

**HB 1 Carbon Storage Research  
Kentucky Consortium for Carbon Storage**

**Contract PO2-855-0700011517**

**Progress Report for the Quarter Ending September 30, 2008  
Submitted to the Kentucky Energy and Environment Cabinet**

Kentucky Geological Survey  
James C. Cobb, Director and State Geologist  
University of Kentucky

David C. Harris, Principal Investigator  
October 23, 2008

**KYCCS.ORG**



## Major Accomplishments during the Quarter

- Activity continued during the quarter on all 4 of the subprojects setup to perform the research mandated by HB 1 (2007), Western and Eastern Kentucky deep CO<sub>2</sub> storage, CO<sub>2</sub> enhanced oil recovery, and CO<sub>2</sub> enhanced gas recovery (Devonian Shale).
- Significant progress was made on the Western Kentucky deep CO<sub>2</sub> storage test project. The advisory group for this project met twice during the quarter in Lexington. Members of the group also traveled to Atlanta to meet with US EPA Region IV officials to discuss the pending submittal of the Class V underground injection control permit application.
- The Tennessee Valley Authority (TVA) joined the Western Kentucky Carbon Storage Foundation as a funding member in September.
- A contract with Sandia Technologies of Houston, Texas was signed in July for project management, permitting, well design, drilling supervision, bidding, and procurement services for the Hancock County well.
- A contract was awarded to WesternGeco, Houston, Texas for seismic acquisition around the Hancock County well site. Contract negotiations were in progress at the end of the quarter.
- A property access and drilling agreement was written and signed between KGS and the surface property owner at the Hancock County well site. A separate agreement for injection rights and data sharing was written and signed with the mineral lessee. These agreements complete the legal agreements required to drill the well.
- Advanced well logs and rotary sidewall cores in the Devonian black shale from a well in Pike County were obtained in early July. These data will help to evaluate the Devonian Shale near a proposed CO<sub>2</sub> injection site in the shale at Burke Branch, Pike County.

Details of activity during the quarter pertaining to each of the subprojects follow.

## **Western Kentucky Deep CO<sub>2</sub> Storage**

Lead Geologists:

Rick Bowersox and Dave Williams

### **KYCCS-WKY – Summary of 3<sup>rd</sup> Quarter 2008 Activities**

#### **Advisory Committee Meetings Highlights:**

- Two project advisory group meetings were held during the quarter in Lexington. Agendas and summaries of the meetings are included in the Appendix.
- A proposal for \$250,000 in funding for the Hancock County well was submitted to the Illinois Office of Coal Development in July. No decision had been made on this grant at the end of the quarter.
- The Phase I environmental assessment of the Hancock County drill site was completed and the report submitted in September. The report indicated no existing environmental problems at the site.
- Shallow high-resolution reflection seismic data were acquired around the Hancock County drill site. This work was done by Dr. Ed Woolery and students from the University of Kentucky Department of Earth and Environmental Sciences. This shallow seismic data was collected to check for caves and other shallow hazards that could pose a problem for drilling.
- Contracts were awarded for project management and deep seismic data acquisition. Sandia Technologies of Houston will provide project management, well and testing design, drilling bidding and procurement, and well site supervision for the Hancock County well. Seismic data will be acquired by WesternGeco of Houston. After lengthy negotiations, this contract was signed in mid-October. Work should begin immediately.
- Most of the effort this quarter was directed toward preparation of the application to US EPA, Region IV for a Class V injection permit. This is a large volume and responsibilities were divided between KGS, Sandia and ConocoPhillips. KGS staff wrote summaries and provided data for the geologic, oil and gas, and hydrologic parts of the proposal. Sandia was compiling the final version at the end of the quarter, with submission to EPA on October 21.
- Rick Bowersox and Dave Williams attended a meeting at EPA's office in Atlanta to present the drilling project to their staff and discuss requirements for the permit application. EPA staff has indicated a 90-day turnaround on the permit application once submitted.

