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Guide to the use of PACER, the data retrieval and update system for the National Coal Resources Data System (NCRDS)

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INTRODUCTION

PACER Background

The Program to Analyze Coal Energy Resources (PACER) was developed to extend the capability of the Geological Retrieval and Synopsis Program (GRASP) and to provide interactive access to the National Coal Resources Data System (NCRDS) data base files.

PACER Capabilities

PACER provides the capability to select and display all or a part of the data stored in NCRDS. PACER commands are available to request selection, retrieval, display, and statistical analysis of the data. The user may define new data items based on existing data or specify that the requested data be written to disk rather than displayed on the terminal. User assistance commands are also available if questions arise during the use of the PACER system. The typical use of PACER would include selecting a PACER data base, specifying the criteria for the selection of data, and requesting the display of the selected data, e.g. the commands COND, LOGI, SEAR, LIST. Other uses are illustrated in the description of the rest of the PACER commands.

Organization of the PACER User Manual

This manual provides a narrative of PACER as applied to the NCRDS system. Since PACER is an adaptation and extension of GRASP this manual has drawn heavily from the GRASP USER MANUAL submitted by Jones, Bowen and Botbol. The organization of this manual follows their excellent precedent. Use of the system for selection and display of data is covered first since this is this is the primary function of PACER. This is followed by a section on data base structure and requirements and a section showing examples of using PACER as it exists on the U.S.G.S. Honeywell Multics system.

Note: The Multics system operates in lower case. Capital letters are used in this manual only for clarity.

Note: Since the NCRDS - PACER system is a dynamic one, users are notified of changes when they occur via an information segment printed when enter-

ing PACER.

Acknowledgements

PACER has been developed under the direction of the NCRDS-Branch of Coal Resources. The primary programmers have been A.C. Olson, A.L. Medlin, R.J. Smith, D.Blake and S. Crowley.

USING PACER

Access to PACER

To use PACER, one must first obtain administrative access to the U.S. Geological Survey MULTICS computer system in Reston, Virginia. Access procedures to the NCRDS data bases begins with a request for the necessary forms from M. Devereux (Debbie) Carter, NCRDS Project Manager, (703) 860-7464, FTS 928-7464, or write to:

M. Devereux Carter
USGS National Center
Mailstop 956
Reston, VA 22092

She can assist in explaining these procedures. The Reston computer center of USGS grants access. This procedure can be completed quickly if the correct forms are completed and returned to D. Carter as the instructions request. Any diversion from the requested procedures will result in a delay in processing the access request and can unintentionally result in the forms being 'lost'.

Upon completion of the procedures to obtain access permission, two pieces of information will usually be given to you as a new user: 1) a user identification (person_id), and 2) a password. The person_id identifies a user to the computer system for computer usage and billing purposes. The password is used to verify that the individual is a valid user. Normally, an individual should not disclose his/her password to anyone. Please note: there is no NCRDS charge for the use of any NCRDS data bases. THE COMPUTER CENTER CHARGES FOR THE USE OF THE COMPUTER. Therefore direct all billing questions and problems to:

Computer Center Division
USGS National Center
Mailstop 804
Reston, VA 22092

or call (703)860-7123, FTS 928-7123.

Once administrative access is obtained, the user must identify him/herself to the computer (login via terminal) and request the use of PACER, by typing in the command 'pacer'. Again, the Computer Center management staff can explain these procedures in detail. When this procedure is complete, the user will be working in a PACER environment. Generally, the user does not encounter any aspect of the Multics system except as presented and controlled by PACER. There are however some often used Multics commands which operate outside PACER which are important to know. They are described in Appendix IV. But it should be understood that PACER drives the computer and the user drives PACER.

The PACER Environment

The majority of the data managed by PACER may be viewed as a table of rows and columns. The exception to this is data included in USTRAT files; see the PACER program documentation for details.

The table represents a collection of data forming one logical grouping called a record. Each column in the table divides the record into individual fields and provides a name by which all fields in the column are known. This name is a single word shorthand for the attribute of the data items in each column. The following table depicts an example of a data base which will be used throughout the text.

state	county	quad	bed	sulfur %	as ppm
virginia	buchanan	jewell ridge (7.5')	jewell	0.48	10.00l
virginia	buchanan	jewell ridge (7.5')	kennedy	0.70	10.00l
virginia	buchanan	jewell ridge (7.5')	jawbone	0.50	5.00
virginia	buchanan	jewell ridge (7.5')	kennedy	0.60	2.00
virginia	tazewell	jewell ridge (7.5')	jawbone	0.50	1.00
virginia	tazewell	jewell ridge (7.5')	kennedy	0.60	2.00

Typical questions that might be asked are:

What county in virginia has coal with sulfur less than .5 percent?
(sulfur lt .5)
What are the As values for the jawbone bed in Tazewell County?
(bed eq jawbone and county eq tazewell).

PACER allows the user to access one or more related or unrelated data bases. The data base names are maintained in a catalog called the index file which must be present for PACER to function login properly. When the login procedures listed in the preceding section have been completed, PACER will display a welcome message to the user, display the names of the available data bases, and request that the user select one of these data bases. The user responds by typing the name of one of the data bases. PACER will then ask the user to enter a command. PACER is now ready to accept user supplied instructions for the selection and retrieval of data.

As with most automated systems, PACER has a unique terminology and requires specific responses to questions. For instance, when PACER asks for a command to be entered, there are only 17 valid responses:

CONDITION	LOGIC	SEARCH	LIST
NAMES	FUNCTION	KEYS	HELP
DEFINE	UPDATE	STAT	DUMP
TABLE	REVIEW	MULTICS	FILE
QUIT			

These commands can be abbreviated using the first four letters or the full name can be typed; e.g. CONDITION may be either spelled out completely or entered as COND.
A list of commands can be obtained by entering HELP.
Most commands ask questions that allow the user to identify a set or subset of data and examine and manipulate it.
Most questions involve identifying the data base and the item names of interest in the data base (use the NAMES command or refer to Appendix II). For instance STATE, COUNTY, BED and COLECTR are used to identify state, county, coalbed names and the data collector's name in the PACER data base files.

At this point it should be noted that when anything is to be "entered" into the computer, the word or value to be entered must be typed and followed by a "carriage return" (hereafter referred to as CR). This CR is the mechanism that sends the typed information from the terminal to the computer. After an entry is made and processed ENTER COMMAND: will be typed for the next entry (this is called being in the "command

mode".

Two terms which are not self-explanatory will appear from time to time while using PACER: data type and category. The data type is used to describe whether the data is alphabetic or numeric and to describe how the data is stored. This information has minimal impact on a PACER user but is explained here to avoid later confusion. It is essential to know, however, when making a user formatted (f) list under the LIST command. The following table gives the posible data types and their associated meanings (see also Appendix III):

Data Type	Meaning
1	Integer data up to 11 digits long
2	Floating point data (includes a decimal point)
3	Alphabetic data up to 36 characters long
4	Single character value
5	Qualified floating point data
6	Variable length alphabetic data

Type 3 data is used for character data which repeat themselves in the data base. In the sample data base, state and formation could be defined as type 3 data. Type 5 data is similar to type 2 except that a qualifier code may be used. Valid qualifier codes are blank, b, g, l, t, h, and n. This data type was designed to support geochemical data. See NAMES command for USCHEM data base definitions or Appendix II.

Categories are used to group data items into groups of related items. They are used predominately with the NAME and DUMP command. Categories are particularly helpful when there are many data items making up a data record and only a few catagories that are of interest for reviewing.

Selecting a PACER Data Base

There are two methods used to select a PACER data base file. One is upon initial entry into PACER as was described in the previous section. The second method is by using the FILE command which allows the user to switch from one master data base file to another while in the same PACER session. The data base file selected upon entry into PACER or by the FILE command is called the the "selected master file".

As the NCRDS data bases have grown, two of the master data base

files have been broken down into sub-master data base files in order to cut down SEARCH time and expense. The submaster files should be entered as the "input file" if the user wants to SEARCH these data base files after the main master data base has been chosen. Combining data from files under the same master data base during the SEARCH command is explained in the SEARCH section further on in the manual.

The presently available master data base files and the sub-master data base files are:

USCOAL - ECOAL, WCOAL and NEWCOAL
USALYT
USCHEM
USGEOL
BMALYT
USTRAT - MTSTRAT, WYSTRAT, COSTRAT, VASTRAT, WVSTRAT, ALSTRAT NMSTRAT, KSTRAT, KYSTRAT, PASTRAT, MDSTRAT, TNSTRAT, MOSTRAT, ARSTRAT, MSSTRAT, and CROSTRAT (the U.S.G.S.- Conservation Div. Cro/Cdp map data) naming convention = state postal abbreviation prefix plus "strat".
BMRESBAS
USPET
ICHEM

The FILE Command

This command asks the user for a data base name. If the requested data base does not exist, the error message

"data base name IS NOT AN AVAILABLE DATABASE. USE ONE OF THE FOLLOWING:"

is displayed followed by a list of valid data base names. One of these data base names must be entered. In addition to the previous error message, the user may be instructed to

"USE THE PACER FILE COMMAND TO SELECT A DIFFERENT DATABASE
OTHERWISE ENTER THE QUIT COMMAND"

This message will appear if PACER encounters difficulty accessing the requested data base. When this message appears, the Data Base Administrator or the individual responsible for PACER should be contacted.

Conditional Selection of Data

PACER uses three commands to establish selection criteria for data: CONDITION, LOGIC, and SEARCH. The user can specify one to twentysix conditions. Each condition is identified by a letter which is used to refer to that condition in the LOGIC command. There is a limit of 10 between and equal conditions per logical search. The LOGIC command is used to provide a logical connection for each of the desired conditions. The SEARCH command then uses the retrieval criteria provided by the CONDITION and LOGIC commands to create a subset (file) of data. This file can then be used by other PACER commands. Following the detailed description of these commands is an example showing the combined use of each.

The CONDITION Command

The CONDITION command allows the PACER user to specify a set of retrieval conditions. These conditions consist of three parts: a data name, a relational operator, and a data value. These conditions remain in effect until a new set is entered. The data name is the name of a data item in the data base. The relational operator is one of the following:

operator	meaning
eq	equal to
ne	not equal to
gt	greater than
lt	less than
ge	greater than or equal to
le	less than or equal to
be	between (numerically inclusive)
cs	contains substring (character string)

The data value is a series of numbers, letters, or words which are stored in the data base. In the case of data values for qualified real data (which is a special data type used principally for geochemical analysis) the qualifier is enclosed in parenthesis (eg. trace eq (g)).

When the command CONDITION is entered, PACER will respond with the capital letter A. A retrieval condition should then be entered followed by a CR. PACER will again prompt with the next sequential capital letter. This sequence will be repeated until all retrieval conditions have been entered. To end the prompting, enter only a CR in response to the capital letter prompt. A maximum of 26 retrieval conditions may be entered.

Each of the relational operators requires a single value except the BE (between) operator. This operator requires two values: a lower limit and an upper limit. These two values must

be separated by a comma (eg. depth be 3000,6000).

The CS (contains the character string) operator is similar to the EQ operator except that only a part of the value need be entered. The substring operator can only be used with alphabetic data

(types 3 and 6). For instance, if bed were a data name and a retrieval condition was to specify all data that have pittsourgh as a component of bed, the following two examples of conditions would accomplish the same purpose:

Example 1	Example 2
A. bed eq pittsburgh	A. bed cs pittsburgh
B. bed eq pittsburgh no 8	
C. bed eq pittsburgh main	

The following LOGIC command as described below would also have to be included to complete the retrieval criterion.

	Example 1	Example 2
	a.or.b.or.c	a
or	a+b+c	a

Use of the CS operator could result in two unexpected results. If the operand of the condition, in this case pittsburgh, has two different spellings or has been misspelled, some desired records may not be selected. The other unexpected result would be the retrieval of extra data if the operand is used in a context other than the context for the desired retrieval. An example showing both results is the selection of Army locations using LOCATION CS FORT as the condition against the following list of values for LOCATION.

FORT BELVOIR
FT. COLLINS
BEAUFORT
FORT LEE

BEAUFORT, which is not wanted, would be selected and FT. COLLINS, which is wanted, would not be selected.

If during the current terminal session, additional retrieval conditions are needed or a list of current conditions is desired, the CONDITION command can be entered and ".add" supplied as the first retrieval condition. This will cause a list of existing conditions to be printed. PACER then prompts for additional conditions.

The LOGIC Command

The LOGIC command is used to specify which retrieval conditions are to be used in the data retrieval process and to supply the and/or/not logic that defines a retrieval criterion. The logical expression is constructed using the letters corresponding to the conditions entered via the CONDITION command, the logical operators AND, OR, or NOT, and the left and right parentheses (if grouping of logical expressions is necessary). The logical operators must be entered as .AND., .OR., or .NOT. . The symbols *, +, or - may also be used for .AND., .OR., or .NOT. respectively; in fact they are most commonly used in NCRDS PACER work.

In any retrieval, PACER evaluates NOT (-) expressions first, then the AND (*) expressions, and then the OR (+) expressions. If parentheses are used to group logical expressions, expressions within parentheses are evaluated first.

For example:

a. state eq virginia
b. county eq buchanan
c. county eq tazewell
d. CR

would be linked as a*(b+c) or a.and.(b.or.c)

The LOGIC and CONDITIONS will remain in effect for all further searches until new LOGIC or CONDITIONS are entered.

The SEARCH Command

The SEARCH command is used to select data from the data base according to the conditions and the logical arrangement supplied by the CONDITION and LOGIC commands.

When the SEARCH commmand is entered, an input and output file will be requested. The input file may be the name of a selected master file, or in the case of USTRAT and USCOAL one of sub-master data base files or the name of a file created by a previous execution of the SEARCH command. The output file name can be any name. Care must be taken in the file naming process because if the file to be created has the name of an already existing file, the contents of the older file will be replaced by the retrieved data.

OUTPUT FILE NAMES MUST BE 6 CHARACTERS OR LESS.

After a successful search has been made, PACER will display the number of records searched, the number of records found which match the selection criteria and the name of the file where the selected records are stored.

It will also be asked if the user wants to search another input file. This option allows another input file from the same data base (i.e. any of the USTRAT files) to be searched with the same conditions and the resultant data will be added to the first resultant file. This is the method PACER uses to combine or merge files.

The only restriction to a search is that the input and output file names can not be the same. If the same name is used for input and output, PACER will identify the duplication and ask for another output file name. If an input file not currently known to PACER is requested, PACER will inform the user of the condition and ask if the user wants to use this file. If answered yes, the file must already exist on the computer system. If answered no, the SEARCH command is terminated and PACER will ask for another command.

Example of Conditional Selection

The following example of the CONDITION, LOGIC, and SEARCH commands is based on the sample data base appearing on page 3.

```
ENTER COMMAND: cond

A. bed eq jawbone

B. sulfur lt 1.0

C. CR


ENTER COMMAND: logi

ENTER LOGIC: a.and.b    (or    a*b)

.


ENTER COMMAND: search

ENTER INPUT FILE NAME: sample
```

```
ENTER OUTPUT FILE NAME: example
ALL   10 RECORDS OF sample   SEARCHED.
       1 RECORDS FOUND WHICH SATISFY THE REQUEST.
THEY HAVE BEEN STORED IN example

DO YOU WANT TO SEARCH ANOTHER INPUT FILE?
n
```

The following is an example of how to structure a conditional search for qualified data as in USCHEM:

```
ENTER DATABASE NAME: USCHEM



ENTER COMMAND: COND

A. ashsof eq 2910  -  (will give all qualified  and unqualified data with
                       a numeric value of 2910)
B. ashsof eq (g)   -  (will give only ashsof data with a "g" qualifier)

C. ashsof eq ( )   -  (will give all unqualified ashsof data)

D. ashsof ne (g)   -  (will give all ashsof data witnout a "g" qualifier)

E. ashsof ne ( )   -  (will give all ashsof data with any qualifier)

F. CR


ENTER COMMAND: LOGIC

ENTER LOGIC: a*b   -  (will give all 2910g records)
```

The KEYS Command

Use of this command , if not understood, could lead to erroneous searches; therefore, use the KEYS command only when the user is familiar with PACER.

The KEYS command is based upon the fact that PACER creates keyed files where every record in each data base file has a unique key assigned to it when it is added to the system. The key of a record is an integer value and is assigned in ascending numerical order.

The key can be used as a data item in lists and searches as any other data item. The KEYS command makes use of these keys by isolating only the keys specified for all further work during the present PACER session. This is particularly useful in avoiding searching an entire data file,

for example: entering the keys 18934,19000 and 19250 when working with a USTRAT file limits any subsequent search to the records with keys between and equal to 18934 and 19000, and equal to 19250.

```
ENTER COMMAND: KEYS

1. 18934,19000      (keys be 18934 and 19000)

2. 19250;           (refers to this one key only)

3. CR
```

If these are the records of interest and no further delineation is necessary by conditions, then COND and LOGIC may be skipped. SEAR can be entered and the master data base file file (or sub-master data base file) should be entered as the INPUT file, e.g.:

```
ENTER COMMAND:  search

ENTER INPUT FILE NAME: alstrat

ENTER OUTPUT FILE: example


ALL 67 records of alstrat have been  searched
    67 records found and stored in example

DO YOU WANT TO SEARCH ANOTHER INPUT FILE? n
```

Note that only 67 records of the input file were searched as opposed to the total number of records that would have been searched during a normal conditional search.

PACER provides five commands for displaying data: LIST, FUNCTION, DUMP, TABLE and STAT. The LIST command is the most powerful of the commands, providing user control of the format of the display. The FUNCTION command provides statistical analyses of the data. The DUMP command provides a "quick look" at data stored in PACER. The TABLE command provides access to some pre-formatted tabular output for selected data bases (USCOAL, USALYT, USCHEM and BMALYT at present). The STAT command translates PACER data into the proper format for further work outside of PACER with the U.S.G.S. statistical package on Multics, STATPAC. Each of these commands allow the user to specify the data base or file to be used.

The LIST Command

The LIST command displays data on the user's terminal or writes the data to disk. LIST asks for the name of a file which will be used as the data source. This name can be the name of the selected master file or the name of a previously created file.

PACER then asks for the number of lines to be displayed per page. If a CR is entered, all lines in the input file will be displayed. If a number is entered, PACER will display that many lines and stop. When the display stops, entering a CR will cause the next block of lines to be displayed. Entering any character followed by a CR will end the output and PACER will ask for another command.

Next, PACER asks for the format of the output display. C, R, or F may be entered, for column, row or user-formatted display.

If C is entered, the display will have a columnar format with the columns labelled with the names of the data being displayed. This format provides the most compact display of data but has the limitation of eight character column widths. Data items with values longer than eight characters are truncated to eight characters, and numeric values greater than 8 decimal digits are replaces with **.

If R is entered, records will be displayed with one data name and its corresponding value displayed per line. Records will be spearated by a line of asterisks(*).

