Shallow Coal Exploration Drill-Hole Data, Southeastern Missouri

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Chapter G of

Shallow Coal Exploration Drill-Hole Data—Alabama, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas

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Introduction

Coal exploration drill-hole data from 1,049 wells in southeastern Missouri drilled between 1976 and 1978 by Phillips Coal Company, a division of Phillips Petroleum Company (Phillips), are discussed in this chapter, and the data are provided in an accompanying spreadsheet. The data are part of a larger dataset donated to the U.S. Geological Survey (USGS) by the North American Coal Corporation, which purchased Phillips assets in 2001 (see chapter A, this volume). The data in these reports have been digitized from field maps to create unified and spatially consistent coal exploration drill-hole datasets for each of the States (chapters B–K, this volume). Data for southeastern Missouri include a geologic map of the State with drill-hole coverage (fig. G1), a list of data attributes and explanations of the data format (table G1), a list of comments found in the data and descriptions of them (table G2), a list of counties and the number of drill holes for each county (table G3), and tabulated data in spreadsheet format (see appendix G1).

Methods

Hardcopy Phillips exploration maps, in Missouri East 1927 State coordinate plane projection, were scanned and georeferenced into a geographic information system (GIS) using ArcMap™ software from the Environmental Systems Research Institute, Inc. (ESRI). Drill-hole locations were then digitized into the GIS, and all coal data were recorded into an attribute table for each drill-hole point. Each data point is uniquely labeled with a two-letter county code followed by a numeral. The attribute table for each point contains basic site information and location references along with information on the coal beds found during exploration (table G1). For example, drill-hole locations where coal was found will have beds numbered sequentially (that is, 1,2,3…15), followed by thickness of the coal bed (1_C), thickness of coal and partings (1_CP), depth to the top of the bed (1_DEPTH), a bed regional name (1_BED), and any comments about quality or other information in regard to the coal bed (1_COMMENTS) (table G2). All of the depth and thickness measurements are measured in decimal feet. Comments have been added by USGS staff if there were problems or uncertainties during compiling or if any additional information on the maps needed to be described. Once the digitizing of the maps was complete, the spatial data were then projected into a North American Datum of 1983 geographic coordinate system in order to standardize all the Phillips datasets into a common projection. The shapefile data were exported to a spreadsheet (see appendix G1).

Generalized Coal Geology of Southeastern Missouri

The surface geology of southeastern Missouri is dominated by Quaternary aged alluvial sediments, with Tertiary and Upper Cretaceous outcrops that extend to the northeast out of Arkansas with Ordovician bedrock bounding the Gulf Coast sediments to the northwest (fig. G1). The major coal-bearing formations of this region are of Tertiary Age and are separated into the Wilcox, Claiborne, and Jackson Groups that formed in a cyclic nearshore deltaic environment (fig. G2). Most of the coal beds form lenses that have limited areal extent, making it difficult to correlate beds across the region (Oman, 1986).

Data

The southeastern Missouri coal exploration drill-hole dataset contains information on coals in seven counties within the Gulf Coast (fig. G1, table G3). Of the 1,049 drill holes, 593 drill holes are noted as no coal found during exploration, 161 drill holes are listed as “no significant lignite” (NSL), and the remaining 278 drill-hole locations record coal-bed penetrations. Exploration depth ranged from a minimum of 42 feet to a maximum exploration depth of 297 feet. Due to the generalized nature of the original highway maps that contained the drill-hole information and the process of georeferencing these maps to a new base layer, location error is expected to be ±0.25 miles.

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Warwick, P.D., SanFilipo, J.R., Crowley, S.S., Thomas, R.E., and Freid, J., comps., and Tully, J.K., digital comp., 1997, Map showing outcrop of the coal-bearing units and land use in the Gulf Coast coal region: U.S. Geological Survey Open-File Report 97–172, 1 sheet, accessed April 20, 2011 at *pubs.usgs.gov/of/1997/of97-172/*.

Appendix G1

The Southeastern Missouri coal exploration drill-hole dataset in spreadsheet format is available at *pubs.usgs.gov/of/2011/1261/Appendices/G1-MO.xls*.

Table G1. Attribute titles and data descriptions and formats for the southeastern Missouri drill-hole dataset.

Attribute title	Data description and format
DRILL_HOLE NAME	Two-letter county code followed by drill-hole number.
COUNTY	County where the drill hole is located.
ELEVATION	Elevation above sea level in feet.
DEPTH_TOTAL	Depth of drill hole in feet.
DEPTH_PROBED	Depth of geophysical probe measurement in feet.
LATITUDE	Decimal degree location values given to 4 decimal places.
LONGITUDE	Decimal degree location values given to 4 decimal places.
COMMENT	Additional information regarding the entire drill hole.
X_C	Thickness of coal for bed number X in feet.
X_CP	Thickness of coal and partings combined for bed number X in feet.
X_DEPTH	Top depth of bed number X in feet.
X_BED	Regional name for coal bed X.
X_COMMENT	Additional information regarding coal bed X.

