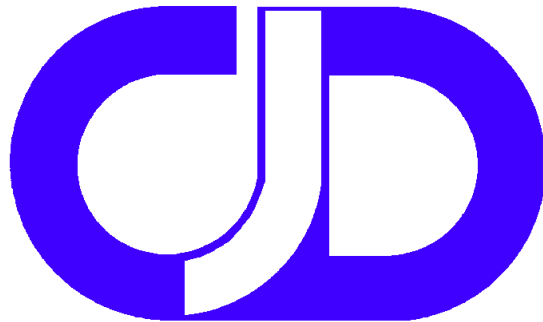


C-Master

User's Guide

CJD Software



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Introduction

This manual was written as a step-by-step description of each function and how the user can interact to achieve their specific goals. Some sections also address the reasoning and methods behind the processing performed. The best way to interact with the program is to do some “test files” and play with them for a bit.

C-Master’s strengths are the entry of bore hole data in a logical, rigorous fashion, creation of strip logs from these data, and facilitating data input/output to/from other programs via Excel compatible files. Additionally, a flexible method for extracting relevant data from multiple lithologies for studies (roof/floor/etc.) is provided.

C-Master has been designed for and by geologists. Over the last 30 years, it has been a valuable tool to many people and governmental organizations. C-Master is a way to get lithology data entered fast, exported to other programs fast, and produce detailed log strips fast. There are a few things that C-Master is not. It is not a comprehensive borehole GIS tool. While there are elements that can support mine planning, it is not a mine planning tool. The concentration is on the lithology log and the rocks it describes to assist the geologist in their interpretation of the data.

C-Master uses a user input window (the **Main Menu**) as the primary interface to the user. You can run the program entirely from a keyboard, you can use the mouse, you can use a tablet and use a combination of typing and screen taps, or you can use a combination of all these. Menu choices will respond to a mouse click. Data boxes can be selected with the keyboard or the mouse. Certain classes of data boxes will toggle values through multiple mouse clicks. A few specialized options (called “quick-fills”) are accessible only through a mouse click.

There can be various interpretations of technical terms in this industry. **A comprehensive list of terms and definitions, and a list of C-Master specific terms, is given here.** This nomenclature is used extensively through this document and the full User’s Guide.

The data used in C-Master are records of downhole lithology descriptions consisting of two sections, the header and the downhole lithologies. The header of the log contains identifiable information about the physical location, ownership, and general characteristics of the lithologies that follow. The lithologies are the individual, sequential rock types that compose the record of the borehole. These lithologies have data entry format and recording types, as well as seam/bed code information, analysis information, and comments. For each lithology, a numeric code (“Ferm code”) is assigned that defines a standard rock type. It is through these Ferm codes that log strips are produced. Users may enter the code directly or may choose to enter non-standard English phrases that the software can translate (“coding”) through a dictionary function.

All of the files created or used by C-Master have a specific file format. This formatting information is available should you wish to encode/decode data from/to another data format. However, there is no

guarantee expressed or implied that C-Master file formats will remain in their current form indefinitely.

Getting Started

Software installation is quick and easy. You must have Administrator Privilege to install the software. If you do not have access to the Administrator credentials for installation, a special install version can be created for you that does not require Admin rights. Please contact CJD Software for this special version. There may be a small additional charge.

Once installed, you point to your data folder locations for each C-Master program via **Shortcuts**¹. These shortcuts will run the programs and “attach” a configuration file so that your specific options can be used when C-Master is run.

C-Master requires the user to use a specific folder for data storage². This keeps all your data in one place that can be easily be backed up. You can pick any folder name you wish and begin the configuration process by using the CONFIGMAKER program to help you.

If the configuration options given here do not satisfy your needs, please contact CJD Software directly and we can discuss other options with you.

¹ Shortcuts are standard within Windows. You can create a shortcut to your data or programs manually by right-clicking on an item then selecting “Create Shortcut”. C-Master will help you create shortcuts with the proper formatting to link your data to the C-Master programs so you don’t have to know how to construct a Shortcut.

² You can have multiple data folders. The Shortcuts created will help keep those separated, since they will “point” to different configuration files in different folders. If you deal with proprietary data, this is an easy way to keep the data separated.

Quick Overview

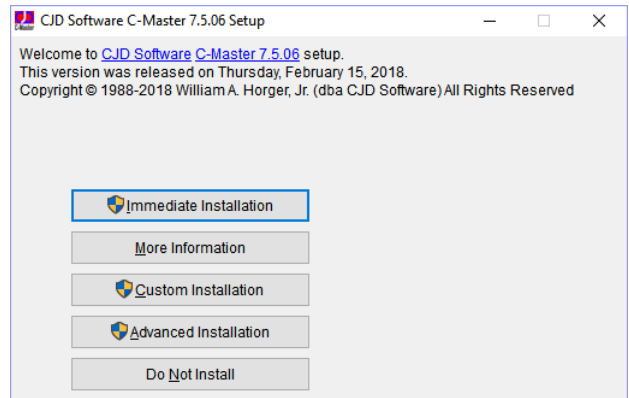
C-Master program operations can be viewed as sequential operations, like small chunks; that is, you don't need to understand everything to get started quickly. C-Master operations can be broken into the following chunks:

- **Initial Setup and Installation** (installation and shortcuts creation)
- **Initial Setup for Lithology Log Data** (descriptive information and lithology data)
- **Assigning Form Codes and English Descriptions (Coding)**
- **Creating Strip Logs (LOGPLOT)**
- **Google Earth® KML File Generation** (display log data on Google Earth)
- **Advanced Processing**
 - **Projects and Processing**
 - Identifying processing parameters to apply to lithology logs
 - **Extracting Data from a Project**
 - Using a Project to output processed parameters
 - Making a Google Earth (KML) file for project data display

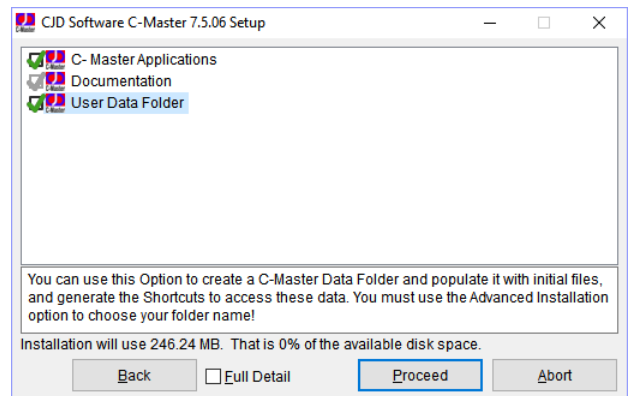
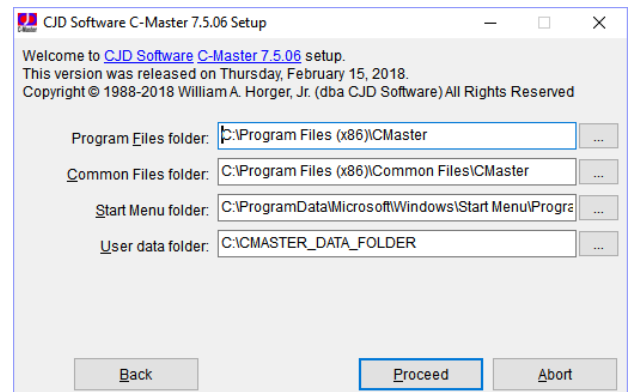
Each of these elements has more advanced features. Refer to the **Table of Contents** for more information.

Initial Setup and Installation

It is suggested that you perform the Immediate Installation option, and let the installer choose the location of the program and supporting files. However, if you need to install the software on, perhaps, a networked drive, you may need to choose the location. For that, you can choose “Advanced Installation”. Refer to the Appendix for the details on installation and your options.



Installing the software will create a set of shortcuts in the Start Menu. These shortcuts are generic and will not be properly configured and attached to your data folder (or folders). The simplest way to get this initial data folder created and populated, and to get the Shortcuts created, is to select “Advanced Installation” and set your user data folder. Then, you will be prompted to check the box in front of User Data Folder. This will insure your initial configuration file and the necessary shortcuts are built properly in this folder.



Should you require more extensive set-up, inclusion of dot-matrix printers, or have installed the software on a server, use the CONFIGMAKER program.

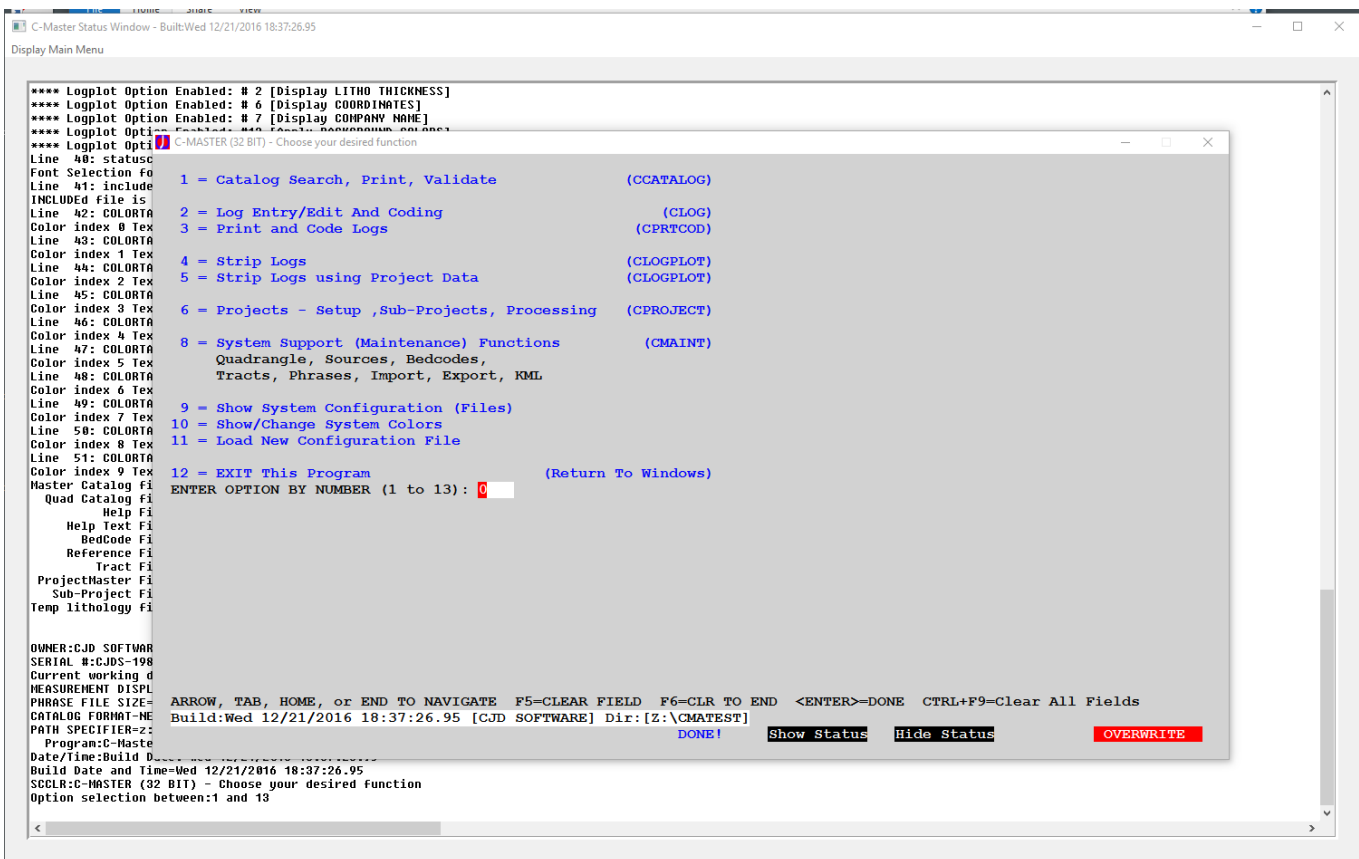
Since CONFIGMAKER is also a C-Master program, you may wish to read the next section that describes the user interface you'll be seeing.

The User Interface



Once you start C-Master, you will be presented with a splash screen, identifying the C-Master program you are running, the date/time of the build you are using, and software version, and information about where the program is installed and what the default folder at start-up is.

The Menu Window will be presented and through this window your interactions will begin.



There is another window, in white, called the Status Window. Normally, this window is minimized. It is shown here behind the Main Menu. This window contains informational messages about what is happening in C-Master, including the copyright notices, configuration file processing, etc. Sometimes a beep will sound, indicating that something occurred that was unexpected or is worthy of your attention. You can press F8 to switch back and forth between the Main Menu and the Status Window. For extremely serious errors or when information should be noted by the user, a message boxes will pop-up with information. Sometimes, the beep is strictly informational (i.e. a log ID was requested, but not found in the Master Catalog). The reason(s) for the error will also be displayed in the Status

Window³ for your convenience if the message duration was too short or was unexpected. In the following tutorial, you can enter menu options using the keyboard, or you can click the desired option using the mouse. (Note: your system can be configured to accept double clicks.)

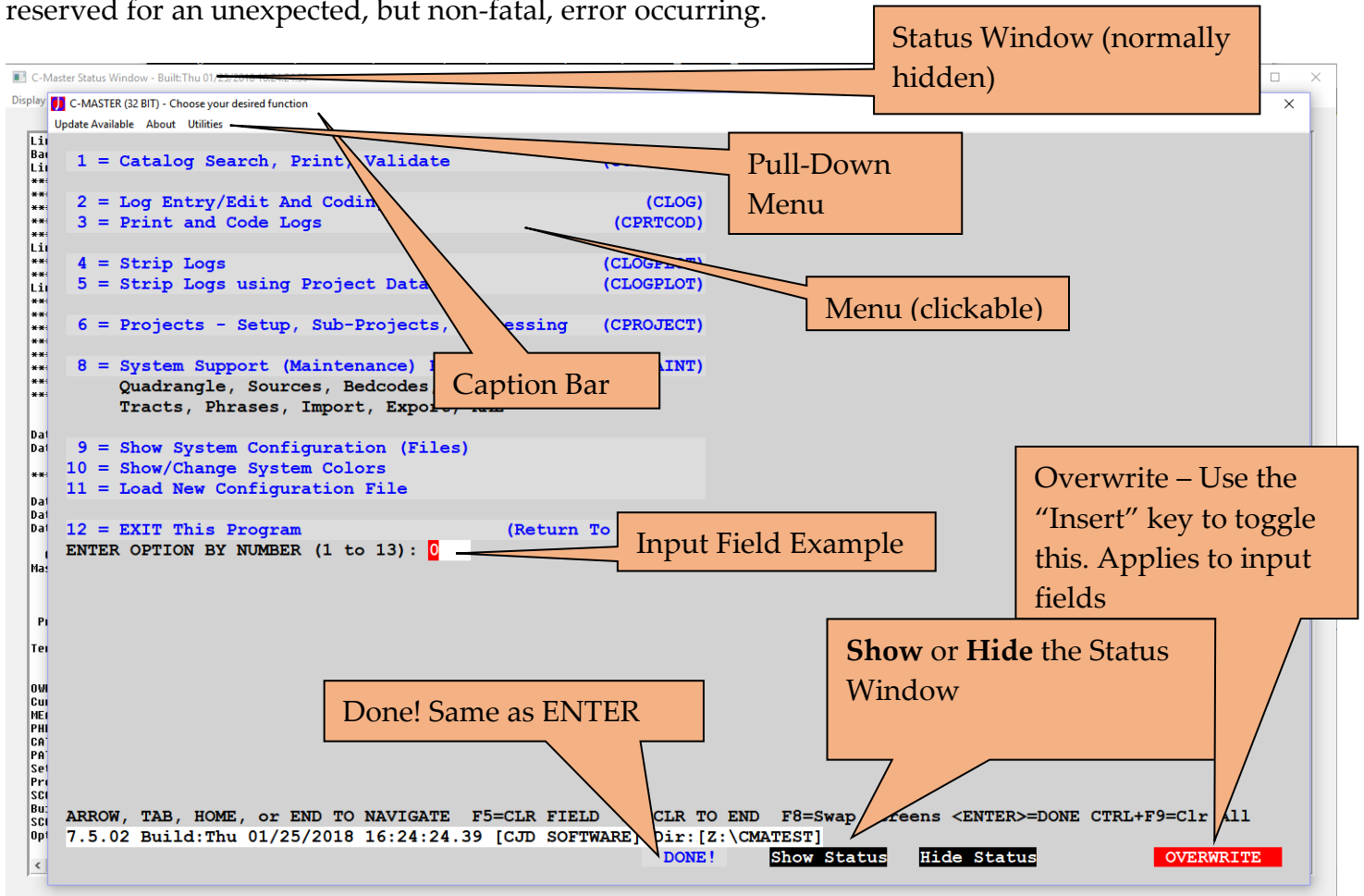
Some, and perhaps even more, data is saved in a LOG file that is kept as you run C-Master. This logging file is “re-started”: when it reaches about 50 MB in size. This log file is critical if you have a problem, as it documents the steps (but not all the keystrokes) that occurred as you navigated the program and encountered an error. This file can be critical to help in debugging your specific issue and helping us keep the software as error free as humanly possible.

³ Rather than causing the program to pause each time it finds some small issue, it has been found that logging the issue to the Status Window and beeping to inform the user that there is something going on they should be aware of is usually sufficient. You can display or hide the Status Window by using the highlighted buttons on the bottom right section of the Main Menu.

Interacting with C-Master – How to interpret the Main Menu screen

C-Master presents the user with two windows, only one of which can be interacted with at a time.

In the image below, you'll see a blue shaded window and behind it a white window. The blue window is the Menu Window, and the white window is the Status Window. The Menu Window is where all your keyboard interactions will take place, with selecting menus, entering data, etc. The Status Window has informational messages. These messages will inform you about errors, missing files, etc. The messages may or may not be accompanied by an audible beep. Beeps are typically reserved for an unexpected, but non-fatal, error occurring.



The Menu Window is created once and updated dynamically. Certain features are always present. The Caption Bar contains an informational message about the contents of the Window. Along with this information is the Date and Time of the Software build. If you are experiencing a software problem, this information is important to supply in your trouble report. This same information appears occasionally in the Status Window as well. The bar near the bottom give you hints on how to navigate through the window. You can use the Arrow keys (Up/Down/Left/Right), the TAB key (same as Down), and SHIFT+TAB (Back Tab) to move from data field to data field. If you are in a data field and press F5, all the characters from the current cursor position to the end of the field will be erased. F6 will erase the entire field. CTRL+F9 allow you to clear all the data fields. It requires you to verify that's what you wish to do, since you could lose a lot of work if you pressed this combination

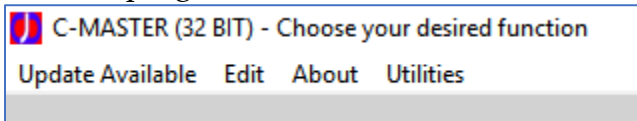
by accident. CTRL+F9 will clear ALL the fields on the screen to blanks. Yes/No fields don't like spaces and will complain!

