Map of Reflection Seismic Data in Kentucky

In assessing the geologic storage potential for carbon dioxide in any particular area of Kentucky, as complete a picture as possible of the subsurface geology is essential. Often deep-well data is not sufficiently dense to provide the necessary information. In such cases, regional reflection seismic data may supplement otherwise sparse drill data. Many areas have data that was previously acquired, usually by oil and gas exploration companies. Reflection seismic data may be difficult to find, especially by those users unfamiliar with oil and gas exploration.

The map of the reflection seismic data in Kentucky is intended to provide users with a quick visual reference that will allow them to determine the particular areas of the state that have seismic data and the identity of the data owner or primary source for the specific data. All other information concerning the seismic data are within the purview and available from the data owners, primary providers, or vendors, as the case may be. These primary sources are listed below for any particular survey shown on the map.

In addition to existing data, two seismic surveys in progress are shown on the map. These are the surveys being conducted by the Kentucky Geological Survey (KGS) in Hancock County and a group shoot by Evans Geophysical, Inc. (Evans) in eastern Kentucky. The location of the seismic data on the map is the information supplied directly by the various primary sources listed below. In most cases, the data was supplied as digital data in ESRI shapefile format. The exception is the existing Evans Geophysical, Inc. data that

was supplied as paper copies of page-size stick or shot-point maps (the proposed Evans group-shoot data, however, was provided in digital shapefile format). In the case of the Evans paper copies, the lines or points located as closely as possible using roads, county lines, or Carter Coordinate sections for geographic control. It is likely, therefore, that these lines may lack the location accuracy of the other lines on the map. The map is a work in progress and is intended to be complete as possible; however it is

known that some of the data available in Kentucky may not shown on the map as detailed location information concerning certain surveys is not currently available from the owners. For example in southeastern Kentucky, Seisco has additional seismic data not shown on this map. When in doubt, users of this map should consult vendors about the possibilities of additional data. If publicly available data are found that are not shown on this map, the authors would welcome notification to aid in updating future versions of the

For the past 40 or more years, reflection seismic data have been collected in Kentucky by the oil and gas industry and less commonly by governmental agencies. During this time, major oil companies including Amoco, Arco, Conoco, Exxon, Gulf, Shell, Texaco, and geophysical companies like Petty Ray, Western Geophysical, and Texas Instruments Geophysical Service, Inc. collected regional seismic data. In addition, smaller exploration companies including Ashland, Columbia Natural Gas, and others collected data limited to specific areas. By the 1980s most of the major companies had ceased hydrocarbon exploration operations in Kentucky and by the late 1990s most had made their seismic data available through outside vendors. More recently, seismic data have been collected by state government and private agencies for the purpose of deep-well disposal

Additional seismic data is currently being collected by the Kentucky Geological Survey in Hancock County in preparation for the drilling of an 8,000-foot test well that will test Lower Paleozoic strata for their suitability as reservoirs and seals for carbon dioxide storage. It is expected that additional seismic data may be collected in the future for carbon storage purposes in response to the incentives related to coal-to-liquids legislation (House Bill No. 1) passed by the Kentucky Legislature in August 2007.

Seismic data continues to be collected for oil and gas purposes. Evans Geophysical, Inc. is collecting data as part of a group shoot in eastern Kentucky across the Rome Trough and that proposed survey has been included on the map. The details of the group shoot being proposed by Seismic Specialists, Inc. across the Rough Creek Graben in western Kentucky are unknown at this point and are not shown on the map.

DISCLAIMER

Although these data have been processed successfully on a computer system at the Kentucky Geological Survey (KGS), no warranty, expressed or implied, is made by KGS regarding the utility of the data on any

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other system, nor shall the act of distribution constitute any such warranty.