**Project Administration:**

1. Work continued on preparing the application for the State drilling permit. The well location was surveyed. Staff investigated various ways to secure the necessary bond (\$10,000) from the University. In the end, the UK Risk Management office met the bonding requirements with an insurance policy.
2. The Subsurface Lease, Right of Way and Easement and Fluid Injection Test Well Agreement and Memorandum of Understanding with Marvin L. and Brenda Mae Blan was executed on July 31<sup>st</sup>. Negotiation and execution of the Grant of Subsurface Easement and Memorandum of Understanding with the oil and gas leaseholder controlling the test well site was completed on October 1<sup>st</sup>. These documents secured the wellsite and subsurface access for the drilling and completion of the test well. The two grants of easement were submitted to the Hancock County Clerk for recording on October 23<sup>rd</sup>.
3. Title search for the first tract of the Blan property was completed and revealed no problems. Title work on a second, less important tract was pending completion at the end of the quarter. This work was completed in mid-October and likewise showed clear title to the subject property.
4. The wellsite was surveyed and location plat prepared for permitting the test well with the Kentucky Division of Oil and Gas Conservation.
5. Soil gas monitoring on the Blan property was begun in September. This work will collect background levels of CO<sub>2</sub> and methane prior to drilling and injection to allow detection of leakage of CO<sub>2</sub> post-injection.
6. The second public information meeting for local residents was scheduled for Oct. 27 in Hawesville.
7. TVA joined the Western Kentucky Carbon Storage Foundation in September with a commitment of \$50,000 in funding.

**Presentations:**

1. Technical review of the planned drilling program and well design was presented at the EPA office in Atlanta on August 12. Nine members of the EPA Region 4 staff were in attendance as well as an EPA attorney in Washington DC by teleconference, and representatives of the project manager Sandia Technologies and industry partner ConocoPhillips.
2. Rick Bowersox presented a review of the HB-1 project at the Kentucky Oil and Gas Association meeting in Louisville on July 1<sup>st</sup>.
3. Jim Cobb and Dave Harris presented an update on the HB 1 project to the Kentucky Legislature's Interim Subcommittee on Energy on July 18 in Frankfort.
4. Jim Cobb and Dave Harris presented an update on the HB 1 project to the Kentucky Legislature's Appropriations and Revenue Committee on September 22 in Frankfort.

Agendas, meeting summaries, and other details of the western project's activity can be found in the Appendix and on the project web site ([www.kyccs.org](http://www.kyccs.org)).

**Kentucky Consortium for Carbon Storage  
Western Kentucky Deep Saline Project Industry Partners**

**Funding Partners**

ConocoPhillips  
E.ON U.S. LLC  
Kentucky Syngas, LLC  
Kentucky Geological Survey, University of Kentucky  
Kentucky Governor's Office of Energy Policy  
Smith Management Group  
State of Illinois Office of Coal Development (pending)  
Schlumberger Carbon Services  
Tennessee Valley Authority

**Associate Partners**

Big Rivers Electric Corp.  
GEO Consultants, LLC  
Henderson County Riverport Authority  
ICON Construction, Inc.  
Praxair Inc.  
Sunshine Oil and Gas  
University of Kentucky Center for Applied Energy Research  
URS Corp.

**Pending Participation**

Duke Energy

## **Eastern Kentucky Deep CO<sub>2</sub> Storage**

Lead Geologists:

Steve Greb and Warren Anderson

Triana Energy drilled 3 deep wells in Clark County that had reservoir properties and depth suitable for testing CO<sub>2</sub> injection. Although not located in the Eastern Kentucky Coal Field, the geology of these wells was similar to areas farther east. Discussions were continuing with Triana personnel concerning use of the wells in this research, but we learned in August that the wells had been plugged by Triana without our knowledge. Apparently other issues involving partners led to the need to plug the holes without participation in CO<sub>2</sub> storage research. Although KYCCS could attempt to re-enter one of these wells, a new agreement with the surface owner would need to be written. Based on discussions with Triana, at least one of the surface owners is not very receptive to continuing activity on this property. Although we are not completely abandoning the possibility of using one of these wells, we are now actively considering options in other areas.

The Pine Mountain Regional Development Authority has offered the group a well in Bell County that could be deepened to the Knox for injection tests. We are currently waiting on cost estimates from the operator of the well for additional logging and coring to assess the feasibility of using that well. The well is located on the Pine Mountain thrust sheet and would be characteristic of that area.