In this color scheme, the blue text items are clickable menu selections. You can either enter in the Options Box the desired menu item number or click on the item with the mouse. The "Done!" button performs the same function as the ENTER key. The "Overwrite" area allows you to select whether entering data through the keyboard overwrites the field, or if it inserts those characters at the cursor location. The INSERT key on the keyboard will also cause this value to toggle. You can see the Input Field (in this case, menu selection) highlighted for ease of viewing.

Unlike most Windows programs, you are not allowed to CLOSE the Menu Window using the "X" in the upper right corner. A message (and a beep) will inform you of this. This prevents you from "killing" the program by accident and losing your work.

Menu Bar

The Menu Bar at the top of this window contains information pull-downs and a few utilities. Also, if there is an update to the software, this will show in the menu bar that an update may be available for you. If your maintenance agreement expires, you will receive a notification to this effect when you start the program, but not if there is a later version available.



Edit (Copy, Cut, Paste, Edit ClipBoard)

This pull-down includes the normal CTL-C, CTL-X and CTL-V (copy, cut, paste) options that are also available from the keyboard. When you copy or paste, the field will temporarily be highlighted as a visual indicator.

There is another option; Edit Clipboard. This allows you to edit unformatted text in the clipboard (up to 260 characters) and save it back into the clipboard. This is provided so that you can copy an entire field (or drag/drop a file name), remove unwanted text from that clipboard data, and then paste it later.

Utilities

Datum verification

This pull-down will run a data check utility on the coordinate transformation software. You can use this if/when you change the datum grid shift files or point the software to a different location.

Rebuild Catalog from Logs

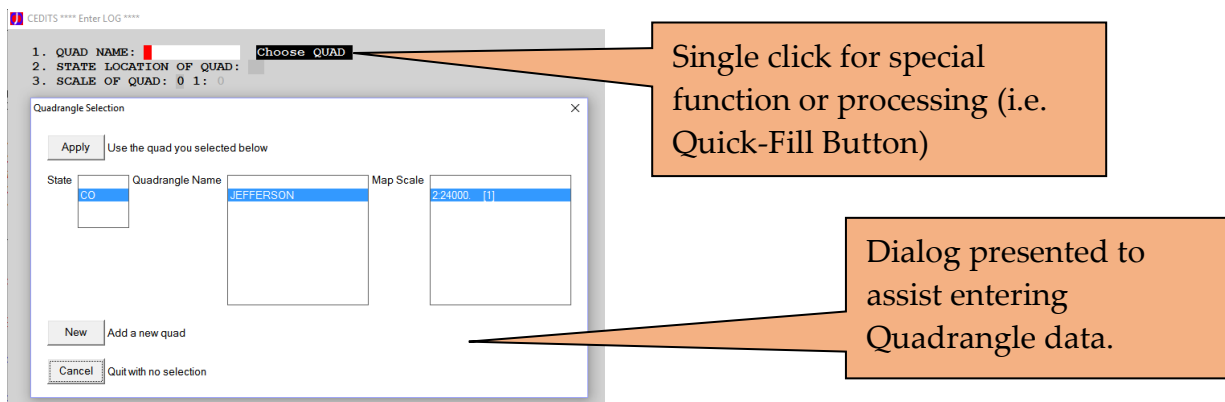
This utility will read every log on your system (as identified in the Master Catalog), re-scan all the utility files to re-establish reference ID numbers, bed numbers, etc. and perform some book keeping operations. It can take a long time if you have a huge catalog. You can also run the utility in a verification mode, reading all the logs, but not making any changes. Make a backup before using this function to make permanent changes.

Carter Coordinate Calculator

This is a handy Carter to UTM, Lat/Lon, and Kentucky Single Zone State Plane conversion utility. It can also interface with a log header (if a header is being edited) to both use and re-compute coordinates. It duplicates the Kentucky Geological Survey calculator but does not require an Internet connection to run.

Variations in Menu Windows

Some Menu Windows have a clickable button that allows you to perform a “quick-fill” or performs some specialized operation. For a quick-fill action, clicking on the button will cause a dialog box to pop up. In the example below, you’ll see the quick fill button that was selected, and the dialog presented (Quadrangle selection)⁴. The data to be applied are show as highlighted in blue.



To copy the values from the dialog box into the Menu Window, click “Apply”. If you have not selected all the required data, you will be prompted to select the missing value(s).

⁴ The Overwrite/Insert state does not apply to the dialog box and must be toggled by the user.

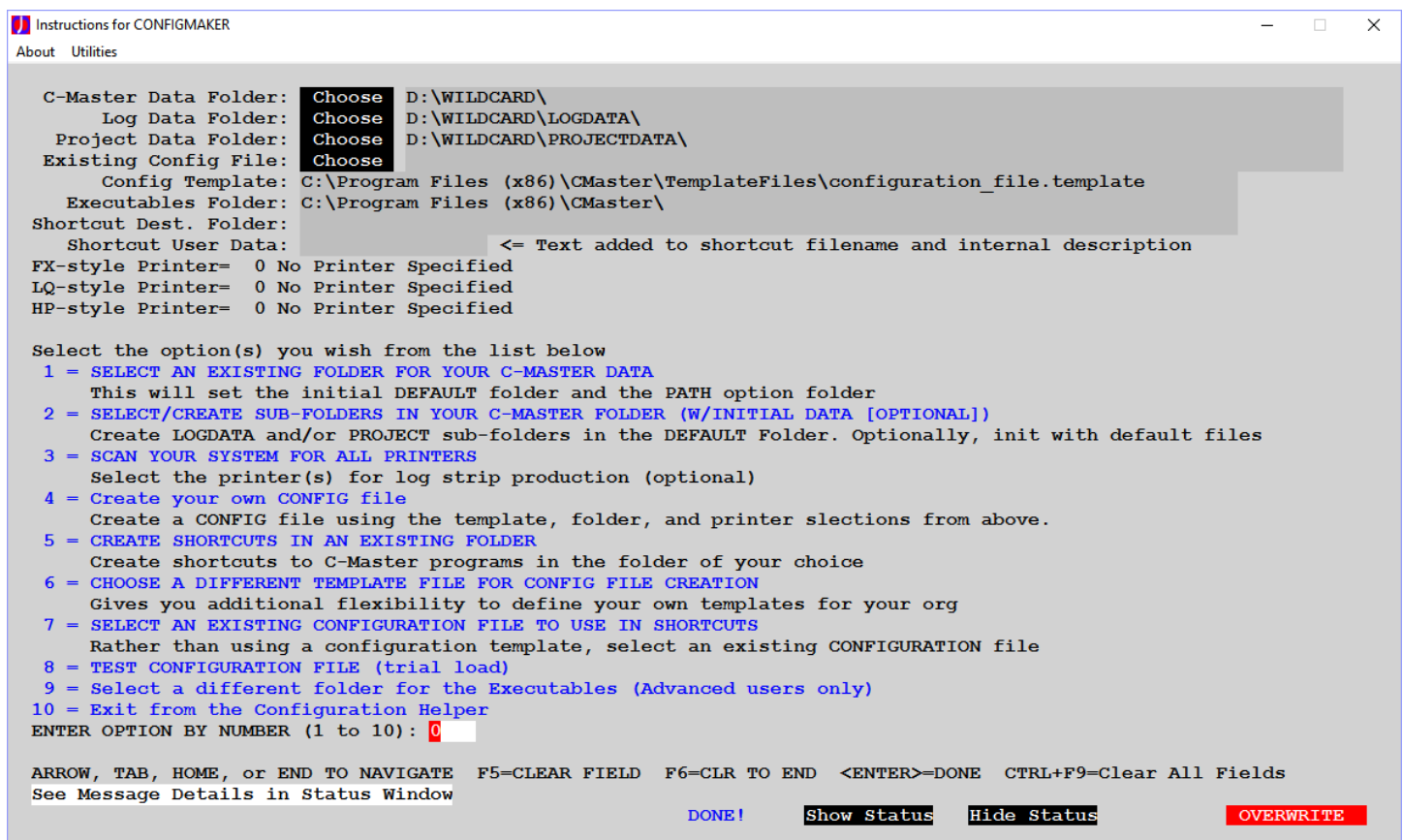
CONFIGMAKER and Shortcut Creation – Getting Set to Run C-Master Programs

When you installed C-Master you may have chosen the option to have Setup create a folder.

Once the program has been installed, you can access the Configuration Helper program (CONFIGMAKER) from the Start Menu. CONFIGMAKER will present you a set of options to execute. For a “standard” configuration, where you will output Log Strips to AutoCAD, PDF, or image files (JPG or BMP), you would select options 1, 2, 4, and 5 (in that order) to get a basic configuration. If you use a dot-matrix printer (see **Configuring Printers: Windows 2000, Windows XP and Windows 7** for more information on supported devices and how to configure for them), you would also select option 3 (options 1, 2, 3, 4, and 5, in that order) to perform the printer scan and select.

Once you’ve done these basic steps, you can the resulting Configuration File manually with your specific options. C-Master has many configuration file options to tailor its operations to your needs. Please refer to the details in the **Configuration Options** section for your options.

An example of the CONFIGMAKER screen is shown below.



On this screen, the main C-Master data folder has been chosen (D:\WILDCARD), along with the default folders for the logs themselves (Options 1 and 2), and project data (which you may not be using). Also, the standard template file is selected, and from that file, your personal configuration file

will be built for you. Once you've exercised the remaining options (possibly 3, and definitely 4 and 5) options, you can do a trial load (Option 8) to verify that the config file was constructed properly for your needs.

CONFIGMAKER will not overwrite any existing files in a folder (when using Options 1 and 2). In this document, it is assumed that you create a folder (for example, **D:\WILDCARD**) in which to create the initial data, establishing a "playground" for trying new things.

Initial Setup for Lithology Log Data

Choices made during initial setup will carry through for the life of your data in a specific data folder on your computer.

When entering a log, you will enter a Quadrangle Name to identify in a broad fashion the location of the data. This can be an actual quadrangle, or any other piece of identifying information. For consistency within C-Master, it should identify geographic area or other identifiable information. If you choose to use a named quadrangle (USGS quad sheets), you can choose from a list of all the quadrangle sheets the USGS offers (in a 1:24000 scale). The quadrangle name(s) need to be defined before or during the entry of the first logs into the system.

Within the descriptive information for each log are references to the source company name of the log provider, and who the contributor of the log is. These may be different entities, or the same, or may have had a name change. The ID number assigned to the source is extremely important as it establishes a "chain of ownership".

Similarly, the Tract (land parcel name, area, etc.) has this same chain of ownership. Consider this when assigning ID numbers. This is exceptionally important when logs from a wide variety of sources are in the same C-Master database. If you only have your own logs to deal with, this may be less important.

Coordinates are, of course, extremely important. C-Master is not a GIS program but does have a general method of handling data in different datums. The as-installed default datum is NAD27. You can change the defaults through the configuration file to NAD83 or WGS84. Whenever possible, the datum of the coordinate being presented is shown to prevent confusion. C-Master uses the National Geodetic Survey software (dated 1977-1986) to perform basic coordinate conversions within the North American datum, and Proj.4 for transformations between datums. Choose your most desired datum early. Since NAD83 and WGS84 differ by only a small amount, it is suggested that you choose NAD83 for continental USA data rather than WGS84. Using NAD27 for log coordinates, then outputting products in NAD83 is not a problem!

Initial Log Entry

Start C-Master from the shortcut created manually or using CONFIGMAKER. The next several sections will guide you through the process of getting a log into the system and getting logs strips and reports out.

At this point, you have no quadrangles defined, no log sources, and no tracts defined. You can jump in with your lithology data entry immediately and create these reference files as you enter your first log. The basic unit is the Lithology Log; that's where we'll start. We will enter some data just to get a feel for C-Master all the way through generating a strip log.

```
C-MASTER (32 BIT) - Choose your desired function

1 = Catalog Search, Print, Validate           (CCATALOG)
2 = Log Entry/Edit And Coding                 (CLOG)
3 = Print and Code Logs                       (CPRTCOD)

4 = Strip Logs                               (CLOGPLOT)
5 = Strip Logs using Project Data             (CLOGPLOT)

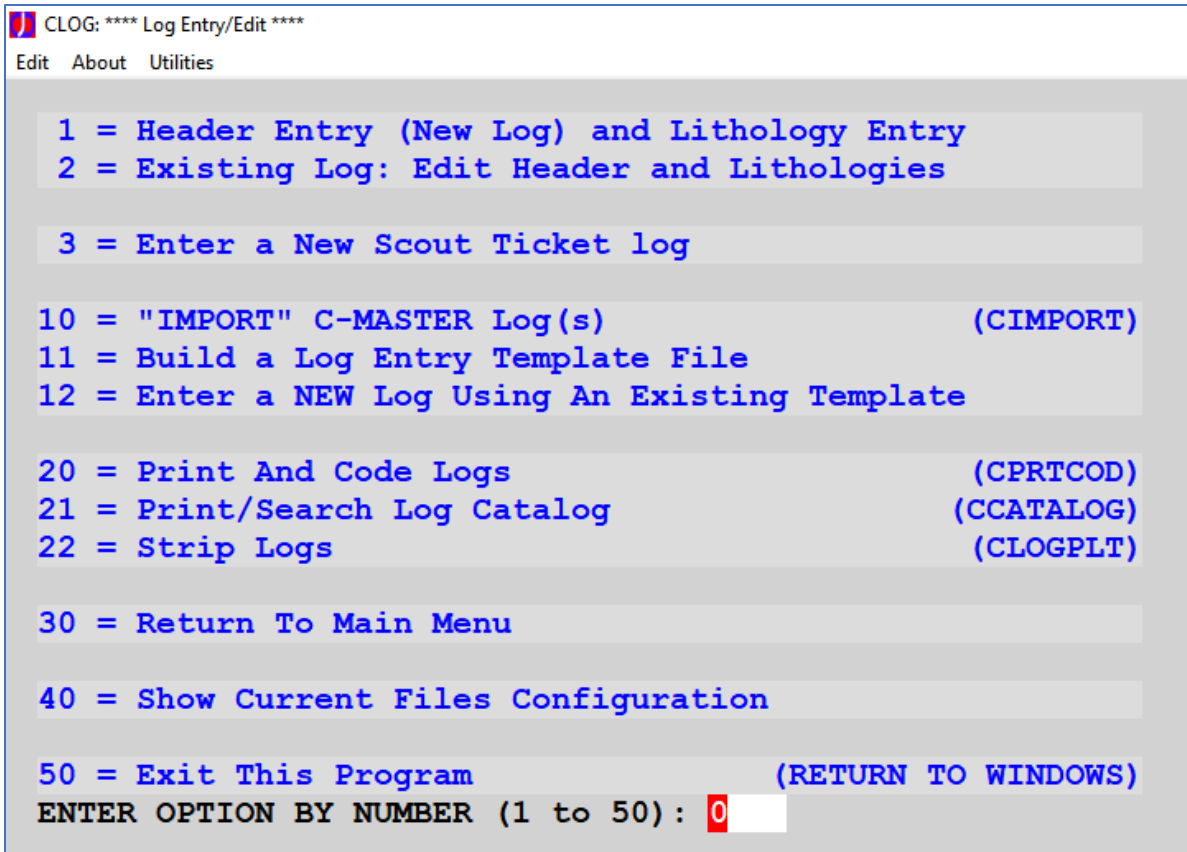
6 = Projects - Setup, Sub-Projects, Processing (CPROJECT)

8 = System Support (Maintenance) Functions   (CMAINT)
   Quadrangle, Sources, Bedcodes,
   Tracts, Phrases, Import, Export, KML

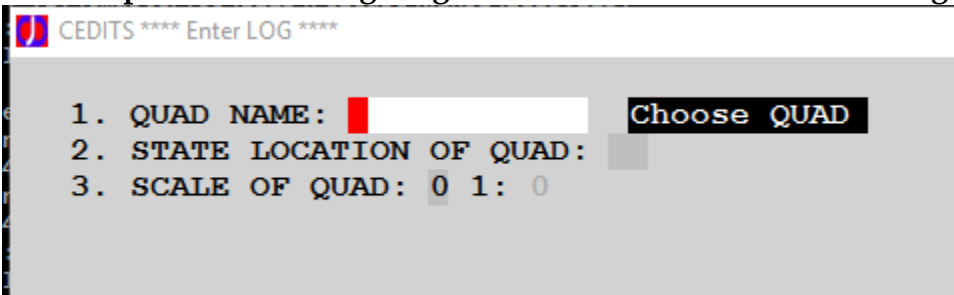
9 = Show System Configuration (Files)
10 = Show/Change System Colors
11 = Load New Configuration File

12 = EXIT This Program                       (Return To Windows)
ENTER OPTION BY NUMBER (1 to 13): 0
```

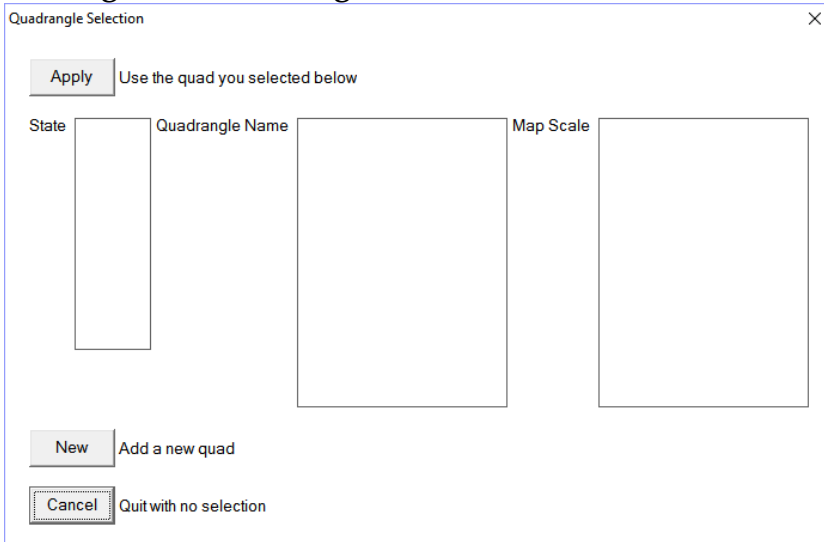
Select Option 2 (Log Entry).



