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National Coal Resource Assessment Non-Proprietary Data: Location, Stratigraphy, and Coal Quality for Selected Tertiary Coal in the Northern Rocky Mountains and Great Plains Region

by

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SOFTWARE REQUIREMENTS

The data contained in this Open-File Report were compiled in Microsoft Excel 5.0/95. In the Location and Stratigraphy File Statistics section of this report a summary of the various files is included. This may help the user by showing the file size and number of rows within each file. This may be useful "at a glance" information because some versions of spreadsheet programs have row limitations.

INTRODUCTION

One of the objectives of the National Coal Resource Assessment in the Northern Rocky Mountains and Great Plains region was to compile stratigraphic and coal quality-trace-element data on selected and potentially minable coal beds and zones of the Fort Union Formation (Paleocene) and equivalent formations. In order to implement this objective, drill-hole information was compiled from hard-copy and digital files of the: (1) U.S. Bureau of Land Management (BLM) offices in Casper, Rawlins, and Rock Springs, Wyoming, and in Billings, Montana, (2) State geological surveys of Montana, North Dakota, and Wyoming, (3) Wyoming Department of Environmental Quality in Cheyenne, (4) U.S. Office of Surface Mining in Denver, Colorado, (5) U.S. Geological Survey, National Coal Resource Data System (NCRDS) in Reston, Virginia, (6) U.S. Geological Survey coal publications, (7) university theses, and (8) mining companies.

Non-proprietary and proprietary data from more than 18,000 oil and gas wells, coal drill holes, and outcrop measured sections were collected in the Powder River, Williston, Hanna, Carbon, and Greater Green River (east flank of the Rock Springs uplift) Basins. These data come from 6,217 locations in the Powder River Basin, 6,033 in the Williston Basin, 1,905 in the Hanna and Carbon Basins, and 4,052 in the Greater Green River Basin (east flank of the Rock Springs uplift). Only the non-proprietary drill-hole and measured section data (11,020) are included in this Open-File Report. These drillholes penetrated the Fort Union Formation in the Powder River, Williston, and Greater Green River (east flank of Rock Springs uplift) and the Ferris and Hanna Formations in the Hanna and Carbon Basins.

Data from hard copy were entered directly into the StratiFact database manager or entered into a spreadsheet format and then imported into the StratiFact database manager. The database includes information on: (1) drillhole identification, (2) geographic location (latitude, longtitude, northings, eastings, section, township, and range, elevation, drillhole depth, county, and 7 ½ minute quadrangle name where available), (3) data source or operator's name, (4)

confidentiality (i.e. proprietary or non-proprietary) (5) stratigraphic measurements (depth in feet to various lithologic contacts), (6) lithologies (rock types and lithologic modifiers (i.e. carbonaceous shale), (7) stratigraphic nomenclature (i.e. formation names and coal zone names). The data from the drill holes were then correlated using StratiFact. All data (proprietary and non-proprietary) from this investigation are archived in the USGS National Coal Resource Data System (NCRDS). In this Open-File Report geographic (location) and stratigraphic output from StratiFact were recombined through use of other relational database programs (Access) and output into Excel formats.

FILE ORGANIZATION

This CD-ROM includes six folders that contain the data for the assessed coals in the Northern Rocky Mountains and Great Plains. The folders are named Carbon (Carbon Basin), Green (Green River Basin), Hanna (Hanna Basin), Powder (Powder River Basin), Willist (Williston Basin), and Coalqual (Coal Quality). Each folder contains an Excel spreadsheet(s) file(s), and except for Coalqual, a Word file and a .pdf file containing a composite stratigraphic column showing the assessed coal within the region and (in bold) the particular coal contained within that folder.

LOCATION AND STRATIGRAPHIC SPREADSHEET FIELDS

There are 15 to 20 columnar fields containing the location and stratigraphic data within the spreadsheets. A brief description of these fields follows.

Point ID contains the location point identifier that was used in the stratigraphic relational database. This may be expressed as an alpha numeric or numeric.