KYCCS gave a series of presentations to Equitable Resources concerning CO<sub>2</sub> sequestration research in the Eastern Kentucky Coal Field. These included both the eastern deep saline and Devonian shale projects. KYCCS is in discussions with Equitable for collaborative research to test the Devonian black shale for enhanced gas recovery using CO<sub>2</sub>.

## **CO<sub>2</sub> Enhanced Oil and Gas Recovery**

Lead Geologists:

Brandon Nuttall and Marty Parris

### **Devonian Shale CO<sub>2</sub> Enhanced Natural Gas Recovery and Storage Project**

- Completed logging and rotary sidewall coring in the Blue Flame K-2605 Batten & Baird well, Pike County. Arranged for shale core analysis to be done by Chesapeake Energy in their Oklahoma City lab. Sent sidewall cores to Chesapeake for analysis.
- Negotiated split of expenses with Battelle Memorial Institute for the coring and logging costs.
- The total organic carbon (TOC) and Rock-Eval data from the Blue Flame K-2605 Batten & Baird core samples were received from Chesapeake and the data have been provided to Schlumberger to use as input for their Well Montage Shale Analysis
- There is very little publicly available Rock-Eval data so I'm working on gaining insights on interpreting the information and comparing the Blue Flame well with the Rosewood 2 Bargo well. There are some differences I don't yet understand.
- Received initial draft of processed ECS log from Schlumberger. Reviewed draft and discussed with Schlumberger log analyst. Provided Rosewood 2 Bargo well data to analyst for comparison and use in completing modeling for the Blue Flame K-2605 Batten & Baird well.
- KGS had a productive meeting with Equitable Resources in Pittsburgh, September 27. We discussed the overall project and goals of the House Bill 1 research. In particular, we discussed the eastern Kentucky deep saline test effort and the shale enhanced natural gas recovery/CO<sub>2</sub> storage research. Equitable's reservoir engineering group has been modeling the shale in conjunction with their program of horizontal drilling and I hope we can bring them on board.
- Initial contact made with Andreas Busch and Bernhard Krooss. These German researchers published a paper entitled *Carbon Dioxide Storage Potential of Shales* (Int'l. J. of GHGT, 2008) where they looked at CO<sub>2</sub> adsorption in shales with respect to reservoir seal efficiency. Their experimental equipment and techniques may provide insight on injectivity and enhanced gas production in shales.

### **CO<sub>2</sub> Enhanced Oil Recovery Project**

Discussions continued with Bernie Miller (Miller Energy Technology) and Scott Frailey (Illinois State Geological Survey) regarding a joint CO<sub>2</sub> EOR project. After plans for a project in the Euterpe field were shelved in June, attention shifted to the Sugar Creek field in Hopkins County. Illinois is in the process of modeling the CO<sub>2</sub> response at Sugar Creek before a decision is made.

Later in the quarter interest in a possible CO<sub>2</sub> EOR project at Euterpe was revived by Bernie Miller, and is now open for consideration again. We are hoping to make a decision on a joint project with the Illinois State Geological Survey by year-end.

Marty Parris, Dave Harris and Dave Williams met with several principals of Nally Oil on September 16 in Henderson. Nally has a deeper oil field in Union County that may be suitable for a CO<sub>2</sub> flood. The Caney Mound Field produces from the McCloskey C zone at about 2,550 ft. This field is of interest because CO<sub>2</sub> would be in a miscible phase, which results in complete solution with the oil and higher recovery factors. We are evaluating data from the field to determine feasibility. The field is in the Ohio River floodplain and flooding is a concern during parts of the year.

Two operators in eastern Kentucky were contacted again to explore interest in CO<sub>2</sub> EOR. Journey Oil owns several deep Big Lime fields in Letcher, Leslie and Perry Counties. They are currently trying to sell these properties and are unable to commit to a project at this point. Related to the Big Lime oil fields in Leslie, Letcher and Perry Counties, we were able to obtain 9 core analyses and technical reports for these fields from Equitable Resources, the original owner. These reports were released to us for use in the project and will be important data for evaluation of these fields.