Table G2. Explanation of comments used to describe the southeastern Missouri drill-hole dataset (modified from J.A. Luppens, U.S. Geological Survey, written commun., 2009).

Comment	Description
?	Questionable data/information.
CORED	Indicating that the drill hole was cored.
DH	Abbreviation for "drill hole."
I	Abbreviation for inferior. Subjective term used to describe poor coal quality.
NC	Abbreviation for "no coal." No coal was found during exploration for this drill hole.
NP	Abbreviation for "not probed." Geophysical logging never occurred at this location.
NSL	Abbreviation for "no significant lignite." Coal may have been found during exploration but because the coal beds were thin (usually less than 2 feet thick) no coal data were recorded.
ODD DH SYMBOL	Location symbol on the original coal exploration maps was square. The meaning of the square symbol is unknown. The majority of drill-hole locations on the Phillips coal exploration maps were marked with a circle; or if the drill hole was cored, a triangle was used.
PI	Abbreviation for "partially inferior." Used to describe that a portion of the coal bed is of a low quality.

Table G3. Southeastern Missouri counties and the number of drill holes by county.

County	Number of drill holes
Butler	43
Dunklin	198
Mississippi	214
New Madrid	171
Pemiscot	196
Scott	68
Stoddard	159
Total	1,049

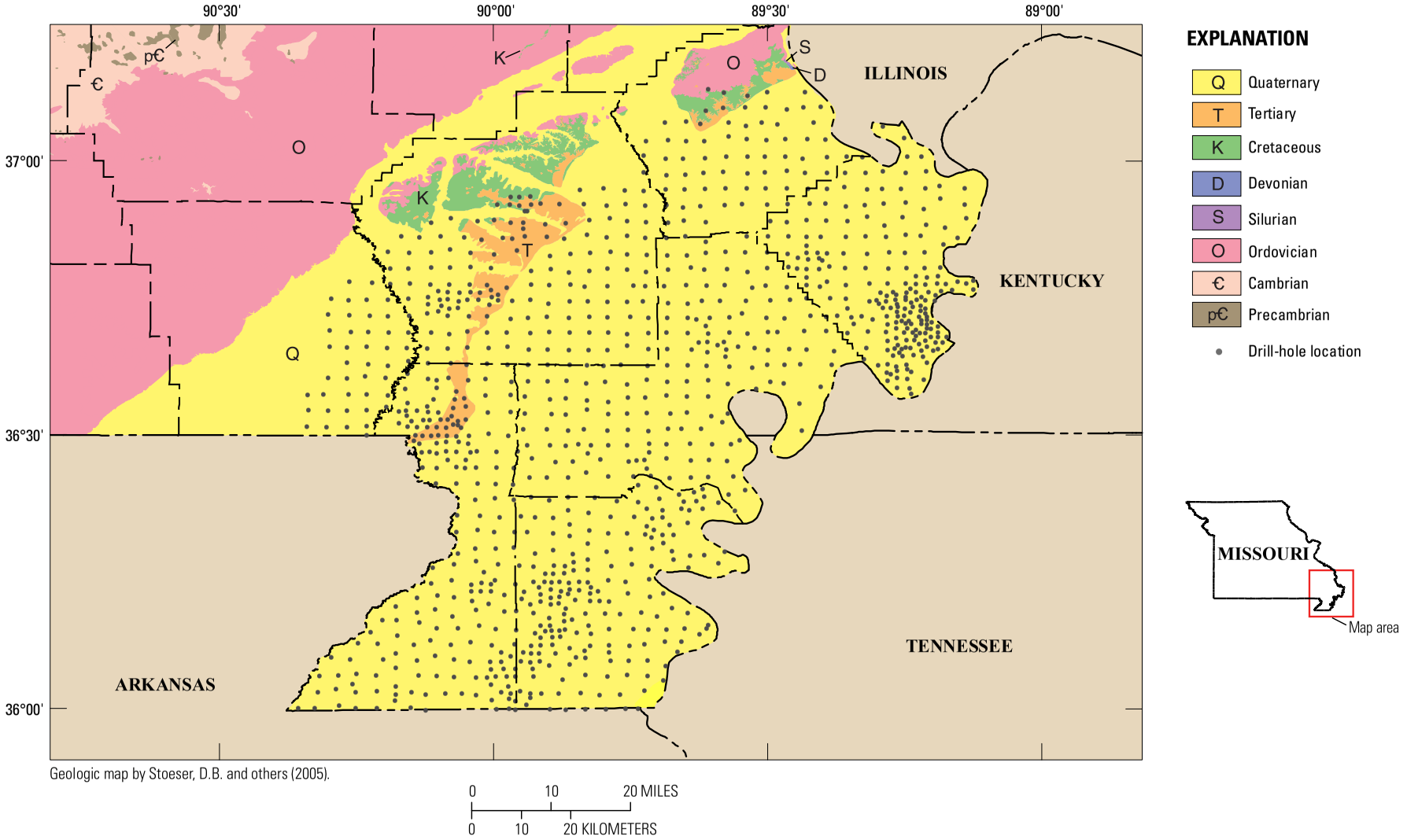

Figure G1. Regional Missouri map with generalized geology overlaid with drill-hole locations (Stoeser and others, 2005).

