will present major project decisions to PAC for agreement on significant expenditures.
Liability of Sponsors

- **Sponsor liability for university research:**
  - UK cannot indemnify sponsors, but we know of no case where a sponsor has been held liable for research activity.
  - UK legal counsel is currently looking into this.

- **Liability related to injected CO$_2$ is a concern in all CO$_2$ projects (like FutureGen):**
  - This project will involve small volumes of CO$_2$.
  - Will follow lead established by DOE demonstration projects.
  - Liability insurance could be explored.
Confidentiality

- Data and results of project to be published
  - No confidentiality
- Confidential data provided by consortium members to aid in field or site evaluation will be held confidential within the consortium
Probable Participants

CO$_2$ EOR/EGR

- Commonwealth of Kentucky
  - Portion of $5,000,000 total funding (to be determined)

- E.ON U.S.
  - Financial support for entire project (priority is W. Kentucky deep storage)

- Schlumberger Carbon Services
  - Consulting services, discounted logging and well services, Petrel and ECLIPSE software donation

- Case Drilling Co.
  - EOR western Kentucky
Probable Participants

**CO₂ EOR/EGR**

- Perry County Coal (TECO)
  - Devonian shale wells for EGR
- Hard Rock Drilling Co.
  - Interested in EOR/EGR in western Kentucky
- Travell Energy, Bowling Green
  - Warren County oil leases for EOR
- Interstate Natural Gas
  - Engineering services, oil wells, Devonian Shale wells
Pending Participants

CO\textsubscript{2} EOR/EGR

- Chesapeake Energy
  - Possible EOR/EGR project
- Cumberland Valley Resources LLC
  - EOR projects
- Pike County
  - Proposal for EGR/EOR
- Miller Energy/Bretagne
  - Probable EOR work in eastern or western Ky.
Federal Cost Share

- No federal dollars identified yet for CO$_2$ EOR/EGR projects
- Appalachian Basin DOE CO$_2$ partnership (Battelle) a possibility
- DOE/NETL (Morgantown) will be issuing a RFP for CO$_2$ EOR projects in the near future
Project Schedule

- Overall HB 1 project to take 3-4 years
- EOR/EGR projects will vary in timing, but we need to identify candidates ASAP
- Need to allow time to see meaningful results
Discussion Points

- Project Advisory Committees
- Liability concerns
- Project schedule
  - Organization and participation deadline
  - Technical milestones
- Identification of additional participants
- Budget
  - Financial contributions: equal shares or variable?
While CO$_2$ EOR potential is significant, deep saline or Devonian shale storage will be needed to handle expected volumes.
What’s Next?

- Participation decisions requested by Jan. 15
  - Consortium will remain open after that date
- We expect the level of industry funding will vary
- In-kind participation is welcomed
- A company’s participation and funding level cannot be held confidential
- Project results to released immediately
# Proposed Program Budget

## CO\textsubscript{2} EOR/EGR Subproject

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