Preliminary Determination of Bacteriological Niche Communities in Paleocene-Eocene Wilcox Group Coals from Coalbed Methane Producing Wells in North Louisiana

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ABSTRACT

Exploration and production drilling for coalbed methane (CBM) in the Wilcox Group (Paleocene-Eocene) coal beds in north-central Louisiana has gone forward with a significant number of wells having been drilled since the first test well in 2001. The coal-bearing stratigraphic section extends eastward into neighboring western Mississippi, and westward into northwestern Louisiana and northeastern Texas. In general, individual coal beds reach a maximum thickness of about 20 ft (6 m), and the coal beds tend to be thickest and most numerous in the lower part of the section; cumulative coal thickness can exceed 100 ft (30 m). Although coal rank, and consequently gas content, varies with depth drilled 350- 5,000 ft (100-1500 m), initial gas value results from isotherm analysis indicate that there may be as much as 165 scf/t (standard cubic ft per ton, raw basis) in the deeper parts of the basin.

Isotopic data obtained from coalbed methane and produced water samples indicate that the gases are biogenic in character, primarily produced by bacterial reduction of CO_2 and that, in some places, these gases may be mixed with migrated thermogenic gases. A first look at the microbial community, using coal particulate matter filtered from produced CBM water samples, revealed methanogenic populations (tentatively identified as *Methanospirillium* sp.) intrinsic to the coal particulate matter. Purple sulfur (*Chloromatium* sp.) and green sulphur (*Chlorobium* sp.) populations were epiphytic or surface-attached to the coal particles. Further work needs to be done to understand the stoichiometry of the reduction of carbon dioxide to methane by the bacteria and the relationship the bacterial community plays in this conversion.