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## Geology & Technology Subcommittee Report

**To:** Stephanie Timmermyer, Chairperson, CCS Working Group

**From:** Tim Grant, Chairperson, Geology & Technology Subcommittee

**Re:** Geology & Technology Subcommittee meeting of November 10, 2009

**Date:** November 16, 2009

The Geology & Technical Subcommittee of the Carbon Capture and Sequestration (CCS) Working Group met on November 10, 2009 at Allegheny Energy's Fort Martin power station near Point Marion, West Virginia. The next meeting is scheduled following the meeting of the Carbon Capture and Sequestration (CCS) Working Group on December 9, 2009 at 9:00 AM at the DEP offices in Charleston, West Virginia.

Dr. Michael Hohn, director of the West Virginia Geological and Economic Survey and Lee Avery, head of the Oil and Gas Division of the West Virginia Geological and Economic Survey attended out meeting. Dr. Hohn provided an over view of stratigraphy and structure of the geology of West Virginia. The various horizons involved in coal mining and oil & gas activity were discussed as well as those saline horizons that may provide sequestration opportunities. The Midwest Regional Carbon Sequestration Partnership (MRCSP) assessed the potential storage capacity of the stratigraphic section within its area, which includes West Virginia, Pennsylvania Ohio, New York, Maryland, Kentucky, Indiana and Michigan. Also, NETL's Carbon Sequestration Atlas provides a table listing estimates of potential storage for the three types of storage reservoirs. This information is based on the work done by the various partnerships. While not discussed at the meeting, the Atlas data for West Virginia:

| CO <sub>2</sub> Emissions |           | O & G Reservoirs | Unmineable Coal Seams |      | Saline Reservoirs |        | Total Storage Potential |        |
|---------------------------|-----------|------------------|-----------------------|------|-------------------|--------|-------------------------|--------|
| Annual Emissions          | # Sources |                  | Low                   | High | Low               | High   | Low                     | High   |
| 102.1                     | 30        | 1,353            | 177                   | 177  | 3,343             | 13,463 | 4,873                   | 14,994 |

Except for the number of sources, all values are in million metric tons.

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Pennsylvania's Department of Conservation and Natural Resources has also done an initial study on geologic carbon sequestration opportunities within that state. We reviewed the distribution of potential coal sequestration, oil & gas fields and the limited number of deep wells for saline storage. USGS has developed a seismicity map of the United States that suggest that the southern counties of West Virginia may experience a low magnitude tremor once in 50 years.

Dr. Tim Carr of West Virginia University spoke to the subcommittee about a Carbon CyberInfrastructure. Dr. Carr is also involved with NATCARB. The presentation about a Carbon CyberInfrastructure and the following discussion on the types and availability of data was revealing. Dr. Carr pointed out the difficulties in acquiring data presents a dis-incentive for CO<sub>2</sub> storage field development. Controlling for risks associated with CO<sub>2</sub> storage field operations is proportional to knowledge and knowledge requires data, information. Readily available geo-information will go a long way towards minimizing risk. We also discussed what information is available from the Geological and Economic Survey. Availability of data also depends on what kind of data is collected from those who get a permit to drill wells. Dr. Hohn mentioned a Senate bill which had been proposed in the last two legislative sessions and will be presented in the up coming session that will provide the Geological and Economic Survey the authority to request copies of information, data and samples collected during drilling operations. There was discussion among the subcommittee regarding supporting this legislative effort and this topic will be presented to the CCS Working Group in the next meeting, December 9.

The AEP Mountaineer CCS Project information was presented to the subcommittee. Two members of the subcommittee were able to attend the commissioning ceremony and we thank Tim Mallan for the opportunity. This is the first power plant in the world to capture a portion of its flue stream, separate the CO<sub>2</sub> and sequester it. AEP has announced plans to scale up the current project from 20 MWe to 235 MWe. We plan to review the AEP Mountaineer data package with Jeff Knepper, following the next CCS Working Group meeting, to better understand the storage potential AEP has in the vicinity of their plant.

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John Leeson provided the subcommittee a summary assessment on the risk of CO<sub>2</sub> acting as an asphyxiate. Based on records of CO<sub>2</sub> pipeline operations and EOR field operations the risk is minimal. Jeff Knepper provided the subcommittee a summary assessment on regulations that can minimize groundwater contamination. Current regulations were sufficient to award AEP a permit to inject captured CO<sub>2</sub> into the subsurface at their Mountaineer plant site. Tim Grant provided the subcommittee a summary assessment regarding the risk of induced seismicity due to injection. The most famous incident is the Army's disposal of weapon wastes at the Rocky Mountain Arsenal near Denver, Colorado. Here, injection pressures were about 50% above in situ pressures. Also, injection was into the basement granites which had only fracture porosity. The subcommittee also discussed the timing on deployment of CCS technology, the relation between EOR injection and proposed CO<sub>2</sub> sequestration injection, leakage from storage reservoirs as well as what would be an acceptable rate of leakage. Grant Bromhal volunteered to research these later topics on injection and leakage. More information will be gathered on these research topics, and along with other subjects, will be incorporated in the draft report. Work on developing an outline was deferred to individual feedback following the meeting.

One of our subcommittee members, Paul Kramer of Allegheny Energy, arranged for our meeting site and provided a quick tour of the power plant after the meeting. Allegheny Energy is in the process of installing SO<sub>2</sub> scrubbers and it was a good opportunity to learn more about the operations of a source; fascinating engineering. It helps the perspective on sequestration.

Next steps for the Technical Committee include the following:

Discuss with the CCS Working Group the possibility of the group supporting the legislative effort of the Geological and Economic Survey to improve gathering of geologic data acquired during well drilling operations;

Meet with Jeff Knepper to review the AEP Mountaineer CCS project data package;

Further develop our outline for the draft report and begin preparing the text for the various outline topics.