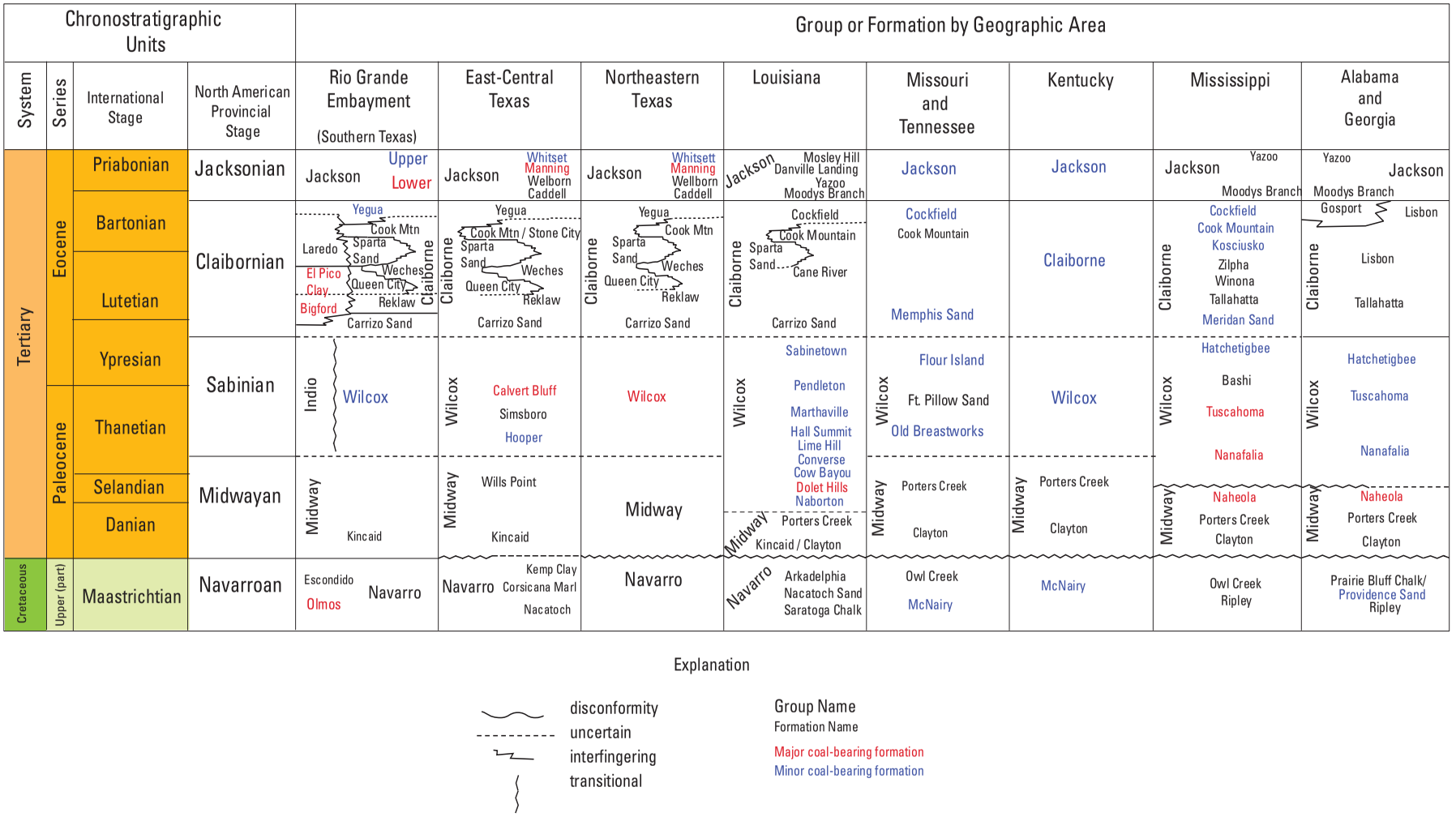

Figure G2. Generalized stratigraphic chart showing major and minor coal-bearing formations in the Mississippi Embayment and Gulf Coastal Plain (modified from Warwick and others, 1997; Ogg and others, 2008).