If F is entered, data will be displayed under the control of a user supplied format. The user supplied format allows the user to

define the starting column position and width for data names. This format must be supplied for any or all data names to be displayed. The format is supplied when PACER asks for a list of names. Each data name may be entered with two numbers and a format. The first number is the column position in the display where the first character of the data item will appear and the second number is the number of characters to be displayed.

The format option is used in conjunction with the starting position and the length for numeric and character items (types 1-6). The format uses a FORTRAN like format statement enclosed in parentheses to define the number of digits for integer data (type 1 data), the number of digits and decimal places for decimal data (type 2 and 5 data), or the number of characters for character data (types 3, 4, and 6). For integer data, the format statement would include an "i" followed by a number giving the number of digits to be included in the display. For decimal data, the format statement would include an "f" followed by the total number of digits to be displayed, a period, and the number of digits to the right of the decimal point. In addition, for type 5 data space must be allowed for the qualifier by specifying an ",a1" format after the numeric format. A number followed by an "x" will cause blanks to be inserted. For character date, the format statement would include multiples of "a4" sufficient to include the number of characters to be displayed.

Keep in mind that the line length on a narrow terminal and assummed by Multics unless specifically changed, is 80 characters. The line length for the high speed printout is 132. For work on a wide carriage terminal the line length may be reset with the Multics system command "ll" and then the desired number, i.e, ll 132.

Examples of an integer format for the number 12345 beginning in column 1 would be:

Format	Result	Description
1 5 (i5)	12345	Display all five digits.
1 3 (i5)	123	Display first 3 digits.
1 5 (2x,i5)	bb123	display only the first 3 digits preceded by 2 blanks. (The "b" represents blanks)
1 7 (i5)	12345bb	Display all 5 digits with 2

trailing blanks.

1 7 (2x,i5)	bb12345	Display all 5 digits with 2 leading blanks.
1 3 (i3)	***	See note 1.

Examples of decimal data using 12345.67 beginning in column 1 would be:

Format	Result	Description
1 8 (f8.2)	12345.67	Display all digits with 2 decimal places.
1 7 (f8.2)	12345.6	Displays the first 6 digits with 1 decimal place.
1 8 (f8.0)	bb12345.	Displays only the whole number.
1 5 (f5.2)	*****	See note 1.

Example of decimal qualified data using 12345.57l beginning in column one would be:

1 9 (f8.2,a1) 12345.67l Displays all digits plus alpha qualifing code

NOTE 1: If the format provides for fewer digits than exist in the number, asterisks will be printed (eg. if a format of i2 is entered and the number to be displayed is 321, ** will be displayed).

Alphabetic data (types 3, 4, and 6) use an 'a' format in parentheses after the starting position and the length.
For example, state 10 8 (2a4) would display state names starting in column 10 and display up to 8 characters of each state name.

Examples of alphanumeric data with 7 characters using "wyoming" beginning in column 1 would be:

Format	Result	Description
1 7 (2a4)	wyoming	Displays all 7 characters
1 7 (a4,a3)	wyoming	Displays all 7 characters
1 6 (2a4)	wyomin	Displays first 6 characters
1 6 (a4,a2)	wyomin	Displays first 6 characters
1 4 (a4)	wyom	Displays first 4 characters

Note2: If the characrter data has been truncated as above (a4) and all 132 characters have been formatted there is a risk that some of the data in the beginning columns will be written over. Check with the NCRDS manager if this occurs.

Note3: For a listing of the suggested formats and maximum number of characters allowed by PACER for data items in selected data base files see Appendix III.

If the columnar or user supplied format was selected, PACER asks if data is to be written to disk. If disk output is requested, PACER asks for the name of the disk file. PACER then asks if headings should be output. if the user responds "yes", the data item names will be column headings on each page of printer output. If the user anticipates the need to sort the list data on a disk file, the headings option should not be used.

The sort command referred to is a Multics system command which can operate only on list files created in PACER, not PACER files themselves. There is no sorting command within PACER at this time. See Multics command sort_seg (ss) in Appendix IV.

Next PACER asks for the list of names to be displayed and prompts with the number 1. The name of a data item known to PACER should be entered.

PACER will then prompt with the next sequential number. When the complete list of names has been entered, enter a CR and the requested data will be displayed or written to disk.

On the Multics version of PACER, when the LIST command prompts with a number, ".stored fname" may be entered. "fname" must be the name of a file created with a Multics editor, which contains data names and, if the user supplied format is requested, the starting position, length, and format. If this file is not, the display will be accomplished using the list of data names from the previous LIST command.

The following example displays the data stored in the file "example" by the conditional selection example given earlier.

```
ENTER COMMAND: list

ENTER NAME OF FILE: example

ENTER NUMBER OF LINES/PAGE: 25
AT EACH PAUSE PRESS CR KEY TO CONTINUE. TO ABORT ENTER A.
```

```
3 TYPES OF LISTING ARE POSSIBLE:
  C - COLUMN TYPE (DEFAULT FORMAT)
  F - COLUMN TYPE (USER FORMAT)
  R - ROW TYPE

SELECT C, F, OR R: f


WOULD YOU LIKE THE OUTPUT SORTED? (y or n): n
ENTER THE LIST OF ITEM NAMES.

1. state 1 8 (2a4)
2. quad 11 19 (4a4,a3)
3. bed 34 12 (3a4)
4. estrank 46 3 (a3)
5. sulfur 54 4 (f3.2)
6. CR
```

state	quad	bed	estrank	sulfur
virginia	jewell ridge (7.5')	jewell	bit	0.70

Note: If the option to send the data to disk is chosen, the disk file must have a unique name. The disk file list can then be sorted with the Multics command sort_seg.

The FUNCTION Command

The FUNCTION command provides statistical capabilities for data stored by PACER. Currently only three functions are available, MEAN, SUM, and FIT. When the FUNCTION command is entered, PACER asks for the input file name, the function name and the function arguments. For the SUM function it is also asked if the user wishes to send the output to disk. The input file will be the name of the selected master file or the name of a previously created file.

If the MEAN function is selected, one to five names of numeric data items can be entered as function arguments. The function and the names must be separated by commas or spaces. When the list of functions has been completed, the minimum, maximum, mean, sum, variance, and standard deviation for each data name listed will be displayed.

If the SUM function is selected, one to five names of character data items (type 3), integer data (type 1) and single character (type 4) can be entered as function

arguments. The function and the names must be separated by commas or spaces. When the list of functions has been completed, each different entry for the data item and the number of times it occured in the input file will be listed/. The option to send the output to disk was primarily designed so that the list could be sorted by the Multics sort_seg command since the values from the SUM function appear as they do on the master data base file - not in alphabetic or numeric order.

If the FIT function is selected, the names of two numeric data items must be entered. The name of the first item will be treated as the independent variable and the second will be the dependent variable. The function and data names must be separated by commas or spaces. This will result in the slope, intercept, and correlation coefficient of the linear least square fit of the two data items being displayed.

The DUMP Command

The DUMP command provides a simple method to display all data in a specified file. When executed, this command asks for a file name and the number of lines to be printed. The file name can be the name of the default PACER data base or the name of a previously created file. The number of lines per page tells how many lines will be displayed before there is a pause in the output. Entering a CR after a pause in the display will continue the output. Entering any character and a CR will cause the display to be aborted.

If the data base has individual data names grouped into categories, PACER will allow display of data for selected categories or for all categories. If selected categories are desired , PACER will display available category numbers and names, and ask for a list of numbers for the desired categories. The list of numbers must be in ascending order and separated by commas. If a sequence of categories is desired, the lowest value and the highest value separated by a dash (-) may be entered. For example, 1,3,5-7 would cause data for categories 1,3,5,6, and 7 to be displayed.

The output of the DUMP command consists of lines with a data name and its corresponding value. Records are separated by a line of asterisks(*). After data for each requested category is displayed, PACER will pause. A CR will cause the data for the next category to be displayed. Any character followed by a CR

will cause the DUMP to be terminated.

The TABLE Command

The TABLE command provides access to one or more pre-formatted tables, designed for each specific data base. When the command is executed, a list of available tables, numbered consecutively, will be printed. The user selects one or more numbers for the desired table(s). PACER then prompts for where the table should be printed: 1) wide carriage user terminal; or 2) USGS compu center. Depending on the data base and the tables chosen, PACER may prompt for title and other descriptive information. Tables are printed automatically if they have been directed to the user's terminal. If the tables were directed to disk, then the table disk file must be printed on the high speed printer for Multics in Reston with the dprint command (see end of PACER example and Appendix IV.

The master data base files for which there are pre-formatted tables at present are:

USCOAL - ECOAL,WCOAL and NEWCOAL
USALYT
USCHEM
BMALYT

User Assistance

PACER provides three commands to assist the user in using PACER. The HELP command provides a list of valid commands, the NAME command provides a list of valid data item names, and REVIEW provides a summary of the current terminal session. PACER also has the additional method for assistance of entering a "?" as a response when the user needs more information.

The HELP Command

The PACER HELP command provides a list of commands and a short description of the purpose of the command.

The NAME Command

The NAME command provides a list of valid data names for the

selected master file. If data names were grouped into categories when the data base was created, PACER will ask if all categories are to be displayed. If the answer is yes, PACER will display the category name followed by the data name, data type, and description for each defined data item. When an entire category has been displayed, PACER will pause. A CR will start the display of the next category. Any character followed by a CR will bypass the printing of the remaining categories.

Regardless of whether all categories or selected categories are to be displayed, PACER will first ask if the meaning of the type codes should be displayed. If the answer is yes, each type code and a short description will be displayed. PACER will then pause. A CR will cause the display of categories to begin. Any character followed by a CR will bypass the displaying of categories.

The last function performed by the NAME command is to list values for dictionary type items. PACER will ask if a list is desired. Answering yes will cause PACER to ask for item names and print a number. One data name should be typed for each number displayed. Enter only a CR when all names have been entered. PACER will then print a list of dictionary values for each name entered and ask again if dictionary values are desired. Entering no will cause PACER to ask for another command.

Note: Most NCRDS - PACER data bases have a great many values under a dictionary data item, i.e. bed. This should be taken into account when printing the dictionary values on a terminal.

The REVIEW Command

The REVIEW command provides a display of information relating to the current terminal session with PACER. The selected master file name, the variables defined using the DEFINE command, a list of variable names used with the LIST command, the current conditions which have been defined by the CONDITION command, the logic statement entered through the LOGIC command, and the names of files used by the SEARCH command are all displayed. The REVIEW command is one of the few commands which does not ask for information from the terminal.

Miscellaneous Commands

The following three commands complete the basic set of

PACER commands. Two additonal commands, available in the Multics version of PACER, are described in Section IV, Multics Implementation.

The DEFINE Command

The DEFINE command provides the capability to define new data items (variables). When DEFINE is entered as a command, PACER asks for a list of new variables, prints any previously defined variables, and prints a number. For each number printed, a definition for a new variable should be typed. Definitions must be entered as a variable name, an equal sign (=), and an arithmetic expression. Up to twenty variables may be defined.

The variable name must be a new name. The original PACER data names can not be re-defined using the DEFINE command.

An expression may contain numeric constants, numeric type item names (type codes 1, 2, and 5), arithmetic operators, intrinsic functions, and parentheses. Numeric constants may be given in integer, fixed decimal, or floating point form. The arithmetic operators are +, -, *, /, and ** (for exponentiation). The intrinsic functions are absolute value (abs), square root (sqrt), modulo 10 (mod), base 10 logarithm (log), integer truncation (int), sine (sin), and cosine (cos). The sine and cosine functions assume that the argument represents an angle expressed in degrees. The argument for an intrinsic function may itself be an expression and must be enclosed in parentheses. Expressions are evaluated in a particular order. Sub-expressions within parentheses (including function arguments) are evaluated first, followed by exponentiations, followed by multiplications and divisions, followed by additions and subtractions.

Defined variables are applicable only for the current selected master file. If a new master file is selected, the defined variables are lost.

PACER allows defined variables (variables defined by a previous execution of the DEFINE command) to be used in the arithmetic expression. Also, defined variables may to be saved and re-used later. Saving the defined variables is accomplished by entering save "fname" in response to the numeric prompt (where "fname" is the name of a disk file where the defined variables are to be saved). Defined variables which have been saved, may be re-used by entering read "fname" in response to the numeric prompt. In this case, fname is the name of the disk file where defined variables were saved.

Example:

```
ENTER COMMAND: define
ENTER LIST OF NEW VARIABLE DEFINITIONS

  1. read rankbtu

Note: Rankbtu is the name of the disk file containing the defined
variables 2-4 made during an earlier session

  2. m1=btu-(50*sulfur)

  3. m2=100-(1.08*bmash+.55*sulfur)

  4. mmfbtu=(m1/m2)*100

Note: mmfbtu will be the new variable constructed from the
defined expressions m1 and m2

  5. fe2o3wc=fe2o3*(usgsash/100)

  6. save convfe

Note: convfe will be the name of the disk file where all the
above definitons will be saved.

  7. CR

  note* The DEFINE command must be entered before a defined
        item can be used in any other command.
```

The UPDATE Commands

The UPDATE command permits a user to change data items in a subfile created by a search. When UPDATE is entered as a command a brief description is printed for the five (5) possible updating procedures for PACER. Only the options 3,4 and 5 are available to general users. UPDATE changes made to a subfile are permanent, and therefore subfiles may not be written back to the master file by anyone except the NCRDS data manager or delegate.

This command allows users to test different correlations, or correct data as they interpert it for their own use.

After the instructions are printed the user is prompted to enter their "Data Manager Id". The general user should enter 00. After the prompt "Update Procedure", the user should enter 3, 4 or 5 to select the desired procedure, sequential, key, or batch. A set of instructions will then be printed for that procedure.

UPDATE Procedure 3

UPDATE Procedure 3 is designed for the sequential review and revision of records belonging to a sub-file selected from the master data basefile (or a sub-file). After the sequential revision hs been completed, only the NCRDS manager may elect to post the subfile back onto the master file.

This display will be followed by the prompt:

NAME OF DATA ELEMENT TO BE CHANGED:

The user may either enter a valid data element name or specify the command NEXT or QUIT. If a proper name has been entered, the next prompt will be either:

ENTER DECIMAL VALUE (if a decimal value is being corrected) or

ENTER DATA or CHARACTER STRING (if it is an alphnumeric value)

At this point the data value may be left unchanged by entering a CR.

If the value is alphanumeric, a search is made to determine whether the data entry matches an already existing dictionary entry.

Note: Entries in the NCRDS - PACER dictionary file can be examined via the NAMES command or by contacting the NCRDS manager.

If there is a matching dictionary entry, or if the proper type of numerical data has been entered, the next prompt will be:

DO YOU WISH TO CHANGE ANY MORE DATA ELEMENTS BELONGING TO THIS RECORD?
ENTER YES OR NO:

A response of NO will cause all preceding changes to that record to be posted back onto the subfile. A response of YES will again display the questioning prompt for further changes. The user can then select another data element to revise, or may enter NEXT or QUIT. The NEXT response proceeds to display the next record from the subfile. The QUIT command presents the user with the option of posting the subfile onto the master file, which must be answered "no" or an error will occur.

If during the dictionary check an error or new item has been entered as a value this prompt appears:

THERE IS NO DICTIONARY MATCH FOR THE DATA NAME
followed by the data element and the prompt:

DO YOU WISH TO ENTER THIS DATA IN THE DICTIONARY? YES OR NO?:

An entry of YES will make that alphanumeric value a permanent dicitionary entry and then there will be a query for further data changes to the record. A NO entry will bring the prompt:

ENTER DATA VALUE:

This gives the user the opportunity to re-enther the correct alphanumeric value for that data element.

After all records in the subfile have been revised or after QUIT has been entered, the following will appear:

FILE (*) HAS BEEN REVISED. DO YOU WISH TO WRITE THIS FILE ONTO THE MASTER FILE? YES OR NO:

It is at this point that any users other than the NCRDS manager or delegate must say NO. A NO response will return control for selection of another data procedure:

UPDATE OPERATIONS HAVE BEEN COMPLETED. IF YOU WISH TO CONTINUE WITH THE UPDATE PROCEDURE ENTER THE NUMBER (1-5)> ENTERING "0" FOR THE PROCEDURE PROMPT OR "QUIT" FOR THE FILE PROMPT WILL RETURN CONTROL TO THE SEARCH AND RETRIEVAL PORTION IF PACER.

UPDATE PROCEDURE (1-5):

If a user other than the NCRDS manager or delegate attempts to enter a "YES", an error will result in an exit from PACER.

UPDATE Procedure 4:

Update procedure 4 is the update feature which allows the user to identify from a subfile the records which contain data elements for correction by the record's key number.

The prompts and responses are similar to those of UPDATE Procedure 3 except that the record will not appear for revision until the key is entered.

UPDATE Procedure 5:

Update procedure 5 is the batch revision procedure. It is used to change the value for an item in all the records of a subfile to the entered value or by an entered formula.

The set of instructions will be followed by the prompt:

NAME OF DATA ELEMENT TO BE CHANGED:

The user will respond to this prompt and the ones that follow for the data values in the same manner as when using UPdate 3 . There is a slight modification if a formula is used.

```
DATA FILE TO BE REVISED: example
NAME OF DATA ELEMENT TO BE CHANGED: sulfur
ENTER QUALIFIED DATA: f
ENTER FORMULA: sulfur-.05
DO YOU WISH TO CHANGE ANY MORE DATA BELONGING TO THIS FILE?
```

Note: by entering "f" the user is indicating a formula needs to be entered. The formula only requires the part of the formula to the right of the equal sign as in sulfur=sulfur-.05.

Because of the mass record revision capability of this UPDATE procedure, a display is not produced for any of the records changed. If it is desired to review any records in this subfile, UPDATE 3 or UPDATE 4 may be accessed after UPDATE 5 and records examined. Enter QUIT when the review should be concluded. The LIST command could also be used.

After the updating of a subfile the user can conclude the update process by entering a 0 (zero) when prompted for the UPDATE procedure (1-5). At this point, the prompt ENTER COMMAND will appear and the user may repond with any one of the standard PACER commands. It is also possible at this point to select another subfile for editing.

The QUIT Command

When all work using PACER has been completed, the QUIT command should be entered. If files were created during the use of PACER, PACER will ask if any are to be saved. If files are to be saved, PACER will print a list of the file names and ask that the files to be saved be identified by number. The numbers of the files to be saved should be typed separated by commas. If a range of numbers are to be entered, the first and last number, separated by a dash (-), may be entered (eg. 1,6-9 would save files 1, 6, 7, 8, and 9). All files not saved will be deleted. CAUTION: If one of these files were originally obtained from the disk storage system, it will be deleted unless it is saved at

this time.

DESIGNING A PACER DATABASE

Data Base Concepts

PACER provides an organized storage and retrieval capability for data. Thus far, the description of PACER has been limited to retrieval of data as this is the primary purpose of the system. However, before data can be retrieved, it must be stored on disk in a prescribed format. This section describes the concept of PACER data bases, the format of the PACER data, and the methodology for storing data. A working knowledge of computer systems and programming techniques, particulaly FORTRAN, is assumed.

