INITIAL GIS ANALYSIS OF CO₂ SEQUESTRATION IN COAL BEDS IN OHIO

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ABSTRACT

The potential for coalbed methane and CO₂ sequestration in Ohio has been the focus of recent research. This study examines the potential for geologic sequestration of CO₂ in the coalbeds of Ohio. The study was conducted using the Ohio Division of Geological Survey's 1:24,000-scale bedrock geology maps, the U.S. Geological Survey's National Coal Resource Data System, and other GIS datasets.

DISCUSSION AND RESULTS

CO₂ sequestration potential was determined using the Ohio Division of Geological Survey's 1:24,000-scale bedrock geology maps, the U.S. Geological Survey's National Coal Resource Data System, and other GIS datasets.

REFERENCES


MIDCARB is a cooperative project between the five state geological surveys of Kansas, Illinois, Indiana, Kentucky, and Ohio. The MIDCARB project will be looking at the feasibility and economics of geologic CO2 sequestration potential in the five state region. The project will use GIS technology to evaluate potential sinks of CO2. Potential sinks include abandoned oil & gas fields, saline aquifers, and unmineable coalbeds. The CO2 has the potential of being used in a beneficial way in enhanced oil recovery and enhanced coalbed methane recovery.

DISCUSSION AND RESULTS

Better evaluations of coalbed methane resources and CO2 sequestration potential can be obtained using data from the detailed coal resources studies. The recently completed studies of the available coal resources of the Middle Kittanning and Upper Freeport coal beds are examples of such investigations. Therefore, evaluations performed on a per bed basis will be more accurate than those calculations using the net coal resources. As part of the MIDCARB project, future work will be to calculate the coal bed methane resources and CO2 sequestration potential of all the significant coalbeds in Ohio.

As was done for the net coal resources, the coal resources, coal bed methane resources, and the potential sequestered CO2 were calculated. Similar assumptions are made for the calculations, using the gas content values of Couchot and others (1980) and the previously discussed assumptions. For the Middle Kittanning coal bed, the coal gas content is assigned an average value of 57.22 ft³/ton from the five known published values, while for the Upper Freeport coalbed the coal gas content is assigned an average value of 88.16 ft³/ton from the seven known published values. Coal bed methane is assumed only to be produced below 500 feet of overburden. Thus, using the assumption that CO2 is preferentially adsorbed onto coalbeds at a 2:1 ratio, the following calculations can be made:

**Middle Kittanning coalbed**
- Coal Resources (below 500 ft overburden) – 8.27 Bt
- Coalbed Methane Resources – 473 Bcf
- CO2 sequestration potential – 54.9 Mt

**Upper Freeport coalbed**
- Coal Resources (below 500 ft overburden) – 4.05 Bt
- Coalbed Methane Resources – 356 Bcf
- CO2 sequestration potential – 41.4 Mt

Using the GIS web technology, we can query individual themes and display the results. For example, one of the CO2 sources, the Jeffery Energy Center coal-fired power plant has been queried. The MIDCARB project will be using web technologies to allow the display, query, and analysis of the different themes. The data themes will be managed by the different state survey, but accessed through a common portal. The MIDCARB web site address is: WWW.MIDCARB.ORG

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