U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 97-134

U.S. GEOLOGICAL SURVEY
COAL QUALITY (COALQUAL) DATABASE: VERSION 2.0

OVERVIEW

Since the middle 1970's, the U.S. Geological Survey (USGS) has maintained a coal quality database of national scope. The USGS generated data on more than 13,000 samples on samples collected by the USGS and cooperative state geological surveys. For each sample, 136 parameters are recorded, including data on location and sample description, analytical data from ASTM tests, and USGS tests for major-, minor-, and trace elements. Many of these data have been published in various USGS Open-File Reports or other publications. This CD-ROM contains coal quality data for 7,430 coal samples that represent complete-bed thicknesses at various localities. The CD contains the coal quality data in the COALQUAL database; Landview III™ (data management software) which is integrated with MARPLOT™ (mapping software); documentation on the software and data; documents pertaining to the collection and analysis of coal samples, as well as to terminology and calculation of coal resources; and various software help files. Help files are on the CD as .pdf files (See list in PDFLIST.PDF) and can be accessed with the Adobe Acrobat Reader software, which is also included on the CD.

It is strongly recommended that the user spend 30 minutes to go through the Quick-Start Tutorial to become familiar with the software to access the COALQUAL data. As the user gains expertise, the longer tutorial covers most of the other functions, in particular mapping functions, that are useful in looking at the data. One of the advantages of this software is that the user can add new data and map sets to the data already on the CD. The next version of the CD, available after the completion of the National Coal Resource Assessment, will contain new analyses, as well as the data collected as part of the assessment.

The data are presented on a whole-coal basis, in addition the oxides are also shown as a percentage of the total ash on an ash-basis for specific elements. The standard analyses, American Society for Testing and Materials (ASTM) data are provided on an as-received basis, whereas USGS data are provided on a remnant-moisture basis (using USGS test methods, moisture contents of samples were not adequately determined prior to analysis. Therefore some samples, particularly low-rank coal samples, contained significant amounts of unmeasured moisture which would manifest an effect by reducing the amount of ash, trace- major-, and minor- elements.). Samples have been selected from the USCHEM (USgeoCHEMical) database using the following criteria:

1. GSASH data must have a positive value, not 0, in order to convert data on an ash-basis to a whole-coal basis.
2. GSASH and STDASH data must be less than or equal to 33 percent (as-determined basis).
3. All data must represent complete-bed channel or drill core (SEE list of SAMPTYPE and VALREP values in TECHINFO.PDF. For some localities, data are represented by one sample obtained either by channel or core (Swanson & Huffman, 1976; Stanton, 1989). In other localities, data were calculated from weighted averages of samples taken sequentially to represent the bed thickness. (Weighted averages are calculated by normalizing the data to the total "bed thickness" using the individual sample thicknesses.)
4. Samples must have an ESTRANK (apparent rank) value which is not a rock type. (SEE list of ESTRANK values in TECHINFO.PDF)

THE USGS MAKES NO CLAIMS AS TO THE ACCURACY OF APPARENT COAL RANK CALCULATED FROM PARAMETERS OF PROXIMATE AND ULTIMATE ANALYSES. (With some samples calculated rank may be higher due to air-drying of samples before analysis.)

All ASTM data are reported to two decimal places unless otherwise noted (SEE TECHINFO.PDF).

ALL USGS ANALYTICAL DATA ARE REPORTED TO TWO SIGNIFICANT FIGURES, EXCEPT FOR GSASH WHICH IS REPORTED TO 1 DECIMAL PLACE EVEN THOUGH THE VALUES ARE SHOWN TO THREE DECIMAL PLACES IN THE DATABASE TO MEET CONDITIONS OF THE SOFTWARE TO PROPERLY PLACE THE DECIMAL POINT.

All elemental data are reported in parts-per-million (ppm). Data fields are labeled by the two letter symbol for the element and have a suffix of _E such as AS_E, which represents elemental arsenic. (SEE TECHINFO.PDF FOR OTHER DATA FIELDS)

Qualified data are included in the database in the following manner: greater than values have been treated as the value, reported less than values have been treated by multiplying the reported less than value by 0.7 (SEE CONNOR, 1976 in REFERENC.PDF) and dropping the qualifier, and NULL values (represented by -0 in the database) represent zero values which were qualified. (Qualified zero values are obtained when a sample was not analyzed for an element (no data available), when the element had interference in its analysis, or when an element was not detected during an analysis.) The percentage of qualified values for each element was calculated using the original as-received/as-determined database (USCHEM). This percentage calculation did not include qualifiers which resulted in NULL values. See each element in TECHINFO.PDF or in the HELP files in Landview III™ Query option.

Data for elements having more than 25 percent qualified values (Au, Bi, Cd, Cl, Dy, Er, Gd, Ge, Ho, In, Ir, Nd, Os, Pd, Pr, Pt, Rb, Re, Rh, Ru, Sn, Te, Tl, and Tm) should not be used comparison purposes (statistical or otherwise) and elements with 10 to 25 percent qualified values (Ashdef, Ashsof, Ashfld, Slfate, Slfpyr, Slforg, P_2O_5, Ag, Ce, Hf, La, Lu, Nb, P, Ta, Tb, and W) should be used with EXTREME caution for statistical comparison purposes. There is no easy way to separate the qualified values from the non-qualified values in this database. The database structure will be revised in the next version of this CD to resolve this problem. If working with these elements, please contact the authors (See CONTACTS.PDF) to obtain the original qualified data.