Select Option 1 (New Log) to get started. You'll see the following screen displayed:



You currently don't have any existing quadrangles, so click on "Choose Quad", a quick-fill button. You'll get the following window:

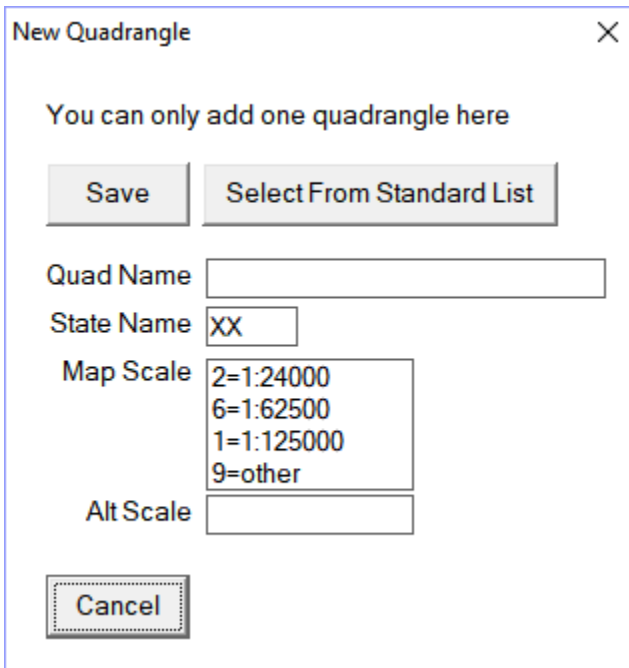


The "Quadrangle Selection" dialog box contains the following elements:

- An "Apply" button with the text "Use the quad you selected below".
- Three empty input fields labeled "State", "Quadrangle Name", and "Map Scale".
- A "New" button with the text "Add a new quad".
- A "Cancel" button with the text "Quit with no selection".

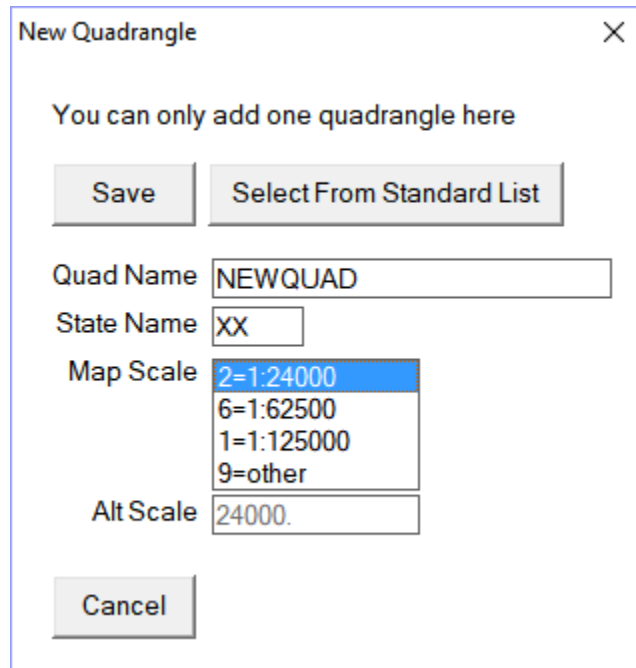
Click on "New"

Enter the needed information:



The "New Quadrangle" dialog box (left) contains the following elements:

- Text: "You can only add one quadrangle here".
- Buttons: "Save" and "Select From Standard List".
- Input fields: "Quad Name" (empty), "State Name" (XX), "Map Scale" (dropdown menu with options: 2=1:24000, 6=1:62500, 1=1:125000, 9=other), and "Alt Scale" (empty).
- Button: "Cancel".



The "New Quadrangle" dialog box (right) contains the following elements:

- Text: "You can only add one quadrangle here".
- Buttons: "Save" and "Select From Standard List".
- Input fields: "Quad Name" (NEWQUAD), "State Name" (XX), "Map Scale" (dropdown menu with options: 2=1:24000, 6=1:62500, 1=1:125000, 9=other), and "Alt Scale" (24000).
- Button: "Cancel".

I have chosen a "bogus" name so I can try things out before starting to enter production data. You could also click on "Select From Standard List" to be presented with the entire USGS catalog of 1:24000 quadrangle names, and could pick one from that list.

Now, click on "Choose Quad" and get:

Quadrangle Selection

Apply Use the quad you selected below

State XX Quadrangle Name NEWQUAD Map Scale 2:24000. [0]

New Add a new quad

Cancel Quit with no selection

Click "Apply"; this "fills in" the Main Menu screen data.

CEDITS **** Enter LOG ****

1. QUAD NAME: NEWQUAD Choose QUAD

2. STATE LOCATION OF QUAD: XX

3. SCALE OF QUAD: 2 1: 24000.

Hit the "Enter" key or click the "Done!" button at the bottom.

Begin entering the Log Header information. This describes the location, ownership, and lithology data entry formats for the lithology records to follow. All header fields have an assigned number. These numbers are used in various portions of C-Master to reference back to the header data as needed.

5. ENTER SOURCE TYPE (1,2,3 OR 4): Choose REFERENCE

5.1 UNPUB RECORD. COMP OR AGENCY NAME:

5.2 UNPUBLISHED PUBLIC AGENCY RECORD
 U.S. OR POSTAL CODE: SOURCE ABBREVIATION:

5.3 SERIAL PUBLICATION.
 PUB OR ORG: TYPE OF REPORT:
 VOLUME: PAGE: MON: YEAR:

5.4 BOOK:
 TITLE: AUTHORS NAME: YEAR: PAGE:

6. DIVISION OR TRACT: Choose Tract

7. DRILL HOLE NUMBER:

Leave Contributor and DDH # (below) blank to copy the SOURCE and Hole Number from above

8. CONTRIBUTING COMPANY OR AGENCY: Choose REFERENCE

9. CONTRIBUTING COMPANY DDH#:

COORDINATES (Currently NAD27) (1=UTM,2=LAT/LON,3=STATE PLANE) NO NAD83 Datum?

10.1 UTM ZONE:

10.2 UTM NORTHING (- FOR SOUTH): meters NO False Northing!

10.3 UTM EASTING: meters

11.1 LATITUDE N/S:

11.2 LONGITUDE E/W:

12.1 STATE CODE: <= If NAD83 coordinates, use the NAD83 standard State Codes

12.2 STATE PLANE N/S: Feet International feet? NO

12.3 STATE PLANE E/W: Feet

Distance tolerance for duplicate check (feet): 100

Our first field is the Source of the lithology record. This can be any one of 4 types. For most users, only type 1 “Company or Agency Name” will be applicable. First, though, we need to have some source in the database. Without an identified source, the entry process cannot proceed. So, we click the quick-fill button “Choose Reference” which will also allow us to create a new Source/Contributor.

Reference/Source Data X

Select Data From The List Below

1 = Unpublished Company Record
 2 = Unpublished Public Agency Record
 3 = Serial Publication
 4 = Book

Select Source/Contrib Data - CLICK to select	Verify data in the appropriate field(s)
	Company/Agency <input style="width: 80%;" type="text"/>
	Postal Code <input style="width: 30%;" type="text"/> Source Abbrev <input style="width: 30%;" type="text"/>
	Publisher <input style="width: 30%;" type="text"/> Type <input style="width: 30%;" type="text"/>
	Volume <input style="width: 30%;" type="text"/> Page <input style="width: 30%;" type="text"/> Month <input style="width: 30%;" type="text"/> Year <input style="width: 30%;" type="text"/>
	Title <input style="width: 70%;" type="text"/> Year <input style="width: 30%;" type="text"/>
	Author <input style="width: 50%;" type="text"/> Page <input style="width: 30%;" type="text"/>

We don't have any data yet, so click “New/Edit” to add data to this file.

Below, we've selected an Unpublished Company Record as the type, and have typed in "ABC COMPANY" in the data box to the right. We've assigned it an ID number of 100. You can have the same ID number for multiple companies (indicating who bought who, for example), but only one company with this name.

Reference/Source Data

Enter New Data or Edit Existing Data

1 = Unpublished Company Record
 2 = Unpublished Public Agency Record
 3 = Serial Publication
 4 = Book

Select Source/Contrib Data - CLICK to select

Company Name	ID #

Enter New Data or Modify Existing Data

Company/Agency

Postal Code Source Abbrev

Publisher Type

Volume Page Month Year

Title Year

Author Page

Update Selected Reference Data(Keeps ID #) Delete Selected Items Cancel/ Done Save New ID Source ID #

Click "Save New ID". This adds the data to the reference file with the ID value of 100.

Click "Cancel/Done" to return to the original window.

Select the type of the source (1) and a list of all sources of this type will appear. Select the entry. You'll see the data in the fields to the right (greyed out).

Reference/Source Data

Select Data From The List Below

1 = Unpublished Company Record
 2 = Unpublished Public Agency Record
 3 = Serial Publication
 4 = Book

Select Source/Contrib Data - CLICK to select

Company Name	ID #
ABC COMPANY	100

Verify data in the appropriate field(s)

Company/Agency

Postal Code Source Abbrev

Publisher Type

Volume Page Month Year

Title Year

Author Page

Apply New/Edit Cancel/ Done

Click "Apply" to place this data into the Main Menu.

Similarly, do this same sequence for the Tract (intent: an identifiable parcel or set of parcels of land). A tract name is not required to be used but can be useful later. Input the drill hole identifier (hole number) for this log. If the Contributor is the same as the source and is a Type=1, leave fields 8 and 9 blank and C-Master will fill in the data. Enter the coordinate of the drill hole. You can choose the datum here, or let it default, whatever is appropriate. This coordinate is used to search all existing logs to make sure the log has a unique location (sanity check). In this case, there are no existing logs with which to compare, but enter some log coordinates anyway. They will be saved with the remainder of the header data. For this log, I've set the coordinates to be in the NAD83 datum, entered in Lat/Lon.

```

CEDITS **** Source of log data ****

5. ENTER SOURCE TYPE (1,2,3 OR 4): 1 Choose REFERENCE
5.1 UNPUB RECORD. COMP OR AGENCY NAME: ABC COMPANY
5.2 UNPUBLISHED PUBLIC AGENCY RECORD
   U.S. OR POSTAL CODE:          SOURCE ABBREVIATION:
5.3 SERIAL PUBLICATION.
   PUB OR ORG:                  TYPE OF REPORT:
                                  VOLUME:          PAGE:          MON:          YEAR:
5.4 BOOK:
   TITLE:                        AUTHORS NAME:          YEAR:          PAGE:
6. DIVISION OR TRACT: MY TRACT   Choose Tract
7. DRILL HOLE NUMBER: 1234-5678
Leave Contributor and DDH # (below) blank to copy the SOURCE and Hole Number from above
8. CONTRIBUTING COMPANY OR AGENCY: Choose REFERENCE
9. CONTRIBUTING COMPANY DDH#:
COORDINATES (Currently NAD27) (1=UTM,2=LAT/LON,3=STATE PLANE) 2 YES NAD83 Datum?
   10.1 UTM ZONE:
10.2 UTM NORTHING (- FOR SOUTH): meters NO False Northing!
   10.3 UTM EASTING: meters
   11.1 LATITUDE N/S: N 40
   11.2 LONGITUDE E/W: W 101
   12.1 STATE CODE: <= If NAD83 coordinates, use the NAD83 standard State Codes
12.2 STATE PLANE N/S: Feet International feet? NO
12.3 STATE PLANE E/W: Feet

Distance tolerance for duplicate check (feet): 100

```

You can enter Lat/Lon in decimal degrees or degrees/minutes/seconds (separated by spaces), or Nddmmss.ss/Wddmmss.ss format. The hemisphere is required (i.e. you cannot enter -101 degrees for west longitude).

Trying to “back out” a log once in the C-Master Master Catalog is difficult. That is why you are offered a look at the critical data that defines a log before committing to saving it.

```

CEDITS - Verify

1. QUAD NAME: NEWQUAD
2. STATE LOCATION OF QUAD: XX
3. SCALE OF QUAD: 2 1: 24000.
5.1 UNPUB RECORD. COMP OR AGENCY NAME:
ABC COMPANY
7. DRILL HOLE NUMBER: 1234-5678
11.1 LATITUDE N/S: N 40
11.2 LONGITUDE E/W: W 101
Is this correct (Y or N)?

```


Answer in the affirmative to save this log header. You'll be given a screen with the log ID number assigned to this log. It is through the quad/state/scale and log ID that you gain access to these data in the future. Continue entering log header information.

```

EDITSC: Quad, State, Scale, LOG ID Entry

QUAD:NEWQUAD      STATE:XX  SCALE:2    24000.  LOGID:    1  PROJECT:

COORDINATES (Currently NAD83) (1=UTM,2=LAT/LON,3=STATE PLANE)  2  YES NAD83 Datum?
  10.1 UTM ZONE:
10.2 UTM NORTHING (- FOR SOUTH):          meters NO False Northing!
  10.3 UTM EASTING:          meters
  11.1 LATITUDE N/S:  N 40
  11.2 LONGITUDE E/W:  W 101
  12.1 STATE CODE:          <= If NAD83 coordinates, use the NAD83 standard State Codes
  12.2 STATE PLANE N/S:          Feet  International feet? NO
  12.3 STATE PLANE E/W:          Feet
Extended Coordinates
13.1 CARTER SECTION:  A-Z  E-W DELIM:  FROM N:  FROM E:
14.1 TOWNSHIP:  RANGE:  SEC:  1st Q:  2nd Q:  3rd Q:
15 COMPANY GRID N/S:  COMPANY GRID E/W:
17. STATE WHERE HOLE LOCATED: CO
18. COUNTY: JEFFERSON
19. TOWNSHIP, MAGISTERIAL DISTRICT, OR INCORPORATED PLACE: CONIFER
20. GROUND LOCATION DESCRIPTION: SOUTH OF US 285 BY 1/2 MILE
  
```

This next screen captures some of the known parameters about the log, such as top of hole elevation, how the elevation is determined, the depth of the log (which may vary from the actual depth), and the upper/lower beds applicable to this log.

```

EDITSC: Quad, State, Scale, LOG ID Entry

QUAD:NEWQUAD      STATE:XX  SCALE:2    24000.  LOGID:    1  PROJECT:

21. ELEVATION AT TOP OF HOLE OR SECTION: F 7550  ANGLE: 0
22. METHOD OF ELEVATION DETERMINATION: S GPS  B, S, H, Y, U, or O
23. NAME OF PERSON LOGGING: HORGER
24. YEAR DRILLED OR MEASURED: 2017
25. TOTAL DEPTH OF DRILL HOLE: F 253.56
26. BED CODE REGION IDENTIFIER:  Choose BEDS
27. CODE OF UPPERMOST IDENTIFIABLE BED:
28. CODE OF LOWERMOST IDENTIFIABLE BED:
  
```

If you intend to tag lithologies with identifiable bed codes, then fill in the region code, the upper bed name, and the lower bed name. Refer to the main User's Manual for details on seam tagging and bedcode processing. You can always come back later and update this information.

We then describe how the lithology information will be entered. I have chosen the most flexible entries to illustrate how they are used in examples below. Note that the program accommodates a wide range of inputs and methods of logging cores. If any of these are unknown (29.2, 30.1, or 30.2), then entry of the lithology data will not be permitted. If you don't know how the data were recorded, use the "Combination" form. The intent of "Combination" is to be able to use multiple entry formats

for individual lithology records, so we've chosen "Combination".

EDITSC: Quad, State, Scale, LOG ID Entry

```
QUAD:NEWQUAD      STATE:XX  SCALE:2    24000.  LOGID:    1  PROJECT:
29.1 KIND OF RECORD: C          C, E, T, U, or O
29.2 METHOD OF LITHO DESCRIPTION: 3    1=Code, 2=English, 3=Combination
30.1 UNITS OF MEASUREMENT: 4      1=FIF, 2=FT, 3=M, 4=Combination
30.2 METHOD (S) OF MEASUREMENT: 4    1=Thk, 2=Cum, 3=Core Barrel, 4=Combination
```

At the end of the descriptive data entry, you are asked for who is doing the initial log entry and the date. In larger companies, it is useful to know who is doing the data entry so procedural or process related problems can be more easily corrected.

EDITSC: Quad, State, Scale, LOG ID Entry

```
QUAD:NEWQUAD      STATE:XX  SCALE:2    24000.  LOGID:    1  PROJECT:
31. PERSON SUBMITTING LOG FOR ENTRY: HORGER
32. DATE OF LOG SUBMISSION (MM/DD/YYYY): 03/07/2017
Click to change Variant data
1:
2:
```

The Variants allow you to enter other information that you might find useful in describing the log. For example, you might reference an e-log from which the lithology data was obtained. There are also Attributes that are displayed below the variants. Attributes give you a user-definable way to tag a log with information that can be useful when searching your catalog for specific log characteristics. We won't be changing any attributes here.

The header is scanned again and any items having an entry concern are listed. In this case, the beds for the log have not been defined. While considered a "flagged error", it does not interfere with the entry of lithology data.

EDITSC: Quad, State, Scale, LOG ID Entry

```
QUAD:NEWQUAD      STATE:XX  SCALE:2    24000.  LOGID:    1  PROJECT:
Display of Flagged Items
26. BED CODE REGION IDENTIFIER:
27. CODE OF UPPERMOST IDENTIFIABLE BED:
28. CODE OF LOWERMOST IDENTIFIABLE BED:
Press <ENTER> Key or Click DONE To Continue:
```

Now, we are ready to enter lithology data! **Select Option 3 (Enter/Edit Lithologies).**

```

EDITSC: Quad, State, Scale, LOG ID Entry

QUAD:NEWQUAD      STATE:XX  SCALE:2    24000.  LOGID:    1  PROJECT:

***HEADER/LITHOLOGY EDIT MENU ***
ENTER THE OPTION NUMBER
1 = Header: Change/Display Line(s)
2 = Header: Show Flagged Items Only
3 = Lithology: Enter/Edit Lithologies
4 = Save Log - Edit Of Header and Lithologies Complete

5 = Exit from all editing WITHOUT saving (since last save)

There Are Flagged Items In The Header

ENTER OPTION BY NUMBER (1 to 5): 0

```

Then select **Option 1 (Windows based Litho Editing)**. Some people like the keyboard-based entry processing. While the Windows technique requires a few mouse clicks, the keyboard focused entry process has been duplicated and may also be acceptable.

```

CLITHO - Lithology Entry And Editing

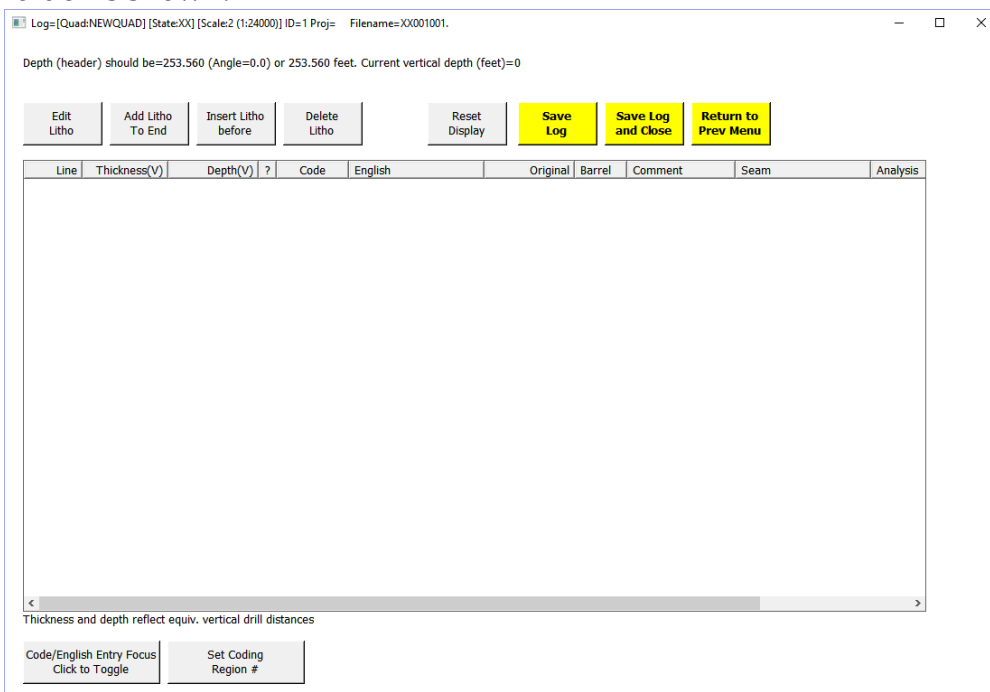
QUAD:NEWQUAD      STATE:XX  SCALE:2    24000.  LOGID:    1  PROJECT:

1 = Use Windows based litho editing
2 = Enter Litho Data (Add to end)
3 = Enter/Add/Edit Existing Litho Entries
4 = Enter Bed Codes Or Analytic Data
5 = Set Lithology Coding Region And Reset All Lithologies To Uncoded
6 = Return To Header/Lithology Edit Menu

ENTER OPTION BY NUMBER (1 to 6): 0

```

This is the basic window from which lithology records can be added, deleted, or edited. The caption bar of the window contains the identifying information about the log and its filename in your data folder is shown.