To date, all of the known data collected in the state is considered two dimensional (2-D), that is, it reflects only the subsurface geology lying directly below the line of survey and does not result in a data volume as is the case with three-dimensional (3-D) data. Much of the reflection seismic data collected in the state are multifold in nature, that is, multiple records are collected from the same subsurface reflection point to build up a clearer, more noise-free and more complete subsurface image. Single-fold data, on the other hand, collects only one record per subsurface reflection point to produce a noisier and less complete image of the subsurface by producing gaps in the shallow data. However, because of the long offsets used in acquiring the data, the deeper geology below about 1,500-2,500 feet is often well imaged. In general, the single-fold data are older and most are confined to the eastern part of the state where they are often the only data available. The data density is much greater in eastern Kentucky, where most of the passable roads have had one or more surveys conducted alone them. Western Kentucky, on the other hand, generally has long, regional and broadly spaced surveys that are commonly somewhat newer and with greater fold, resulting in higher resolution.

For many years the GeoData Corporation provided legacy seismic data to users in Kentucky and an index map entitled, "Kentucky-Tennessee Seismic Data" was provided to potential data purchasers. GeoData is no longer in business and the much of the seismic data shown on that map are not available, with some of it being owned by private companies. Other GeoData data, however, are available through the vendors listed herein (personal communication, Ben Rummerfield, 2008).

ExxonMobil Corporation is also known to have shot seismic data in Kentucky; however, their multifold data are available only if the potential purchaser is willing to pay for the time required by ExxonMobil employees to retrieve the data. ExxonMobil multifold seismic data exist for parts of western Kentucky, especially in the area of the Rough Creek Graben where Exxon drilled wells. Some of the single-fold Exxon data shot in eastern Kentucky are available through the vendors listed herein.

The seismic data map is color coded to match with the data with the owner or source given below. Some of the companies listed are also data brokers and may be available to help acquire most of the seismic data.

Battelle Memorial Institute (Battelle) Columbus, Ohio 43201-2693 Tel: 800-201-2011 or 614-424-6424 www.battelle.org/locations/columbus.aspx Evans Geophysical, Inc. (Evans) 2340 S. Mission View

Suttons Bay, Michigan 49682 Tel: 231-271-6296 www.evansgeo.com Kentucky Geological Survey Fax: 859-257-1147

Public Information Center: 859-257-3896

Tel: 614-265-6586

Fax: 614-447-1918

Ohio Division of Geological Survey (Ohio Geological Survey) 2045 Morse Rd., Bldg. C Attn: Mark Baranoski

www.dnr.state.oh.us/Default.aspx?alias=www.dnr.state.oh.us/geosurvey

PAC Geophysical (PAC) Tel: 281- 293-0293 Phone Fax: 281-293-7899 Fax Email: pacgeo@aol.com

www.3dsurveys.com Seisco, Inc. (Seisco) 5701 Crawford St., Suite H

New Orleans, Louisiana 70123 Tel: 504-731-2995 Fax: 504-731-2997 www.seiscoinc.com/

Seismic Exchange, Inc. (SEI) 11050 Capital Park Drive Houston, Texas 77041 Tel: 832-590-5100 / 866-761-5609 (Toll Free) Fax: 832-590-5290 (Main) www.seismicexchange.com

Seismic Specialists, Inc. (SSI) 1680 Hoyt Street Lakewood, Colorado 80215 Tel: 281-799-5442 Email: paul@shearwave.com www.shearwave.com Seitel, Inc. (Seitel)

10811 South Westview Cir. Dr. Suite 100 Building C Houston, Texas 77043 Tel: 832-295-8300 Fax: 832-295-8301 www.seitel-inc.com

P.O. Box 20008 Owensboro, Kentucky 42304-008 Tel: 270-926-8686 www.txgt.com Wilson Geophysical, Inc. (Wilson) Attn: Bart Wilson, Sales 11011 Richmond Ave., Ste. 225 Houston, Texas 77042