PACER must have five files available: the index, master, mask, dictionary, and definition files. The index file contains a list of available master file names (data bases), a description of the file, and the associated mask, dictionary, and definition file names. The master file contains all numeric data, character data, and pointers to character data stored in the dictionary. The mask file contains the names, type and types, the location of the first value in the dictionary file of each dictionary data item and its maximum length. The dictionary file contains the character data item values for the numeric pointer values being stored in the master file. The definitions file contains information to group data item names into categories, data item name, data types, and data item descriptions. Each of these files except the dictionary file are mandatory, except in the MULTICS version of PACER where the definitions file is optional. The dictionary file is required only if data type 3 has been used.

The index file is the only file that is not named by the data base designer. It must be named index and have the following format:

Position	Content Description
1-8	Name of master file
10-49	Description of master file (optional-may be blank)

51-58	Name of mask file
60-67	Name of definition file
69-76	Name of dictionary file(needed only if dictionary data type is present)

The mask file is identified by the name supplied in the index file. The first record in the file must contain a count of the number of data items present in the master file. The number is right justified in positions 1-3. A maximum of 500 data items are allowed. The remaining records in the file consist of one record for each data item in the master file. These records are defined as follows:

Position	Content Description
1-7	Data item name
10	Data type
11-15	Index giving the starting location of values in the dictionary file for this data item (applicable only for type 3 data)

The dictionary file is identified by the name supplied in the index file. A maximum of 9,999 values may be stored in the dictionary. Dictionary records are defined as follows:

Position	Content Description
1	A flag indicating the last value for a data item. This must always be blank except for the last value in a data item group which should contain an x.
3	A count of the number of four character words needed to store a data value. This number may have a range of 1 to 9.
5-40	The value of a dictionary data type (type 3 item).

The dictionary file is the only optional file. It is needed only if data type 3 is present in the data base. All values for a data item must occupy contiguous records with an x in position one of the last value record for a data item. Each group of values ending with an x in position 1 is called a subdictionary.

The definition file is identified by the name supplied in the index file. This file provides the capability to group data items into categories. If category division is not desired, this file may still exist, defining the entire record as a single category. There are five record types in the definition file. Record type 1, which occurs only once in the file, contains a count of the number of categories in position 1 and 2. A maximum of 17 categories are permitted. Record type 2 contains the name of each category. The number of type 2 records must be equal to the number specified on the type one record. If only one category is desired, it is recommended that "entire record" be used for the category name. Category names may be up to 40 characters in length. Record type 3 identifies the category and category contents using the following format:

Position	Content Description
1-4	Category number--This is a sequential number used for internal identification of categories. The number must be right justified.
6-8	Number of description records in this category.
10-12	Number of data items in a group. This group provides the capability to exclude certain data items from the category when the DUMP command is used. It also allows the grouping of non-contiguous data items when using the DUMP command.
14-16	Beginning data item in the category group. This is a sequential number representing the location of the data item (eg. 1 would be the first data item, 10 would be the tenth item, etc.). If this field contains a zero, a type 4 record must exist to give the number of each data item to include in the group. If this number is greater than zero, the group will start with the data item indicated by this number and include the number of data items indicated in the previous field.

Record type 4 is required only if the fourth field of record type 3 is zero, otherwise it must be excluded. The record is broken

into four character fields with each field containing a number representing the number of the data item to be included in the grouping. If more than 20 data items are to be included, multiple type 4 records must be present. For instance, if the first, fifth, tenth, and twelfth data items were to be included in a category, record types 3 and 4 would appear as follows:

```
                    12345678901234567890
Record type 3         1   4   4   0
Record type 4         1   5  10  12
```

Record type 5 contains the data item name, data type, and data item description in the following format:

Position	Content Description
1-7	Data item name
9	Data type code
11-80	Description of data item

The number of type 5 records must be equal to the number of description records in the category as defined in the second field of record type 3. Multiple description records may be added for a given data item. If this is done, the information in positions 1-9 is optional. Record types 3, 4, and 5 must be repeated for each category defined.

The master file is also identified by the name in the index file. The master file consists of numeric data, pointers to dictionary data and alphabetic data.

MULTICS IMPLEMENTATION

MULTICS Version of PACER

The MULTICS version of PACER is available on the USGS MULTICS systems in Reston. After completion of the normal login sequence, the user can execute PACER by entering >udd>NCRDS>publib>o>pacer or if search rules already exists (or by linking to >udd>NCRDS>publib>e>start_up.ec), simply pacer.

The MULTICS Command

Entering multics (or mult) in response to the ENTER COMMAND prompt, allows the user to execute any MULTICS command. Any valid MULTICS command may be entered. Upon completion of the command, PACER will again ask for a MULTICS command. To return to PACER, enter pacer in response to the request for a MULTICS command.

The STAT Command

The STAT command allows selected PACER numerical data to be formatted into the proper configuration neccessary for a file to be used in the U.S.G.S. statistical package on Multics, STATPAC by George VanTrump. Familiarity with STATPAC is assumed, or the Computer Center Division of U.S.G.S. can provide documentation and assistance.

Other PACER Suggestions

When a user is experienced with the PACER system the prompts may be abbreviated by typing in 23, 24 or 25 when initiating the PACER session.

EXAMPLE:

pacer

PRESS CARRIAGE RETURN 23

WELCOME TO THE NCRDS PACER RETRIEVAL SYSTEM....

All three entries have the same effect on the bulk of the PACER prompts. The difference occurs when using UPDATE; 23 does not shorten the UPDATE prompts,

24 shortens the prompts so that the full record is not displayed in UPDATE 3, and
25 provides only the most minimum prompts and should not be used except by the very experienced user.

In addition to these commands, the MULTICS implementation has additional user assistance available. When a PACER command requests input, the user may enter a question mark (?) to obtain specific information about the input request. After the information is displayed, PACER will again prompt with the input request.

Using PACER

The remainder of this section contains examples of a PACER terminal session. While physical limitations of document size prohibits showing examples of every option, this sample terminal session provides the most frequently used options.

```
pacer

Press carriage return
Welcome to the NCRDS Pacer retrieval system.
At the current time the following data bases are available:

uscoal  - usgs coal resources data

usalyt  - coal analytical data for selected areas

uspeat  - not available at this time

uschem  - usgs geochemical analytical data

usgeol  - us geological data

bmalyt  - USBM standard us coal analytical data

ustrat  - usgs stratigraphic sequence data

bmresbas- USBM Summary Reserve Base and Avg. Anal.

uspet   - usgs petrographic data for select. areas

ichem   - int'l geochemical analytical data

Before any of these data bases may be accessed,
a data base from the above list must be selected.
```

```
Enter database name: uschem


ENTER COMMAND:   ?
Enter the command help.

ENTER COMMAND:   help

The commands which may be issued (and their meaning) are listed below:

cond- Initiates the request for retrieval criteria to be entered in
      the form: name rel value
logi- Initiates the request for a logical expression to be entered
      using logical operators.
sear- Initiates the search of a file based upon previously entered
      conditions and logic.
list- Allows the user to list selected values (variable names will
      be asked for) in a file.
file- Allows the user to select or change the data base to be used.

quit- Terminates the system.

name- Used to print item names, their types and definitions in a
      selected set of groups.
help- Used to obtain the above command definitions.

revi- Lists the files which have been used as well as the conditions
      and logic entered.
dump- Prints all items present for each record in a selected file.
      waits after each n lines
func- Provides for the computation of functions on items in a data
      set (or file).
defi- Used to define new variable names in terms of original item
      names (name=expression)
mult- Permits execution of Multics system commands

tabl- Provides pre-formatted tabular output for selected data
       base files.
stat- Arranges selected numerical data into STATPAC format.

keys- Allows selection of records by key number.


ENTER COMMAND:   names

Would you like to see meaning of type codes?  yes
In each category, the item names, type codes, and descriptions will be
listed. type codes:
```

```
          1 = integer values
          2 = floating point values
          3 = dictionary strings
          4 = single character code
          5 = qualified numeric values
          6 = character string values
          7 = integer array values
          8 = floating point array values


 Shall all categories be considered?  yes
 Category: location information
  name type  description
  ---- ----  -----------
 state   3  state name
 county  3  county name
 latitud 1  latitude coordinate
 ns      3  direction of latitude (n or s)
 longtud 1  longitude coordinate
 ew      3  direction of longitude (e or w)
 aapgprv 1  aapg province number - see aapg-csd geol provinces code map,
            1:5,000,000 and aapg bull vol 54, no 7, july 1970, pp 1301-5


 Category: geologic designations
  name type  description
  ---- ----  -----------
 coalprv 3  coal province name - see us geol survey prof paper 978, pp 8,13
 region  3  coal region name - see us geol survey prof paper 978, pp 9,13
 field   3  coal field name
 distrct 3  local area designator
 formatn 3  formation name
 group   3  group name
 bed     3  coal bed name


**************************************************
example shortened for brevity - see chemterm file in Appendix II
**************************************************


 Would you like to see the possible values
 of dictionary type items?
 yes

 enter the list of item names.
 1.   field

 2.
 field   =
          aladdin
          alkalai butte
```

```
          alton
          arkansas valley
          barber
          basin
          bayfield
          bisti area
          black mesa


**************************************************
example shortened for brevity
**************************************************

    a



 ENTER COMMAND:    cond

 A.    ?
 Enter a condition in the form:  name relation value
 where name is an item name (possibly subscripted), relation is
  eq,ne,le,lt,ge,gt,be, or cs
 and value is a number, number pair, or a character string.
 Enter .add to add new conditions to the current set of conditions.
 As examples:
 depth gt 6000 specifies depth greater than 6000
 sio2 be 40.7,52.9 (inclusive) specifies sio2 between 40.7 and 52.9 (inclusive
 sio2 eq (ghl) specifies that the qualifier code of sio2 is g, h, or l
 subname eq John Doe specifies subname equal to John Doe

 A.    state eq virginia

 B.    county eq buchanan

 C.    county eq tazewell

 D.



 ENTER COMMAND:    logi

 Enter logic: a*(b+c)



 ENTER COMMAND:    sear

 Enter input file name:    uschem
```

```
Enter output file name:  usc1
All  7898 records of uschem   searched.
      100 records found which satisfy the request.
They have been stored in usc1

Do you want to search another input file?  no



ENTER COMMAND:   func

Enter name of file:  usc1
Functions available at this time are:
    mean    fit     sum
Enter function names and corresponding arguments.

1.   sum estrank quad

2.
Would you like output to be to disk?  no
RESPONSE MUST BE y OR n
Would you like output to be to disk?  n


There are    1 for estrank

  100  bit


There are   18 for quad

    2  duty (7.5')
    4  keen mountain (7.5')
   24  jewell ridge (7.5')
    1  bradshaw (7.5')
   29  amonate (7.5')
    3  tip top (7.5')
    4  anawalt (7.5')
    1  patterson (7.5')
    2  tiptop (7.5')
    1  richlands (7.5')
    5  harman (7.5')
    1  elkhorn city (7.5')
    5  keen mtn (7.5')
    7  vansant (7.5')
    6  prater (7.5')
    3  grundy (7.5')
    1  harmon (7.5')
    1  panther (7.5')
```

```
ENTER COMMAND:   cond

A.   quad eq jewell ridge (7.5')

B.


ENTER COMMAND:   logi

Enter logic: a


ENTER COMMAND:   sear

Enter input file name:   usc1

Enter output file name:  usc2
All   100 records of usc1     searched.
       24 records found which satisfy the request.
They have been stored in usc2

Do you want to search another input file?  n


ENTER COMMAND:   sum
sum  Illegal command. Enter help if you wish to see the legal commands.


ENTER COMMAND:   func

Enter name of file:  usc2
Functions available at this time are:
    mean     fit      sum
Enter function names and corresponding arguments.

1.   sum colectr

2.
Would you like output to be to disk?  n
```

```
There are    5 for colectr

     1  usgs-swanson v e
     2  usgs-englund k j
    18  usgs-medlin j h
     1  vdmr-henderson j a
     2  usgs-windolph j f



ENTER COMMAND:   cond

A.   colectr ne usgs-medlin j h

B.



ENTER COMMAND:   logi

Enter logic: a



ENTER COMMAND:   sear

Enter input file name:   usc2

Enter output file name:  usc3
All     24 records of usc2      searched.
         6 records found which satisfy the request.
They have been stored in usc3

Do you want to search another input file?  n



ENTER COMMAND:   list

Enter name of file:  ?
This input file must be an existing file in PACER master file
form. If a blank name is entered, the selected PACER master file
will be used.
```

```
Enter name of file:  usc3

Enter number of lines/page:
At each pause press cr key to continue. To abort enter a.
3 Types of listing are possible:
  c - Column type (default format)
  f - Column type (user format)
  r - Row type

select c, f, or r:  ?
```

If R is entered, records will be displayed with one data name and its corresponding value displayed per line. Records will be separated by a line of asterisks(*).

If C is entered, the display will have a columnar format with the columns labelled with the names of the data being displayed. This format has the limitation of eight character column widths. Data items with values longer than eight characters are truncated to eight character.

If F is entered, data will be displayed under the control of a user supplied format. The user supplied format allows the user to define the starting column position and width for data names. This format may be supplied for any or all data names to be displayed. If the format is not supplied for a data item, the display of that item will be the same as the C option. Each data name may be entered folowed by a starting position, ending position, and format.

```
do you desire more help concerning this command?  yes
```

The format option is used in conjunction with the starting position and the length for numeric items only (data types 1, 2, and 5). The format uses a FORTRAN like format statement enclosed in parentheses to define the numnber of digits for integer data (type 1) and the number of digits and decimal places for decimal data (type 2 and 5). For integer data, the format statement would include an i followed by a number giving the number of digits to be included in the display. For decimal data, the format statement would include an f followed by the total number of digits to be displayed, a period, and the number of digits to the right of the decimal point. In addition, for type 5 data, space must be allowed for the qualifier by specifying an a1 format after the numeric format. Alphabetic data requires only the starting position and ending position.

```
select c, f, or r:  c

Would you like output to be to disk?  n

do you wish to enter a new list of names?  y

enter the list of item names.
1.   state
```

2. county

3. quad

4. bed

5. fieldid

6. sulfur

7. as

8.

state	county	quad	bed	fieldid	sulfur	as
virginia	buchanan	jewell r	jewell	e-128	0.00	10.00
virginia	buchanan	jewell r	kennedy	e-129	0.00	10.00
virginia	buchanan	jewell r	jawbone	e-130	0.00	5.00
virginia	buchanan	jewell r	kennedy	H87A1	0.60	2.00
virginia	tazewell	jewell r	jawbone	SOL 30	0.50	1.00
virginia	tazewell	jewell r	kennedy	SOL 31	0.60	2.00

```
ENTER COMMAND:   list

Enter name of file:  usc3

Enter number of lines/page:
At each pause press cr key to continue. To abort enter a.
3 Types of listing are possible:
  c - Column type (default format)
  f - Column type (user format)
  r - Row type

select c, f, or r:  r

do you wish to enter a new list of names?  n



state   =virginia
county  =buchanan
quad    =jewell ridge (7.5')
bed     =jewell
fieldid =e-128
sulfur  =    0.00
as      =   10.00
************************
```

```
state    =virginia
county   =buchanan
quad     =jewell ridge (7.5')
bed      =kennedy
fieldid  =e-129
sulfur   =    0.00
as       =   10.00
************************
```

```
**************************************************
example shortened for brevity
**************************************************
```

```
ENTER COMMAND:   update
```

This is 'update.'
It is designed to permit the user to add records to or delete records from the master file, or to change records or portions of records in a subfile of the master file and to post these changes onto the master file.

The five procedures used to update the master file are:

1. The addition of new records already written into a temporary file. Unlike the other update procedures which operate on records in the master file format, this procedure operates on raw data records and converts these records to the master file format for insertion into the master file.

2. The deletion, by key, of records already existing in the master file.

3. The sequential revision of records from a selected subfile (i.e. selected through a logical search) from the master file. This subfile may then be posted onto the master file after the desired revisions are completed.

4. The selection, by key, of any record belonging to the subfile for revision of any selected data element. The data manager has the option of posting the selected record onto the master file or leaving it, as revised, in the subfile for further revision.

5. The batch revision of a given data element which will be the same value for all records in the selected subfile.

When revision has been completed on any selected subfile, the user may then elect to post the revised subfile onto the master file, or save the subfile for review and possible further revision by any of the 2-5 update procedures.

Records deleted from the master file are saved in a special 'save deletion' file for future recovery if there should arise a need to reconstitute these records.

****

Note: Only MCRDS manager or delegate can post back to the master file.

****

Data manager id no. (1-99): 00
Update procedure (1-5): 3
Data file to be revised: usc3

Records from the designated subfile will be presented sequentially for review and update. After all records have been examined by the reviewer, he may then elect to post the records in this subfile onto the master file.

Whenever you wish to leave a selected data element unchanged, enter an asterisk, *, followed by a carriage return.

If you wish to procede to the next record in the file, enter the characters 'next' following the prompt: 'name of data element to be changed.' The 'next' command will leave that record in its original, unrevised state and the next record will be displayed, in sequence, from the subfile. if at any time you do not wish to review the remainder of the file, enter 'quit.'