We'll start off by adding a couple of records, using different entry methods to illustrate the flexibility. We click "Add Litho to End" to start this process.

Pictured below is an initial entry dialog with the entry format not yet selected.

Because we've indicated a variety of methods can be used, note that the option buttons toward the bottom (Litho Type, etc.) are not filled in. We must select what we wish to do before the appropriate input fields are enabled.

In this example, we've selected the data entry to be litho code, thicknesses in decimal feet, and individual lithology thickness as the initial input format. We've entered the Ferm Code as 001 (overburden) of 35 feet thick (individual thickness) and added a driller comment (DECOMPOSED).

Notice here that the "Ignore" button has changed color and text since it was first displayed. When you enter or change any data, the button changes color to let you know that the data has yet to be accepted as entered for processing. If you were to click "Data Changed. Ignore?" now, your entered

data would be discarded. We'll click on "Save Entered Data and Continue" to proceed to the next lithology to be entered. This is also the default button, so hitting the ENTER key will also work.

Looking at the core, we see that there is a 2-foot gap (cumulative thickness=37) in the lithology record. We've now switched this lithology record to indicate the cumulative thickness is entered. C-Master will show the **thickness** of this individual **unit** as 2 feet thick.

The screenshot shows a software interface for entering lithology data. At the top, there is a yellow box labeled "NOT CODED" and two buttons: "Click to Code" and "Click to Code and Continue". Below these are input fields for "Code/English" (containing "000"), "Thickness" (containing "37"), and "Barrel" (containing "0"). A "Comment" field contains the text "GAP". There are also empty fields for "Seam Tags", "Analysis Tags", "UserData 1", and "UserData 2". At the bottom, there are three radio button groups: "Litho Type" (with "Code" selected), "Thickness" (with "Feet/In/Frac" selected), and "Thickness Measures" (with "Cumulative Thickness" selected). A "Change Format(s)" button is to the right of these groups. At the very bottom, there are three buttons: "Save Entered Data and Continue", "Save Entered Data and End Entry", and a yellow button labeled "Data changed: Ignore?".

Now, we switch to core barrel mode, where the thicknesses are cumulative within the core barrel. We will also begin entering lithology data as English phrases.

This third lithology is SANDSTONE in a core barrel (barrel=1) and its cumulative thickness in this barrel is 15 feet 2 and 3/4 inches.

The screenshot shows the same software interface as above, but with updated data. The "Code/English" field is empty, and the "English" radio button under "Litho Type" is now selected. The "Thickness" field contains "15 2 3/4" and the "Barrel" field contains "1". The "Comment" field is empty. The "Thickness Measures" radio button group now has "Core Barrel Thickness" selected. The "Data changed: Ignore?" button is still present at the bottom right.

We click "Save Entered Data and End Entry" to save this and return to the overview of the lithology data.

Right now, our litho entries show:

Log=[Quad:NEWQUAD] [State:XX] [Scale:2 (1:24000)] ID=1 Proj= Filename=XX001001.

Depth (header) should be=253.560 (Angle=0.0) or 253.560 feet. Current vertical depth (feet)=52.229

Line	Thickness(V)	Depth(V)	?	Code	English	Original	Barrel	Comment	Seam	Analysis
1	35.000	35.000	*	001		35		DECOMPOSED		
2	2.000	37.000	*	000		37		GAP		
3	15.229	52.229	*		SANDSTONE	15 2 3/4	1			

Thickness is shown in decimal feet and is the thickness of each lithology unit, depth is cumulative (down hole), and the elevation shown is the **bottom** of each litho entry (far right side; not shown here). The "*" in the column before the code indicate that the lithology entry is not "coded"; that is, the English description (or Ferm Code) has not been assigned yet. Coding logs in batches is more efficient and will be covered a bit later.

We'll click "Save Log and Close" to save this data before proceeding. We'll select Option 4 again to save this log and indicate who just edited the log. The initial date of entry is saved, and the date of the last edit is saved. You can always find when a log was initially entered, and when it was last edited.

Assigning Ferm Codes and English Descriptions (Coding)

It's time to Print and Code logs! Select Option 20 to proceed to printing and coding.

```

CLOG: **** Log Entry/Edit ****
Edit About Utilities

1 = Header Entry (New Log) and Lithology Entry
2 = Existing Log: Edit Header and Lithologies

3 = Enter a New Scout Ticket log

10 = "IMPORT" C-MASTER Log(s) (CIMPORT)
11 = Build a Log Entry Template File
12 = Enter a NEW Log Using An Existing Template

20 = Print And Code Logs (CPRTCOD)
21 = Print/Search Log Catalog (CCATALOG)
22 = Strip Logs (CLOGPLT)

30 = Return To Main Menu

40 = Show Current Files Configuration

50 = Exit This Program (RETURN TO WINDOWS)
ENTER OPTION BY NUMBER (1 to 50): 0
    
```

We have multiple options available. We will select the Geologists Correction Copy with Auto Coding and report no-codes (Option 3).

```
CPRTCOD - PRINT AND CODE LOGS

You have      0 logs queued for processing.
 1 = Operators Correction Copy
 2 = Geologists Correction Copy But No Auto coding
 3 = Geologists Correction Copy With Auto Coding and report "No Codes"
 4 = Auto Code Logs And Report "No Codes"
 5 = Auto Code Logs And Add "No Codes" Manually by line
 6 = Auto Code Logs Without Any Report Generated
 7 = Print Headers Only (No Coding)
 8 = Same As (1) Without Header Display
 9 = Same As (2) Without Header Display
10 = Same As (3) Without Header Display
11 = Exit To Main Menu (If No Logs To Process)
12 = Clear Temporary (internal) Phrase file for autocoding
99 = Begin Processing
ENTER OPTION BY NUMBER (1 to 99): 0
```

You will be asked for the identifying information for the logs to process.

```
CPRTCOD - SELECT LOGS TO PRINT

PROJECT CODE: 
1. QUAD NAME: NEWQUAD Choose QUAD
2. STATE LOCATION OF QUAD: XX
3. SCALE OF QUAD: 2 1: 24000.
ENTER -1 TO BEGIN PROCESSING
ENTER LOG ID RANGE: 1 0 Select start using Hole ID data
```

Since we have only the one log, we just specify the start log ID as 1 and click “Done!” or press “Enter”. In this case, we have not set the coding region number for this log (as installed, the Phrases file is set to 1=Eastern, 2=Western). We will set the coding region to 2 and proceed.

We now show one log ready to be processed. You can select different logs for different processing steps within a single “batch”, up to 1000 logs in all.

```
CPRTCOD - PRINT AND CODE LOGS

You have      1 logs queued for processing.
 1 = Operators Correction Copy
 2 = Geologists Correction Copy But No Auto coding
 3 = Geologists Correction Copy With Auto Coding and report "No Codes"
 4 = Auto Code Logs And Report "No Codes"
 5 = Auto Code Logs And Add "No Codes" Manually by line
 6 = Auto Code Logs Without Any Report Generated
 7 = Print Headers Only (No Coding)
 8 = Same As (1) Without Header Display
 9 = Same As (2) Without Header Display
10 = Same As (3) Without Header Display
11 = Exit To Main Menu (If No Logs To Process)
12 = Clear Temporary (internal) Phrase file for autocoding
99 = Begin Processing
ENTER OPTION BY NUMBER (1 to 99): 0
```

Select option **99** to begin processing this batch. A PDF file is generated with the results of the coding operation.

```

PAGE:      1 DATE: Tuesday, 7 March 2017
          ALL DEPTH/THICKNESS DATA IN FEET

LOG=[      ] [NEWQUAD      ] [XX] [ 2 1:  24000.] ID=      1
COMMENT=-          SOURCE HOLE=1234-5678   CONTRB HOLE=1234-5678

-----
LINE  CODE          ENGLISH          COMMENTS          CUMULATIVE          UNIT          ELEVATION
-----
 1  001  CASING OR SURFACE MATERIAL  DECOMPOSED        35.000          35.000          7515.000
 2  000  NO ROCK RECOVERED          GAP                37.000           2.000          7513.000
 3  000  SANDSTONE                   ** CANNOT CODE    52.229          15.229          7497.771
-----

```

“SANDSTONE” is not a valid phrase, so it is marked as uncoded.

If you do lots of logs in a single batch, the reports on the following pages will be useful. They will show which entered data cannot be coded for each log and how many of these errors were found and in which logs. You can identify driller unique phrases in this way, for example.

```

PAGE:      1 DATE: Tuesday, 7 March 2017
          ALL DEPTH/THICKNESS DATA IN FEET

          CODING ERRORS - CODE OR ENGLISH PHRASE (May have been manually coded)

          CODE OR ENGLISH          ERRORS IN LOG(S)
-----
SANDSTONE                          1 LOG=[      ] [NEWQUAD      ] [XX] [ 2 1:  24000.] LOGID=      1
-----

```

We can manually code logs at this point (using Option 5), update the phrase file to include the new terms, or re-edit the log and make the corrections there.

Let’s ignore the uncoded lithologies for right now and create a strip log.

Creating Strip Logs (LOGPLOT)

From the main menu, select “Strip Logs” (Option 22). We will select a JPG file as the output, and then choose the options for the data to appear with the log.

```

JPG Image Output has been selected
Enter "Y" By The Options Desired For All Logs in this batch
Option 2 => 3.33 Inch Headers
Options 3, 4, 5, and 7 => 5 Inch Header
Option 11 will force an 8 inch header

Y 1:LITHOLOGY CODE
Y 2:LITHOLOGY THICKNESS
N 3:COMMENTS          0          Scaling for plot (ft/in or m/2.54 cm).
Y 4:LITHOLOGY ENGLISH          0.000 == 10 ft/in or 3 m/2.54 cm
N 5:BED CODES (SEAM TAGS)
Y 6:COORDINATES  Y 15:Use SP or Lat/Lon          0          Length (in inches) to add to the plot
Y 7:COMPANY NAME
N 8:OUTPUT IN METERS          N          "Y"=enable plot optimization, "N" to disable
N 9:SHOW LITHO LINE NUMBERS
N 10:FORCE LOG TO NEW PAGE          Text to be appended to PLOT files generated
N 11:EXTRA-WIDE/SINGLE LINE ID          Use to save plot selections for later
Y 12:Apply BACKGROUND Colors
N 13:Create PETRA LIC file
14:Use UNLIMITED PDF Width/Length
N 16:Show lithology base elevation

Enter "Y" to Proceed or "N" to Abandon  Y

```


All options marked with a “Y” will be present on the log strip. The scaling will be left at 10 ft/in.

```
JPG Image Output has been selected          There Are Currently 0 logs awaiting processing
ENTER PROJECT CODE:                          0 = Process log selection (Q/St/Sc + LOG ID Range)
1. QUAD NAME: NEWQUAD                        Choose QUAD          1 = Read Catalog Search File/Apply current intervals
2. STATE LOCATION OF QUAD: XX               2 = Edit List of Currently Selected Logs
3. SCALE OF QUAD: 2 1: 0                   3 = Save log selection in Catalog Search format
ENTER LOG ID RANGE: 1 0                     Use Hole ID data     4 = Begin Log Strip processing
                                           5 = Quit/Abandon selections
                                           ENTER OPTION BY NUMBER (0 to 6): 0

You can select/deselect the plot display options below for the NEXT set of log selections
X:Ferm Code X:Thick :Comments :English :Beds :Line #'s X:Background :Elevation

INTERVAL SELECTION? N To go through the end of the log, specify 99999 for depth
Use ELEVATION for Intervals? N or -99999 for Elevation Clear all interval selections
1:0 ->0 F 11:0 ->0 F 21:0 ->0 F 31:0 ->0 F
2:0 ->0 F 12:0 ->0 F 22:0 ->0 F 32:0 ->0 F
3:0 ->0 F 13:0 ->0 F 23:0 ->0 F 33:0 ->0 F
4:0 ->0 F 14:0 ->0 F 24:0 ->0 F 34:0 ->0 F
5:0 ->0 F 15:0 ->0 F 25:0 ->0 F 35:0 ->0 F
6:0 ->0 F 16:0 ->0 F 26:0 ->0 F 36:0 ->0 F
7:0 ->0 F 17:0 ->0 F 27:0 ->0 F 37:0 ->0 F
8:0 ->0 F 18:0 ->0 F 28:0 ->0 F 38:0 ->0 F
9:0 ->0 F 19:0 ->0 F 29:0 ->0 F 39:0 ->0 F
10:0 ->0 F 20:0 ->0 F 30:0 ->0 F 40:0 ->0 F
Log Scaling: 10 feet/inch

Boundary Filter Load Boundary Filter File Clear Boundary Filter File

0 Boundary File:
EXCLUDE logs if inside the boundary? N
```

We now select the logs for processing from the following screen.

There are options available here for advanced display and are described in the detailed section on **Log Strip processing**. We'll select the only log in the system. Press “Enter” to pre-process the log selection (option 0 is the default, so pressing Enter automatically selects 0 as the option) and add this to the internal list.

Once this pre-processing step is done, we can then run the log strip generator (Option 4, Begin Log Strip Processing). This process is batch oriented and can run without any manual intervention. If you do not choose to run the Windows batch file now, and run log strips selection again, you will overwrite your first work with the new selections! We'll go ahead and run the LOGPLOT step now.

```
Start LOGPLOT right now?

JPG Image Output has been selected
You can manually run the batch by double clicking on BATCHLOG.CMD
in your default directory, or you can let me start it for you now.

Do you want to start LOGPLOT now? Y
```

Since we've asked for a JPG and did not force one log per file, we'll find the JPG file in the **JPG_MULTI** sub-folder of our main folder. Since the “**SANDSTONE**” entry is not coded, it shows with a default pattern (**UNKNOWN**). Going back and editing the litho entry to “**SS**” (the standard phrase for sandstone), we don't need to re-perform the log selection for strip log production. We can simply re-run the existing command file (**BATCHLOG.CMD**), creating a new image file. I've shown the original and the corrected log, side-by-side.

```

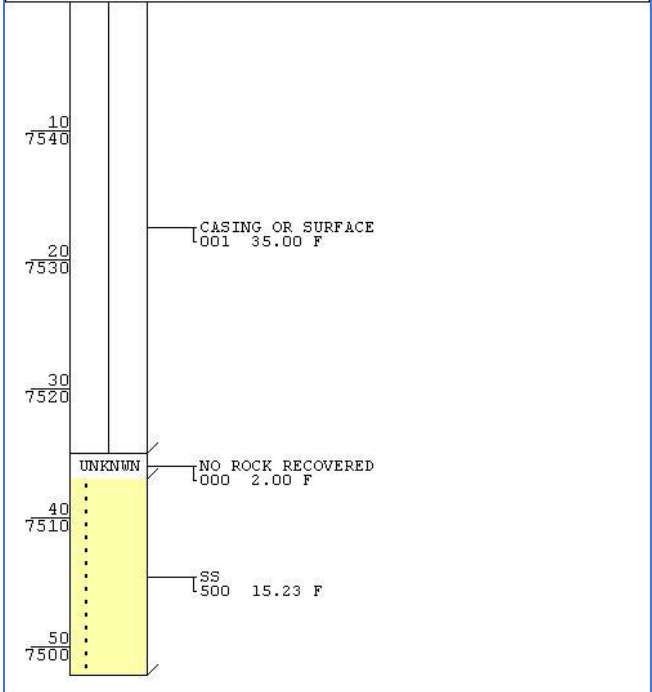
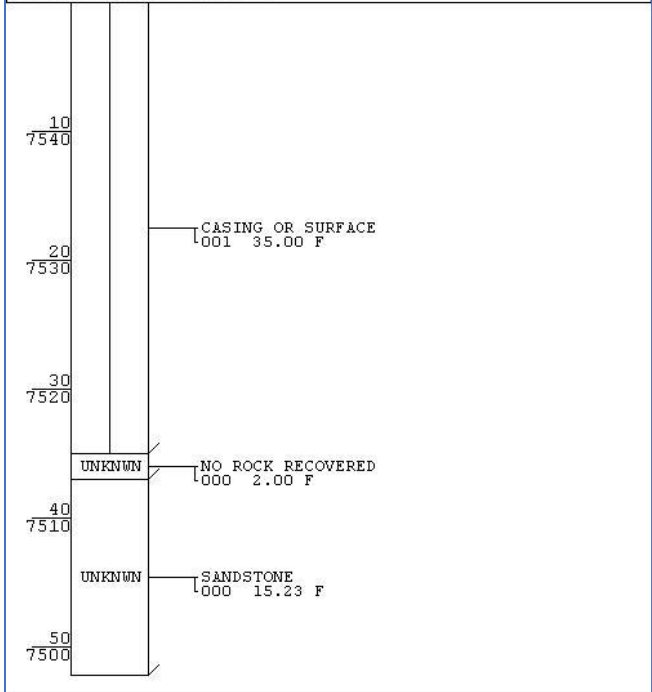
NEWQUAD      1      ST XX 1/24000
CO.NO.1234-5678  ABC COMPANY
ELEV 7550.00  ELEV BY SURVEY
 10.00 FT/IN  TYPE CORE
NAD83
SW 100.999566
INTRVL      BY HORGER YEAR 17
ENGLISH
DDH:1234-5678

```

```

NEWQUAD      1      ST XX 1/24000
CO.NO.1234-5678  ABC COMPANY
ELEV 7550.00  ELEV BY SURVEY
 10.00 FT/IN  TYPE CORE
NAD83
SW 100.999566
INTRVL      BY HORGER YEAR 17
ENGLISH
DDH:1234-5678

```



Note the coordinates are not quite what we entered. This is because we entered the coordinates as NAD83, but the default datum for display of coordinates in log strips was chosen as NAD27. This can be changed by modifying the CONFIG file and selecting the desired datum for log strips.