Data Source is the source of the drill hole information. This may be the lease operator, data collector, or a report. An alpha numeric or numeric point identifier, often in parentheses, is commonly included within this field and denotes the point ID from the original report. Acronyms are commonly used to denote mining and petroleum companies such as CCCO, BNI, SUNOCO, UREX, and some government agencies such as USGS, CDC (Conservation Division of the USGS), MBMG (Montana Bureau of Mines and Geology). This data was most commonly derived from geophysical log headers and may have been abbreviated to accommodate field limitations within some programs.

Elevation is measured in feet above sea level and is expressed to one decimal place.

Depth is the depth of the drill hole in feet, or the depth to which the interval was described expressed to one decimal place.

Latitude is expressed in decimal degrees to five decimal places.

Longitude is expressed in negative decimal degrees to five decimal places.

UTM Northing is the Universal Transverse Mercator coordinate with values carried to two decimal places.

UTM Easting is the Universal Transverse Mercator coordinate with values carried to two decimal places.

Township is expressed as north or south depending upon the local survey. This information is not available for all locations.

Range is expressed as east or west depending upon the local survey. This information is not available for all locations.

Section is expressed as a number from 1 to 36. This information is not available for all locations.

7 ½ Minute Quadrangle is the name of the U. S. Geological Survey map that contains the location of the drill hole. This data is not available for all locations.

County is shown if that information is available.

State is shown for all locations.

Quarter Section Location is the location within the section and is not available for all locations.

Lithology Top is the depth in feet from the surface to the top of the lithology listed for that interval and is expressed to two decimal places.

Lithology Bottom is the depth in feet from the surface to the bottom of the lithology listed for that interval and is expressed to two decimal places.

Lithology is the descriptive term used by the data collector for the rock in the interval. **Rock** is the generic term used by some data collectors to represent undifferentiated sedimentary rock types other than coal.

Lithology Modifier is the descriptive term provided by data collectors to more specifically describe the rocks.

Zone includes the name of the formation and member, as recognized by the U. S. Geological Survey, and coal zone name, which is informal and often reflects local and mining terminology.

LOCATION AND STRATIGRAPHY FILE STATISTICS

BASIN	FILE NAME	FILE SIZE	ROWS IN FILE	NUMBER OF NON-PROPRIETARY DATA POINTS
Carbon Basin	J107.xls (Excel File)	569.0 KB	1,973	51
Green River Basin	Deadman.xls (Excel File)	901.0 KB	2,525	148
Hanna Basin	Ferris50.xls (Excel File)	41.0 KB	91	8
	Ferris65.xls (Excel File)	60.5 KB	160	17
	Hanna77.xls (Excel File)	163.0 KB	527	21
	Hanna78.xls (Excel File)	535.0 KB	1,873	109
	Hanna79.xls (Excel File)	473.0 KB	1,675	108
	Hanna81.xls (Excel File)	348.0 KB	1,157	43
Williston Basin	Beulah.xls (Excel File)	3.04 MB	14,125	2,116
	Hagel.xls (Excel File)	8.81 MB	19,947	2,133
	Hansen.xls (Excel File)	1.31 MB	6,347	306
	Harmon.xls (Excel File)	1.66 MB	8,122	380

BASIN	FILE NAME	FILE SIZE	ROWS IN FILE	NUMBER OF NON-PROPRIETARY DATA POINTS
Powder River Basin	Wyodak1.xls (Excel File)	4.56 MB	14,155	815
	Wyodak2.xls (Excel File)	5.22 MB	15,716	736
	Wyodak3.xls (Excel File)	3.91 MB	13,140	273
	Wyodak4.xls (Excel File)	4.12 MB	14,096	697
	Wyodak5.xls (Excel File)	2.53 MB	7,116	389
	Wyodak6.xls (Excel File)	4.71 MB	14,957	935
	Wyodak7.xls (Excel File)	4.57 MB	14,063	774
	Wyodak8.xls (Excel File)	4.33 MB	13,545	845
	Knobloch.xls (Excel File)	1.20 MB	4,222	153
	Rosebud.xls (Excel File)	506.0 KB	1,722	187

