NCRDS FY05-09 SUMMARY

Kentucky Geological Survey

Agreement number: 3046917300

Project Title: Kentucky Coal Data for the National Coal Resources Data System

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Main objectives of project tasks:
To continue to build the exploration drill hole database, improve bed correlation assignments, and convert all documents to electronic format.

BASE AGREEMENT

Coal Thickness Database
This database contains discrete measurements of coal thickness, parting thickness, elevation, and bed name primarily from field sites such as outcrops, surface mines and underground mines. Some measurements were derived from drill hole data. Most of the data recorded were collected during coal resource field studies, such as the 1980’s Brant investigation into the coal resources of Kentucky, or from other published sources. There are currently 37,950 records in the table; 32,359 are from the eastern Kentucky coal field and 5,580 are from the western Kentucky coal field. The most recent data added to this database are associated with the coal availability studies of the 1990’s. All of these data have been submitted to the NCRDS database.

The original record design of this database was focused on the measurement of a single coal bed, even though the measurements may have come from a site where more than one coal was exposed. A continuous “measured section”, therefore, was deconstructed into individual coal measurements. However, there was no easy way to reconstruct the original measured sections. Recent work has been initiated to recombine the individual measurements into complete sections. To date, 4,096 measured sections have been compiled that comprise all localities where more than one bed was measured. The work remaining is to add overlying and underlying rock information to sites with single coal bed measurements.

Each coal measurement was originally recorded on an index card that included locality information and a graphic section. These 27,846 cards were scanned for public access.

Coal Borehole Database
This database contains records of coal exploration drill holes—core holes, rotary drill holes, or interpreted geophysical logs. Entry of data into this database and revision of coal bed correlations are continuous activities. At present, there are a total of 15,965 holes with valid locations. The eastern Kentucky coal field has 10,251 holes, 5,696 of which are publicly available. The western Kentucky coal field has 5,999 holes, 4,114 of which are publicly available. A complete set of public drill hole data was submitted to NCRDS in the early part of this program cycle.

Two major data acquisitions have been received within the past three years. The first, obtained from Consolidation Coal, contained all the records of Island Creek Coal Company’s western Kentucky division, including drilling data and property and mine maps. This collection of 1434 drill holes was inventoried and archived, and any drill holes not already in the database
were added. Alliance Coal Company donated all the drilling records from their eastern Kentucky Martiki property. These logs were entered into the KGS database during the 2008-2009 project cycle.

To facilitate the review of original drill hole documents a scanning program was initiated to digitize all paperwork associated with the drill hole database. The western Kentucky data are completely scanned resulting in 5,850 PDF document files. The eastern Kentucky data are about 90% complete with 8,994 documents scanned.

Upper Elkhorn No.2 Assessment

An assessment of the Upper Elkhorn No.2 coal bed was conducted in 2007/2008 using methodology similar to the National Coal Assessment program. This resulted in a complete review and revision of coal bed correlation tags for this interval in the coal borehole database. Preliminary maps have been generated defining coal zone architecture and mined out areas. Work on coal thickness isopach maps is underway.

Coal Quality Data

KGS maintains two databases related to coal quality. The first consists of samples analyzed in our laboratory or that of a known cooperator (USGS and CAER). Few additions have been made to this database in recent years. It contains 4393 proximate analyses, 2872 ultimate analyses, 3358 physical property analyses, 2293 coal petrology analyses, 318 ash mineral analyses, 1883 ash fusion analyses, and xxx trace element analyses.

A number of core holes were drilled in Kentucky in cooperation with the USGS during mapping and coal resource investigations. These holes, stored at the KGS core and sample facility, were the source of many coal samples for analysis. A recent inventory of core holdings revealed that a number of these analyses were not entered into the coal quality database. An effort is now being made to recover the original documents for these missing analyses, and update the database accordingly.

The second coal quality database is composed of analyses that were provided with drilling records donated by private companies. In addition to standard proximate and ultimate analyses, some of these samples have washibility analyses. KGS has been entering these data into the database over the past several years. There are currently 11,771 analyses in the database representing whole seam, bench, or incremental samples. About 65% of the records are standard proximate analyses and 35% are washibilities. Additional work is under way to record size data for the samples (overlooked during the first data entry phase) and to complete the entry of available records.

Future Goals

The Kentucky Division of Permits has compiled information about permitted areas for surface mining since the Surface Mine Control and Reclamation Act was passed in 1977. Permitted areas were drawn on 7.5-minute mylar overlay base maps, but these data have never been converted to GIS format to facilitate data analysis and resource assessment. KGS initiated a pilot study in 2009 to develop methodology for vectorization, and hopes to continue compiling the data so that mined out assessments of surface coal can be facilitated.

ADD-ON PROJECTS

Shale Gas Production and Oil Shale Potential in eastern Kentucky (Greb, S.F., and Nuttall, B.C.)

USGS funded KGS to collect outcrop, core, and cutting samples of the Devonian black shale in eastern Kentucky as part of a regional (Kentucky, Ohio, Tennessee, Virginia, West Virginia) study of the Devonian black shale. Samples were taken and delivered to USGS for processing in 2008. Samples were used to study the relationships of stratigraphy, organic
content, thermal maturity, clay mineralogy, and kerogen types to shale gas production and to the possible occurrences of organically rich oil shales.

Geology and Paleontology of the Stoney Fork Member, and adjacent strata
(Eble, C.F., and Greb, S.F.)

USGS funded KGS to collect core and outcrop samples of the Stoney Fork marine zone for conodont analyses. KGS sent samples to USGS for processing in 2008. KGS also sampled the coals beneath the marine zone for palynological analyses. Biostratigraphic correlations between coal fields in the basin and between the Appalachian and Midcontinent basins have largely been palynologically based, so the palynological analyses will allow comparisons with the conodont biostratigraphy.

Training Workshop for NCRDS cooperative partners
(Weisenfluh, G., and Greb, S.F.)

USGS funded KGS to host an NCRDS meeting in Lexington, in 2008. KGS hosted the meeting, managed participant travel, lodging, and meals, and ran a field trip.

Update Lexicon information for Kentucky
(Greb, S.F.)

USGS funded KGS to review and provide corrections for the current U.S. Geological Survey Lexicon (GEOLEX) contents for Kentucky. KGS has completed the work with notations for units that are no longer in use, and units used in the recent digital geologic maps. Work is completed but report still needs to be submitted. There are more than 1200 pages of names for Kentucky.