This was a quick view of how one can enter data into C-Master and get log strips created quickly. If you'd like to dig deeper into C-Master, you can continue to the [Program Details – More Information on Program Features](#).

There are a few things to consider for your production data.

Work Flow Considerations

If you deal with data from a variety of quadrangles, you should use the Quadrangle Maintenance function to create all those quadrangle entries in the Quad Catalog. This will speed your entry process.

If you have several different sources of logs, you should use the Source Maintenance function to create all the sources. The log sources (source or contributor) may be from a variety of companies. If a company has merged with a different company, you may wish to assign source ID numbers that reflect this. If all the data are considered part of the new company, all data should be assigned the same ID number. This will make it clear that while the name has changed, the ownership of the data is a single entity. If, however, you need to maintain separation of these data, you may consider assigning an ID and then assigning a sub-id. For example, ABC Company would be assigned ID=700, while the DEF Company data is assigned ID=701. These relationships are totally up to you, and you can use any system you wish.

Drill hole numbers do not have to be unique EXCEPT that a drill hole number must be **unique for a given source**. This restriction is imposed to help prevent you from entering the same log twice. If you do have duplicated drill hole numbers, consider modifying them in a way to preserve their uniqueness (i.e. adding a letter at the end).

While Tract Names are not required, they can be of benefit to identify locations of the boreholes. Tract names also present a unique problem if your data is spread over a wide area. For example, mountain names are not necessarily unique within a state, and parcels of land can be identically named in different areas. However, tracts must have a unique name for the assigned ID. So, assigning ID=645 for the "US Mountain" tract works great if there is only one "US Mountain" property. If there are multiple named tracts, then you may wish to resolve ambiguities by making the tract names unique.

The assignment of Bed Codes can help you create a Project and automate some of the data extraction tasks. To do so, a consistent method of assigning a code name to identifiable beds within your areas is critical. A set of "standard" bed codes is provided with C-Master, should you be able to use these pre-defined beds. Refer to the **detailed section** for how bed codes can be formed and how bed codes should be entered to use C-Master's features effectively.

With all these considerations in place, sometimes one deals with a variety of data that should not, or cannot, be intermingled. Usually proprietary data, C-Master is designed to deal with this. You would create separate folders for each set of data. By then creating program shortcuts that reference each folder of data, you deal with only that folder of data.

If you have special needs or wish to learn more about this data separation and how to most easily handle it, please give a call or e-mail. Always happy to give assistance!

Projects and Processing

One of the flexible tools available for data extraction is Projects and Processing. With this, you can group logs together and process the lithology data to extract additional information by performing calculations on the aggregate of all the lithologies in a defined interval. Once this is completed, you can have C-Master perform generate interval log strips automatically.

You must first create a Project. This defines the physical parameters of your data, like the tract(s) and the ownership of the drill hole data. You then set up a Sub-Project, further narrowing the area of study. You then choose the lithology logs to process (a "log list"); these are "attached" to the Sub-Project. This set of logs will be analyzed against your set of parameters, determining reference points, and thus the intervals defined between the reference points. You may define up to three reference points; these may or may not exist in each log. Between each pair of reference points, C-Master can compute the thickness of user-selectable rock types. Further, you can perform more detailed selection of various rock types that may assist in roof or floor studies or help compute recovery ratios. In other words, your Project might define a large area, and your sub-projects would be concentrated on smaller areas (and perhaps different logs) with differing parameters. If your sub-projects use the same logs for each one, you can easily copy your master list to any sub-project (or between Projects) for easy use. Similarly, you can copy your reference points and processing parameters from one sub-project to another, or from another, project.

Selection of logs for the Project can be done completely manually, or results from a Catalog Search can be used to speed the process. For example, you could use the Catalog Search with a boundary selected to choose logs of interest, then save that set of selected logs into a Catalog Search File. You would then use that file to load the set of logs into the Sub-Project.

If you intend to make changes to the logs to support the Project work, you can create project specific logs (with a project code attached to the file). In this way, your original logs are not disturbed in any way. The drawback is that if you need to incorporate changes made in the Project-specific logs back into the original log, you'll have to do it manually. Most users will find that simply specifying the original log as being a member of the project is sufficient. Creation of Project Logs is performed manually (i.e. a log or block of logs at a time).

There can be up to 100 sub-projects for each project (numbered 00-99). The parameters specified are used to search each log in the Sub-Project and see if the reference points can be found within the log. If so, certain calculations can be performed and data output in report format for use in other programs. Also, log strips can be generated directly from these processed parameters without having to re-enter any data. This feature will allow you to produce, for instance, a section of each log in the Sub-Project that contains a specific named bed. Or, to show the interval in each log that shows the uppermost to lowermost selected beds.

The first time you start Projects and Processing, you will be asked if you wish to create the Project Master File. Answer “Y” to create the file and continue. You may then be asked if you wish to create the Sub-Project Master File. Answer “Y” to create the file and continue.

You must define a Project (Option 1) before defining any Sub-Projects.

```

Define (New) or Revise (Existing) Project or Sub-Project Definition
 1 = Create a New Project
 2 = Print (PDF) Project, Sub-Project, Log, and Parameter information
 3 = Select Project from List

Current Project Selection: [ ] Sub-Project: 0
11 = Edit Project Descriptions and References
12 = Create Project-specific Logs From Existing Logs
13 = Create a New Sub-Project Description
14 = Edit Sub-Project Description
15 = Add/Remove/List Logs in a sub-project
16 = Clone current sub-project LOG SELECTIONS
17 = Clone current sub-project PARAMETERS

Sub-Project Parameters (Using Project/Sub-Project Selection above)
21 = Define/Modify the Reference Points
22 = Define/Modify the Rock Intervals
23 = Define/Modify the Rock Units

Process Sub-Projects (Using Project/Sub-Project Selection above)
25 = Process a single sub-project
26 = Process multiple sub-projects

Export Processed Data (Select Project/Sub-Project manually)
31 = Extract Processed Data into CSV (and KML) files
32 = Plot strip logs using PROJECT data
33 = Plot strip logs (not using project data)
34 = Create Catalog Search File using Logs from a Sub-Project

40 = Return To Main Menu
ENTER OPTION BY NUMBER (1 to 40): 0

```

```

Projects [AAA] to [AAJ]
Select here for a list of Projects

You can select a Project below
Prj  ##
AAA ( 6)
AAB ( 1)
AAC ( 0)
AAD ( 0)
AAE
AAF
AAG ( 0)
AAH ( 1)
AAI ( 0)
AAJ

```

For existing Projects and Sub-Projects, click on “Select Here for a list of Projects” to see the main project parameters, and the sub-project parameters. You can select the Project/Sub-Project from this option as well.⁵

⁵ Sometimes, especially after a long period of time, you might forget the details. This option gives you immediate access to these data.

Defining A Project

The Project definition contains identifying information on the Principal Investigator and the bed codes that are expected to be contained in the Project. Also, since a Project may span different regions, you can specify the region(s) for which the data will apply.

UPDPRJ: Principal Investigator And Beds - Descriptions

```

Defining a NEW project
PRINCIPAL INVESTIGATOR AND BEDS
1. PRINCIPAL INVESTIGATOR NAME: BILL HORGER
2. BED CODE REGION: APPL Choose BEDS
3. UPPER BED CODE: 100
4. LOWER BED CODE: 12
    
```

UPDPRJ: Region Of Study

```

Defining a NEW project
REGION OF STUDY
STATE ---COUNTY-----TOWNSHIP--
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
    
```

Of interest would be the Company from which the data are being used and the Tract(s) that applies. Up to 20 can be provided, and the quick-fill buttons are available to you to assist filling in the data. You can enter data about the mine/pit in the additional field provided.

UPDPRJ: Company Information

```

Defining a NEW project
COMPANY INFORMATION
-----COMPANY FOR STUDY----- TRACT-----MINE OR PIT-----
CJD SOFTWARE THIS IS A TRIAL
1 REF TRACT
2 REF TRACT
3 REF TRACT
4 REF TRACT
5 REF TRACT
6 REF TRACT
7 REF TRACT
8 REF TRACT
9 REF TRACT
10 REF TRACT
11 REF TRACT
12 REF TRACT
13 REF TRACT
14 REF TRACT
15 REF TRACT
16 REF TRACT
17 REF TRACT
18 REF TRACT
19 REF TRACT
20 REF TRACT
    
```

Enter the current date and description to round out the definition of a Project.

```
UPDPRJ: Date And Description

Defining a NEW project
DATE AND DESCRIPTION
 11. DATE (MM/DD/YY) : 07/08/10
 12. ENTER UP TO 5 LINES OF DESCRIPTION
THIS IS LINE 1
ANOTHER LINE
MORE DATA HERE
MORE HERE
AND THE END IS HERE
```

None of this information is required. However, it is useful to document the information that is the basis for the logs that will be analyzed.

Project-Specific Logs

If you create a Project-specific log from an existing log (Option 12), it will retain the same basic file name, and to it will be appended a Project code⁶. In keeping with the C-Master assigned Project codes, the first project is AAA, the second is AAB, etc. It should be noted that the actual code that is assigned is arbitrary; that is, C-Master will not care if Project-specific logs from Project AAA are used in the AAE project. The assignment of a Project Code to a lithology log should follow the rhyme or reason that makes most sense to you.

```
CREPRJ: PROJECTS AND PROCESSING

Creation of Project Logs will COPY a log to a new file and give it a new name. You are not required to
COPY a log to use it in a project, and it might not be what you wish to do. Only create PROJECT SPECIFIC
logs if you expect to CHANGE the Project-specific log and do not wish to affect the original log (i.e.
experimenting or performing an academic exercise).

Will create PROJECT logs in Project:AAA

USE DATA FROM EXISTING PROJECT? N
PROJECT: <== Leave BLANK to use ORIGINAL logs
```

⁶ The downside of a Project log is if you make changes to this log, those changes are not reflected in the original log. Project logs are very useful when you want to do a lot of changes in the logs and don't wish to affect the integrity of the original data, or if you are in an academic environment.


```
Will create PROJECT logs in Project:AAA

Using logs from Project=
ENTER QUAD,STATE,SCALE OF OLD DATA
1. QUAD NAME: JJEFFERSON Choose QUAD
2. STATE LOCATION OF QUAD: CO
3. SCALE OF QUAD: 2 1: 24000.
```

Creating and using a Project-specific log has one major effect: this effectively severs the relationship to the original log. What that means is any changes you make to the original log will not be reflected in this Project-specific log, and any changes you make in the Project-specific log will not be reflected in the original log. If that is desirable in your situation (i.e. an academic environment or if experimentation on the log data is to be performed, etc.) then creation of Project-specific logs may be right for you.⁷

In this example, logs will be assigned the AAA project code when copied.

```
QUAD:JEFFERSON STATE:CO SCALE:2 24000. LOGID: 10 PROJECT:
COPY DATA TO NEW QUAD,STATE,SCALE? █
```

You can also copy these logs to a new quad/state/scale if you so choose.

```
QUAD:JEFFERSON STATE:CO SCALE:2 24000. LOGID: 10 PROJECT:
ENTER LOG ID RANGE: 0 0 Select start using Hole ID data
```

Specify the range of the log ID numbers you wish to copy.

If you chose not to use Project-specific logs, you can attach the original log to the Sub-Project through the Sub-Project menu selection. What this will mean is any changes you make to this original log will be available to any Project that uses the log; you need only to re-process the Project data to use these changes.


The choice between creating and using Project-specific logs versus just using an original log is dependent on what you wish to do. If having a separate log to edit and modify is what you want, then you'll need to create Project-Specific logs. If you do not want to create Project-Specific logs, then you can simply use original logs. The processing steps detailed later make absolutely no changes to the logs. It is therefore totally safe to use an original log in any number of Projects. Remember, however, that changes made to the original log might affect the processing previously done with this log (i.e. change in depth of a reference point, adding zero thickness lithologies, etc.).

⁷ You can attach **both** a Project-specific log **and** the original log to the Sub-Project and see what the effects of editing/modifying lithology entries has on the computed data.


Defining a Sub-Project

Select Option 13 to define the Sub-Project. The Sub-Project definition contains the Target definition (short description; MINE, PIT, etc.), the anticipated bed code limits of interest, and a description. The descriptive information might include specific information about why this Sub-Project was created (i.e. performing a rock/other analysis to support recovery ration calculations).

```
Modify Sub-Project Definition:AAA Sub-Proj:00
1. TARGET FOR PROJECT: MINE
  Bedcode region  APPL
2. UPPER BED CODE: 100 Choose BEDS
3. LOWER BED CODE: 10
4. SUB-PROJECT DESCRIPTION
TEST FOR STUFF
MORE STUFF
AND MORE STUFF
```

 SPRNEW: MAKE CORRECTIONS HERE

```
DEFINE SUBPROJECT INFORMATION Project:AAA Sub-Proj:00
1. TARGET FOR PROJECT: MINE
2. UPPER BED CODE: 100
3. LOWER BED CODE: 11
4. SUB-PROJECT DESCRIPTION

IS THIS CORRECT? 
```

Attaching Logs to the Sub-Project

Option 15 will then allow you to attach logs to the Sub-Project for processing. The menu selections allow you to manually add a log (or group of logs), a group of logs from a Catalog Search (Importable File), remove logs, and see the currently “attached” logs. If you wish, you may abandon all changes made since the last save.


```
Sub-Project Log File: PRJDEF00.AAA
Current Project Data: Project=AAA Sub-Project:00

Sub-Project Log Options Are:

1 = Add A Log (Original or Project-Specific)
2 = Add Logs From A Catalog Search File
3 = List (and Remove) Logs From this Sub-Project

4 = Save Current Log Selections and Continue

5 = Save Changes and Return To Previous Menu

6 = Abandon Changes (since last SAVE) and Return to Previous Menu
ENTER OPTION BY NUMBER (1 to 6): 
```

If you manually add a log, you have the option of adding Project-specific Logs or original logs. For the original logs, remove (make blank) the Project for Log Addition field. Leave the LOG ID range as zero to go back to the previous menu.

```

Current Project:PRJDEF00.AAA
Add LOGS to PROJECT: AAA
Project Log for Log Addition:      <== Leave BLANK to Choose Original Logs
1. QUAD NAME: JEFFERSON           Choose QUAD
2. STATE LOCATION OF QUAD: CO
3. SCALE OF QUAD: 2 1: 24000
ENTER LOG ID RANGE: 1           10 Select start using Hole ID data
    
```

Editing the Attached Logs' List

Using Option 3 (List and Remove Logs...) will show you the logs that have been “attached” to the sub-project. You can remove any or all the logs using this view. Just select the log (or logs), selecting blocks of logs or using CTRL-click to select individual logs to be removed, then click “Remove logs”.

There are 61 Catalog Entries available

Quad	State	Scale	Proj	Log ID	Elevation	Depth	Drill Hole Number	UTM	1?	2?	3?
HNSH	KY	2 [1: 24000.]		109	1570.000	209.998	410	17/4149875 / 324174	Y		
HNSH	KY	2 [1: 24000.]		132	1610.000	193.002	408	17/4149655 / 326409	Y		
HNSH	KY	2 [1: 24000.]		155	1660.000	295.000	LK-60-1	17/4138496 / 327031			
HNSH	KY	2 [1: 24000.]		77	1161.000	376.998	M-10	17/4140595 / 331164			
HNSH	KY	2 [1: 24000.]		58	1598.000	846.008	S-161	17/4145417 / 334102		Y	
HNSH	KY	2 [1: 24000.]		21	1441.000	726.005	S-55	17/4149405 / 331254		Y	
HNSH	KY	2 [1: 24000.]		61	1500.000	811.421	S-204	17/4146380 / 332859		Y	
HNSH	KY	2 [1: 24000.]		54	1540.000	836.004	S-157	17/4144617 / 331659		Y	

You can sort the list by the indicated columns. For example, sorting on the UTM column would allow you to sort all the logs whose coordinates are not defined (0/0/0) to the top to then be removed. Or, sort by depth to remove all logs whose depth is less than a given depth.

The columns marked as 1?, 2?, 3? will be populated **AFTER** you have processed this list of logs against the reference point criteria (see below). These columns show whether the reference point was found. You could use these columns to eliminate logs that do not contain one or more reference points. Click on the column header to sort the column. For reference points, logs that do not contain the reference point will show as a blank. Select all the blank entries and remove them to yield only those logs who have that reference point.

In the columns that follow the reference points are the interval thicknesses. You can use those as selection criteria as well.

Once the Projects and Sub-Projects have been defined and populated with the logs to which they apply, we can proceed to the entering the parameters against which the logs will be processed, reference points found, and intervals processed.

Setting Up the Parameters

The processing side of Projects and Processing sets the parameters by which the logs in the Sub-Project are processed, and then extracts these data through either automated log strips or specific data extraction into a file (CEXTRACT) or for presentation using Google Earth.

You can define 0, 1, 2, or 3 reference points. Each pair of reference points defines an interval. If you have only two reference points, there is one interval; if you have three reference points, you can have three intervals (1-2), (2-3), (1-3).

The first reference point is defined as referenced to a seam tag doublet (a bedcode followed by a qualifier), a distance from the Top or Bottom of the log or an absolute elevation, or the first occurrence of a rock type, searched from the top or bottom of the log. For the qualifier field, you can specify a single character, or a wildcard ("B*"), or leave blank to use only the bedcode.

The second and third reference points have a variety of possibilities.

For the second reference point, you can specify a seam tag to search for, a distance from reference point 1 or an absolute elevation, or by the first occurrence of a rock type that meets a minimum thickness requirement. If not searching by a seam tag, you can also specify whether this reference point is up or down from the first reference point.