COAL QUALITY DATA

Another task of the coal resource assessment in the Northern Rocky Mountains and Great Plains region is to collect coal quality and trace-element geochemical data from the selected Fort Union and equivalent coal beds and coal zones in the Powder River, Williston, Hanna, Carbon, and Greater Green River (east flank of Rock Springs uplift) Basins. These coal-bed and coal-zone properties were directly related to a drill hole or correlated to the nearest drill hole. Thus, both stratigraphic and coal quality-trace element properties are linked in the databases by a unique Point ID. The data sources for coal quality are: 1) the unpublished, but available, U.S. Geological Survey coal quality database USCHEM, February, 1992, and 2) Bragg and others (1994). Proprietary data were used to calculate range (minimum and maximum value) and arithmetic means for coal quality in the various basins; these ranges and means are published in U.S. Geological Survey Professional Paper 1625-A, but not in this report. Coal quality data include moisture; ash yield; total sulfur; calorific value; pounds of sulfur dioxide per million Btu; moist, mineral-matter-free Btu; and elements of environmental concern.

The 12 trace elements of environment concern include antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, selenium, and uranium.

COAL QUALITY SPREADSHEET FIELDS

The coal quality spreadsheet file is organized into 24 columnar fields that contain location and quality information.

Point ID contains the unique sample identifier that was used in the coal quality database. This Point ID identifier is the same Point ID used in the stratigraphic relational database whenever the locations are the same. When locations are different or whenever stratigraphic data are missing, no corresponding Point ID will be found in the stratigraphic database.

Basin is the assessed sedimentary basin from which the coal sample was collected.

Coalfield is the coalfield from which the coal sample was collected. These data are not available for all samples.

Assessment unit is the coal bed or zone assessed. It may have either an informal name or a published coal bed or zone name which often reflects local and mining terminologies.

Latitude is the latitude coordinate for point source location of coal sample in decimal degrees. All samples are in the Northern Hemisphere (north is implied, not expressed).

Longitude is the longitude coordinate for point source location of the coal sample in negative decimal degrees. All samples are in the Western Hemisphere (west is indicated by a negative value).

Moisture is the moisture value (as-received basis) in percent to two decimal places as determined by ASTM method D3173-93 (ASTM, 1994c).

Ash yield is the ash value in percent to two decimal places as determined by ASTM method D3174-93 (ash obtained at 750 degrees C) (ASTM, 1994d).

Total sulfur is the total sulfur value in percent to two decimal places as determined by ASTM method D3177-89 (ASTM, 1994e).

Calorific value is the gross calorific value of the coal sample expressed in British thermal units per pound (Btu/lb) as determined by ASTM method D2015-94 (ASTM, 1994b).

Pounds of sulfur dioxide per million Btu (lb SO_2/MMBtu) is a calculated value to two decimal places used in measuring sulfur emissions from coal fired power plants. Calculation is according to the following formula:

l**b SO_2/MMBtu** = (2,000,000 x percent sulfur)÷Btu

Moist, mineral-matter-free Btu (MMMfBtu) is a calculated value used in conjunction with other variables to determine apparent rank. Calculation follows ASTM method D388-92a (ASTM, 1994a, p. 171) and is according the following formula:

MMMfBtu = 100 x (Btu – 50 x percent sulfur) ÷ (100 – (1.08 x ash yield + 0.55 x percent sulfur))

Antimony is the antimony (Sb) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Arsenic is the arsenic (As) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Beryllium is the beryllium (Be) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Cadmium is the cadmium (Cd) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Chromium is the chromium (Cr) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Cobalt is the cobalt (Co) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Lead is the lead (Pb) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Manganese is the manganese (Mn) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Mercury is the mercury (Hg) value to three decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Nickel is the nickel (Ni) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Selenium is the selenium (Se) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

Uranium is the uranium (U) value to two decimal places in parts-per-million and on whole-coal and remnant moisture basis.

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