# Preliminary Gulf Coast Coalbed Methane Exploration Maps: Depth to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance

By Charles E. Barker, Laura R.H. Biewick, Peter D. Warwick, and John R. SanFilipo

Open-File Report 2000–113

**U.S. Department of the Interior**
**U.S. Geological Survey**

**U.S. Department of the Interior**
KEN SALAZAR, Secretary

**U.S. Geological Survey**
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia 2009

For product and ordering information:
World Wide Web: http://www.usgs.gov/pubprod
Telephone: 1-888-ASK-USGS

For more information on the USGS—the Federal source for science about the Earth, its natural and living resources, natural hazards, and the environment:
World Wide Web: http://www.usgs.gov
Telephone: 1-888-ASK-USGS

Suggested citation:
Barker, C.E., Biewick, L.R.H., Warwick, P.D., and SanFilipo, J.R., 2009, Preliminary Gulf Coast Coalbed Methane Exploration Maps: Depth to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance: U.S. Geological Survey Open-File Report 2000–113, 2 p.

# Preliminary Gulf Coast Coalbed Methane Exploration Maps: Depth to Wilcox, Apparent Wilcox Thickness and Vitrinite Reflectance

By Charles E. Barker, Laura R.H. Biewick, Peter Warwick, and John SanFilipo

Strong economic controls on the viability of coalbed methane (CBM) prospects make coal geometry and coal property maps key elements in identifying sweet spots and production fairways. Therefore, this study seeks to identify the apparent prospective areas for CBM exploration in the Wilcox Group (Paleocene-Eocene) lignite and coalbeds by mapping net coal thickness, depth to coal, and coal rank (vitrinite reflectance). Economic factors are not considered in this CBM prospects study. Given the comparatively extensive gas pipeline and other production infrastructure development in the Gulf Coast Region, these factors seem less a control compared to other areas. However, open leasable public lands are minimal or nonexistent in the Gulf Coast region and access to the CBM prospects could be a problem.

The depth to top of the Wilcox Group and Apparent Wilcox Group thickness maps are contoured from location and top information derived from the Petroleum Information (PI) Wells database (Sheets 1 and 2). The depth to Wilcox map represents the tops found in the database with the addition of surface geology from USGS maps and field data. The Wilcox apparent thickness map is constructed by searching for Wilcox and Midway Group tops. Apparent thickness is computed by subtracting Midway

top from the Wilcox top. Geographic control is superimposed on the maps from USGS state line, county, elevation and other data files. The veracity of the PI Wells database is being checked by comparison to published cross sections and geologic maps.

Interpretation of the depth to Wilcox and apparent thickness maps along with published measured sections and cross sections indicates that parts of Texas, Louisiana, Mississippi and Alabama contain broad areas where a 20- to 40-foot net thickness of lignite and coal occur at shallow depths. The thicker coal zones are attributed to growth faulting or rift zones influencing peat deposition. The depth to Wilcox map shows several areas where dome-like uplifts and bench-like coal-bearing rock are buried to depths less than 5,000 ft.

Vitrinite reflectance data for the Wilcox Group is sparse (Sheet 1). Searches of the AGI Georef, USGS Organic Geochemistry, Pennsylvania State University coal library, and State Geological Survey publications as well as other web data sources have turned up mostly information on shallow, mineable coals. Data from the deeper Wilcox group will mostly require new measurements of vitrinite reflectance from core and cutting samples. The authors are currently compiling a vitrinite reflectance data base and are looking for collaborators to contribute subsurface samples or reflectance data.

What is known about rank is that shallow occurrences of the Wilcox "lignite" ranging in depth from outcrop to <4,000 ft, locally reach a maturity equal to bituminous coal. This rank level is an important benchmark for CBM prospects because it marks the onset of thermogenic gas generation.

In conclusion, the data indicate that CBM prospects for the Gulf Coast are better in South Texas (Webb, Dimmitt, LaSalle, and Frio Counties) because the coal rank is anomalously high there and the coals occur at shallow depths over an extensive area. There are also local structures and apparent stratigraphic traps in this area that make attractive drilling targets. Finally, these higher rank southern Texas Wilcox coals are also plumbed to an apparently very thick section of Wilcox to the east that is mature with respect to gas generation and could provide significant thermogenic gas to these targets.