For the third reference point, you can specify a % of the distance between reference points 1 and 2 (some mid-point between the two), a seam tag to search for, a distance from reference point 2 or an absolute elevation, or by the first occurrence of a rock type that meets a minimum thickness requirement

An example of the screen that selects the reference points is shown below.

```
Current Project Data: Project=AAA Sub-Project:00
Sub-Project Bed Code Range is: Upper BedCode= 122 (# 51 ) Lower BedCode= 10 (# 57 )
NUMBER OF REFERENCE POINTS (0,1,2,3): 3

REFERENCE POINT 1 - Tagged,Distance/Elevation,or Rock type (T,D,R): T
Top/Bottom (T,B): T of TAG: HZ9  Click to select bedcode
Up from bottom, or Down from top (U,D): D
DISTANCE: 0 FEET  <==Use Elevation?
Rock Type For Search: Minimum Thickness: 0
001

REFERENCE POINT 2 - Tagged,Distance/Elevation,or Rock type (T,D,R): D
Top/Bottom (T,B): T of TAG:  Click to select bedcode
Up/Down from Reference Point 1: D
Distance: 39.25 FEET  <==Use Elevation?
Rock Type For Search: Minimum Thickness: 0
500

REFERENCE POINT 3 - Tagged,Distance/Elevation,Rock type,or % (T,D,R,%): D
Top/Bottom (T,B): B of TAG:  Click to select bedcode
Up/Down from Reference Point 2: U
Distance: 10 FEET  <==Use Elevation?
Rock Type For Search: Minimum Thickness: 0
000

% Of Distance Between Ref 1 And Ref 2: 50

Is this all correct? 
```

Let's assume that we wish to define three reference points. We choose to have the first reference point be the top of the first seamtag of "HZ9 *" (any seam tag with HZ9 as the bedcode). For the second point, we chose the first occurrence, looking upward from the bottom, of "HZ9 *". We then chose the third point to be 10 feet up from reference point 2. When we process our theoretical intervals, it is possible that some logs will have only one point found, some may have two points, some may have all three. In this case logs where the first and second points are found, then the third point may also be found. Only for intervals for which there are two reference points are found can there be data computed within in those intervals.

The Rock Interval parameters are rock type based. That is, you specify the codes of those types you are calling "rock". All remaining codes are considered "other". It is from the rock types that lithologies can be grouped and rock-to-other thicknesses and ratios determined and reported.

DEFINT: ROCK INTERVALS

```
Current Project Data: Project=AAA Sub-Project:00
DEFINE ROCK TYPES FOR INTERVAL 1 (1 TO 2)
02*
DEFINE ROCK TYPES FOR INTERVAL 2 (2 TO 3)
DEFINE ROCK TYPES FOR INTERVAL 3 (1 TO 3)
```

In this data, the first interval (between Reference points 1 and 2) has the Rock type defined as anything that is coal (02*).

SPCUNT: DEFINE THE ROCK UNIT PARAMETERS

```
Current Project Data: Project=AAA Sub-Project:00
DEFINE THE ROCK UNIT PARAMETERS
DEFINE VALID ROCK TYPES FOR INTERVAL 1 (1 to 2)
02*
THICKNESS OF A ROCK UNIT MUST BE => 1 FEET
CAN CONTAIN OTHER TYPE UP TO 10 PERCENT
ROCK UNIT MAX BREAK THICKNESS: .1 FEET
DEFINE VALID ROCK TYPES FOR INTERVAL 2 (2 to 3)
02*
THICKNESS OF A ROCK UNIT MUST BE => 1 FEET
CAN CONTAIN OTHER TYPE UP TO 10 PERCENT
ROCK UNIT MAX BREAK THICKNESS: .1 FEET
DEFINE VALID ROCK TYPES FOR INTERVAL 3 (1 to 3)
02*
THICKNESS OF A ROCK UNIT MUST BE => 1 FEET
CAN CONTAIN OTHER TYPE UP TO 10 PERCENT
ROCK UNIT MAX BREAK THICKNESS: 1 FEET
```

The Rock Unit Parameters are also rock type based. In addition, you can specify that a rock unit may consist of multiple rock types, but the aggregation of those individual lithologies must be greater than a specified thickness, and not contain more than a certain percentage of “other” types so long as no “other” type has a thickness greater than a specified value (“break thickness”). Rock Unit parameters differ from rock intervals in that the Rock Interval makes no distinction about the aggregation of rock on top of other rocks. The Rock Unit parameters are more specific about how layers of differing lithology can be aggregated.⁸

Upon returning to the Projects and Processing Menu, select Option 25 to start processing. You can specify one (or none) of the reports. In any case, all processing steps are performed. Once complete, when you return to the Projects and Processing Main Menu, the report file (if any) will be presented.

```
PROJECT=AAA
SUBPROJECT: 0
ENTER REPORT OPTION(S) DESIRED
Y POINT DATA REPORT
Y ROCK INTERVAL DATA
Y ROCK UNIT DATA
Select the Option(s) desired above
Process with processing using the options above? Y
```

It is useful to process a batch of Sub-Projects from a single main Project. First, specify the PROJECT to be processed. Then, select Option 26 from the Projects and Processing Menu (CSEAMBAT). You will

⁸ It must be noted here that the direction followed by the reference points can influence the Rock Unit data computations. This is because the application of (specifically) “Can Contain Other Type Up To ... Percent” may cause a logical break in one direction (shallow to deep) but not in the other direction (deep to shallow).

then be presented with a menu that shows the processing options, and the option to just quit to the previous menu.

```
PROJECT SELECTED: AAA
  Select Report Option(s) Desired
 POINT DATA Report?
 ROCK INTERVAL DATA Report ?
 ROCK UNIT DATA Report?

Sub-Project Selection - Range, Select from list, or Quit (R,S,or Q): R

SUBPROJECT TO START: 0
SUBPROJECT TO END: 0

Sub-Project: 0 N
```

Select the Reporting options from the three options. You then select a RANGE of sub-projects (R, the default), select each sub-project to process (S) from a list, or Quit to the previous menu. Once you have selected your options, then click “Done” or press return to start the processing. You do not need to request a report to have the data computed.

The processing status and other messages will be displayed in the Status Window.

Other Projects and Processing Options

There are a few other options available on this menu that deserve explanation. The ability to “clone” a sub-project can save you a lot of work. Exporting the logs that are used in a sub-project has utility for other C-Master programs. Let’s examine each of these options.

Clone Current Sub-Project Log Selections

Because Sub-Projects can be so easily used to perform lots of calculations on lots of data, many users will begin work on a Sub-Project, then experiment with various processing parameters and log selections. Once this work has been shown to make sense, other Sub-Projects would be defined to modify the Processing parameters to gather other data on these same logs. However, the process of manually adding logs to the new Sub-Project is, at best, tedious. This is where the “cloning” of the log selections can help.

Choose the Project/Sub-Project from which the “Master” set is to be taken. Select Option 16, and you’ll be asked for the Project Code of the cloning and the range of sub-projects.

```
Clone Sub-Project Log File

Source of LOGS is Project AAA Sub-Project: 0

Enter PROJECT code for clone: AAA <== Set to BLANK to go back to previous menu
Sub-Project Range      Start: 1 End: 12
```

This example has the Sub-Project 00 copied into Sub-Projects 1 through 12.

Or, you could clone the log definitions for AAA/00 into AAB for all sub-projects 00 to 99.

As another example, let us assume that Project AAA Sub-Project 00 has been your baseline. After completing Sub-Projects 01 through 12, you discover that there are fifty logs that should have never

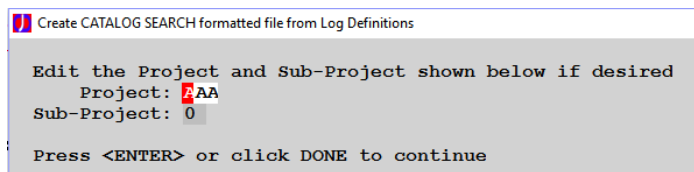
been included. To remedy this situation, you would edit the log definitions in Sub-Project 00, then clone 00 into Sub-Projects 01 through 12. Re-process (using the Batch processing option), and you are done!

Similarly, you can similarly clone the parameter file using Option 17.

Create Catalog Search File using Logs from a Sub-Project

You may need to extract the list of attached logs for other purposes. For example, if you were to wish to obtain a complete log strip for each log in the Sub-Project, you could manually enter each log ID/ID range into LOGPLOT. This would be very inefficient.

By creating a Catalog Search File, you can bypass the manual log selection. LOGPLOT allow you to input as many log definitions as you like using Catalog Search Files. As an example, creating a log strip using a defined interval is fine, but perhaps you wish to plot an interval based solely on absolute elevation that encompasses the interval, but now can show additional information about the rock types above and below the interval. You could use the Catalog Search File option to make these specialized log strips.



You will be presented with the currently selected Project and Sub-Project. You can change this to be any Project/Sub-Project combination you wish. Press <ENTER> or click <DONE> and you will be

presented with a Windows dialog where you can specify the name of the file to create (or use an existing one) and the folder into which the file will be written.

If the file exists, you will be asked if it is OK to overwrite.

This file can also be used to add log definitions to a Sub-Project, to select logs for Export (CSV), and various other functions in C-Master.

Examples of Processed Data

The following is an example (simplified) for processing.

You have a section of a log whose lithologies are:

LINE	CODE	ENGLISH	COMMENTS	CUMULATIVE	UNIT	ELEVATION
1	000	NO ROCK RECOVERED	OVERBURDEN	100.000	100.000	6700.000
2	100	SH (UNDIF)	SHALE	102.000	2.000	6698.000
		* BED:100 0				
3	500	SS	SANDSTONE	107.000	5.000	6693.000
4	100	SH (UNDIF)	SHALE	107.200	0.200	6692.800
5	020	COAL	COAL	107.300	0.100	6692.700
6	500	SS	SANDSTONE	117.300	10.000	6682.700
7	100	SH (UNDIF)	SHALE	122.300	5.000	6677.700
8	500	SS	SANDSTONE	142.300	20.000	6657.700
9	100	SH (UNDIF)	SHALE	144.300	2.000	6655.700
		* BED:10 0				
10	1190	ASH		244.300	100.000	6555.700

Having defined three intervals, the processing shows the first reference (the TOP of the litho that

contains the bed code 100; same as the bottom of the previous lithology), the second reference (the BOTTOM of the litho containing the bed code 10), and the third reference point (50% between 1&2).

```

REFERENCE POINT 1: TOP OF TAGGED ENTRY: 100
REFERENCE POINT 2: BOTTOM OF TAGGED ENTRY: 10
REFERENCE POINT 3: 50.00%(DISTANCE FROM REF POINT 1 TO REF POINT 2)
-----QUAD----- ST ---SCALE-- LOGID TOH ELEVATION --DEPTH-- ---REFERENCE POINT 1--- ---REFERENCE POINT 2--- ---REFERENCE POINT 3---
--ELEV-- --THICK-- --TYPE-- --ELEV-- --THICK-- --TYPE-- --ELEV-- --THICK-- --TYPE--
JEFFERSON CO 1: 24000. 2 BAR 6800.00 244.30 6700.00 100.00 000 6655.70 20.00 500 6677.85 10.00 500
PRJ ZONE 0 UTM= 0.N 0.E 2.00 100 2.00 100 100.00 1190 5.00 500 5.00 500

```

Looking at the rock interval for the interval between reference point 1 and 2: The ROCK is defined to be Sandstone and all other litho codes are Type=OTHER. There are 3 sandstones (total=35 feet (THICK/R)) or the total of 44.3 feet (interval), yielding 79.01% rock, with 3.76 rock-to-other ratio and 0.27 other-to-rock ratio.

```

REFERENCE POINT 1: TOP OF TAGGED ENTRY: 100
REFERENCE POINT 2: BOTTOM OF TAGGED ENTRY: 10
ROCK TYPES FOR INTERVAL BETWEEN 1 AND 2
500
-----INTERVAL BETWEEN 1 AND 2-----
-----QUAD----- ST ---SCALE-- LOGID PRJ ZONE ---UTMN--- ---UTME--- --THICK- THICK/R- --%/R- ----R/O-----O/R-----
JEFFERSON CO 1: 24000. 2 0 0. 0. 44.300 35.000 79.01 3.76 0.27

```

Looking at the rock units for the interval between reference points 1 and 2: The rock unit calculation shows that there are 2 rock units. Since the maximum allowed break is 0.5 feet (or 10%), the litho on line 7 is the break (5 feet > 0.5 feet). Note that the %RK, R/O and O/R ratios are different. This is because the intervening lithologies on lines 4 and 5 have been included in the rock definition because their thicknesses were < 0.5 feet and did not represent more than 10% of the thickness of the actual rock.

```

REFERENCE POINT 1: TOP OF TAGGED ENTRY: 100
REFERENCE POINT 2: BOTTOM OF TAGGED ENTRY: 10
FOR ROCK UNITS CALCULATION BETWEEN 1 AND 2
500

MAX THICKNESS OF BREAKS OF OTHER TYPES IN A ROCK UNIT= 0.500 FT( 0.152 M)
MAXIMUM % OF OTHER TYPES IN A ROCK UNIT= 10.0%
MINIMUM THICKNESS OF A ROCK UNIT= 10.000 FT( 3.048 M)

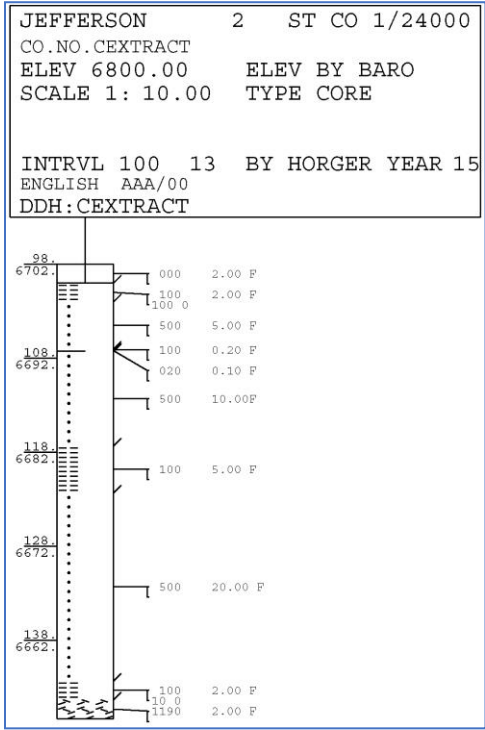
-----ROCK UNITS BETWEEN 1 AND 2-----
-----QUAD----- ST ---SCALE-- LOGID ZONE ---UTMN--- ---UTME--- --THICK-- THICK/R- --%RK- ----R/O-----O/R-----MEAN RK- #UNITS-
JEFFERSON CO 1: 24000. 2 0 0. 0. 44.300 35.300 79.68 3.92 0.25 17.650 2
PRJ=

```

The process for determining rock units works like this:

The first lithology that meets the definition of a rock of minimum thickness is found. The next lithology is examined. If it is a rock, then it is added to the previous rock. If it is "other", then this litho is compared to the max break thickness (if thinner, it might be added) or if the percentage of this other type would cause trigger a break. If neither condition is satisfied (no break), then the next lithology is examined and the process repeats, only this time, if the type is "other", the accumulation of "other" is used for the comparisons. Once a break is found, the next litho that meets the next "rock" definition is searched for. The direction of the interval ("upward" or "downward") means that it is possible to get two different answers between two intervals. However, the directionality can be used, for example, for roof or floor studies.

There is no requirement for the rock unit and rock interval to use the same rock types.



Using the log strip for Projects option, and asking for 2 feet on each side of the interval, and to display the code, thickness and seam tags, this is interval 1:

Extracting Data from a Project

When you start the extraction process (Option 31), you will be presented with a single screen that allows you to make all selections.

```
CEXTRACT: Intervals and Data
About Utilities

Project Code (BLANK To Quit): AAA
Sub-Project Number: 0
Do you want to save the data in CSV format? Y
Do you want the CSV file to be Excel Compatible? Y
Value For Missing Data= -999
Do you want alternate coordinates? N
Choose one of the following as alt coordinate: 0
Coordinate datum - Do you wish NAD83 datum? YES

Select Intervals And Data From The List Below
then select the appropriate processing option.
KML File also? N
Color Table Index? 0 <= Displayed Color for Push-Pin

Int/Ref=>1 2 3
1 = ELEVATION OF REFERENCE POINT => Ref Elev
2 = LITHOLOGY AT REFERENCE POINT => Ref Lith
3 = THICKNESS OF INTERVAL => Int Thick
4 = THICKNESS OF ROCK TYPE(S) IN INTERVAL => Int RkThick
5 = PROPORTIONAL THICKNESS OF ROCK TYPES IN INTERVAL => Int PropThick
6 = RATIO OF THICKNESS OF ROCK TYPES TO OTHERS IN INTERVAL => Int RatioRock
7 = RATIO OF THICKNESS OF OTHERS TO ROCK TYPE(S) IN INTERVAL => Int RatioOther
8 = TOTAL THICKNESS OF ROCK UNITS IN INTERVAL => RU TotThick
9 = PROPORTIONAL THICKNESS OF ROCK UNITS IN INTERVAL => RU PropThick
10 = RATIO OF THICKNESS OF ROCK UNITS TO OTHERS IN INTERVAL => RU RatioRock
11 = RATIO OF THICKNESS OF OTHERS TO ROCK UNITS IN INTERVAL => RU RatioOther
12 = MEAN THICKNESS OF ROCK UNITS IN INTERVAL => RU MeanThick
13 = NUMBER OF ROCK UNITS IN INTERVAL => RU NumRU
14 = NO DATA SPECIFIED => NoData

1 = Choose different option pre-load file 7 = Choose Header Items for KML Display
2 = Generic selection of most used options
3 = Clear all selected options
4 = Save currently selected options
5 = Process with selected options
6 = Quit to previous menu
ENTER OPTION BY NUMBER (1 to 7): 0
```

If you do not wish CSV format, the data output will be output in a fixed column format. If you are not creating a CSV file, then the Missing Data value should be set to something you or the program you use can recognize as representing missing data.

If you want CSV format, you can opt-in for Excel compatibility, meaning the text fields will be surrounded with the `"xxx"` format. You'll be asked if the alternate coordinates are to be included⁹. If you answer in the affirmative, you can choose one of types presented. These data are added as a field with no extra processing.

Just to the right of the CSV selection, you can select that a KML compatible file be created at the same time. You can set the color of the push pins that shows the location of the drill hole. The color is one

⁹ For alternative coordinates, the following rules apply:

For **company grid**, the coordinates are stored as E/W in the first 12 characters, and N/S as the second 12 characters.

For **state plane coordinates**, the state plane zone is not stored. The E/W coordinate is stored in the first 12 characters, and the N/S coordinate is stored in the second 12 characters. State plane coordinates are available only if state plane coordinates were used for the original input.

of the [AutoCAD color entries](#). The file name you select for the data output will have the text “.KML” appended to it identifying this as the KML file.

Select the interval/reference point and the data item you wish to have in the results file. You can extract up to 13 different kinds of numeric data from the processed data from each of the intervals or reference points. You can also specify a value that will be used for missing data (i.e. the elevation of a reference point when that reference point cannot be found). You can select some or all these 13 different values from any one of the three reference points¹⁰. For instance, you could select Reference point 1: elevation, interval 2: thickness of the interval, and interval 3: total thickness of rock units. Specify the interval/reference (“INT”) and the numeric indicator for the data you wish to have in the output file (“DAT”).