Cumberland Valley Resources owns shallow oil production in Magoffin County. This company is interested in discussing a possible project, and we are currently waiting on a list of leases and wells to evaluate.

To summarize, we are considering 3 possible enhanced oil recovery projects in western Kentucky, and 2 projects in eastern Kentucky. We are continuing to solicit additional fields to evaluate for EOR potential.

# Appendix

## Western Deep CO<sub>2</sub> Storage Project

### Meeting Proceedings July –September, 2008

**WESTERN KENTUCKY SEQUESTRATION SUB-PROJECT  
MEETING  
July 24, 2008  
KGS Well Sample and Core Library, Lexington, KY**

These people were present for the meeting:

**KGS Staff**

Dave Williams  
Dave Harris  
Rick Bowersox  
Mike Lynch

**Smith Management**

Karen Thompson

**Sandia Technologies**

Phil Papadeas

**ConocoPhillips**

Paul Heard  
Michelle Pittenger

**EnSafe Inc.**

Shane Goodnight  
[sgoodnight@ensafe.com](mailto:sgoodnight@ensafe.com)

**E.ON US**

Roger Medina

**Geo Consultants**

Ross Miller

Dave Williams opened the meeting with the introduction of Shane Goodnight of EnSafe, who explained that EnSafe is interested in the project. EnSafe performs environmental consulting services.

**Status of Agreements:**

Dave Williams reported that the property owner has agreed in principle to all the items in the property lease, and the title search has been completed on the drill-site tract, site #48. He will send copies to the Consortium members when he receives it. The title attorney is still working tract #49, which is not as important as #48. He added that the data sharing agreement with R & B is still at UK's legal office, but there should be no problems with it.

## **Funding Contracts:**

Dave Harris indicated that the application to the Illinois Office of Coal Development for \$250,000 for well-logging by Schlumberger was submitted about a week and a half ago. He's hoping for a quick turn-around.

Michelle Pittenger said that Duke Energy has allowed ConocoPhillips access to data from its Gibson County 11,000-foot-deep well, but has not allowed that access to the Foundation or the Consortium. They have been offered membership in the Consortium in exchange for the data.

## **Status of bids for services:**

The project management bid by Sandia Technologies has been approved by the University of Kentucky, and Phil Papadeas will be the primary contact. Papadeas indicated UK and Sandia are in the process of signing the final contract documents.

GeoSciences Inc. of Georgetown (Ky.) has been selected to do the Phase I environmental assessment of the site. A contract for the work has been submitted to the UK legal office.

Rick Bowersox said a contractor for the seismic program work has been selected, but he is not in a position yet to identify the company. A contract must be submitted to UK on this work as well.

Paul Heard indicated that road construction to the site should begin in September or October. Dave Williams added that Ed Woolery of KGS has begun the shallow seismic work at the site and explained the shear-wave and P-wave lines Woolery plans to run across the well site. The data should take a couple of weeks to process.

Mike Lynch summarized his plan to prepare a news release to be sent out to the media when the site lease and data-sharing contracts have been signed. It will announce that the project is in a position to begin.

## **Presentation by Sandia Technologies**

Phil Papadeas made a presentation on project management and the permitting process. The presentation is available at the KYCCS.org web site. These are the topics he addressed:

A meeting is scheduled August 12 with the Region IV EPA in Atlanta to introduce the project to EPA.

Since this is a new process for that EPA office with few similar wells in the region, there are questions about how Region IV will apply its existing rules and its proposed rules on carbon dioxide sequestration wells to this project.

The Consortium should emphasize to EPA that this is a limited test project and should propose the injection of more carbon dioxide than will actually be used.

Because EPA's process is slow and deliberate, getting an application completed and submitted early is important.

It was agreed that the well could be drilled under a state permit as a gas or oil exploration well while the EPA permit for injection is pending, and that the support of political leaders for the EPA application could help to move it efficiently.

Phil indicated he hopes to be able to submit the application to EPA in mid or late September. He suggested that those who will go to Atlanta should meet immediately after this meeting or some other time before the August 12 meeting to prepare.

Dave Harris commented that KYCCS may want to submit comments to EPA on the agency's proposed rule for the drilling of permanent carbon dioxide storage wells. He asked the members to submit any such comments to him.