* * * * * * * * * *

```
  state: virginia          county: buchanan
coalprv: eastern           region: appalachian
   quad: jewell ridge (7.5')          colectr: usgs-swanson v e
fieldid: e-120                          field: nde              aapgprv: 160
latitud: 371146    n     longtud:  815129   w district: nde
formatn: new river          group: nde              beg: jewell
 member: nde                 zone: nde                depth(in):       0.00
sampthk(in):      31.20    system: pennsylvanian       series: nde
locname: nde                                            date: 740612

estrank: bit               majrank: nde              minrank: nde
  anida: d  anidn: 168256 labcode: 15   samotyp:  1  analtyp:  1
 valrep:  1                 othert: n

    btu:   0.000   ashdef:   0.000   ashsof:   0.000   ashfld:   0.000
freswel:   0.000  moistur:   0.000   volmat:   0.000   fixedc:   0.000
    ash:   0.000  hydrogn:   0.000   carbon:   0.000  nitrogn:   0.000
 oxygen:   0.000   sulfur:   0.000  sulfate:   0.000  sulfpyr:   0.000
sulforg:   0.000   adloss:   0.000
```

```
**************************************************
example shortened for brevity
**************************************************
                                                key:    418

                        * * * * * * * * * *


 Name of data element to be changed:  sulfur
 enter qualified data:  0.0b
 Do you wish to change any more data belonging to this record?  no

                        * * * * * * * * * *

   state: virginia          county: buchanan
 coalprv: eastern           region: appalachian
    quad: jewell ridge (7.5')          colectr: usgs-englund k j
 fieldid: e-129                       field: nde                aapgprv: 160
 latitud: 371008    n     longtud:  815034   w district: nde
 formatn: new river          group: nde              bed: kennedy
  member: nde                 zone: nde                 depth(in):       0.00
 sampthk(in):     22.80     system: pennsylvanian       series: nde
 locname: nde                                            date: 740612

 estrank: bit         .     majrank: nde              minrank: nde
   anida: d  anidn: 168257 labcode: 15   samptyp:  1  analtyp:  1
  valrep:  1                othert: n

     btu:   0.000   ashdef:   0.000   ashsof:   0.000   ashfld:   0.000
 freswel:   0.000  moistur:   0.000   volmat:   0.000   fixedc:   0.000
     ash:   0.000  hydrogn:   0.000   carbon:   0.000  nitrogn:   0.000
  oxygen:   0.000   sulfur:   0.000  sulfate:   0.000  sulfpyr:   0.000.
 sulforg:   0.000   adloss:   0.000


**************************************************
example shortened for brevity
**************************************************
                                                key:    419

                        * * * * * * * * * *


 Name of data element to be changed:  sulfur
 enter qualified data:  0.0b
 Do you wish to change any more data belonging to this record?  n

                        * * * * * * * * * *

   state: virginia          county: buchanan
 coalprv: eastern           region: appalachian
    quad: jewell ridge (7.5')          colectr: usgs-englund k j
```

```
fieldid: e-136                          field: nde                aapgprv: 160
latitud: 371439     n     longtud:  815045    w district: nde
formatn: new river          group: nde              bed: jawbone
 member: nde                 zone: nde             depth(in):        0.00
sampthk(in):      42.00    system: pennsylvanian    series: nde
locname: nde                                        date: 740612

estrank: bit              majrank: nde              minrank: nde
  anida: d  anidn: 168258 labcode: 15   samptyp:  1  analtyp:  1
 valrep:  1               othert: n

    btu:    0.000   ashdef:   0.000   ashsof:   0.000   ashfld:   0.000
freswel:    0.000  moistur:   0.000   volmat:   0.000   fixedc:   0.000
    ash:    0.000  hydrogn:   0.000   carbon:   0.000  nitrogn:   0.000
 oxygen:    0.000   sulfur:   0.000  sulfate:   0.000  sulfpyr:   0.000
sulforg:    0.000   adloss:   0.000


**************************************************
example shortened for brevity
**************************************************
                                                    key:    420

                        * * * * * * * * * *


Name of data element to be changed:  sulfur
enter qualified data:  0.0b
Do you wish to change any more data belonging to this record?  no

                        * * * * * * * * * *

  state: virginia           county: buchanan
coalprv: eastern            region: appalachian
   quad: jewell ridge (7.5')          colectr: vdmr-henderson j a
fieldid: H87A1                          field: nde                aapgprv: 160
latitud: 371136     n     longtud:  815216    w district: nde
formatn: norton             group: nde              bed: kennedy
 member: nde                 zone: nde             depth(in):        0.00
sampthk(in):      28.00    system: pennsylvanian    series: nde
locname: nde                                        date: 761101

estrank: bit              majrank: nde              minrank: nde
  anida: w  anidn: 193932 labcode: 15   samptyp:  1  analtyp:  1
 valrep:  1               othert: n

    btu: 14755.0   ashdef: 2270.00   ashsof: 2355.00   ashfld: 2445.00
freswel:    9.000  moistur:   2.700   volmat:  25.000   fixedc:  69.000
    ash:    3.300  hydrogn:   5.100   carbon:  83.400  nitrogn:   1.400
 oxygen:    6.100   sulfur:   0.600  sulfate:   0.000  sulfpyr:   0.060
sulforg:    0.580   adloss:   1.800
```

```
**************************************************
example shortened for brevity
**************************************************
                                                key:    3374

                          * * * * * * * * * *

 Name of data element to be changed:  quit

 You have entered 'quit' to terminate this revision procedure.
  file 'usc3' has been revised.
 do you wish to write this file onto the master file? no
 Update procedure (1-5):  0



 ENTER COMMAND:   list

 Enter name of file:  usc3

 Enter number of lines/page:
 At each pause press cr key to continue. To abort enter a.
 3 Types of listing are possible:
   c - Column type (default format)
   f - Column type (user format)
   r - Row type

 select c, f, or r:  f

 Would you like output to be to disk?  n

 do you wish to enter a new list of names?  y

 enter the list of item names.
 1.   state 1 8 (2a4)

 2.   county 10 8 (2a4)

 3.   quad 20 19 (4a4,a3)

 4.   bed 41 7 (1a4,a3)

 5.   fieldid 49 6 (1a4,a2)

 6.   sulfur 58 5 (f3.2,a1)

 7.   as 65 6 (f5.2,a1)

 8.
```

state	county	quad	bed	fieldid	sulfur as	
virginia	buchanan	jewell ridge (7.5')	jewell	e-128	.00b	10.00
virginia	buchanan	jewell ridge (7.5')	kenneuy	e-129	.00b	10.00
virginia	buchanan	jewell ridge (7.5')	jawbone	e-130	.00b	5.00
virginia	buchanan	jewell ridge (7.5')	kennedy	H87A1	.60	2.00
virginia	tazewell	jewell ridge (7.5')	jawbone	SOL 30	.50	1.00
virginia	tazewell	jewell ridge (7.5')	kenneuy	SOL 31	.60	2.00

```
ENTER COMMAND:   func

Enter name of file:  usc3
Functions available at this time are:
    mean    fit     sum
Enter function names and corresponding arguments.

1.   mean usgsash bmash

2.

Mean statistics for usgsash with      6 item(s).
 Min=      2.90  Max=     15.60  Mean=       8.22
 Sum=      49.32  Variance=     32.30  Std deviation=       5.68

Mean statistics for bmash   with      6 item(s).
 Min=      0.00  Max=     12.60  Mean=       4.38
 Sum=      26.30  Variance=     32.51  Std deviation=       5.70



ENTER COMMAND:   func

Enter name of file:  usc3
Functions available at this time are:
    mean    fit     sum
Enter function names and corresponding arguments.

1.   fit usgsash fe2o3

2.

    6 points used to fit usgsash to fe2o3
Slope=  -1.4     Intercept=   26.     Corr. coeff.=  -.92



ENTER COMMAND:   table
At the current time the following listings are available:
```

```
   1   Geologic and location information
   2   Bureau of Mines data
   3   Oxides and oxides elements as elements
   4   Trace elements of ash and whole coal
   5   Statistical summary of all elements

Enter a list of numbers for desired listings (i.e. 1-3,5):  1-5

Input file name:  usc3

     1   wide carriage terminal which you are using at this time
     2   line printer in reston

where do you want the table printed? (enter 1 or 2)  2

enter unique name for output segment:  usc3t

how many prints do you want? (1-4)  1


Starting Geologic and location information.
Enter name of sample area (up to 32 characters):  jewell ridge (7.5'), va.

enter 1 or 2 digit number for this table (with a decimal):  1.


Geologic and location information completed.


Starting Bureau of Mines data.
Enter name of sample area (up to 32 characters):  jewell ridge (7.5'), va.
Enter type of samples in area (e.g. 1 of 4 major ranks):  bit
Enter 1 or 2 digit number for this table(with a decimal):  2.
Input:
keys: char(4) 0;
.
      3 records sorted.


Bureau of Mines data completed.


Starting Oxides and oxides elements as elements.
Enter name of sample area (up to 32 characters):  jewell ridge (7.5'), va.
Enter type of samples in area (e.g. 1 of 4 major coal ranks):  bit
Enter 1 or 2 digit number for this table (with a decimal):  3.


Oxides and oxides elements as elements completed.


Starting Trace elements of ash and whole coal.
```

```
Enter name of sample area (up to 32 characters):  jewell ridge (7.5'), va.

Enter type of samples in area (e.g. 1 of 4 major ranks):  bit

Enter 1 or 2 digit number for this table (with a decimal):  4.
Input:
keys: char(4) 1 fixed bin(35) 2;
.
      6 records sorted.


Trace elements of ash and whole coal completed.


Starting Statistical summary of all elements.
Enter name of sample area (up to 32 characters):  jewell ridge (7.5'), va.
Enter type of samples in area (e.g. 1 of 4 major ranks):  bit
Enter 1 or 2 digit number for this table (with a decimal):  6.
enter 1 for usgs data
      2 for usbm data
      3 for both    :  3


Statistical summary of all elements completed.



ENTER COMMAND:   mult
You may execute any multics command,
so be careful. Enter pacer to return to the pacer system.

Enter multics command:  dp usc3t
1 request signalled, 45 already in printer queue 3


**************************************************************

See end of PACER session for example of tables.

**************************************************************

 Enter multics command:  pacer



ENTER COMMAND:   dump

Enter name of file:  usc3

Enter number of lines/page:  10
```

```
Shall all categories be considered?  no
Each record has been divided into the following general categories:
        Cat. #   Cat. name
        ------   ---------
           1     location information
           2     geologic designations
           3     bibliographic information
           4     rank information
           5     analysis id and codes
           6     proximate and ultimate data
           7     geochemical data (ash,oxides)
           8     geochemical data (ba - ir)
           9     geochemical data (la - ru)
          10     geochemical data (sb - zr)
Enter a list of ascending numbers matching your categories of interest
(ie. 1,3,5 or 2-5)

     4



Category: rank information
 estrank  bit
 majrank  nde
 minrank  nde
************************


Category: rank information
 estrank  bit

   a



ENTER COMMAND:   define
Enter list of new variable definitions

 1.  read rankbtu
 1. fe2o3wc=(fe2o3*usgsash)/100
 2. m1=btu-(50*sulfur)
 3. m2=100-(1.08*bmash+.55*sulfur)
 4. mmfbtu=(m1/m2)*100

 5.



ENTER COMMAND:   list
```

```
Enter name of file:  usc3

Enter number of lines/page:
At each pause press cr key to continue. To abort enter a.
3 Types of listing are possible:
  c - Column type (default format)
  f - Column type (user format)
  r - Row type

select c, f, or r:  c

Would you like output to be to disk?  n

do you wish to enter a new list of names?  y

enter the list of item names.
1.   bed

2.   fieldid

3.   sulfur

4.   btu

5.   rankbtu
rankbtu  is unrecognized. reenter name.

Would you like to see a list of the item names?  n

5.   mmfbtu

6.


  bed        fieldid    sulfur     btu         mmfbtu
  jewell     e-128         0.00b      0.00         0.00
  kennedy    e-129         0.00b      0.00         0.00
  jawbone    e-130         0.00b      0.00         0.00
  kennedy    H87A1         0.60    14755.    15321.62
  jawbone    SOL 30        0.50    13356.    15480.10
  kennedy    SOL 31        0.60    13671.    15424.36



ENTER COMMAND:   review


uschem   is the selected master file

The following new variables have been defined:
```

```
     fe2o3wc=(fe2o3*usgsash)/100
     m1=btu-(50*sulfur)
     m2=100-(1.03*bmash+.55*sulfur)
     mmfbtu=(m1/m2)*100

Current list of variable names is:
bed      fieldid sulfur  btu      mmfbtu

Current conditions are:
   A.  colectr ne usgs-medlin j h

urrent logic statement is: a

The following searches have been made:
Input: Output:
 uschem    usc1
 usc1      usc2
 usc2      usc3
 usc2      usc3



ENTER COMMAND:    file

Enter database name: uscoal



ENTER COMMAND:    multics

Enter multics command:  ls -msf

Multisegment-files = 4, Lengths = 42.

r w     7  usc3
r w    10  usc2
r w    20  usc1
r w     7  ecraven


Enter multics command:  pacer



ENTER COMMAND:    dump

Enter name of file:  ecraven

Enter number of lines/page:  10
```

```
Shall all categories be considered?  yes



Category: location information
 state     virginia
 county    buchanan
 pmerid              0
 twnship    0.0000
 tns       -
 range      0.0000
 rew       -
 section    0.0000


 aapgprv           160

Category: geologic designations
 coalprv   eastern
 region    appalachian
 thickns             1
 field     southwest
 distrct   nde
 ovrbrdn             3
 formatn   norton
 bed       red ash


 reliabl             1
 system    pennsylvanian
 quad      jewell ridge (7.5')
 byear              58
 series    lower-middle

Category: bibliographic information
 source    usgs circ 171
 year            1952

Category: resource delimiters
 majrank   bit


 minrank   bit
 id                  0
************************


Category: location information
 state     virginia
 county    buchanan
 pmerid              0
 twnship    0.0000
```

```
tns      -

   a



ENTER COMMAND:   func

Enter name of file:  ecraven
Functions available at this time are:
    mean     fit      sum
Enter function names and corresponding arguments.

1.   sum county bed

2.
Would you like output to be to disk?  m
RESPONSE MUST BE y OR n
Would you like output to be to disk?  n


There are    2 for county

     3  buchanan
     2  tazewell


There are    2 for bed

     1  red ash
     4  raven


ENTER COMMAND:   upda

This is 'update.'
It is designed to permit the user to add records to or delete records from th
master file, or to change records or portions of records in a subfile of the
master file and to post these changes onto the master file.

The five procedures used to update the master file are:

1.  The addition of new records already written into a temporary file.  Unlik
    the other update procedures which operate on records in the master file
```

format, this procedure operates on raw data records and converts these records to the master file format for insertion into the master file.

2. The deletion, by key, of records already existing in the master file.

3. The sequential revision of records from a selected subfile (i.e. selected through a logical search) from the master file. This subfile may then be posted onto the master file after the desired revisions are completed.

4. The selection, by key, of any record belonging to the subfile for revision of any selected data element. The data manager has the option of posting the selected record onto the master file or leaving it, as revised, in the subfile for further revision.

5. The batch revision of a given data element which will be the same value for all records in the selected subfile.

When revision has been completed on any selected subfile, the user may then elect to post the revised subfile onto the master file, or save the subfile for review and possible further revision by any of the 2-5 update procedures. Records deleted from the master file are saved in a special 'save deletion' file for future recovery if there should arise a need to reconstitute these records.

```
Data manager id no. (1-99):  00
Update procedure (1-5):  5
Data file to be revised:  ecraven

This is the batch update procedure.
Given a specified data element name and a specified data element value, this
procedure changes all records in the given subfile to the data value specified
for that data element name.

The batch edit/revision procedure can be terminated by entering 'quit' when
a prompt for the name of the data element is encountered.
Name of data element to be changed:  bed
Enter value:  jewell
Do you wish to change any more data belonging to this file?  no
 file  '*'  has been revised.
do you wish to write this file onto the master file? no
Update procedure (1-5):  0



ENTER COMMAND:   func

Enter name of file:  ecraven
Functions available at this time are:
    mean    fit     sum
Enter function names and corresponding arguments.
```

```
1.    sum tonnage
Function arguments must be non-numeric variables (type 3, 4 or 5)
tonnage is an invalid name.  Re-enter line.

1.    mean tonnage

2.

Mean statistics for tonnage with      5 item(s).
 Min=       0.40   Max=      14.21   Mean=       5.39
 Sum=       26.97   Variance=      37.32   Std deviation=       6.11



ENTER COMMAND:    quit


The following files have been created during this session:
   1      usc1
   2      usc2
   3      usc3
   4      usc3t
   5      rankbtu
   6      ecraven
   7      ecjewell
   8      ecva

Do you wish to save any of them?  yes
Enter a list of numbers corresponding to
those files you wish to save (ie. 1-3,5).

      1-8


dp usc3t


Note:  this is the Multics command to send the disk
file "usc3t" created during the TABLE command to the high
speed printer in Reston.


The following are the tables created in USCHEM by the TABLE command.

They have been modified slightly for the purpose of this example.
```

USCHEM - TABLE Command Output

Table 1. Descriptions for 6 samples from jewell ridge (7.5'), va.

sample no.	state	county	latitud	longitud	formation	coal bed	rank	sample type	sampled thickness (inches)
d168256	virginia	buchanan	371146n	815129w	new river	jewell	bit	channel	31.2
d168257	virginia	buchanan	371008n	815034w	new river	kennedy	bit	channel	22.8
d168258	virginia	buchanan	371439n	815045w	new river	jawbone	bit	channel	42.0
w193932	virginia	buchanan	371136n	815216w	norton	kennedy	bit	channel	28.0
w195133	virginia	tazewell	370801n	815208w	new river	jawbone	bit	drill core	
w195134	virginia	tazewell	370848n	815236w	kanawha	kennedy	bit	drill core	

Table 2. Proximate, ultimate, btu and forms of sulfur analyses of 3 bit samples from jewell ridge (7.5'), va..

[all analyses except btu are in percent. original moisture content may be slightly more than shown because samples were collected and transported in plastic bags to avoid metal contamination. type of analyses: a, as received; b, moisture free; c, moisture and ash free. all as received analyses by coal analysis section, u.s. bureau of mines, pittsburgh, pa. types b and c calculated from type a.]

		proximate analysis				ultimate analysis						forms of sulfur		
sample no.	type	moisture	volatile matter	fixed carbon	ash	hydrogen	carbon	nitrogen	oxygen	sulfur	btu value	sulfate	pyritic	organic
w193932	a	2.7	25.0	69.0	3.3	5.1	83.4	1.4	6.1	0.6	14755	0.01	0.06	0.58
	b	---	25.7	70.9	3.4	4.9	85.7	1.4	3.8	0.6	15165	0.01	0.07	0.60
	c	---	26.6	73.4	----	5.1	88.7	1.5	3.9	0.6	15698	0.01	0.07	0.62
w195133	a	0.9	28.4	58.1	12.6	4.8	75.9	1.2	5.1	0.5	13356	0.01	0.04	0.45
	b	---	28.7	58.6	12.7	4.7	76.6	1.2	4.3	0.5	13477	0.01	0.05	0.46
	c	---	32.8	67.2	----	5.4	87.8	1.4	5.0	0.6	15442	0.01	0.05	0.53
w195134	a	1.1	28.6	59.9	10.4	4.9	77.2	1.3	5.6	0.6	13671	0.01	0.08	0.52
	b	---	28.9	60.6	10.5	4.8	78.1	1.3	4.7	0.6	13823	0.02	0.09	0.53
	c	---	32.3	67.7	----	5.4	87.2	1.5	5.2	0.7	15449	0.02	0.10	0.59

Table 3. Major and minor oxide composition of the laboratory ash of 6 bit samples from jewell ridge (7.5'), va..

