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A Stratigraphic Coding System for Data Entry into the National Coal Resources Data System

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This report is preliminary and has not been reviewed for conformity with USGS editorial standards and stratigraphic nomenclature.

STRATCODE, a computer program designed to incorporate a numerical coding system for stratigraphic descriptions, has been written for use with the National Coal Resources Data System (NCRDS), which operates on a Prime computer. The use of a rock code for lithologic descriptions can eliminate many hours spent describing rocks in the field and entering field rock descriptions into the computer in the office. The codes used presently in the program are based upon the coding system developed in Ferm and others (1985), Ferm and Smith (1981), and Ferm and Weisenfluh (1981). These references provide the user with the codes, how to use the coding system, and pictures of representative cores of the rock types.

Dictionaries containing the stratigraphic codes and the equivalent English descriptive data have been established within the STRATCODE program. The dictionaries are used to convert the numerical stratigraphic codes into descriptive terms appropriate for use in the NCRDS USTRAT data base. The three dictionaries used presently in this program are organized by geographic area - the Pittsburgh basin, the southern Appalachians, and the Rocky Mountain area, following the source material cited above. If more code books or other coding systems become available or are necessary to users, new dictionaries can be created in coordination with the data base manager.

The STRATCODE program is user-friendly, menu-driven, and contains numerous help sessions. The five steps of the data entry process are shown in a flowchart in figure 1. The main menu of the program is shown in figure 2. In brief, the coded data are entered into the system, and an update file is created from the stratigraphic codes and used to insert the descriptive terms into the appropriate data base fields.

The **first** step is to create a raw data file in a format acceptable to the NCRDS stratigraphic data base. One method for the creation of a raw data file is use of the the microNCRDS program designed for the personal computer (O'Connor and SanFilipo, in preparation). When typing in the raw data, the lithologic description code MUST be entered into the wildcard2 field (see figure 3 - unit information). If information such as bed and formation are available, they must be entered with the header information, thickness, and wildcard2 information (figure 3). The code will be used to fill in the descriptive data in the fields corresponding to lithology, lithologic modifier, color, grainsize, grainshape, mineralogy, bedding, contact, fossils, fractures-joints-cleats, and comment 2.

Lithologic characteristics not covered by a specific code may be added in the appropriate fields simply by typing the proper descriptors at the time of data entry. The STRATCODE process will not destroy any data entered into fields not

covered by a code. However, the program will overwrite data entered into a field for which the code has data. For example, code 314 in the Pittsburgh basin represents black massive sandy shale. Therefore, the following fields will be overwritten as such (see figure 4):

field no. 48 - lith - sh

field no. 49 - lithmod - sdy

field no. 50 - color - blk

field no. 54 - bedding - mass

If, for example, "ss strs" had been entered in the lithmod field at the time of data entry, it would be overwritten by "sdy." Check the appropriate STRATCODE basin dictionary before entering additional descriptive data to ensure that the data are not entered into fields that will be overwritten.

The **second** step is to run the ADDABS program on all the raw data. This must be done by NCRDS personnel. The ADDABS program is used to convert raw data created during the data entry process into a file that is compatible with the NCRDS master database file. The file created is called a PACER file and will be used within the STRATCODE program.

The **third** and **fourth** steps are performed by the user with the STRATCODE program.

The **third** step entails making a PACER list from your newly created PACER file (Option 1 of the program, figure 2). The

PACER list will consist of unique computer-assigned NCRDS key numbers (record keys) and the stratigraphic code that was entered in the wildcard2 field. Follow the menu within the STRATCODE program; the STRATCODE program will access the PACER file and make the list.

The **fourth** step (Option 2, figure 2) involves making an update file from the PACER list created in step 3. The update file consists of NCRDS record keys, field numbers (data base record structure numbers that correspond to fields such as lithology, lithologic modifier, etc.), and items to be added to those fields. The STRATCODE program uses its own dictionaries to convert the code contained in the wildcard2 field into data compatible with NCRDS USTRAT record data fields.