Sara Smith came to the meeting for a short time to say that she has submitted a proposal to the newly-formed Department for Energy Development and Independence for \$120,000 for education projects relating to KYCCS work. She said \$20,000 had been set aside for KGS for travel, graphic and presentation design, etc. She added that the application also proposed statewide public forums on carbon storage topics and presentations before a variety of meetings and conferences. She is awaiting word on its approval status.

Mike Lynch explained that he and Dave Harris had promoted a teacher workshop in Illinois on climate change / carbon storage topics, and four Kentucky teachers have registered for it.

### **Drilling project status**

Dave Williams said the specific location for the well has been agreed on, and surveyors will be asked to do the necessary survey of the property soon.

The property owner told him the Marathon pipeline right of way is 50 feet along their major gas line through the property, and this should not be a problem for the project, though Marathon should be notified of the work being done.

Dave Harris said the baseline soil gas and groundwater monitoring in the project area being done by KGS staff should start in September.

Paul Heard gave a brief update on the construction plan development.

On the permitting procedures, Rick Bowersox said he has sent a package of information on the project to the Region IV EPA office in Atlanta. He has also talked to the state Division of Water about a storm water management permit, which Karen

Thompson said involves a short online application which mostly deals with best management practices (silt fences, other soil-erosion reduction procedures, etc.) if, in fact, such a permit is needed.

Dave Williams has been consulting with a Kentucky Division of Oil and Gas official in western Kentucky for assistance on getting the necessary state permit for the project. KGS has researched the specific location of the well, and the location meets state requirements for distance from other wells.

Dave Harris noted that an Appalachian Basin Partnership has recently posted a number of well logs on their website which may be of interest to the partnership and helpful for the project. He also said KGS needs to follow up on the possible availability of data on the DuPont well in Louisville.

Michelle Pittenger said ConocoPhillips is still working on reprocessing earlier seismic data from the area around the project.

The next meeting was set for August 21 at 9:00 a.m. at the KGS Well Sample and Core Library.

After lunch, Michelle Pittenger made a presentation on a study of the Knox formation.

## **ACTION ITEMS:**

### **ConocoPhillips:**

Scott Rennie will continue to seek access to the data from the Duke Energy Gibson County well for the entire partnership (not just ConocoPhillips).

ConocoPhillips staff will complete the re-processing of existing seismic data for the project area.

### **KGS:**

Ed Woolery will complete the shallow seismic work with the help of UK students.

Mike Lynch will develop a news release to disseminate when the property lease and data-sharing contracts are completed.

Dave Williams will send a copy of the property title opinion to the partners and ask that a survey be done on the site property.

Marty Parris and other KGS staff will start soil gas and groundwater sampling and monitoring in September.

Dave Harris will follow up on whether data on the Louisville DuPont disposal well is available.

He will also attach a total dollar value to Phase III of the project when all of the new contracts have been finalized and signed (i.e., project management, seismic program, etc.)

**Partnership:**

Interested members will attend an August 12 introductory project meeting in Atlanta with EPA Region IV staff to discuss the permitting process.

They will also get together before the Atlanta meeting (possibly immediately after this meeting, July 24) to plan the Aug. 12 meeting.

**Sandia Technologies:**

Phil Papadeas will seek any public data available on Duke Energy's Gibson County, IN well via FOIA request.

He plans to submit the permit application to EPA with a target time of middle to late September.

**WESTERN KENTUCKY SEQUESTRATION SUB-PROJECT  
MEETING  
August 21, 2008  
KGS Well Sample and Core Library, Lexington, KY**

These people were present for the meeting:

**KGS Staff**

Dave Williams  
Dave Harris  
Rick Bowersox  
Jim Drahovzal  
John Kiefer  
Mike Lynch

**CAER**

Jim Hower

**Smith Management**

Karen Thompson

**Sandia Technologies**

Phil Papadeas

**ConocoPhillips**

Scott Rennie  
Paul Johnson

**Geo Consultants**

Ross Miller

**TVA**

**E.ON US**

Roger Medina  
Sharon Dodson  
Tom DePaull

Ed Stephens (via telephone)

Dave Williams opened the meeting with introductions of all attendees. Jim Hower of CAER said CAER Director Rodney Andrews met with the University of Kentucky Board of Trustees recently and that the Board recognized and supported the energy-related research of both CAER and KGS. He also noted the \$1.4 million recently granted to CAER for coal-to-liquids research.