[values are in percent unless labeled as parts per million. the coals were ashed at 525 c. l after a value means 'less than the value shown', n means 'not detected', b means 'no data available', and h means 'not determined due to interference'.]

lab. no.	ash	sio2	al2o3	cao	mgo	na2o	k2o	fe2o3	mno	tio2	p2o5	so3	cl(ppm)

d168256	3.9	26.1	21.4	4.41	1.96	0.24	0.30	22.8	0.09	0.91	0.10l	1.36	0.00b
d168257	3.3	27.6	24.0	5.99	1.96	0.14	0.85	26.0	0.06	0.81	0.11	7.10	0.00b
d168258	9.7	48.4	32.8	1.28	0.75	0.19	1.23	13.3	0.02l	1.35	0.65	0.62	0.00b
w193932	2.9	36.0	24.0	4.50	1.82	0.23	2.00	16.0	0.05	1.10	0.08	6.90	0.00b
w195133	15.6	50.0	24.0	6.50	0.96	0.26	0.64	3.9	0.06	2.30	0.93	3.40	0.00b
w195134	14.0	51.0	23.0	0.99	1.66	0.19	5.20	6.4	0.03	1.10	0.02	1.80	0.00b

Table 4. Major and minor oxide composition of 6 bit samples from jewell ridge (7.5'), va. on a whole-coal basis.

[values are in percent unless labeled parts per million. si, al, ca, mg, na, k, fe, mn, ti, p, cl, and s values were calculated from analyses of ash. l after a value means 'less than the value shown', n means 'not detected', b means 'no data available', and h means 'not determined due to interference'.]

lab. no.	si	al	ca	mg	na	k	fe	mn (ppm)	ti	p (ppm)	s	cl(ppm)
d168256	0.48	0.44	0.12	0.05	0.01	0.01	0.62	27	0.02	17 l	0.02	0.00b
d168257	0.42	0.41	0.14	0.04	0.00	0.02	0.59	15	0.02	15	0.09	0.00b
d168258	2.19	1.68	0.09	0.04	0.01	0.10	0.90	14 l	0.08	274	0.02	0.00b
w193932	0.49	0.37	0.09	0.03	0.00	0.05	0.32	11	0.02	10	0.08	0.00b
w195133	3.65	1.98	0.72	0.09	0.03	0.08	0.43	72	0.22	633	0.21	0.00b
w195134	3.34	1.70	0.10	0.14	0.02	0.60	0.63	32	0.09	12	0.10	0.00b

Table 5. Trace element composition of the laboratory ash of 6 bit samples from jewell ridge (7.5'), va.

[Values are in parts per million. The coals were ashed at 525 C. L after a value means 'less than the value shown', N means ' not detected', B means ' no data available', and H means ' not determined due to interference'. The precision and accuracy of the computer spectrographic values (S) are within one bracket at 68% confidence level and two brackets at 95% confidence level. The bracket is logarithmically defined as +50%, -33% of value reported.]

Lab. no.	Ag (s)	Au (s)	B (s)	Ba (s)	Be (s)	Bi (s)	Cd	Ce	Co	Cr	Cs
d168256	0.00n	0.00n	0.n	300.	15.	0.00n	1.00l	0.l	1282.	1795.	0.00b
d168257	0.00n	0.00n	0.n	300.	10.	0.00n	1.00l	0.l	2147.	2147.	0.00b
d168258	0.00n	0.00n	0.n	700.	15.	0.00n	1.00l	0.l	518.	1035.	0.00b
w193932	0.40	10.00l	58.	810.	53.	22.00l	0.14	379.	155.	169.	10.34
w195133	0.10l	10.00l	30.	510.	9.	15.00l	0.10l	218.	14.	151.	3.21
w195134	0.20	10.00l	62.	780.	13.	15.00l	0.73	121.	41.	99.	21.43

****
example shortened for brevity
elements cs to zr usually follow
****

Table 5. Trace element composition of 6 bit samples from jewell ridge (7.5'), va. on a whole-coal basis. [Values are in parts per million. Si, Al, Ca, Mg, Na, K, Fe, Mn, Ti, P, Cl, Cd, Cu, Li, Pb, and Zn values were calculated from analyses of ash. As, Ce, Co, Cr, Cs, Eu, F, Hf, Hg, La, Lu, Rb, Sb, Sc, Se, Sm, Tb, Th, U, and Yb values are from direct determinations of air-dried(32 C)coal. The remaining analyses were calculated from determinations on ash. L after a value means 'less than the value shown', N means 'not detected', B means 'no data available', and H means 'not determined due to interference'.]

Lab. no.	Ag (s)	As	Au (s)	B (s)	Ba (s)	Be (s)	Bi (s)	Cd	Ce	Co
d168256	0.00n	10.	0.00n	0.n	12.	0.58	0.00n	0.04l	0.00l	50.00
d168257	0.00n	10.	0.00n	0.n	10.	0.33	0.00n	0.03l	0.00l	70.00
d168258	0.00n	5.	0.00n	0.n	68.	1.45	0.00n	0.10l	0.00l	50.00
w193932	0.01	2.	0.29l	2.	23.	1.54	0.64l	0.00	11.00	4.50
w195133	0.02l	1.	1.56l	5.	80.	1.40	2.34l	0.02l	34.00	2.20
w195134	0.03	2.	1.40l	9.	109.	1.82	2.10l	0.10	17.00	5.80

****
example shortened for brevity
elements cr to zr usually follow
****

Table 5. Contents of seven trace elements in 6 bit samples from jewell ridge (7.5'), va..
[Analysis on air_dried (32 C) coal. All values are in parts per million. L after a value means 'less than value shown', B means 'no data available', N means 'not detected', and H means 'not determined due to interference'.]

Lab. no.	As	F	Hg	Sb	Se	Th	U
d168256	256.	513.	2.56	17.95	79.0	0.00b	10.85
d168257	307.	613.l	4.60	18.40	129.3	0.00b	12.39
d168258	52.	880.	1.04	10.35	31.6	43.10	18.19
w193932	2.	24.	0.01	1.50	1.1	0.70	0.70
w195133	1.	140.	0.17	0.50	4.0	6.80	2.70
w195134	2.	130.	0.02	0.70	1.5	2.60	1.30

Table 6. Statistics for 6 bit samples from jewell ridge (7.5'), va. excluding zero and qualified values.

data item	values used	mean	std dev	xmin	xmax	range	geo. mean	geo dev	sigma	zero	qual
usgsash	6	8.22	5.19	2.900	15.60	12.70	6.53	2.00	5.68	0	0
statistics for following data items on ash basis											
sio2	6	39.87	10.44	26.110	51.00	24.89	38.41	1.32	11.44	0	0
al2o3	6	24.86	3.66	21.360	32.77	11.41	24.63	1.14	4.01	0	0
cao	6	3.94	2.12	0.990	6.50	5.51	3.15	2.11	2.33	0	0
mgo	6	1.52	0.48	0.750	1.96	1.21	1.42	1.46	0.53	0	0
na2o	6	0.21	0.04	0.140	0.26	0.12	0.20	1.23	0.04	0	0
k2o	6	1.70	1.65	0.300	5.20	4.90	1.13	2.45	1.81	0	0
fe2o3	6	14.74	7.99	3.900	26.04	22.14	12.11	1.97	8.76	0	0
mno	5	0.06	0.02	0.030	0.09	0.06	0.05	1.43	0.02	0	1
tio2	6	1.26	0.49	0.810	2.30	1.49	1.19	1.40	0.54	0	0
p2o5	5	0.36	0.36	0.020	0.93	0.91	0.16	4.12	0.41	0	1
so3	6	3.53	2.59	0.620	7.10	6.48	2.51	2.41	2.84	0	0
statistics for following data items on whole-coal basis											
cl	has insufficent variance to calculate statistics										
ag	2	0.02	0.01	0.012	0.03	0.02	0.02	1.55	0.01	0	4
as	6	5.00	3.74	1.000	10.00	9.00	3.55	2.38	4.10	0	0
there were less than two positive-valued items for au											
b	3	5.01	2.87	1.682	8.68	7.00	4.09	1.97	3.51	0	3
ba	6	50.22	37.59	9.780	109.20	99.42	34.12	2.58	41.17	0	0
be	6	1.19	0.54	0.326	1.82	1.49	1.01	1.87	0.59	0	0
there were less than two positive-valued items for bi											
br	2	1.21	0.31	0.899	1.51	0.61	1.17	1.30	0.43	0	4
cd	2	0.05	0.05	0.004	0.10	0.10	0.02	5.02	0.07	0	4
ce	3	20.67	9.74	11.000	34.00	23.00	18.53	1.59	11.93	0	3
there were less than two positive-valued items for ce											
co	6	3.59	1.50	1.950	5.80	3.85	3.28	1.55	1.65	0	0
cr	6	9.51	7.50	2.282	23.60	21.32	6.78	2.34	8.21	0	0
cs	3	1.27	1.23	0.300	3.00	2.70	0.77	2.68	1.50	0	3
cu	6	17.83	9.81	9.860	37.44	27.58	15.67	1.63	10.74	0	0
there were less than two positive-valued items for dy											
there were less than two positive-valued items for er											
eu	3	0.30	0.09	0.200	0.42	0.22	0.29	1.35	0.11	0	3
f	5	79.80	50.72	20.000	140.00	120.00	59.45	2.30	56.70	0	1
ga	3	3.04	1.12	1.479	4.06	2.58	2.78	1.57	1.37	0	3
gd	3	1.28	0.67	0.406	2.03	1.62	1.05	1.99	0.82	0	3
ge	5	2.07	1.54	0.420	4.64	4.22	1.46	2.45	1.72	0	1
hf	3	0.90	0.59	0.300	1.70	1.40	0.71	2.03	0.72	0	3
hg	6	0.09	0.06	0.010	0.17	0.16	0.06	2.91	0.07	0	0
there were less than two positive-valued items for ho											
there were less than two positive-valued items for in											
there were less than two positive-valued items for ir											
la	6	9.11	6.49	3.260	21.00	17.74	7.17	1.97	7.11	0	0
li	6	18.88	14.14	6.090	42.12	36.03	14.16	2.13	15.49	0	0
lu	3	0.13	0.05	0.100	0.20	0.10	0.13	1.39	0.06	0	3
mn	6	22.55	21.72	6.762	68.64	61.88	15.79	2.19	23.79	0	0

mo	5	1.06	0.59	0.551	1.93	1.38	0.91	1.73	0.66	0	1
nb	4	1.71	1.58	0.290	4.21	3.92	1.00	2.99	1.82	0	2
nd	5	6.94	4.13	2.175	14.49	12.31	5.80	1.85	4.62	0	1
ni	6	5.15	1.67	3.260	7.49	4.23	4.88	1.39	1.83	0	0
there were less than two positive-valued items for os											
pb	6	4.97	3.80	0.815	11.23	10.42	3.39	2.56	4.16	0	0
there were less than two positive-valued items for pd											
there were less than two positive-valued items for pr											
there were less than two positive-valued items for pt											
there were less than two positive-valued items for rb											
there were less than two positive-valued items for re											
there were less than two positive-valued items for rh											
there were less than two positive-valued items for ru											
sb	6	0.83	0.33	0.500	1.50	1.00	0.78	1.43	0.37	0	0
sc	6	2.39	1.65	0.585	5.40	4.81	1.83	2.15	1.81	0	0
se	6	2.82	1.17	1.100	4.22	3.12	2.53	1.65	1.28	0	0
sm	3	1.70	0.43	1.300	2.30	1.00	1.65	1.27	0.53	0	3
sn	2	0.71	0.39	0.319	1.09	0.77	0.59	1.85	0.55	0	4
sr	6	129.48	78.97	24.650	249.60	224.95	100.30	2.19	86.50	0	0
there were less than two positive-valued items for ta											
tb	3	0.23	0.05	0.200	0.30	0.10	0.23	1.21	0.06	0	3
there were less than two positive-valued items for te											
th	4	3.57	2.23	0.700	6.80	6.10	2.68	2.33	2.58	0	2
there were less than two positive-valued items for tl											
there were less than two positive-valued items for tm											
u	6	1.21	0.82	0.404	2.70	2.30	0.95	2.04	0.90	0	0
v	6	11.53	7.02	3.770	20.28	16.51	9.13	2.05	7.69	0	0
there were less than two positive-valued items for w											
y	6	4.51	2.00	2.465	7.64	5.18	4.10	1.54	2.19	0	0
yb	3	0.80	0.16	0.600	1.00	0.40	0.78	1.23	0.20	0	3
zn	6	3.71	2.26	2.217	8.68	6.46	3.26	1.59	2.48	0	0
zr	6	10.28	10.36	2.175	31.20	29.02	6.15	2.77	11.35	0	0

statistics for following data items on 'as received' basis

data item	values used	mean	std dev	xmin	xmax	range	geo mean	geo dev	sigma	zero	qual
btu	3	13927.33	599.21	13355.999	14755.00	1399.00	13914.64	1.04	733.88	3	0
ashdef	3	2360.00	103.52	2270.000	2505.00	235.00	2357.77	1.04	126.79	3	0
ashsof	3	2458.33	112.64	2355.000	2615.00	260.00	2455.80	1.05	137.96	3	0
ashfld	3	2551.67	117.28	2445.000	2715.00	270.00	2549.02	1.05	143.64	3	0
freswel	3	8.67	0.47	8.000	9.00	1.00	8.65	1.06	0.58	3	0
moistur	3	1.57	0.81	0.900	2.70	1.80	1.39	1.61	0.99	3	0
volmat	3	27.33	1.65	25.000	28.60	3.60	27.28	1.06	2.02	3	0
fixedc	3	62.33	4.77	58.100	69.00	10.90	62.16	1.08	5.84	3	0
bmash	3	8.77	3.97	3.300	12.60	9.30	7.56	1.81	4.86	3	0
hydrogn	3	4.93	0.12	4.800	5.10	0.30	4.93	1.03	0.15	3	0
carbon	3	78.83	3.27	75.900	83.40	7.50	78.77	1.04	4.01	3	0
nitrogn	3	1.30	0.08	1.200	1.40	0.20	1.30	1.06	0.10	3	0
oxygen	3	5.60	0.41	5.100	6.10	1.00	5.59	1.08	0.50	3	0
sulfur	3	0.57	0.05	0.500	0.60	0.10	0.56	1.09	0.06	0	3
there were less than two positive-valued items for sulfate											

sulfpyr	3	0.06	0.02	0.040	0.08	0.04	0.06	1.33	0.02	3	0
sulforg	3	0.52	0.05	0.450	0.58	0.13	0.51	1.11	0.07	3	0
adloss	3	0.70	0.78	0.100	1.80	1.70	0.33	3.43	0.95	3	0

APPENDIX I:

NCRDS - PACER MASK FILES

The mask files are part of the control files required by PACER to handle a data base file. They are included here for the user's reference. The information included in each by column is:

1) the data items and their appropriate spelling

2) The data type - see example of NAMES command for definitions.

3) The dictionary catagory pointer

4) The maximum number of computer words for each item.

I	II	III	IV

USCOAL (ECOAL,WCOAL and NEWCOAL) MASK FILE

state	3	10001	4
county	3	20001	6
pmerid	1	0	1
twnship	2	0	1
tns	4	0	1
range	2	0	1
rew	4	0	1
section	2	0	1
aapgprv	1	0	1
coalprv	3	110001	4
region	3	120001	6
thickns	1	0	1
field	3	50001	4
distrct	3	130001	6
ovrbrdn	1	0	1
formatn	3	60001	4
bed	3	70001	5
reliabl	1	0	1
system	3	140001	4
quad	3	100001	7
byear	1	0	1
series	3	150001	4
source	3	90001	5
year	1	0	1

```
majrank  3  80001   4
minrank  3  80001   4
id       1      0   1
tonnage  2      0   1
  3
ctable  summary of coal by county, rank, bed and overburden
ttable  summary of coal by county, township, range, rank, bed and overburden
stable  summary of coal by state, county, rank, bed and overburden
**************************************************
```

USALYT MASK FILE

```
state    3  10001   4
county   3  20001   6
latitud  1      0   1
ns       4      0   1
longtud  1      0   1
ew       4      0   1
pmerid   1      0   1
twnship  2      0   1
tns      4      0   1
range    2      0   1
rew      4      0   1
section  2      0   1
aapgprv  1      0   1
coalprv  3 110001   4
region   3 120001   6
field    3  50001   4
distrct  3 130001   6
formatn  3  60001   4
bed      3  70001   5
system   3 140001   4
series   3 150001   3
quad     3 100001   7
estrank  3  80001   3
source   3  90001   5
year     1      0   1
anida    4      0   1
anidn    1      0   1
fieldid  6      0   4
labcode  1      0   1
samptyp  1      0   1
analtyp  1      0   1
valrep   1      0   1
trace    3 160001   1
othert   3 170001   1
hgrind   2      0   1
btu      1      0   1
ashdef   1      0   1
ashsof   1      0   1
ashfld   1      0   1
freswel  2      0   1
```

```
moistur  2       0    1
volmat   2       0    1
fixedc   2       0    1
ash      2       0    1
hydrogn  2       0    1
carbon   2       0    1
nitrogn  2       0    1
oxygen   2       0    1
sulfur   2       0    1
sulfate  2       0    1
sulfpyr  2       0    1
sulforg  2       0    1
  1
atable
**************************************************
```

USCHEM MASK FILE - (cf. ICHEM, which is the same with these 2 changes:
state = country and county = subarea)

```
state    3  10001    4
county   3  20001    6
latitud  1       0   1
ns       4           1
longtud  1       0   1
ew       4           1
aapgprv  1       0   1
coalprv  3 110001    4
region   3 120001    6
field    3  50001    4
distrct  3 130001    6
formatn  3  60001    4
group    3 190001    4
bed      3  70001    5
member   3 200001    4
zone     3 210001    4
depth    2       0   1
sampthk  2       0   1
system   3 140001    4
series   3 150001    4
locname  3 220001    7
quad     3 100001    7
colectr  3 230001    5
fieldid  6           4
date     1       0   1
estrank  3  80001    4
majrank  3  80001    4
minrank  3  80001    4
anida    4           1
anidn    1       0   1
labcode  1       0   1
samptyp  1       0   1
analtyp  1       0   1
valrep   1       0   1
```

othert	4		1
btu	5	0	2
ashdef	5	0	2
ashsof	5	0	2
ashfld	5	0	2
freswel	5	0	2
moistur	5	0	2
volmat	5	0	2
fixedc	5	0	2
bmash	5	0	2
hydrogn	5	0	2
carbon	5	0	2
nitrogn	5	0	2
oxygen	5	0	2
sulfur	5	0	2
sulfate	5	0	2
sulfpyr	5	0	2
sulforg	5	0	2
adloss	5		2
usgsash	2	0	1
sio2	5	0	2
al2o3	5	0	2
cao	5	0	2
mgo	5	0	2
na2o	5	0	2
k2o	5	0	2
fe2o3	5	0	2
mno	5	0	2
tio2	5	0	2
p2o5	5	0	2
so3	5	0	2
cl	5	0	2
ag	5	0	2
as	5	0	2
au	5	0	2
b	5	0	2
ba	5	0	2
be	5	0	2
bi	5	0	2
br	5	0	2
cd	5	0	2
ce	5	0	2
co	5	0	2
cr	5	0	2
cs	5	0	2
cu	5	0	2
dy	5	0	2
er	5	0	2
eu	5	0	2
f	5	0	2
ga	5	0	2
gd	5	0	2
ge	5	0	2

```
hf          5          0    2
hg          5          0    2
ho          5          0    2
in          5          0    2
ir          5          0    2
la          5          0    2
li          5          0    2
lu          5          0    2
mn          5          0    2
mo          5          0    2
nb          5          0    2
nd          5          0    2
ni          5          0    2
os          5          0    2
pb          5          0    2
pd          5          0    2
pr          5          0    2
pt          5          0    2
rb          5          0    2
re          5          0    2
rh          5          0    2
ru          5          0    2
sb          5          0    2
sc          5          0    2
se          5          0    2
sm          5          0    2
sn          5          0    2
sr          5          0    2
ta          5          0    2
tb          5          0    2
te          5          0    2
th          5          0    2
tl          5          0    2
tm          5          0    2
u           5          0    2
v           5          0    2
w           5          0    2
y           5          0    2
yb          5          0    2
zn          5          0    2
zr          5          0    2
  5
dscrip  Geologic and location information
bmtab   Bureau of Mines data
oxidtb  Oxides and oxides elements as elements
chtab2  Trace elements of ash and whole coal
statwc  Statistical summary of all elements
*****************************************************
```