You will then be shown the reference point/interval/rock units and the data items that you have selected. If you have selected more than will show on a single screen, you’ll be presented with an additional screen of data. You are then asked to confirm these are your choices. If they are not, answer “N” and you can change them.

```
Project/Sub-Project: AAA/ 0
CSV Compatible output /EXCEL compatibility

Ref
Int-----
1 ELEVATION OF REFERENCE POINT
1 LITHOLOGY AT REFERENCE POINT
1 (Int) THICKNESS OF INTERVAL
1 (Int) THICKNESS OF ROCK TYPE(S)
1 (RU) TOTAL THICKNESS OF ROCK UNITS
1 (RU) MEAN THICKNESS OF ROCK UNITS
1 (RU) NUMBER OF ROCK UNITS
2 ELEVATION OF REFERENCE POINT
2 LITHOLOGY AT REFERENCE POINT
2 (Int) THICKNESS OF INTERVAL
2 (Int) THICKNESS OF ROCK TYPE(S)
2 (RU) TOTAL THICKNESS OF ROCK UNITS
2 (RU) MEAN THICKNESS OF ROCK UNITS
2 (RU) NUMBER OF ROCK UNITS
3 ELEVATION OF REFERENCE POINT
3 LITHOLOGY AT REFERENCE POINT
3 (Int) THICKNESS OF INTERVAL
3 (Int) THICKNESS OF ROCK TYPE(S)
3 (RU) TOTAL THICKNESS OF ROCK UNITS
3 (RU) MEAN THICKNESS OF ROCK UNITS
3 (RU) NUMBER OF ROCK UNITS
Is This All Correct? █
```

You’ll then be prompted for the name of a file into which the data will be stored. If you select “Cancel”, you’ll go back to the prompt for the Project and Sub-Project. If you enter the file name, the file will be produced in the appropriate format.

Once the data file has been written, you will be prompted with the same data again. You can select a new project/sub-project or select the option to return to the previous menu. You can, at any time, save

¹⁰ You’ll see that Data option 14 is available. If you chose this option, you can get a list of the logs in the sub-project and the lat/lon coordinates easily.

the options and interval/data selections in a file. This will allow you to have a set of extraction parameters that you frequently use on file.

The data for the non-CSV option is in a "fixed format"¹¹. This means that the column for each data item is the same. Only the data and reference point/interval/rock unit to which it refers are different. There is a header row to identify the interval/ref for each column. The ordering of these data is set by interval. What this also means is that all data selected for interval reference 1 will be processed, in order, then for interval/reference 2, then interval/reference 3.

ITEM	DESCRIPTION-----	Column START	Column END	LENGTH	FORMAT
1	LOG NAME- made up of the following items				
1a	QUADRANGLE	1	12	12	A12
1b	STATE CODE	13	14	2	A2
1c	QUAD SCALE DIGIT	15	15	1	I1
1e	LOG ID #	16	21	6	I6
1f	PROJECT CODE	22	24	3	A3
1g	SUBPROJECT #	25	26	2	I2
1h	Drill Hole Number	27	38	12	A12
1i	Alternative Coordinates	39	66	28	A28
-----		SUB-TOTAL		76	
2	ELEVATION	67	76	10	F10.3
3	DEPTH OF HOLE	77	86	10	F10.3
4	LONGITUDE	87	97	11	F11.6
5	LATITUDE	98	108	11	F11.6
6	DATA ITEM 1	109	120	12	F12.3
7	DATA ITEM 2	121	132	12	F12.3
8	DATA ITEM 3	133	144	12	F12.3
9	DATA ITEM 4	145	156	12	F12.3
10	DATA ITEM 5	157	168	12	F12.3
.					
39	DATA ITEM 39	565	576	12	F12.3

¹¹ To compute the starting column, with ITEM= number of the item you are interested in, compute:

$$COL=109-(ITEM-1)*12$$

Google Earth® KML File Generation

C-Master will produce for you a file (or files) containing your data properly formatted for display on Google Earth. You can use a boundary file (up to 20) to display and filter logs geographically, and you can display a wide array of data from the header information of the logs. All the logs and all the boundary files are available to create the appropriate KML (Keyhole Markup Language)¹² file.

You have 0 logs selected and 0 boundary files selected

```
1 = Select Boundary File
   Clear the Current Boundary File <== Click to stop filtering
2 = Show/Modify Boundary file parameters <== Click for visibility, highlighting, and color

3 = Select LOGS manually (by Q/St/Sc) <== Filtered by the CURRENT boundary file
4 = Select Logs using Catalog Search File <== Filtered by the CURRENT boundary file

5 = Choose Data Fields to display for LOGS
   Change scale factor for pushpins and text using this option
   Select default COLOR TABLE index (logs/boundaries). Leave at 0 if you
   want the default color (yellow): 0

6 = Filter ALL Current Log Selections by the Current Boundary file
7 = Save Current Log Selections as Catalog Search File
8 = Display/Edit Current Log Selections

10 = Create Boundary (Polygon) KML
11 = Create Logs (Point Data) KML
12 = Create LOGS and BOUNDARY KML

13 = Return to previous menu
14 = Clear all boundary selections
15 = Clear all LOG selections

EXCLUDE logs if inside the boundary? N
0 Boundary File:
ENTER OPTION BY NUMBER (1 to 15): 0
```

Boundary Filtering (Polygons) will be shown as “polygons”, while logs are displayed as “placemarks”. Both are in their own KML folders, so you can enable/disable the KML folders to display/hide the data easily. Descriptive information can be added to each of the boundary files so that you can place descriptive text with the region.

C-Master processes boundary files and log selections just like CCATALOG, CLOGPLT, and CEXPORT_CSV. If you select a boundary file, it will be added to an internal list of boundary files. Any logs selected **after** an individual boundary file is in effect will be filtered according to their coordinates. You can “clear” the current boundary file if you wish to have your logs selections to be

¹² KML files are a Google Earth extension of XML. The resulting file is editable, but it is strongly suggested that you do not do this unless you are familiar with XML in general and KML in particular.

unrestricted. You can also "EXCLUDE" logs within a boundary. You can also filter all current logs by a boundary by using Option 6.

You can also add comments to the boundary file selected. These comments will be available when you click on the boundary. 10 lines of text are available for you.

Enter Descriptive Data for the Boundary File

About

```
Select the COLOR TABLE index (1-255) to apply to this boundary
      Leave the value as 0 if you want the default color: 
Highlight: N=Do not change the color of the boundary by mouse movement: 
Visible: N=Do not show boundary initially when selecting the KML file: 

Enter descriptive data for this Boundary
File just entered. This data will be
shown as descriptive text, clickable in
Google Earth.
1:
2:
3:
4:
5:
6:
7:
8:
9:
10:
EXCLUDE logs if inside the boundary? 
```

You can select the various header data to be displayed with each log. Whatever you select will be applied to all the logs in the KML file. This includes the scale factor for the text as well as the pushpin size. Some experimentation with scaling may be needed. For example, if you select 10% for pins, they may not be visible. Also, text scaling at 25% may not be visible.

```
To enable a field for display, set its attribute to "Y" or "X" (use mouse)
To disable a field from display, set its display attribute to blank.
To clear ALL selections, CTRL-F9
State Plane will only be displayed if initial coordinate entry was in State Plane.

 1:Quadrangle (1)
 2:State (2)
 3:Scale (3)
 4:Log ID
 5:Project Code
6:Source (5)
7:Tract (6)
8:Drill Hole # (7)
9:Contributor (8)
10:Company Drill Hole (9)
11:UTM Coordinates
12:Latitude/Longitude
13:State Plane
14:State of Hole (17)
15:County (18)
16:Township (19)
17:Hole Elevation (21)
18:Hole Angle (21)
19:Elevation Method (22)
20:Logger Name (23)
21:Year Drilled (24)
22:Hole Depth (25)
23:Upper Bed (27)
24:Lower Bed (28)
 25:Original File Name
 26:KYGS filename

Current TEXT Scaling=100.%
Enter scale factor (10-1000%) for Text (0=no change): 

Current PUSHPIN Scaling=100.%
Enter scale factor (10-1000%) for Pins (0=no change): 
```

If you select KYGS Filename, then the file associated with the log that contains the JPG log strip will be displayed within the placemark data/text. Stated another way, you can process your logs into a

JPG image log strip (including using intervals) using the one log per page option and “link” that image with your KML file for display.

Once your boundaries and/or logs have been selected, you can choose to generate, separately, the boundary file (polygon) and logs file (placemarks), or have these files combined.

Once the file has been created, you can double click on the filename to start Google Earth and see your data displayed. The default for boundary files (polygons) is “Clamped to ground”. The placemark pins are also clamped to ground. The default color for the polygon is set to YELLOW and is 25% opacity. The default for placemark pushpins (log locations) is set to yellow.

Data are displayed in a “layered” fashion. This means that the data will be displayed as if they are stacked. The first polygon encountered will be on the bottom of this stack. If multiple polygons are on top of each other, the combined opacity may eventually mean that the ground will disappear.

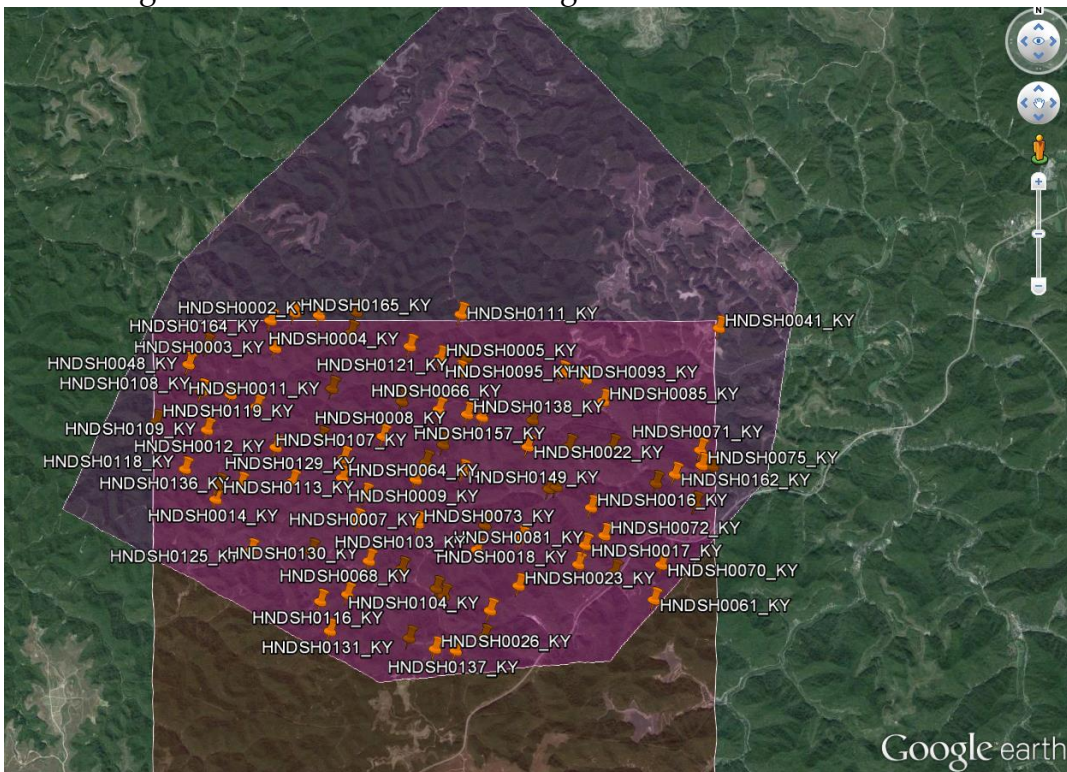
The sample below was produced by following these steps:

A Boundary file was created that defined the HANDSHOE quadrangle.

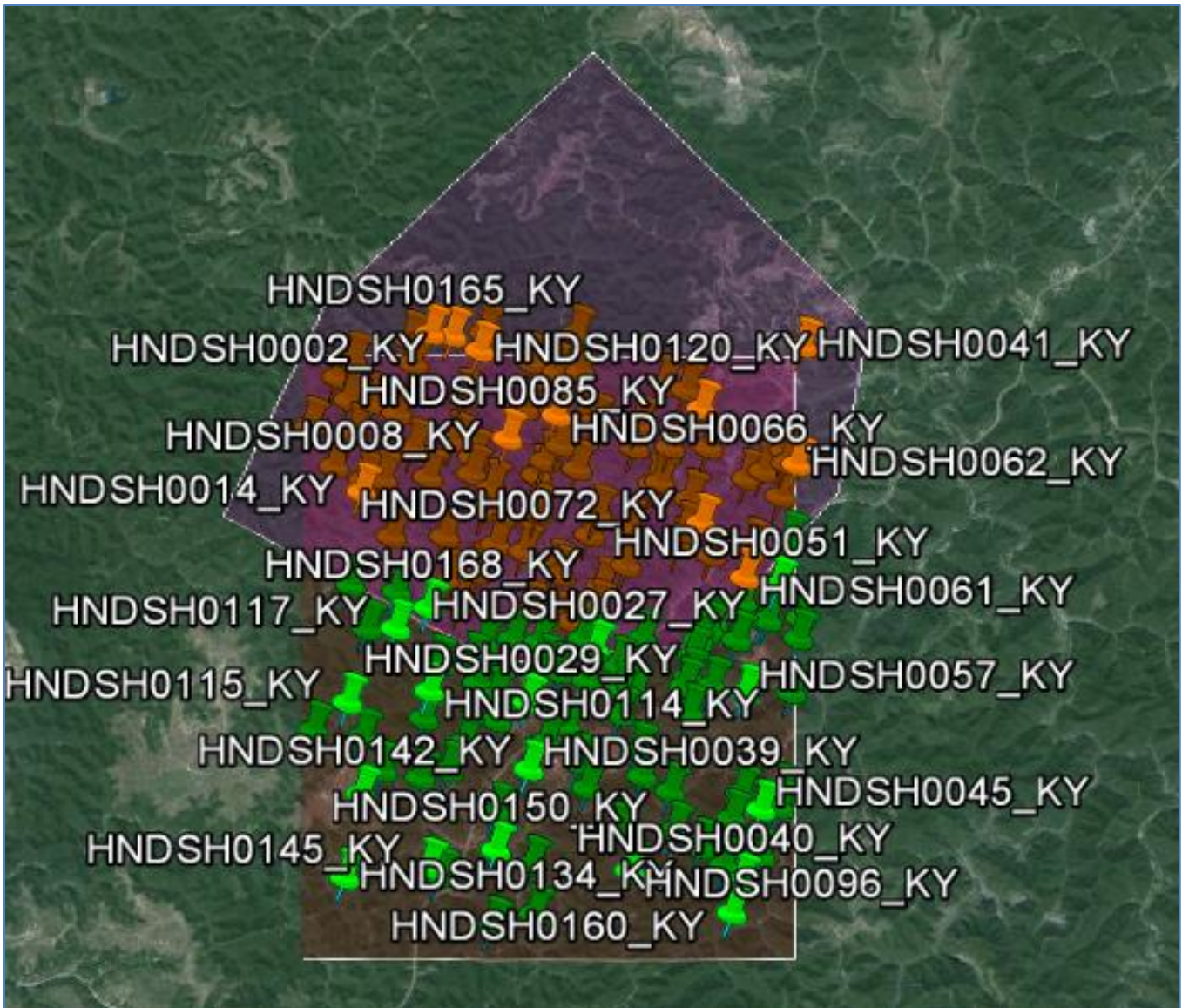
A Boundary file was created (arbitrarily drawn) that overlapped the HANDSHOE quadrangle map.

A Catalog Search file was created that contains all 168 logs in the HANDSHOE quadrangle.

The HANDSHOE boundary file was selected and given the target color index of 1 (red). The arbitrary boundary was then selected with the color index of 6 (pink). The Catalog Search file was loaded and the logs assigned the color index of 30 (pumpkin). With the arbitrarily drawn boundary last loaded, the 168 logs were filtered down to 83 logs.



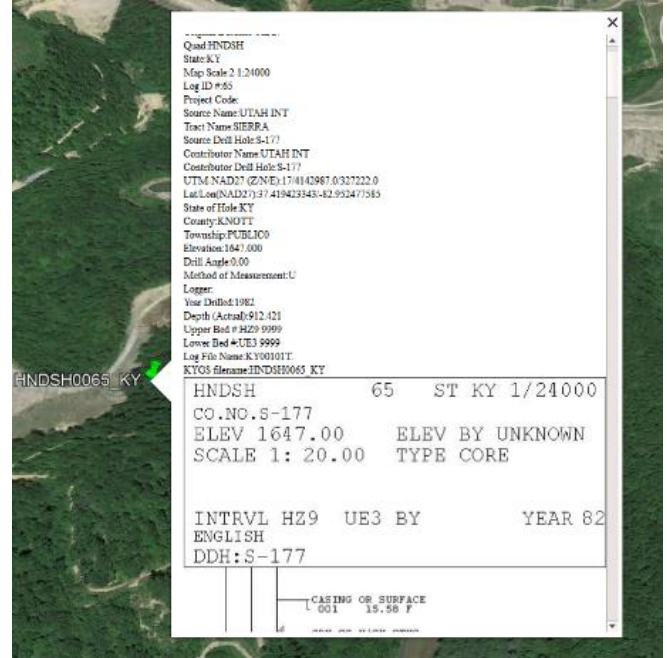
The log selection was cleared in preparation for this next step. The Catalog Search file was processed again, only this time filtering those logs NOT in the arbitrary area and assigning those logs the color index 4 (green). A KML file of only these OUTSIDE THE BOUNDARY logs was created and opened over the original KML file. So, we have two placemark folders and two polygons shown, overlaid.



Zooming in, we can get the detailed description and location data, and see the log location relative to its neighbors. The example below displays all the fields; you can choose to display less data that to meet your needs.

What this example represents is the application of boundary filters and Catalog Search files to produce a visual that tells your story. For example, let's assume you have a client whose properties you manage. You can define the boundary file for one or more properties. Using the Catalog function, create a Catalog Search file that contains all the logs for that client. Load a boundary file and process the logs list. Repeat this, loading the boundary file and logs list for the other properties. You have just created a Google Earth compatible map of all the properties and the logs they bound.

The greatest difficulty is (usually) the establishment of the boundary files. Sometimes, the coordinates of a property can be found in the GIS records provided by some counties. While not as accurate as a surveyor might be able to provide, they may be accurate enough for your purposes.