Evans multifold data

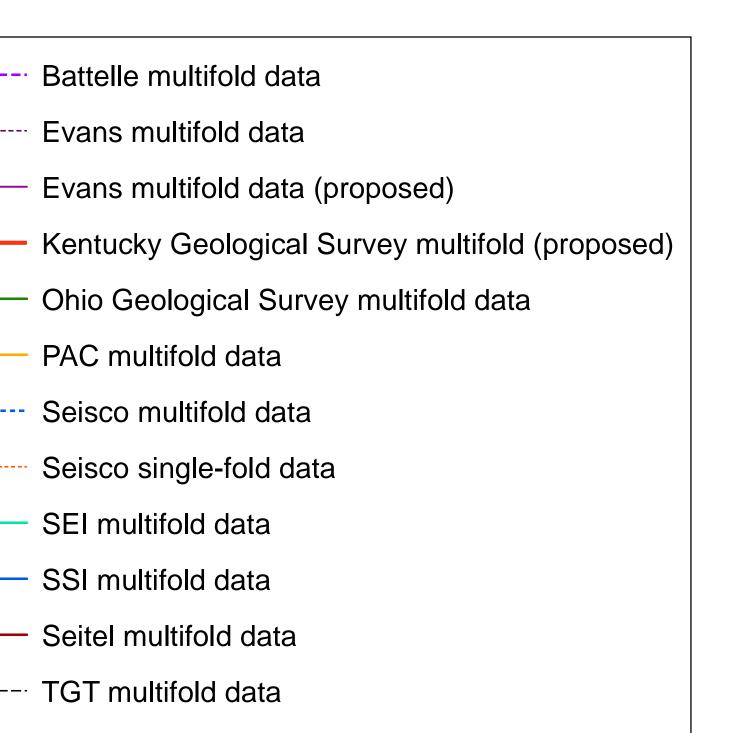
PAC multifold data

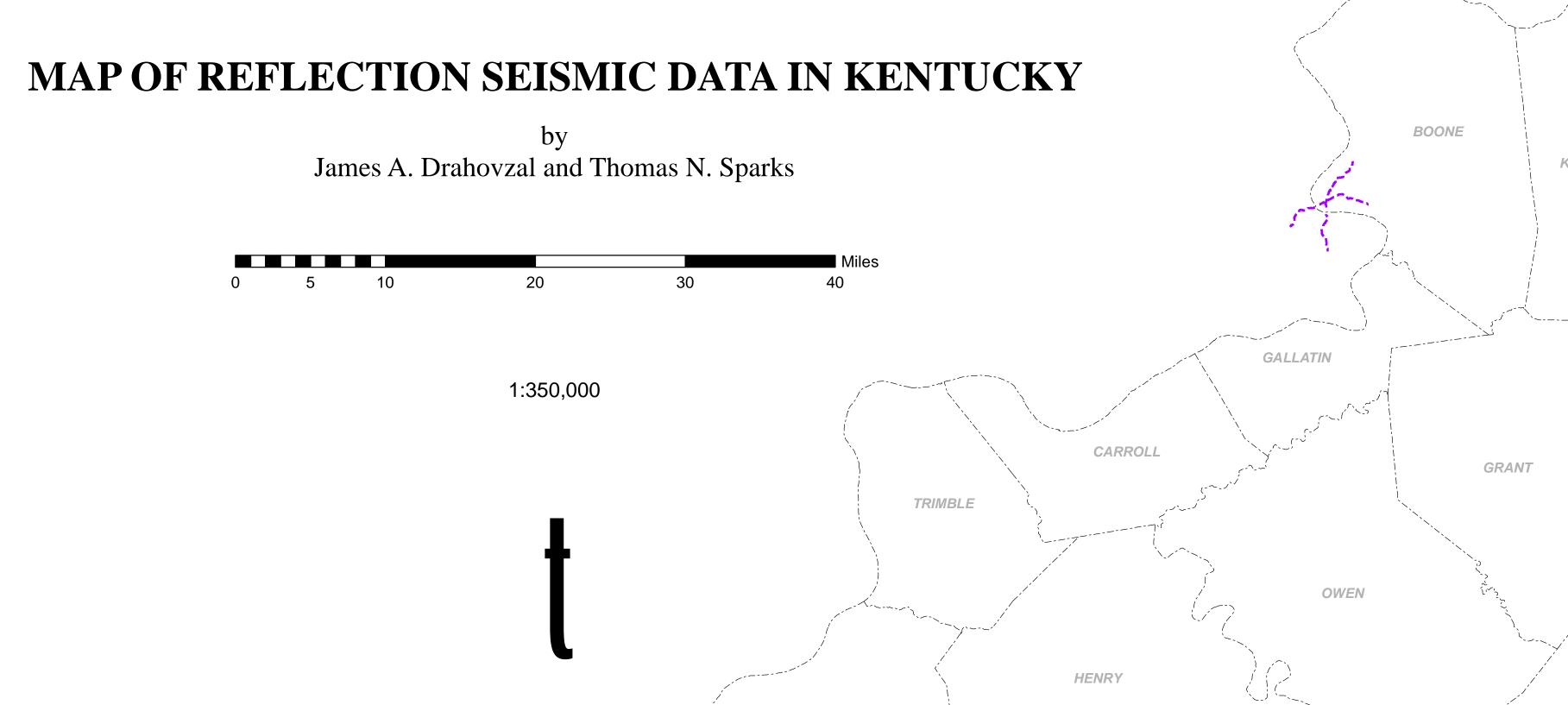
SEI multifold data

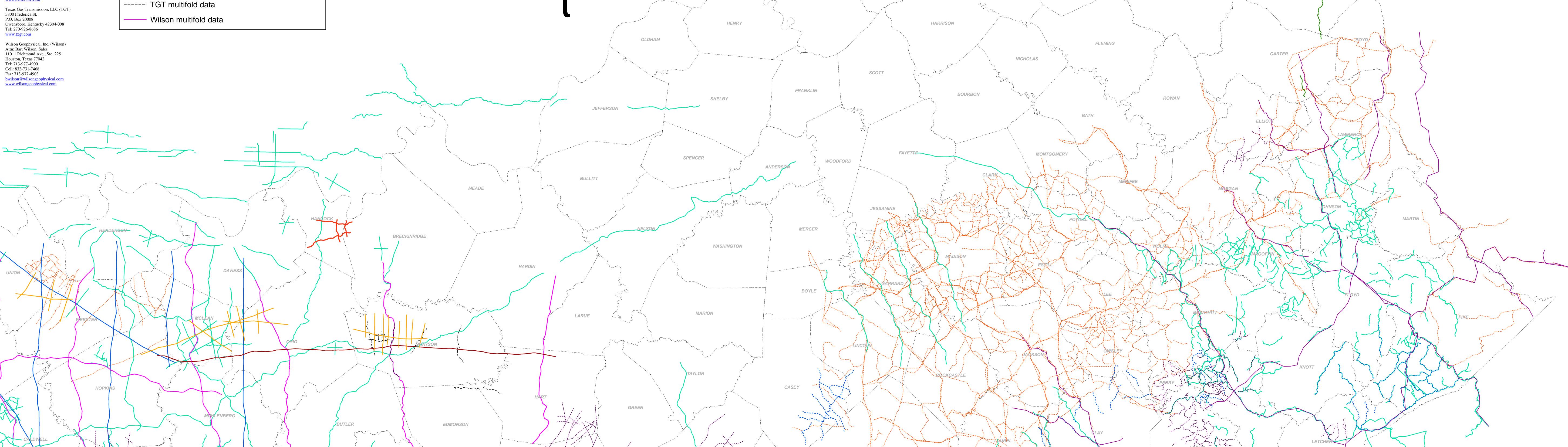
SSI multifold data

3800 Frederica St.

Tel: 713-977-4900 Cell: 832-731-7468 Fax: 713-977-4903 www.wilsongeophysical.com







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