USGEOL MASK FILE

colectr	3	230001	5
type	1	0	1
state	3	10001	4
county	3	20001	6
latitud	1	0	1
ns	4		1
longtud	1	0	1
ew	4		1
aapgprv	1	1	1
quad	3	100001	7
coalprv	3	110001	4
region	3	120001	6
field	3	50001	4
estrank	3	80001	3
fieldid	6	0	4
surfelv	2	0	1
bedelv	2	0	1
topbase	4	0	1
precelv	1	0	1
date	1	0	1
exposur	1	0	1
weaqual	1	0	1
avgslop	1	0	1
locname	3	220001	5
bed	3	70001	5
reliabl	1	0	1
bedthk	2	0	1
thkcomp	1	0	1
resthk	2	0	1
resqual	1	0	1
minout	1	0	1
nopart	1	0	1
partthk	2	0	1
faceclt	1	0	1
buttclt	1	0	1
roof	6	240001	3
roofcon	4	0	1
roofthk	2	0	1
floor	6	240001	3
florcon	4	0	1
florthk	2	0	1
ovrbrdn	6	240001	3
ovrbthk	2	0	1
strtype	6	240001	3
str_s_d	1	0	1
strname	6	0	3
strposi	6	0	2
bed_s_d	1	0	1
descrip	6	0	3
joint1	1	0	1
joint2	1	0	1
formatn	3	60001	4

```
rkposit   6       0    4
rklith    6  240001    3
rkthk     2       0    1
color     6       0    3
bedding   6       0    2
grnsize   6       0    3
grnshap   6       0    3
contup    4       0    1
contlow   4       0    1
fossils   6       0    3
descsed   6       0    4
colsamp   1       0    1
coalid1   6       0    3
co2samp   1       0    1
coalid2   6       0    3
prtsamp   1       0    1
prtid     6       0    3
othsamp   1       0    1
othid     6       0    3
coment1   6       0   20
coment2   6       0   20
**************************************************
BMALYT MASK FILE

state     3   10001    4
statcod   1       0    1
statmod   1       0    1
county    3   20001    6
cntycod   1       0    1
minecod   1       0    1
towncod   1       0    1
bed       3   70001    5
bedcod    1       0    1
sizeno    1       0    1
analyr    1       0    1
tipdel    4       0    1
tonsamp   1       0    1
proxno    1       0    1
moistur   2       0    1
volmat    2       0    1
fixedc    2       0    1
ash       2       0    1
sulfur    2       0    1
btu       1       0    1
ultno     1       0    1
hydrogn   2       0    1
carbon    2       0    1
nitrogn   2       0    1
oxygen    2       0    1
ashsfno   1       0    1
ashsoft   1       0    1
fsilo     2       0    1
fsihi     2       0    1
```

```
hgilo     1        0    1
hgihi     1        0    1
prepcod   4        0    1
majrank   3   80001     3
minrank   3   80001     3
  3
bltab    listing with no summary
btable   average analysis of coal by county
statbm   Statistical summary of analyses
**************************************************
```

USTRAT MASK FILE - applies to all USTRAT sub-data base files

```
colectr   3 230001     5
state     3  10001     4
county    3  20001     6
coalprv   3 110001     4
region    3 120001     6
quad      3 100001     7
field     3  50001     4
estrank   3  60001     4
date      1        0    1
confid    4        0    1
fieldid   6        0    4
surfelv   2        0    1
elvprec   1             1
totdept   2        0    1
locstr    1        0    1
locdip    1        0    1
locangl   1        0    1
source    3 250001     6
dscplog   1        0    1
latitud   1        0    1
ns        4        0    1
longtud   1        0    1
ew        4        0    1
llprec    1             1
weaqual   1        0    1
quartr1   4        0    1
quartr2   4        0    1
quartr3   4        0    1
quartr4   4        0    1
section   2        0    1
twnship   2        0    1
tns       4        0    1
range     2        0    1
rew       4        0    1
coment1   6        0   10
save1     1        0    1
unit      1        0    1
unitqal   4        0    1
from      2        0    1
```

```
to        2        0    1
thk       2        0    1
formatn   3    00001    4
bed       3    70001    5
lith      6   240001    2
lithmod   6   240001    3
color     6   240001    2
grnsize   6   240001    2
grnshap   6   240001    2
mineral   6   240001    3
bedding   6   240001    2
contact   4        0    1
fossils   4        0    1
fjc       4        0    1
coment2   6        0   10
save2     1        0    1
*************************************************3
```

BMRESBAS MASK FILE

```
colectr   3   230001    5
state     3    10001    4
county    3    20001    6
coalprv   3   110001    4
region    3   120001    6
quad      3   100001    7
field     3    50001    4
estrank   3    80001    4
date      1        0    1
confid    4        0    1
fieldid   6        0    4
surfelv   2        0    1
elvprec   1             1
totdept   2        0    1
locstr    1        0    1
locdip    1        0    1
locangl   1        0    1
source    3   250001    6
dscplog   1        0    1
latitud   1        0    1
ns        4        0    1
longtud   1        0    1
ew        4        0    1
llprec    1             1
weaqual   1        0    1
quartr1   4        0    1
quartr2   4        0    1
quartr3   4        0    1
quartr4   4        0    1
section   2        0    1
twnship   2        0    1
tns       4        0    1
range     2        0    1
```

rew	4	0	1
coment1	6	0	10
save1	1	0	1
unit	1	0	1
unitqal	4	0	1
from	2	0	1
to	2	0	1
thk	2	0	1
formatn	3	60001	4
bed	3	70001	5
lith	6	240001	2
lithmod	6	240001	3
color	6	240001	2
grnsize	6	240001	2
grnshap	6	240001	2
mineral	6	240001	3
bedding	6	240001	2
contact	4	0	1
fossils	4	0	1
fjc	4	0	1
coment2	6	0	10
save2	1	0	1
051			
statcod	1	0	1
statmod	1	0	1
cntycod	1	0	1
bedcod	1	0	1
uresbas	2	0	1
sresbas	2	0	1
state	3	10001	4
county	3	20001	6
prepcod	4	0	1
noanal	1	0	1
moishi	2	0	1
moislow	2	0	1
moismn	2	0	1
volmhi	2	0	1
volmlo	2	0	1
volmmn	2	0	1
fixchi	2	0	1
fixclo	2	0	1
fixcmn	2	0	1
ashhi	2	0	1
ashlo	2	0	1
ashmean	2	0	1
sulfhi	2	0	1
sulflo	2	0	1
sulfmn	2	0	1
btuhi	1	0	1
btulo	1	0	1
btumean	1	0	1
noult	1	0	1
hydgnhi	2	0	1

```
hydgnlo  2       0    1
hydgnmn  2       0    1
carbhi   2       0    1
carblo   2       0    1
carbmn   2       0    1
nitrghi  2       0    1
nitrglo  2       0    1
nitrgmn  2       0    1
oxyghi   2       0    1
oxyglo   2       0    1
oxygmn   2       0    1
noashsf  1       0    1
ashsfhi  1       0    1
ashsflo  1       0    1
ashsfmn  1       0    1
nofsi    1       0    1
fsihi    2       0    1
fsilo    2       0    1
nohardg  1       0    1
hardghi  1       0    1
hardglo  1       0    1
**************************************************
```

USPET MASK FILE

```
state    3  10001    4
county   3  20001    6
latitud  1       0   1
ns       4       0   1
longtud  1       0   1
ew       4       0   1
bed      3  70001    5
quad     3 100001    7
colectr  3 230001    5
fieldid  6       0   4
date     1       0   1
estrank  3  80001    4
anida    4       0   1
anidn    1       0   1
bmash    5       0   2
sulfur   5       0   2
rvmax    5       0   2
ltash    5       0   2
sulfpyr  5       0   2
q        5       0   2
collin   5       0   2
telin    5       0   2
vitrod   5       0   2
sporin   5       0   2
cutin    5       0   2
terres   5       0   2
lipres   5       0   2
```

algin	5	0	2
liptod	5	0	2
fusin	5	0	2
semifus	5	0	2
micrin	5	0	2
macrin	5	0	2
sclerot	5	0	2
inerto	5	0	2
bsporin	5	0	2
bcutin	5	0	2
bterres	5	0	2
blipres	5	0	2
balgin	5	0	2
bliptod	5	0	2
bfluor	5	0	2
bexsud	5	0	2
bbitum	5	0	2
v_and_i	5	0	2
rvmin	5	0	2
blank1	1	0	1
blank2	1	0	1
blank3	1	0	1
blank4	1	0	1

APPENDIX II:

NCRDS - PACER TERM FILES

The term files, like the mask files are a part of the control files required by PACER. The term files are accessed during the NAMES command and are included here for the user's reference. Each termfile begins with the name of the data categories referred to in the NAMES command; each group of information appearing between the lines of numbers are what is included in the data categories.

The data item spellings are the correct ones for use in PACER. The column of single integers refers to the data type, per the NAMES command.

USCOAL TERMFILE - FOR ECOAL,WCOAL and NEWCOAL

```
0407
location information
geologic designations
bibliographic information
resource delimiters
0001001000090000
```

```
000100020003U04UU5UU6U07UU080009
state    3  state name
county   3  county name
pmerid   1  principal meridian
twnship  2  township number
tns      4  direction of township (n or s)
range    2  range number
rew      4  direction of range (e or w)
section  2  section number
aapgprv  1  aapg province number - see aapg-csd geol provinces code map,
            1:5,000,000 and aapg bull vol 54, no 7, july 1970, pp 1301-5
0002003700130000
00100011001200130014001500160017001800190020002100 22
coalprv  3  coal province name - see us geol survey prof paper 978, pp 8,13
region   3  coal region name - see us geol survey prof paper 978, pp 9,13
thickns  1  coal seam thickness code
                1 = 14 to 28 inches
                2 = 28 to 42 inches
                3 = greater than 42 inches
                4 = 2.5 to 5 feet
                5 = 5 to 10 feet
                6 = greater than 10 feet
                7 = unclassified
                8 = classified by zone
field    3  coal field name
distrct  3  local area designator
ovrbrdn  1  coal seam overburden thickness code
                1 =    0 to 3000 feet
                2 =    0 to 2000 feet
                3 =    0 to 1000 feet
                4 = 1000 to 2000 feet
                5 = 2000 to 3000 feet
                6 = greater than 3000 feet
                7 = strippable
                8 = unclassified
                9 = strippable to 1000 feet
formatn  3  formation name
bed      3  coal bed name
reliabl  1  reliabililty code
                1 = measured
                2 = measured and indicated
                3 = indicated
                4 = inferred
                5 = unclassified
system   3  geologic age: system
quad     3  topographic quadrangle name and series
byear    1  base year for tonnage estimates
                00 means original tonnage in ground
                51 means tonnage remaining in ground as of 1951
series   3  geologic age: series
0003000200020000
00230024
source   3  source document
```

```
year     1  publication year of source document
00040021000300000
00250026002?
majrank 3  major rank of coal
                anth       = anthracite
                semi anth = semi-anthracite
                bit        = bituminous
                lv bit     = low-volatile bituminous
                mv bit     = medium-volatile bituminous
                hv bit     = high-volatile bituminous
                hv bit a   = high-volatile bituminous a
                hv bit b   = high-volatile bituminous b
                hv bit c   = high-volatile bituminous c
                subbit     = sub-bituminous
                subbit a   = sub-bituminous a
                subbit b   = sub-bituminous b
                subbit c   = sub-bituminous c
                lignite    = lignite
minrank 3  minor rank of coal (see above description)
tonnage 2  coal resource in millions of short tons....a
           tonnage record exists for every unique combina-
           tion of thickness code, overburden code, reli-
           ability code, rank code, and location category,
           as well as certain stratigraphic designations.
**********************************************************


USALYT TERMFILE



0408
location information
geologic designations
rank and biblio information
analysis information
000100140013000?
00010002000300040005000600070008000900100011001200?3
state    3  state name
county   3  county name
latitud  1  latitude coordinate
ns       4  direction of latitude (n or s)
longtud  1  longitude coordinate
ew       4  direction of longitude (e or w)
pmerid   1  principle meridian
twnship  2  township number
tns      4  direction of township (n or s)
range    2  range number
rew      4  direction of range (e or w)
section  2  section number
aapgprv  1  aapg province number - see aapg-csd geol provinces code map,
            1:5,000,000 and aapg bull vol 54, no 7, july 1970, pp 1301-5
000200030003000?
00140015001600170018001900200021
coalprv  3  coal province name - see us geol survey prof paper 978, pp 8,13
region   3  coal region name - see us geol survey prof paper 978, pp 9,13
```

field	3	coal field name
distrct	3	local area designator
formatn	3	formation name
bed	3	coal bed name

```
system  3  geologic age: system
series  3  geologic age: series
000300180004000C
0022002300240025
quad    3  topographic quadrangle name and series
estrank 3  estimated rank of coal
               anth       = anthracite
               semi anth  = semi-anthracite
               bit        = bituminous
               lv bit     = low-volatile bituminous
               mv bit     = medium-volatile bituminous
               hv bit     = high-volatile bituminous
               hv bit a   = high-volatile bituminous a
               hv bit b   = high-volatile bituminous b
               hv bit c   = high-volatile bituminous c
               subbit     = sub-bituminous
               subbit a   = sub-bituminous a
               subbit b   = sub-bituminous b
               subbit c   = sub-bituminous c
               lignite    = lignite
source  3  source document
year    1  publication year of source document
0004004600270000
00260027002800290030003100320033003400350036003700380039004000410042004300440045
00460047004800490050005100 52
anida   4  reported analysis identification (alphabetic)
anidn   1  reported analysis identification (numeric)
fieldid 6  field number assigned by collector/submitter
labcode 1  code for laboratory performing analysis
               1 = u.s. bureau mines
               2 = state university
               3 = state agency
               4 = coal company
samptyp 1  sample type
               1 = channel
               2 = run of mine
               3 = drill core
               4 = other
               5 = grab
anlytyp 1  analysis type
               1 = as received
               2 = air dried
               3 = moisture free
               4 = moisture and ash free
               5 = other
valrep  1 values represent
               1 = single sample
               2 = average of more than one sample
               3 = range of sample values
               4 = other
               5 = grab
trace   3  sample analyzed for trace elements (y=yes n=no)
othert  3  results of other tests shown on analysis
```

```
hgrind  1  hardgrove grindability index
btu     1  btu value
ashdef  1  ash deformation temperature in degrees fahrenheit
ashsof  1  ash softening temperature in degrees fahrenheit
ashfld  1  ash fluid temperature in degrees fahrenheit
freswel 2  free-swelling index
moistur 2  moisture value in percent
volmat  2  volatile matter value in percent
fixedc  2  fixed carbon value in percent
ash     2  ash value in percent
hydrogn 2  hydrogen value in percent
carbon  2  carbon value in percent
nitrogn 2  nitrogen value in percent
oxygen  2  oxygen value in percent
sulfur  2  total sulfur value in percent
sulfate 2  sulfate value in percent
sulfpyr 2  pyritic sulfur in percent
sulforg 2  organic sulfur in percent
**********************************************************
```