The **last** step adds data to the NCRDS master data bases using the update file. This process uses the CORRABS program and must be done by NCRDS personnel. Using the computer record keys as a guide, the CORRABS program overwrites the fields for which the codes have data. Only items specified in the update file are overwritten, thereby allowing data not covered by the codes to be entered into the data bases.

To use the program, type "STRATCODE". The main menu, as shown in figure 2, will then appear on the screen. Help sessions that explain each step are available on the following topics:

1. An Overview of the STRATCODE program.
2. Making a PACER list.
3. Making an Update file.
4. Listing a Basin dictionary.

A full listing of the dictionaries containing the codes and their associated descriptors can be printed out by selecting Option 3 of the STRATCODE program. The program will ask which dictionary is needed and then will print it out in its entirety (see figure 4 for a partial listing).

In order to facilitate some original alpha-character descriptors, decimals were added by the authors to the basic codes in the Pittsburgh basin dictionary so the computer would accept the slight variations. Three basic codes have been altered:

543

543.0 gray sandstone w/ shale streaks

543.1 gray sandstone w/ shale streaks, flat

543.2 gray sandstone w/ shale streaks, rippled

543.3 gray sandstone w/ shale streaks, rippled green

644

644.1 gray carbonate cemented sandstone, calcite

644.2 gray carbonate cemented sandstone, siderite

772

772.1 shale breccia

772.2 shale breccia, silty

The STRATCODE program is easy to use and can result in reduced data entry time and keypunch expenses.

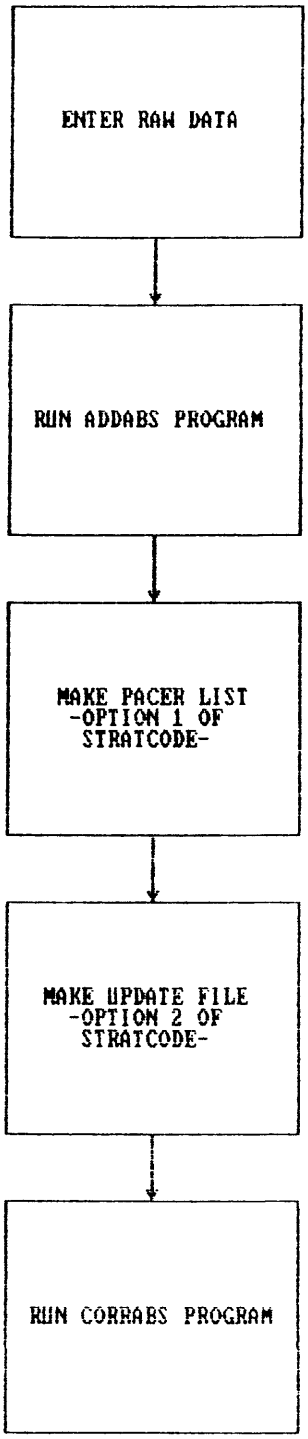

Figure 1. Process for adding Stratcodes and stratigraphic values to NCRDS data.

MAIN MENU

SELECT THE ROUTINE DESIRED

1)	MAKE A PACER LIST	Creates a file containing keys and wild card 2 fields from your PACER file.
2)	MAKE AN UPDATE FILE	Creates an update file containing the appropriate stratigraphic data for your PACER file.
3)	LIST THE DICTIONARY	Creates a listing of the stratcodes and their stratigraphic data for each book available.
4)	HELP	
5)	EXIT STRATCODE	

Figure 2. Main menu of the STRATCODE Program.

USTRAT Data Entry Form
Header Information

Point ID XXXXXXXXXXXXXXXX Quad XXXXXXXXXXXXXXXXXXXXXXXXXXX

State XXXXXXXXXXXXXXXX County XXXXXXXXXXXXXXXXXXXXXXX Prov XXXXXXXXXXXXXXX

Region XXXXXXXXXXXXXXXXXXXXXXX Field XXXXXXXXXXXXXXX

Geologist XXXXXXXXXXXXXXXXXXX Source XXXXXXXXXXXXXXXXXXXXXXX

Surface Elv. XXXXXXX Elv. Prec XX Total Depth XXXXXX (ft.) XXXXX (in.)