**Status of Agreements:**

Dave Williams reported that the agreement with the property owner in Hancock County had been executed August 1 and delivered by Rick Bowersox to the owner along with the first payment.

The Data Sharing Agreement with R & B Resources remains pending. Dave Harris said he has a copy of the latest draft, which is being considered by the UK attorneys. The latest changes clarify the specifications on logging, cuttings, analyses, etc. He added there is some concern about the 2010 expiration of the R & B lease on the property and the owner's outlook on an extension. He said the partners will try to complete the project and provide R & B with all the data to help them make a quick, lower-risk decision on possibly drilling for oil and gas. Any decision by R & B to drill nearby for resources should not be a hindrance to this project, since it will go much deeper than the oil and gas. He hopes to have the final agreement within a week.

## **Status of project tasks:**

The agreement with GeoSciences Corporation of Georgetown, KY is still with the UK lawyers; some details still need to be ironed out.

Karen Thompson asked whether it would be easier to accomplish this and other pending tasks by including them in the Sandia Technologies contract tasks. Phil Papadeas responded that Sandia has done these kinds of things for other projects they have managed and agreed it should be explored for this one. The language of the contract, he said, is broad enough to cover these tasks. It was agreed that this approach will be explored.

Rick Bowersox reported the seismic program contract has been awarded to WesternGeco, LLC of Houston, TX. The field work should be done by the end of September. The company has people in the field now. Very little dynamite will be used. Most of the work will be done with a seismic vehicle. It was suggested that the county judge / executive be informed that this is going on. Dave Williams said he'll visit the Judge McCaslin.

Rick Bowersox also reported that Ed Woolery of UK should be finished doing the data processing for his shallow seismic program by the end of August. The field work is completed.

Scott Rennie reported that Paul Heard and Bill Armstrong of ConocoPhillips are looking at several drilling rigs for the project. There was discussion of the type of rig needed, the limited number of drillers who can do this type of project and the process of narrowing the field of drillers. Two drillers being considered are Les Wilson and Pollister, in Michigan.

Dave Williams reported that the survey of the drilling site had been completed by the company chosen for the job.

He plans to meet with a representative of the state Division of Oil and Gas in western Kentucky to work on the state permit requirements and process. He wants to file the permit application by the end of August. Phil Papadeas noted that the drilling plan filed with the state is exactly the same as the one filed with EPA in Atlanta. The state filing fee is expected to be \$300, and a \$10,000 minimum bond is anticipated. A letter of credit from a state bank will most likely be needed for this.

Dave Harris said he had sent a letter in July to the Foundation on the Phase III funding, which has been approved by the Foundation. The Phase III costs amount to ~\$622,000. It's expected that the Phase IV costs will be estimated by the middle of September. Scott Rennie said the drilling costs, which are still being developed, should be known by mid-October.

Phil Papadeas noted that EPA does not have an application fee for filing an application, though a letter of credit for a surety bond will be needed, as with the state permitting process. EPA provided those who attended the August 12 meeting in Atlanta a packet of guidance on financial assurance.

Dave Williams said the second title search for property near the project is not yet completed. The two title searches are going to cost a total of \$6000. Karen Thompson suggested that a call to the county judge/executive might help to move the process along, since the title attorney is the county attorney.

### **Drilling project status:**

On the issue of the Marathon Oil pipeline right of way through the site-owner's property, Dave Williams said the right of way manager for Marathon said an 8-inch protective pad would be needed near the drilling site and a person would have to be on site to monitor the drilling project. Scott Rennie suggested that the partnership should examine the right of way agreement to determine if Marathon can in fact make such requirements.