USCHEM TERMFILE

```
1008
location information
geologic designations
bibliographic information
rank information
analysis id and codes
proximate and ultimate data
geochemical data (asn,oxides)
geochemical data (ba - ir)
geochemical data (la - ru)
geochemical data (sb - zr)
00010008000700000
00010002000300040005000600007
state   3  state name
county  3  county name
latitud 1  latitude coordinate
ns      3  direction of latitude (n or s)
longtud 1  longitude coordinate
ew      3  direction of longitude (e or w)
aapgprv 1  aapg province number - see aapg-csd geol provinces code map,
           1:5,000,000 and aapg bull vol 54, no 7, july 1970, pp 1301-5
00020013001300000
00080009001000110012001300140015001600170018001900200
coalprv 3  coal province name - see us geol survey prof paper 978, pp 8,13
region  3  coal region name - see us geol survey prof paper 978, pp 9,13
field   3  coal field name
distrct 3  local area designator
formatn 3  formation name
group   3  group name
bed     3  coal bed name
member  3  member name
```

zone	3	zone name
depth	2	depth to top of sample
sampthk	2	sampled thickness
system	3	geologic age: system

```
series  3  geologic age: series
0003000500050000
0021002200230024 0025
locname 3  mine or drill hole identifier
quad    3  topographic quadrangle name and series
colectr 3  person collecting or submitting data
fieldid 6  field number assigned by collector/submitter
date    1  yr/mo/dy - date is of meaning to the collector
0004002100030000
0026002700 28
estrank 3  estimated rank of coal (also includes lithology for coal
           related rock samples - list dictionary type items in "names"
           command for all possible ranks and lithologies)
              *anth       = anthracite
              *semi anth  = semi-anthracite
              *bit        = bituminous
               lv bit     = low volatile bituminous
               mv bit     = medium volatile bituminous
               hv bit     = high volatile bituminous
               hv bit a   = high volatile bituminous a
               hv bit b   = high volatile bituminous b
               hv bit c   = high volatile bituminous c
              *subbit     = sub-bituminous
               subbit a   = sub-bituminous a
               subbit b   = sub-bituminous b
               subbit c   = sub-bituminous c
              *lignite    = lignite
majrank 3  major rank of coal calculated from U.S.B.M. analyses
           by ASTM classification (see starred items above)
minrank 3  minor rank of coal calculated from U.S.B.M. analyses
           by ASTM classification
0005003600060000
0029003000310032 0033 0034
anida   3  reported analysis identification (alphabetic)
anidn   1  reported analysis identification (numeric)
labcode 1  code for laboratory performing analysis
               1 = u.s. bureau of mines
               2 = state university
               3 = state agency
               4 = coal company
               5 = u.s. geological survey
                   (and combinations e.g. 15 = usbm & usgs)
samptyp 1  sample type
               1 = channel
               2 = run of mine
               3 = drill core
               4 = other
               5 = grab
analtyp 1  analysis type
               1 = as received
               2 = air dried
               3 = moisture free
               4 = moisture and ash free
```

```
                5 = other
valrep  1  values represent
                1 = single sample
                2 = average of more than one sample (composite)
                3 = range of sample values
                4 = composite usbm individual usgs
                5 = composite usgs individual usbm
                9 = sink float (mesh)
               10 = partial seam
               11 = partial upper bench (refers to stratigraphic bench,
                    not sample technique)
               12 = partial lower bench
               13 = partial middle bench
               20 = upper bench
               21 = lower bench
               22 = middle bench
000600190019000O
00350036003700380039004000410042004300440045004600470048004900500051005200530
othert  3  results of other tests available (y or n) - will later be coded
btu     1  btu value
ashdef  1  ash deformation temperature in fahrenheit
ashsof  1  ash softening temperature in fahrenheit
ashfld  1  ash fluid temperature in fahrenheit
freswel 2  free-swelling index
moistur 2  moisture value in per cent
volmat  2  volatile matter value in per cent
fixedc  2  fixed carbon value in per cent
bmash   2  ash value in per cent usbm (750 c)
carbon  2  carbon value in per cent
oxygen  2  oxygen value in per cent
hydrogn 2  hydrogen value in per cent
nitrogn 2  nitrogen value in per cent
sulfur  2  total sulfur value in per cent
sulfate 2  sulfate value in per cent
sulfpyr 2  pyritic sulfur in per cent
sulforg 2  organic sulfur in per cent
adloss  2  air dried loss in per cent
000700400012000O
00540055005600570058005900600061006200630064006S
usgsash 2  ash value in per cent usgs laboratory (525 c)
           ***usgs analytical methods are given by location of laboratory
              i.e. (washington:denver)
           ***the laboratory performing analysis is indicated by anida value
              i.e. w = washington
                   d = denver
           ***if the analytical methods used for an element have changed for
              a laboratory, the methods are given in order of oldest
              to newest  e.g. (spec,inaa-750527,wetchem-760203:spec)
              with date of conversion of ash or whole coal basis - yr,mo,dy
           ***usgs types of analyses***
              wetchem = wet chemical analysis
                        w numbers numbers on ash except hg & f
                        d numbers on ash except as, f, hg, & sb
```

```
                inaa     = instrumental neutron activation analysis
                           on whole coal
                na       = delayed neutron activation analysis on whole coal
                xrf      = x-ray fluorescence
                           w numbers on ash except cl & p
                           d numbers on ash except se
                spec     = spectrographic on ash
                           for w numbers optical emission
                           for d numbers six-step
             ***contact usgs - branch of coal resources for specifics***
sio2     5   sio2 value in per cent in ash (spec,xrf:xrf)
                 b = no data available
                 l = less than value shown
                 g = greater than value shown
                 h = not determined due to inteference
                 n = not detected
al2o3    5   al2o3 value in per cent in ash (spec,xrf:xrf)
cao      5   cao value in per cent in ash (spec,xrf:xrf)
mgo      5   mgo value in per cent in ash (wetchem:wetchem)
na2o     5   na2o value in per cent in ash (wetchem,inaa:wetchem)
k2o      5   k2o value in per cent in ash (spec,xrf:xrf)
fe2o3    5   fe2o3 value in per cent in ash (spec,xrf:xrf)
mno      5   mno value in per cent in ash (spec,wetchem:spec,wetchem)
tio2     5   tio2 value in per cent in ash (spec,xrf:xrf)
p2o5     5   p2o5 value in per cent in ash (spec,xrf:xrf)
so3      5   so3 value in per cent in ash (spec,xrf:xrf)
0008002700270000
00670068006900700071007200730074007500760066007700780079008000810082 0083
00840085008600870088008900900091 0092
ag       5   ag value in ppm - ash (spec:spec)
as       5   as value in ppm - whole coal (inaa:wetchem)
au       5   au value in ppm - ash (spec:spec)
b        5   b value in ppm - ash (spec:spec)
ba       5   ba value in ppm - ash (spec:spec)
be       5   be value in ppm - ash (spec:spec)
bi       5   bi value in ppm - ash (spec:spec)
br       5   br value in ppm - ash (aa)
cd       5   cd value in ppm - ash (wetchem:wetchem)
ce       5   ce value in ppm - ash,wc (spec,inaa-750727:spec)
cl       5   cl value in ppm - whole coal (xrf:xrf)
co       5   co value in ppm - ash,wc (spec,inaa-750727:spec,inaa-760819)
cr       5   cr value in ppm - ash,wc (spec,inaa-750727:spec,inaa-760819)
cs       5   cs value in ppm - ash,wc (spec,inaa-750727:spec)
cu       5   cu value in ppm - ash (wetchem:wetchem)
dy       5   dy value in ppm - ash (spec:spec)
er       5   er value in ppm - ash (spec:spec)
eu       5   eu value in ppm - ash,wc (spec,inaa-750727:spec)
f        5   f value in ppm - whole coal (wetchem:wetchem)
ga       5   ga value in ppm - ash (spec:spec)
gd       5   gd value in ppm - ash (spec:spec)
ge       5   ge value in ppm - ash (spec:spec)
hf       5   hf value in ppm - ash,wc (spec,inaa-750727:spec)
hg       5   hg value in ppm - whole coal (wetchem:wetchem)
```

```
ho        5  ho value in ppm - ash (spec:spec)
in        5  in value in ppm - ash (spec:spec)
ir        5  ir value in ppm - ash (spec:spec)
00090017001700J0
009300940095009600970098009901000101010201030104010501060107010801O9
la        5  la value in ppm - ash (spec,inaa-750727:spec)
li        5  li value in ppm - ash (wetchem:wetchem)
lu        5  lu value in ppm - ash,wc (spec,inaa-750727:spec)
mn        5  mn value in ppm - ash (spec,wetchem:spec,wetchem)
mo        5  mo value in ppm - ash (spec:spec)
nb        5  nb value in ppm - ash (spec:spec)
nd        5  nd value in ppm - ash (spec:spec)
ni        5  ni value in ppm - ash (spec:spec)
os        5  os value in ppm - ash (spec:spec)
pb        5  pb value in ppm - ash (wetchem:wetchem)
pd        5  pd value in ppm - ash (spec:spec)
pr        5  pr value in ppm - ash (spec:spec)
pt        5  pt value in ppm - ash (spec:spec)
rb        5  rb value in ppm - ash,wc (spec,inaa-750727:spec)
re        5  re value in ppm - ash (spec:spec)
rh        5  rh value in ppm - ash (spec:spec)
ru        5  ru value in ppm - ash (spec:spec)
0010001900190000
011001110112011301140115011601170118011901200121012201230124012501260127012B
sb        5  sb value in ppm - whole coal (inaa:inaa)
sc        5  sc value in ppm - ash,wc (spec,inaa-750727:spec)
se        5  se value in ppm - whole coal (inaa:inaa)
sm        5  sm value in ppm - ash,wc (spec,inaa-750804:spec)
sn        5  sn value in ppm - ash (spec)
sr        5  sr value in ppm - ash (spec:spec)
ta        5  ta value in ppm - ash (spec:spec)
tb        5  tb value in ppm - ash,wc (spec,inaa-750727:spec)
te        5  te value in ppm - ash (spec:spec)
th        5  th value in ppm - whole coal (na:na)
tl        5  tl value in ppm - ash (spec:spec)
tm        5  tm value in ppm - ash (spec:spec)
u         5  u value in ppm - whole coal (na:na)
v         5  v value in ppm - ash (spec:spec)
w         5  w value in ppm - ash (spec:spec)
y         5  y value in ppm - ash (spec:spec)
yb        5  yb value in ppm - ash,wc (spec,inaa-750727:spec)
zn        5  zn value in ppm - ash (wetchem:wetchem)
zr        5  zr value in ppm - ash (spec:spec)
**********************************************************


USGEOL TERM FILE


09
location information
geologic designation
bibliographic information
```

```
elevation & exposure information
coal information
structural information
stratigraphic information
sample information
comments
0001001600100000
00010002000300040005000600070008000900010
colectr 3  person submitting data
type    1  associated status code of submitter
                1 = usgs geologist
                2 = state geologist
                3 = other geologist
                4 = driller
                5 = other
state   3  state name
county  3  county name
latitud 1  latitude coordinate
ns      4  direction of latitude (n or s)
longtud 1  longitude coordinate
ew      4  direction of longitude (e or w)
aapgprv 1  aapg province number - see aapg-csd geol provinces code map,
           1:5,000,000 and aapg bull vol 54, no 7, july 1970, pp 1301-5
quad    3  topographic quadrangle name and series
0002000300030000
001100120013
coalprv 3  coal province name - see us geol survey prof paper 978, p 8,13
region  3  coal region name - see us geol survey prof paper 978, p 9,13
field   3  coal field name
0003000700020000
00140015
estrank 3  estimated rank of coal code
                anth    = anthracite
                bit     = bituminous
                subbit  = sub-bituminous
                lignite = lignite
                unknown = rank unknown
fieldid 6  field number assigned by collector/submitter
0004002900090000
00160017001800190020002100220023 0024
surfelv 2  surface or ground elevation in feet
bedelv  2  coal bed elevation in feet
topbase 4  designation for elevation at top or base of bed
precelv 1  precision of instrument code for elevation reading
                1 = transit
                2 = hand level
                3 = barometer
                4 = estimated from map
date    1  yr/mo/dy - date is of meaning to the collector
exposur 1  type of exposure code
                1 = surface exposure
                2 = surface mine
                3 = underground mine
```

```
                4 = shaft
                5 = drift
                6 = slope
                7 = drill core
                8 = drillhole
                9 = other
weaqual 1  weathering quality code of coal
                1 = fresh
                2 = slightly weathered
                3 = weathered
                4 = highly weathered
                5 = bloom
                6 = clinkered
                7 = other
avgslop 1  average slope of surface at exposure site
locname 3  mine name and/or drillhole number
000500430019000O
00250026002700280029003000310032003300340035003600370038003900400041004200430
bed     3  coal bed name
reliabl 1  reliability code of coal bed name
                1 = certain
                2 = probable
                3 = uncertain
bedthk  2  coal bed thickness in inches
thkcomp 1  is coal bed thickness complete?
                1 = yes
                2 = no
resthk  2  resource coal thickness in inches
resqual 1  accuracy code for resource thickness
                1 = precise
                2 = estimated
minout  1  is coal mined out?
                1 = yes
                2 = no
nopart  1  total number of partings in seam not included
           in resource thickness
partthk 2  total thickness of partings in inches
           in seam not included in resource thickness
faceclt 1  face cleat nnn1/nnn2/nn3/n4
           nnn1 strike of cleat in compass bearing (e.g. read degrees
                in clockwise direction from north)
           nnn2 dip of cleat in compass bearing
           nn3  dip angle of cleat
           n4   scale of cleat code
                1 = fine, < 1/2 inch apart
                2 = medium, 1/2 - 2 inches apart
                3 = large, > 2 inches apart
buttclt 1  butt cleat nnn1/nnn2/nn3/n4 - see faceclt
roof    6  roof lithology - see abbreviations list
roofcon 4  roof contact descriptive code
                c = conformable
                g = gradational
                n = unconformable
```

```
                    s = sharp
                    u = undulating
roofthk 2   roof thickness in inches
floor   6   floor lithology - see abbreviations list
florcon 4   floor contact descriptive code - see roofcon
florthk 2   floor thickness in inches
ovrbrdn 6   overburden lithology - see abbreviations list
ovrbthk 2   overburden thickness in inches
0006001700070000
0044004500460047004800490050
strtype 6   structure type (e.g. fault, fold, lineation)
str_s_d 1   structure nnn1/nnn2/nnn3
            nnn1 strike of structure in compass bearing - see faceclt
            nnn2 dip of structure in compass bearing
            nnn3 dip angle of structure
strname 6   recognized structure name (e.g. san andreas fault)
strposi 6   structure position (e.g. downthrown, nose)
bed_s_d 1   bedding nnn1/nnn2/nnn3 - see str_s_d
descrip 0   additional structure description
            nnn1 strike of joint in compass bearing - see faceclt
            nnn2 dip of joint in compass bearing
            nn3  dip angle of joint
            n4   prominence of joint code
                    1 = strong, < 1 foot apart
                    2 = moderate, 1 - 3 feet apart
                    3 = weak, > 3 feet apart
joint2  1   joint2 nnn1/nnn2/nn3/n4 - see joint1
0007001200120000
0051005200530054005500560057005800590060006100062
formatn 3   formation, member, or bed name
rkposit 6   position of rock unit relative to coal bed
rklith  6   rock unit lithology
rkthk   2   rock unit thickness in inches
color   6   suggested gsa internatl standard color abbreviations
bedding 6   bedding characteristics of rock unit
grnsize 6   grain size according to wentworth scale
grnshap 6   grain shape
contup  4   upper contact descriptive code - see roofcon
contlow 4   lower contact descriptive code - see roofcon
fossils 6   fossils present in rock unit
descsed 6   descriptive sedimentology of rock unit
0008002600080000
0063006400650066006700680069070
co1samp 1   nn1/n2/n3/n4
            nn1 number of coal samples collected
            n2  type of sample code
                    1 = channel
                    2 = run of mine
                    3 = drill core
                    4 = other
                    5 = grab
                    6 = fossil
            n3 number of samples sent to usbm for analysis
```

```
            n4 number of samples sent to usgs for analysis
coalid1 6   field numbers of coal samples assigned by field personnel
co2samp 1   nn1/n2/n3/n4 - see colsam1
coalid2 6   field numbers of coal samples assigned by field personnel
prtsamp 1   n1/n2/n3/n4
            n1 number of parting samples collected
            n2 type of sample code - see colsam1
            n3 number of samples sent to usbm for analysis
            n4 number of samples sent to usgs for analysis
prtid   6   field numbers of parting samples assigned by field personnel
othsamp 1   n1/n2/n3/n4
            n1 number of other samples collected
            n2 type of sample code - see colsam1
            n3 number of samples sent to usbm for analysis
            n4 number of samples sent to usgs for analysis
othid   6   field numbers of other samples assigned by field personnel
00090003000200000
00710072
coment1 6   comments that contain information not included in other
coment2 6   fields and continuations of existing fields - see abbreviations
            list
**************************************************


BMALYT TERM FILE


0608
location identifiers (codes)
analysis specifics (codes)
proximate data
ultimate data
other tests
preparation & rank codes
00010007000700000
000100020003000400050006 0007
state   3   state name
statcod 1   state fips code
statmod 1   state modifier (pa & ky)
county  3   county name
cntycod 1   county fips code
minecod 1   usbm mine code
towncod 1   usbm town code
00020014000600000
000800090010001100120013
bed     1   bed name
bedcod  1   coal bed code
sizeno  1   usbm size code
               01 = run-of-mine or crushed run-of-mine
            02-98 = screening sizes
               99 = face or channel sample
analyr  1   year of analysis
            last 2 digits (e.g. 19xx)
```

```
tipdel  3  tipple/delivered code
                t = tipple
                d = delivered
           u to z = additional tipple samples
                    within same year
tonsamp 1  tonnage sampled (in short tons)
00030007000700000
00140015001600170018001900200
proxno  1  number of proximate analyses
moistur 2  per cent moisture - as received
volmat  2  per cent volatile matter - dry basis
fixedc  2  per cent fixed carbon - dry basis
ash     2  per cent ash - dry basis
sulfur  2  per cent sulfur - dry basis
btu     2  btu value - dry basis
00040005000500000
00210022002300240025
ultno   1  number of ultimate analyses
hydrogn 2  per cent hydrogen - dry basis
carbon  2  per cent carbon - dry basis
nitrogn 2  per cent nitrogn - dry basis
oxygen  2  per cent oxygen - dry basis
00050006000600000
00260027002800290030031
ashsfno 1  number of asn softening temperature analyses
ashsoft 1  ash softening temperature in degrees fahrenheit
fsilo   2  free swelling index - low
fsihi   2  free swelling index - high
hgilo   1  hardgrove grindability index - low
hgihi   1  hardgrove grindability index - high
00060006000300000
00320033034
prepcod 3  preparation code
             r = raw
             p = partially washed
             w = washed
majrank 3  rank calculated by astm classification
minrank 3  rank calculated by astm classification
**************************************************


USTRAT TERMFILE (applies for all STRAT sub data base files)


05
location & rank information
fieldid, elevation, depth & bibliographic information
location & weathering quality information
unit geologic description information
coment2
00010013000800000
00010002000300040005000600070008
colectr 3  person submitting data
```

```
state    3  state name
county   3  county name
coalprv  3  coal province name - see us geol survey prof paper 978, p 8,13
region   3  coal region name - see us geol survey prof paper 978, p 9,13
quad     3  topographic quadrangle name and series
field    3  coal field name
estrank  3  estimated rank of coal
                anth     =  anthracite
                bit      =  bituminous
                subbit   =  sub-bituminous
                lignite  =  lignite
                unknown  =  rank unknown
000200450010000
000900110012u013001400150016001700180019
date     1  yr/mo/dy - date is of meaning to the collector
fieldid  6  field number assigned by collector/submitter - same as map id no
            MUST BE IDENTICAL TO ID NO ON MAPS SUBMITTED TO NCRDS
                  FOR DIGITIZING
surfelv  2  surface or ground elevation in feet
elvprec  1  surface elevation qualifing codes
              1 = etm +\- 10ft (etm=estimated from topo map)
              2 = etm +\- 20ft
              3 = etm +\- 50ft
              4 = from driller
              5 = from Kelly Bushing - enter KB elv in coment1 field
              6 = from Kelly Bushing +\- 5ft
              7 = from Kelly Bushing +\- 10ft
              8 = transit
              9 = hand level
             10 = barometer
totdept  2  total depth of section, core, log, etc. in feet and inches
locstr   1  local strike in degrees from north clockwise
locdip   1  local dip in degrees from northn clockwise
locangl  1  local dip angle
source   3  source of data
dscplog  1  description or log code - 3 digit - all DESCRIPTIONS preceded by 1,
            all LOGS by 2; eg. drill hole = 2u1
            1nn = DESCRIPTIONS          2nn = LOGS
                        n codes
            1=roadcut              1=core           10=resistivity
            2=outcrop              2=drill hole     11=spon. potential
            3=underground mine     3=rotary         12=sonic
            4=surface mine         4=drillers log   13=laterolog
            5=prospect pit         5=electric       14=seismic
            6=measured section     6=geophysical    15=caliper
            7=mine mouth           7=gamma          16=coal test
            8=section from         8=density        17=oil and gas
              publication            (gamma-gamma)
                                   9=neutron        18=water well
                                     (activation)
                                  19=soil test      30=multiple-see STRAT
                                  20=power line        manual
                                     hole           31=combination - see
```

```
                                21=pump hole        STRAT manual
                                22=ventilation
                                   shaft
                                23=gamma&neutron
                                24=gamma&density
                                25=rotary&core
0003003200160000
0020002100220023002400250026002700280029003000310032003300340035
latitud 1  latitude coordinate - in degrees, minutes, seconds and 4
           digits for decimal seconds (ddmmssxxxx, x=decimal seconds)
ns      4  direction of latitude (n or s)
longtud 1  longitude coordinate - in degrees, minutes, seconds and 4
           digits for decimal seconds (ddmmssxxxx, x=decimal seconds)
ew      4  direction of longitude (e or w)
llprec  1  latitude\longitude qualifier codes
                1 = +\- 100ft
                2 = +\- 200ft
                3 = +\- 500ft
                4 = +\- 1/4 mile
                5 = +\- 1/2 mile
                6 = gt 1/2 mile
weaqual 1  weathering quality code of coal
                1 = fresh
                2 = slightly weathered
                3 = weathered
                4 = highly weathered
                5 = bloom
                6 = clinkered
                7 = other - enter in coment1
                8 = multiple (see unit qual)
quartr1 4  position of quarter
quartr2 4  position of quarter
quartr3 4  position of quarter
quartr4 4  position of quarter
section 2  section number
twnship 2  township number
tns     4  direction of township (n or s)
range   2  range number
rew     4  direction of range (e or w)
coment1 6  drill hole number, mine name & other items mentioned above
0004005600170000
0037003800390040004100420043004400450046004700480049005000510052005300
unit    1  numeric or alphabetic code assigned by NCRDS to
           identify each unit within the section
unitqal 4  alphabetic unit qualifing codes - 1-4 letters allowed
           see STRAT Manual for more details and coment2 field
           a = analysis run on sample
           b = boundry (base or top of formation, etc.)
           c = coal thickness for resource calc is different than measured
           d = interbedded
           e = elevation recorded
           f = floor rock
           g = gradational
```

```
            i = incomplete thickness
            k = klinkered - coal burned
            l = change in log type
            m = estimated ("maybe") thickness value, cf. "I"
            n = interlaminated
            r = roof rock
            s = sample from unit has been collected
            u = uncertian bed name
            w = weathering for specific units if different than rest of units
            x = extropolated thickness value not to be used for resource calc
from      2  depth of top of unit in inches
to        2  depth of bottom of unit in inches
thk       2  rock unit thickness in inches
formatn   3  formation name
bed       3  coal bed, marker bed, or other identifying stratigraphic name
             of standard abbreviations
lith      6  primary lithology - one lith name permitted - see ncrds abbrev. list
lithmod   6  abbreviated lithologic modifiers - see ncrds abbrev. list
color     6  gsa internatl standard color abbreviations
grnsize   6  grain size according to wentworth scale
grnshap   6  abbreviated grain shape - see ncrds abbrev. list
mineral   6  abbreviated mineralogy, characteristics of rock unit - see
             ncrds abbrev. list
bedding   6  abbreviated bedding characteristics of rock unit - see
             ncrds abbrev. list
contact   4  contact descriptive code
                  g = gradational
                  i = irregular
                  n = unconformable
                  o = other
                  s = sharp
                  u = undulating
fossils   4  code for fossils present in rock unit
                  b = brackish
                  f = fresh
                  i = invertebrate
                  m = marine
                  o = other
                  p = plant
                  v = vertebrate
fjc       4  alpha character code for indicating presence of one or more
             of the following conditions:
                  f = fractures
                  j = joints
                  c = cleats
             if neccessary enter measurements in coment2
             see STRAT Manual for specifics
0005000200010000
0054
coment2   6  miscellaneous comments and information not
             included in other fields - see ncrds abbrev. list
**************************************************

BMRESBAS TERM FILE
```

```
0508
location identifiers
preparation codes
proximate data
ultimate data
other tests
0001000800080000
0001000200030004000500060007000 8
statcod 1  state fips code
statmod 1  state modifier
cntycod 1  fips county code
bedcod  1  coal bed code
uresbas 2  reserve base - underground - million tons
sresbas 2  reserve base - strip - million tons
state   3  state name
county  3  county name
0002000400010000
0009
prepcod 4  preparation code
               r = raw
               q = partially washed
               w = washed
0003001900190000
0010001100120013001400150016001700180019002000210022002300240025002600270(
noanal  1  number of analyses
moishi  2  per cent moisture - as received (high)
moislow 2  per cent moisture - as received (low)
moismn  2  per cent moisture - as received (mean)
volmhi  2  per cent volatile matter - dry (high)
volmlo  2  per cent volatile matter - dry (low)
volmmn  2  per cent volatile matter - dry (mean)
fixchi  2  per cent fixed carbon - dry (high)
fixclo  2  per cent fixed carbon - dry (low)
fixcmn  2  per cent fixed carbon - dry (mean)
ashhi   2  per cent ash - dry (high)
ashlo   2  per cent ash - dry (low)
ashmean 2  per cent ash - dry (mean)
sulfhi  2  per cent sulfur - dry (high)
sulflo  2  per cent sulfur - dry (low)
sulfmn  2  per cent sulfur - dry (mean)
btuhi   1  btu value (high)
btulo   1  btu value (low)
btumean 1  btu value (mean)
0004001300130000
0029003000310032003300340035003600370038003900400041
noult   1  number of ultimate analyses
hydgnhi 2  per cent hydrogen - dry (high)
hydgnlo 2  per cent hydrogen - dry (low)
hydgnmn 2  per cent hydrogen - dry (mean)
carbhi  2  per cent carbon - dry (high)
carblo  2  per cent carbon - dry (low)
carbmn  2  per cent carbon - dry (mean)
```

```
nitrghi 2  per cent nitrogen - dry (high)
nitrglo 2  per cent nitrogen - dry (low)
nitrgmn 2  per cent nitrogen - dry (mean)
oxyghi  2  per cent oxygen - dry (high)
oxyglo  2  per cent oxygen - dry (low)
oxygmn  2  per cent oxygen - dry (mean)
0005000100010000
0042004300440045004600470048004900500051
noashsf 1  number of ash softening temperature analyses
ashsfhi 1  ash softening temperature (high)
ashsflo 1  ash softening temperature (low)
ashsfmn 1  ash softening temperature (mean)
nofsi   1  number of free swelling indices
fsihi   2  free swelling index (high)
fsilo   2  free swelling index (low)
nohardg 1  number of hardgrove grindability
hardghi 1  hardgrove grindability indices (high)
hardglo 1  hardgrove grindability indices (low)
**************************************************
```