Description Log XXX Weathering X Filepointer XXXXXXXXXXXXXXX

Est. Rank XXXXXXXXXXXX Local: Strike XXX Dip XXX Angle XXX

Latitude XX XX XX X Longitude XXX XX XX X Lat./Long. Precision XX

Ownership XXXXXXXXXXXXXXX Date XXXXXX Confid X Prin Meridian XX

Quarters XX XX XX XX Section XXXX Township XXXXX X Range XXXXX X

Comment1 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX Hydro Cd XXXXXXXX

New Cards 0 of 0

USTRAT Data Entry Form
Unit Information

Unit No. XXXX

Unit Qualifier XXXX

From XXXXXX (ft.) XXXXX (in.)
To XXXXXX (ft.) XXXXX (in.) Thickness XXXXXX (ft.) XXXXX (in.)

Formation XXXXXXXXXXXXXXXX Name XXXXXXXXXXXXXXXXXXX

Primary Lithology XXXXXXXX Lithology Modifier XXXXXXXXXXXX

Color XXXXXXXX Grain Size XXXXXXXX Grain Shape XXXXXXXX

Mineralogy XXXXXXXXXXXX Bedding XXXXXXXX

Contact X Fossils X Fractures X Joints X Cleats X

Wildcard 1 XXXX Wildcard 2 XXXXXXXX

Comment2 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

New Cards 5 of 5

Figure 3. Data entry form of KEYPUNCH routine of the micro-NCRDS program. X's show where data are entered and amount of space available for that data.

287.0
LITH: CLST LITHMOD: COLOR: RED-GN
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: CONTACT: FOSSILS: FJC:
COMENT2: W- LS NODS

300.0
LITH: SH LITHMOD: SDY COLOR:
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: CONTACT: FOSSILS: FJC:
COMENT2:

313.0
LITH: SH LITHMOD: SS STRS COLOR: BLK
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: CONTACT: FOSSILS: FJC:
COMENT2:

314.0
LITH: SH LITHMOD: SDY COLOR: BLK
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: MASS CONTACT: FOSSILS: FJC:
COMENT2:

315.0
LITH: SH LITHMOD: SDY COLOR: BLK
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: MASS CONTACT: FOSSILS: FJC:
COMENT2: CHRN

316.0
LITH: SH LITHMOD: SDY COLOR: BLK
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: CHRN CONTACT: FOSSILS: FJC:
COMENT2:

317.0
LITH: FCLY LITHMOD: SDY COLOR: BLK
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: CONTACT: FOSSILS: FJC:
COMENT2:

318.0
LITH: SH LITHMOD: SDY COLOR: BLK
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: BRW CONTACT: FOSSILS: FJC:
COMENT2:

319.0
LITH: SH LITHMOD: SDY COLOR: BLK
GRNSIZE: GRNSHAPE: MINERAL:
BEDDING: CONTACT: FOSSILS: 0 FJC:
COMENT2:

Figure 4. Example of the Stratcode Dictionary.

References

Ferm, J.C., and Smith, G.C., 1981, A guide to cored rocks in the Pittsburgh basin, Department of Geology, University of Kentucky, Lexington, KY, 109 p.

Ferm, J.C., and Weisenfluh, G.A., 1981, Cored rocks of the southern Appalachian coal fields, Department of Geology, University of Kentucky, Lexington, KY, 93 p.

Ferm, J.C., Smith, G.C., Weisenfluh, G.A., and DuBois, S.B., 1985, Cored rocks in the Rocky Mountain and High Plains coal fields, Department of Geology, University of Kentucky, Lexington, KY, 90 p.

O'Connor, J.T. and SanFilipo, J., in preparation, MicroNCRDS: Data entry program for the National Coal Resources Data System.

Smith, G.C., 1982, Methods and criteria for producing a photographic core logging manual for the "Pittsburgh basin," unpublished Masters thesis, University of South Carolina, 60 p.