Rick Bowersox reported on the August 12 meeting at the EPA's Atlanta office. He said EPA asked many questions and also said there would need to be a two-mile area of review, which is more than was expected. Rick showed a map of the site with a two-mile radius, which showed 77 oil and gas wells, most of which are abandoned. Phil Papadeas commented that most of the mapped wells are not of consequence, since the deep-well project is so much deeper than they are. In response to a question, he also noted that EPA did not make any comment about the applicability of its proposed rules on carbon storage to this project. There was discussion that perhaps EPA hopes to learn from this project as part of developing the new rules.

Rick said EPA has proposed one requirement which will pose a problem: the placement of an additional packer in the well casing to mitigate possible leakage. He said this requirement would make testing much more difficult and expensive, as the extra packer would have to be moved regularly. The additional cost could be \$50,000 to \$100,000, according to Phil Papadeas.

There was discussion about the issue and comments that what is currently in the drilling plan is sufficient and actually a more accurate gauge of pressure in the well. It was noted that the fact that this will not be a long-term injection well should be pointed out to the EPA and that leakage security is being achieved by other means.

Scott Rennie said EPA estimated a 90-day time from submittal to approval, under the best-case scenario, so approval might come in January. Phil Papdeas suggested a pre-submission to EPA of the drilling plans before the permit application is submitted. He hopes this will convince EPA that the extra packer is unnecessary. He still hopes to submit the application in mid-September.

He also suggested that EPA representatives be invited to the well site for the carbon dioxide testing phase. He said EPA was complimentary of the outreach which has already been done. Karen Thompson suggested proactively submitting a plan for a public meeting, if it's required during the application process.

Dave Harris asked what should happen if the drilling encounters deep gas. Will it harm the project plan, and would the gas zone have to be cased? Scott Rennie indicated that if it is not a lot of gas, the majority of the planned testing can still be done. But he also suggested a risk analysis and contingency plan be drawn up for this possibility.

Ross Miller said that, in the case that deep gas is encountered, Geo Consultants and R & B might be interested in buying the well. Dave Harris said this scenario had happened in Ohio previously.

On the EPA permitting process, Phil Papadeas said Sandia will begin assembling the application from pieces which come to them from the partners. The application will have five parts:

- Administrative section (describing the well owner)
- Technical section (describing the geology of the project area)
- Reservoir modeling
- Drilling and abandonment plan
- Monitoring program

In answer to a question, Phil indicated that a standard umbrella liability policy of \$2 million is a good idea for the project. Foundation members are comfortable that they are already covered by liability insurance. Dave Harris indicated he will check with UK on coverage for KGS.

The next meeting was scheduled for October 2, 2008, at the same location.

## **ACTION ITEMS:**

### **KGS:**

**Dave Harris** will continue to check with UK's legal office on the status of the data-sharing agreement with R & B. When he has a final copy from the legal office, it will be submitted to Ross Miller to show to R & B.

**Dave Harris** and **Dave Williams** will discuss with **Phil Papadeas** possibly turning over the arrangements for contracting for a Phase I environmental review and other tasks to Sandia to get these arrangement done more quickly.

**Dave Williams** will contact the Hancock county judge / executive to inform him of the expected arrival of seismic trucks and possible use of a very limited amount of

dynamite for the seismic program; he will also try to get some help from the judge / executive to get the second title search completed.

**Dave Williams** will meet with a state Division of Oil and Gas representative to work on the state drilling permit application, targeting early September for submission. He will also determine the bonding requirements for both the state and federal permits.

With ConocoPhillips, examine the right of way agreement between Marathon Oil and the property owner to determine if Marathon Oil can require any steps on our part during the project.

Invite EPA to be at the project site for the carbon dioxide testing phase.

Develop a risk analysis and contingency plan, in conjunction with other partners, for the possibility that deep gas may be encountered during the drilling of the deep hole.

Discuss with UK the possible need for standard \$2 million liability coverage.

**Rick Bowersox** will disseminate to the partners the processed information from Ed Woolery's shallow seismic work at the site.

**ConocoPhillips:**

Will work on drilling costs, targeting mid-October to have them completed.

**Sandia Technologies:**

Before submitting the EPA permit application, send a drilling plan to the EPA to demonstrate that the included pressure monitoring and safety plans are adequate, and the EPA-proposed packer in the casing is unnecessary, redundant, and expensive.

Send in the completed EPA application by mid-September (target date).