USPET TERM FILE

```
07
location information
bibliographic information
analysis id and codes
coal information
white light analysis
blue light analysis
coal information continued
0001000600060000
0001000200030004000500006
state    3  state name
county   3  county name
latitud  1  latitude coordinate
ns       4  direction of latitude (n or s)
longtud  1  longitude coordinate
ew       4  direction of longitude (e or w)
0002000300030000
0007000800009
bed      3  coal bed name
quad     3  topographic quadrangle name and series
colectr  3  person collecting or submitting data
0003001200050000
0010001100120013O014
fieldid  6  field number assigned by collector/submitter
date     1  yr/mo/dy - date is of meaning to the collector
estrank  3  estimated rank of coal
                anth    = anthracite
                bit     = bituminous
                subbit  = subbituminous
                lignite = lignite
```

```
                unknown = rank unknown
anida    4  reported analysis identification (alphabetic)
                        d = denver
                        w = washington
anidn    1  reported analysis identification (numeric)
0004000o00060000
0015001o0017001900190020
bmash    5  ash value in per cent usbm (750 c)
sulfur   5  total sulfur value in per cent
rvmax    5  reflectance of vitrinite in oil - mean of max values
ltash    5  low temperature ash value (<150 c)
sulfpyr  5  pyritic sulfur in percent
q        5  fluorescent quotient
0005001500150000
0021002200230024002500260027002800290030003100320033003400 35
collin   5  white light analysis of collinite
telin    5    "      "        "      " telinite
vitrod   5    "      "        "      " vitrodetrinite
sporin   5    "      "        "      " sporinite
cutin    5    "      "        "      " cutin
terres   5    "      "        "      " terpene resinite
lipres   5    "      "        "      " lipid resinite
algin    5    "      "        "      " alginite
liptod   5    "      "        "      " liptodetrinite
fusin    5    "      "        "      " fusinite
semifus  5    "      "        "      " semi fusinite
micrin   5    "      "        "      " micrinite
macrin   5    "      "        "      " macrinite
sclerot  5    "      "        "      " sclerotinite
inerto   5    "      "        "      " inertodetrinite
0006001000100000
0036003700380039004000041004200430044 0045
bsporin  5  blue light analysis of sporinite
bcutin   5    "      "        "      " cutinite
bterres  5    "      "        "      " terpene resinite
blipres  5    "      "        "      " lipid resinite
balgin   5    "      "        "      " alginite
bliptod  5    "      "        "      " liptodetrinite
bfluor   5    "      "        "      " fluorinite
bexsud   5    "      "        "      " exsudatinite
bbitum   5    "      "        "      " bituminite
v_and_i  5  vitrinite and inertinite (blue light)
0007000500050000
0046004700480049 0050
rvmin    5  reflectance of vitrinite in oil - mean of min values
blank1   1  reserved for future use
blank2   1  reserved for future use
blank3   1  reserved for future use
blank4   1  reserved for future use
**************************************************
```

ICHEM TERM FILE - see USCHEM TERM FILE, with the changes

State = Country and County = Subarea

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APPENDIX III

Some suggested formats and the maximum number of spaces used by NCRDS for the data items in selected data base files. For use when constructing f-lists in the LIST command. See List Command section for complete details.

Possible f-list formats for USCHEM

data item	format	no of spaces
state	(4a4)	16
county	(6a4)	24
latitud	(i6)	6
ns	(a4)	1
longtud	(i7)	7
ew	(a4)	1
aapgprv	(i3)	3
coalprv	(4a4)	16
region	(6a4)	24
field	(4a4)	16
distrct	(6a4)	24
formatn	(4a4)	16
group	(4a4)	16
bed	(5a4)	20
member	(4a4)	16
zone	(4a4)	16
depth	(f7.1)	7
samptnk	(f7.1)	7
system	(4a4)	16
series	(4a4)	16
locname	(7a4)	28
quad	(7a4)	28
colectr	(5a4)	20
fieldid	(4a4)	16
date	(i6)	6
estrank	(4a4)	16
majrank	(4a4)	16
minrank	(4a4)	16
anida	(a4)	1
anidn	(i8)	8
labcode	(i2)	2
samptyp	(i2)	2

analtyp	(i2)	2
valrep	(i2)	2
othert	(a4)	1
btu	(f6.0,a1)	6
ashdef	(f6.0,a1)	5
ashsof	(f6.0,a1)	5
ashfld	(f6.0,a1)	5
freswel	(f6.0,a1)	5
moisture	(f6.0,a1)	5
volmat	(f6.0,a1)	5
fixedc	(f6.0,a1)	5
bmasn	(f6.0,a1)	5
hydrogn	(f6.0,a1)	5
carbon	(f6.0,a1)	5
nitrogn	(f6.0,a1)	5
oxygen	(f6.0,a1)	5
sulfur	(f6.0,a1)	5
sulfate	(f6.0,a1)	5
sulfpyr	(f6.0,a1)	5
sulforg	(f6.0,a1)	5
adloss	(f6.0,a1)	5
usgsash	(f6.0,a1)	5
sio2	(f6.0,a1)	5
al2o3	(f6.0,a1)	6
cao	(f6.0,a1)	6
mgo	(f6.0,a1)	6
na2o	(f6.0,a1)	6
k2o	(f6.0,a1)	6
fe2o3	(f6.0,a1)	6
mno	(f6.0,a1)	6
tio2	(f6.0,a1)	6
p2o5	(f6.0,a1)	6
so3	(f6.0,a1)	6
cl	(f6.0,a1)	6
ag	(f6.0,a1)	6
as	(f6.0,a1)	6
au	(f6.0,a1)	6
b	(f6.0,a1)	6
ba	(f6.0,a1)	6
be	(f6.0,a1)	6
bi	(f6.0,a1)	6
br	(f6.0,a1)	6
cd	(f6.0,a1)	6
ce	(f6.0,a1)	6
co	(f6.0,a1)	6
cr	(f6.0,a1)	6
cs	(f6.0,a1)	6
cu	(f6.0,a1)	6
dy	(f6.0,a1)	6
er	(f6.0,a1)	6
eu	(f6.0,a1)	6
f	(f6.0,a1)	6
ga	(f6.0,a1)	6

gd	(f6.0,a1)	6
ge	(f6.0,a1)	6
hf	(f6.0,a1)	6
hg	(f6.0,a1)	6
ho	(f6.0,a1)	6
in	(f6.0,a1)	6
ir	(f6.0,a1)	6
la	(f6.0,a1)	6
li	(f6.0,a1)	6
lu	(f6.0,a1)	6
mn	(f6.0,a1)	6
mo	(f6.0,a1)	6
nb	(f6.0,a1)	6
nd	(f6.0,a1)	6
ni	(f6.0,a1)	6
os	(f6.0,a1)	6
pb	(f6.0,a1)	6
pd	(f6.0,a1)	6
pr	(f6.0,a1)	6
pt	(f6.0,a1)	6
rb	(f6.0,a1)	6
re	(f6.0,a1)	6
rh	(f6.0,a1)	6
ru	(f6.0,a1)	6
sb	(f6.0,a1)	6
sc	(f6.0,a1)	6
se	(f6.0,a1)	6
sm	(f6.0,a1)	6
sn	(f6.0,a1)	6
sr	(f6.0,a1)	6
ta	(f6.0,a1)	6
tb	(f6.0,a1)	6
te	(f6.0,a1)	6
th	(f6.0,a1)	6
tl	(f6.0,a1)	6
tm	(f6.0,a1)	6
u	(f6.0,a1)	6
v	(f6.0,a1)	6
w	(f6.0,a1)	6
y	(f6.0,a1)	6
yb	(f6.0,a1)	6
zn	(f6.0,a1)	6
zr	(f6.0,a1)	6

Possible f-list formats for USTRAT

data item	format	no of spaces
colectr	(5a4)	20
state	(4a4)	16
county	(6a4)	24
coalprv	(4a4)	16

region	(6a4)	24
quad	(7a4)	28
field	(4a4)	16
estrank	(3a4)	12
date	(i6)	6
confid	(i1)	1
fieldid	(4a4)	16
surfelv	(f7.1)	7
elvprec	(i2)	2
totdept	(f6.1)	6
locstr	(i3)	3
locdip	(i3)	3
locangl	(i3)	3
source	(6a4)	24
dscplog	(i3)	3
latitud	(i7)	7
ns	(a4)	1
longtud	(i7)	7
ew	(a4)	1
llprec	(i2)	2
weaqual	(i1)	1
quartr1	(a4)	2
quartr2	(a4)	2
quartr3	(a4)	2
quartr4	(a4)	2
section	(f4.1)	4
twnship	(f5.0)	5
tns	(a4)	1
range	(f5.0)	5
rew	(a4)	1
coment1	(10a4)	40
unit	(i4)	4
unitqal	(a4)	4
from	(f7.1)	7
to	(f7.1)	7
thk	(f6.1)	6
formatn	(4a4)	16
bed	(5a4)	20
lith	(2a4)	8
lithmod	(3a4)	12
color	(2a4)	8
grnsize	(2a4)	8
grnshap	(2a4)	8
mineral	(3a4)	12
bedding	(2a4)	8
contact	(a4)	1
fossils	(a4)	1
fjc	(a4)	1
coment2	(10a4)	40

Possiole f-list formats for USPET

data item	format	no of spaces

state	(5a4)	16
county	(6a4)	24
latitud	(i6)	6
ns	(a4)	1
longtud	(i7)	7
ew	(a4)	1
bed	(5a4)	20
quad	(7a4)	28
colectr	(5a4)	20
fieldid	(5a4)	20
date	(i6)	6
estrank	(3a4)	12
anida	(a4)	1
anidn	(i6)	6
bmash	(f5.2,a1)	6
sulfur	(f5.2,a1)	6
rvmax	(f5.2,a1)	6
ltash	(f5.2,a1)	6
sulfpyr	(f5.2,a1)	6
q	(f5.2,a1)	6
collin	(f5.2,a1)	6
telin	(f5.2,a1)	6
vitrod	(f5.2,a1)	6
sporin	(f5.2,a1)	6
cutin	(f5.2,a1)	6
terres	(f5.2,a1)	6
lipres	(f5.2,a1)	6
algin	(f5.2,a1)	6
liptod	(f5.2,a1)	6
fusin	(f5.2,a1)	6
semifus	(f5.2,a1)	6
micrin	(f5.2,a1)	6
macrin	(f5.2,a1)	6
sclerot	(f5.2,a1)	6
inerto	(f5.2,a1)	6
bsporin	(f5.2,a1)	6
bcutin	(f5.2,a1)	6
bterres	(f5.2,a1)	6
blipres	(f5.2,a1)	6
balgin	(f5.2,a1)	6
bliptod	(f5.2,a1)	6
bflour	(f5.2,a1)	6
bexsud	(f5.2,a1)	6
bbitum	(f5.2,a1)	6
v_and_i	(f5.2,a1)	6
rvmin	(f5.2,a1)	6

APPENDIX IV:

Multics Commands

These are a few of te Multics system commands that are most often used in conjunction with PACER. The use of PACER on Multics is greatly facilitated if there is an understanding of the Multics commands; however, only a brief glossary can be provided here. For further information all registered Multics users should turn to the Multics Users Manual. A copy can be obtained through the U.S.G.S. Computer Center Division. In Reston contact User Information at (703) 860-7123, FTS 928-7123.

LOGIN and LOGOUT:

l Person_id PROJECT

i.e. l KKozey NCRDS

then supply your password.

****

logout

ends session with Multics

****

LS and DL (list segments and delete segments):

"ls (CR)" will give all segments under your account

"ls filename" will give information on the requested file

****

"dl filename" will delete specified file from account

****

PR, DP and SS (print, dprint and sort_segment):

"pr filename" will print the segment specified on the terminal (this connot be done for multi-segment files e.g. ones created by PACER searches. This applies to files sent to disk)

"dp filename" will "d_print" the specified file by printing the file on the high-speed printer in Reston.

"ss filename" -asc -field 1 10 is an example of the

sort_segment command which would sort the specified file through column 10. The user specifies the columns of interest

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REFERENCES

Bowen, R. W., and Botbol, J. M., 1975, The Geologic Retrieval and Synopsis Program (GRASP): U. S. Geological Survey Professional Paper 966, 87 p.

Bowen, R. W., et al., 1981, Grasp User Manual: as exists on U. S. Geological Survey's Reston, Va. Honeywell Multics computer system, for access contact Bowen, 57 p.

Cargill, S. M., Olson, A. C., Medlin A. L., and Carter, M. D., 1976, PACER--Data entry, retrieval, and update for the National Coal Resources Data System (Phase I): U.S. Geological Survey Professional Paper 978, 107 p.