Program Details – More Information on Program Features

Definitions and Terms Used

The primary data used in C-Master are lithology logs (litho logs) consisting mainly of records of downhole lithology descriptions. A litho log is divided into two sections, the header and the downhole lithologies. The header of the log contains identifiable information about the physical location, ownership, and general characteristics of the lithologies that follow. The lithologies are the individual, sequential rock types that compose the record of the borehole. These lithologies have data entry format and recording types, as well as seam/bed code information, analysis information, and comments. For each lithology, a numeric code (“Ferm code”) is assigned that defines a standard rock type. It is through these Ferm codes that log strips are produced. Users may enter the Ferm code directly or may enter non-standard English phrases that the software can translate through a dictionary function.

The following words and phrases are used throughout the documentation and in C-Master prompts and descriptions. Included here are other versions of a term that you may use so that we can have a common understanding.

Term(s)	Usage
“Log” “Litho Log” “Core Log” “Driller’s Log”	The set of information that defines the geographical position of a borehole, the ownership of that data, the source of the original data (if different from ownership), and the rock layers identified in that borehole. As part of the log, the kinds of measurements and units of measure can be specified. The rock layers are initially identified with a numeric Code, or with descriptive phrases. Processes are applied to assign a numeric Code to each rock layer.
“Drill Hole” “Borehole”	The physical hole that is core or rotary drilled and logged.
“Code” “Ferm Code” “Litho Code”	The 3- to 4-digit numeric code (with optional qualifier) that is associated with a specific type of rock. The codes used by C-Master are all Ferm Codes, developed by Dr. John Ferm (et. al.) and used extensively in the US. The codes are the basis for all processing functions and for creating log strips.
“Phrase” “English”	<p>The descriptive phrase associated with a Code. There are two “standard” phrase sets, one for the Eastern US, one for the Western. A phrase might be a common usage term for a region, or specific to the driller/logger performing the initial work. Users can create their own standard phrase list.</p> <p>A non-standard phrase is one that may be unique to a driller, or a locally used term, and appears as raw data in logs that are being entered. C-Master can translate these data, but a sequence of building phrase files (dictionary) must be performed.</p>

Term(s)	Usage
"Coding Region"	A numeric designator (not zero) used to identify a specific phrase file containing standard and non-standard phrases for a specific geographic area.
"Coding Process" "Autocoding"	The process of matching the entered codes or phrases used in describing the lithologies to the corresponding standard phrase or code. The data only need be entered in one form, code or phrase. C-Master will perform the matching process for you. Coding can also apply driller/user specific phrases to lithologies to retrieve the code match.
"Bedcode" "Bedname"	A 1- to 4-character alpha-numeric abbreviation used to identify correlated horizons within in logs. The bedcode of the upper-most (topmost) and lower-most (bottommost) horizons are entered in the log header to facilitate searching for logs containing a specified interval.
"Bed Number" "Bednumber"	A numeric designation for a bed code that indicates the vertical sequence and correlatives for bedcodes. Bednumbers are assigned with the lower number toward the top of the hole, and higher numbers as you descend. C-Master provides multiple sets of pre-defined bedcodes and bednumbers for the Appalachian coal fields.
Seamtag	A Bedcode followed by 1- to 4-digit alpha-numeric code used to tag the upper and lower boundary of a correlated horizon in the downhole portion of logs. A seamtag is always specified as a doublet separate by a space, a bedcode followed by a qualifier (i.e. HZA 5 or SPD B1).
"Bed Region"	A 1- to 4-character region name used to specify a particular set of Bedcode/Bednumber combinations. There are 4 default bed regions and bedcodes supplied as part of the C-Master software package.
"Reference" "Reference File"	Standard lookup lists, usually stored in a C-Master file, containing information used for pick lists and/or area of interest of the user. Categories include Source/Contributor, Tracts, Bedcode, and Phrases.
Import	The act of accepting C-Master formatted and compatible logs from a different system.
"CSV Export"	The act of reformatting C-Master data into a form that is compatible with the Microsoft Excel ® CSV data format for use by another data system.
"LOGPLOT" "CLOGPLT" "Strip Log" "Log Strip"	Production of a graphical representation of a lithology log using the Ferm code as the key for the graphic. The graphic output can be directed to a compatible printer, PDF, AutoCAD, or image (BMP, JPG) format for later use. The CLOGPLT program allows the user to select logs and specify parameters. The LOGPLOT program produces the graphic log strips
"Quad Catalog"	The list of quadrangle names with the associated State code and map scale used. The contents of this file are used to assign the name of the text file used for storing a litho log. Quadrangles are the primary means of organizing boreholes in the database.

Term(s)	Usage
"Master Catalog"	A collection of specific header data associated with each litho log, the name of the file containing the log, and some internal "housekeeping" information. The master catalog functions as an index to all logs in the system for searching purposes.
"Project" "Project Files" "Sub-Project" "Sub-Project Files"	A Project is a collection of logs and descriptive data used for a specific data analysis activity. The logs can be original logs, or they can be copied from an original log, allowing editing of the data without compromising the original log. The Project and Sub-Project files contain lists of selection parameters and log descriptions. These files are used to collect and maintain information on a Project, extract parameters from sets of logs, and provide specified intervals to LOGPLOT for strip log creation.
Elevations Depths	The elevation (or depth) of a lithology is normally specified as the bottom of the lithology. For example, if the top of hole elevation is 1000 feet, and the first lithology is 10 feet thick, then the depth and elevation for the first lithology are shown as 10 and 990, respectively. If a depth or elevation is referenced to the top of the lithology (i.e. within processed data), it will be so indicated.
Coordinates Datums	In past versions of C-Master, all coordinates were assumed to be entered and displayed/used as NAD27. Starting in 2017, NAD83 ¹³ (WGS84) is supported for input and output.
"Cumulative Depth"	The sum of all the lithology thicknesses starting at the surface and extending to the base of a given lithology. The cumulative depth of the last lithology in the log is expected to be nearly equal to the depth reported by the driller.
Intervals	A sequential subset of a log's lithologies. An interval can be defined by absolute footages (50' to 100'), absolute elevations, or relative to one or more tagged horizons. Intervals are used for strip log production and data extraction.

¹³ C-Master is not a GIS program. As such, the ability to deal with coordinate transformations (NAD27 <-> NAD83) is (currently) limited to the continental US, AK, HI, and some territories. In other regions of the world, entry of coordinates marked as NAD83 is assumed to be WGS84; those marked as NAD27 are Clarke 1866 spheroid.

C-Master Specific
Term(s)

Usage

<p>“Flagged Items”</p>	<p>Data items in the Header of a log that have a problem. Examples might include a contributor that doesn’t exist in the Source/Contributor Reference file, a tract that does not exist in the Tract Reference file, a coordinate that did not convert properly, missing data (defaulted to zero), etc.</p>
<p>“Report” “Listing File”</p>	<p>The output from C-Master that provides the user formatted output ready for printing.</p>
<p>“Direct Image” “Image File”</p>	<p>Log strips created in a format compatible with photo editing software and other utilities. Formats supported directly are JPG and BMP.</p>
<p>“GS Name”</p>	<p>Naming convention used to name the file outputs of LOGPLOT and create a unique filename for exported log data. For 1:24000 scale, the name consists of the Quadrangle name, a 4-digit LOG ID number, and the State of the quadrangle (i.e. HNDSH0008_KY). For standard USGS map scales, the digit is included (i.e. HNDSH0008_KY_6), but if the map scale is non-standard, the map scale is also appended (i.e. HNDSH0008_KY_9(1234567)). If the log is a project log, the project code is appended to the end (i.e. HNDSH0008_KY_9(1234567)_AAA).</p>
<p>“Catalog Search File”</p>	<p>This is a text file containing the definitions of a subset of logs that can be used by various functions within C-Master. This file can be used to speed selection of logs. It can be created through the Catalog Search function and by the LOGPLOT log selection function.</p>

Reference Files – Maintenance and Creation

As discussed earlier, C-Master enforces a somewhat strict adherence to entering some Reference data prior to its usage. This was originally in place to force the supervising geologist to identify the location data (named location and coordinates¹⁴) and the ownership data (source, contributor, etc.) to prevent duplication of data due to typing errors. While that kind of duplication can still occur, the C-Master structure will help prevent duplicated data by ensuring that data are entered or available from managed sources. These sources are the Reference Files and Catalogs.

The Quad Catalog contains a list of quad/state/scale combinations that defined the USGS quadrangle sheet that contains the borehole¹⁵. The Master Catalog then contains a list of all the holes entered/created using the Quad Catalog as the common source of reference. The use of USGS quadrangles for cataloging data is an artifact of how the holes were manually georeferenced prior to modern GPS. You can modify this storage design by using designators of your own choosing, but the three fields (Quad, State, Scale) must have values entered and be a unique combination.

Reference files contain data that are critical to smooth operations within C-Master. Among the functions performed by Reference Files are the identification of a borehole or property on which the hole resides, the source of and/or ownership of the borehole data, the identifiable coal beds or the region, and the phrases and expressions that are identified as specific lithology codes. These Reference files are the underpinning of the system and should be managed wisely. Each type of file will be discussed, and how to manage the data for each file explained¹⁶.

Source/Contributor Reference File

This file contains the names and types of the sources of the data you are working with, and the name of the contributor who supplied the log to you. We say types, because in the academic or governmental world, some of these data may be records that are decades old or were obtained from a published record.

Each named source is assigned a reference number (the choice is up to you). You can have up to 999 unique reference numbers. More than one source name can share the same reference number, if there is a relationship between the two companies that entails shared ownership of data, such as divisions

¹⁴ Coordinates may be invalid, and yet still yield a valid conversion result. If, for example, the State Plane to UTM coordinate conversion does not indicate a coordinate error, the result is assumed to be correct. So, be careful with coordinate entry.

¹⁵ There are other variations in the quadrangle data that might be useful for you. Refer to **Appendix I: Alternatives to Quadrangle Names** for more information.

¹⁶ To the greatest extent possible, all editing of Reference files takes place in-memory within C-Master without changing the Reference file itself. For many Reference files, you have an “Abandon” option to throw away all the edits made since the last save. Just in case things go wrong!

and their parent company. It's helpful, though, to enter the source company given on the original document to reduce the chances of duplicate log entry. Establishing relationships between companies through the reference number is useful for searching for data of all those companies using one of their names.

To enter Source/Contributor information, use the CSRCBLD (Option 3) from the System Support menu.

```

There are a total of      0 SOURCES in memory

1 = Add Source/Contributor Info
2 = Print - Sorted by ID #
3 = Print - Sorted by Name
4 = Save Any Changes and Return to Maintenance Menu
5 = Abandon Any Source/Contributor Changes
ENTER OPTION BY NUMBER (1 to 5): 0
    
```

You can input new source information, or you may print the contents of the file. If an editing session goes wrong, you can abandon all the edits performed in this editing session. Choose the "Easy Edit"

option to display a pop-up dialog box that combines all functions in one tool (described at the end of this section). You can add to, delete from, or update the existing entries using this tool.

You can print the contents of the file, sorting the results by either the name or the ID number. The ID number sort is especially useful, as all entries assigned the same number will appear together, such as different companies who have joined/merged over the years. Sorting by name will allow you to verify that similar names (perhaps alternate spellings of a company name) are assigned the same ID number.

Using the Easy Edit Dialog

The Easy Edit button on the main source/reference screen is a new, enhanced method of managing your sources. From a single dialog, you can view existing entries, edit or delete records, and add new names. (Follow this by a step-by-step description of the tools functions.)

You can sometimes shorten the data entry process by clicking on the WHITE link "Choose Reference". This will display a dialog box and pull-down lists from which you can make selections. The lists are selected by the source type (top selection list), and the data entries are displayed in alphabetical order in the lower box, along with their ID number. You can

sort by any available column by clicking on the column to give an ascending sort, then click again for a descending sort. Click the item you wish to use and then click "Apply" to fill in data.

Clicking on “New/Edit” will show a similar dialog from which you can select an existing entry, modify the text to reflect the new source, and save the new entry. This makes it quite easy to select a Company and change its name (perhaps slightly, to accommodate a difference in spelling) and assign it the same number.

For both dialogs, the default button is the “Cancel/Done” button.

If you have made a mistake and added information in error, you can either edit that information out (delete it) here or select Option 5 to abandon any edits. You cannot change an assigned ID number. You must first delete the entry, then add it back with the proper ID number.

Although the Source/Reference file is a text file, it is not recommended to edit information in the file with a text editor.

Old Entry/Edit Method

```

CSRCBLD - ENTER NEW SOURCE

THERE ARE      1 REFERENCE RECORDS
Enter Source Type (5=EXIT):
5. ENTER SOURCE TYPE (1,2,3 OR 4): 1 Choose REFERENCE
5.1 UNPUB RECORD. COMP OR AGENCY NAME: CJD SOFTWARE
5.2 UNPUBLISHED PUBLIC AGENCY RECORD
   U.S. OR POSTAL CODE: CO   SOURCE ABBREVIATION: RTGH
5.3 SERIAL PUBLICATION.
   PUB OR ORG: COAL THROUGH YR   TYPE OF REPORT: MAGAZINE
   VOLUME: 1   PAGE: 125   MON: 10   YEAR: 1923
5.4 BOOK:
   TITLE: DRILLING IN ROCKIES   AUTHORS NAME: HORGER   YEAR: 2015   PAGE: 123

```

Select option 1 to add a new source. Enter the type of record (1-4) or enter a 5 to quit. After you have entered the type, the appropriate fields will open to you for data entry. Enter your data, then press enter. You can use the “Choose Reference”

quick-fill to pre-load information into the fields using an existing entry, then change the data as required to make it unique. This can be useful when data may have been typed incorrectly but the actual Source of the data is unambiguous.

```

CSRCBLD - ENTER NEW SOURCE

5.1 UNPUB RECORD. COMP OR AGENCY NAME:
MY ABC COMPANY

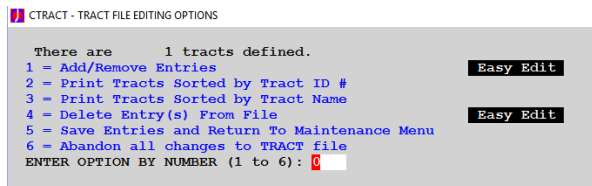
Enter ID Number (0=MISTAKE): 0

```

You will be asked to verify the basic information and assign an ID number as that verification. Enter a zero and click DONE to ignore the entry and return to the previous menu.

Tract Names

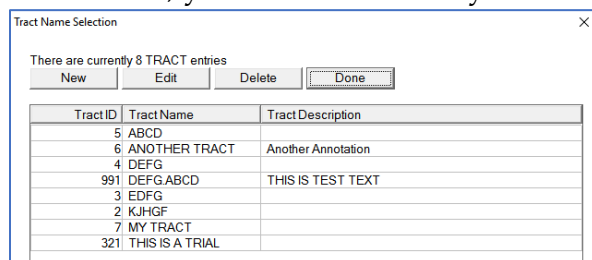
Similarly, the Tract Name file assigns a numeric code to a reference item, like a parcel of land or operating division. Again, the name might change over time, but the numeric code establishes that this parcel is a unique entity that may have had many names. Assigning a tract name to a set of boreholes allows you to easily search for holes associated with that entity but is not a required piece of information. It can have alternate uses, such as grouping holes by a drilling series or exploration program.



To enter Tract information, use the CTRACT (Option 5) from the System Support menu. You can add, print, and delete tract information. If an editing session goes wrong, you can abandon all the edits performed in this editing session.

Using the Easy Edit dialog

The Easy Edit button on the main Tract screen is a new, enhanced method of managing your tract names. From a single dialog, you can view existing entries, edit or delete records, and add new names. By clicking on "Easy Edit" in the main menu, you can use a dialog and enter/edit/delete data more quickly. Once you have performed all of your edits and select "Done" to return to the CTRACT main menu, you will be asked if you wish to save the changes you have made. You can choose to



save the changes now, or select Option 5 from the CTRACT menu to save the changes once you have completed your work.

Old Editing Method

CTRACT - ADD ITEMS TO TRACT FILE

TRACT Name To Add: NEW TRACT <= Blank to return to TRACT menu
Tract Description: TEMPORARY DEFINITION FOR ILLUSTRATION
Enter ID #: 35 (0 To Try Again)

Adding a tract, you specify the tract name and the ID number, if the ID is zero, or the name is blank, you'll be taken back to the main Tract menu. Otherwise, the Tract file is searched to detect duplicate names and the new entry is added if it is unique. A tract description can provide additional information for description of the property.

```

2 Tracts Defined
Enter Tract Name To Delete:
NEW TRACT  <= Blank to return to TRACT menu
    
```

To delete a tract, just enter the name of the tract. The file will be searched, and the entry removed.

At the end, select Option 5 to save all the edits and rebuild the Tract file. Option 6 allows you to abandon all editing since the last Save.

Bed Codes and Seamtags

The Bed Code file defines named stratigraphic horizons (usually a coal or marine zone) using a three-character code, its stratigraphic position relative to other horizons (a number), and the geologic region in which the name is recognized. Bedcodes are used to assign the stratigraphic range of beds occurring in individual logs and to search for logs containing a horizon of interest. For a detailed explanation, refer to **Bed Code Tagging**, where these terms are explained, and examples of use are shown.

The stratigraphic position number is important. Beds that are stratigraphically higher are given smaller numbers, while beds that are stratigraphically lower are given higher numbers. The range of numbers used and the gaps between numbers are user defined.

Sometimes, a bed may be known by more than one name. In these cases, the bed number assigned to each would be identical to indicate stratigraphic equivalence. Catalog searches for a specific name are conducted by its numeric code, so all correlative beds are found. Much work has already been accomplished to provide bed codes and position data for certain sedimentary basins. These data are provided to you as part of the software installation. You can, however, add to these definitions or create your own. For more information about bed codes and importing, please refer to the section **Importing Logs (CIMPORT for C-Master Formatted Lithology Logs)**.

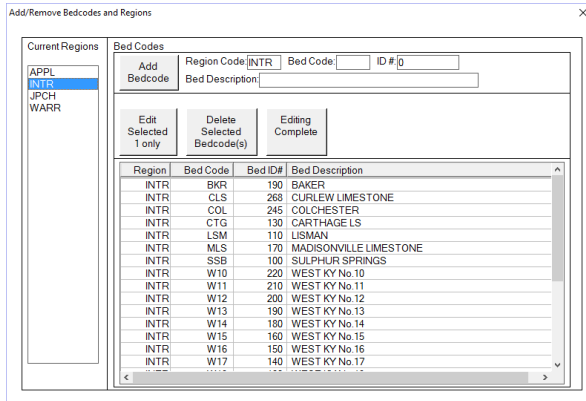
To enter Bed Code information, use the CBED program (Option 4) from the System Support menu.

```

1 = Add Bedcodes To The File           <= Easy Edit
2 = Print Bedcodes Numerically   By Region, by Bed ID
3 = Print Bedcodes Alphabetically By Region, by Bed Code
4 = Delete Bedcode(s)           <= Easy Edit
5 = Save Bedcodes and Return To Maintenance Menu
6 = Abandon Bedcode changes and Exit to Maintenance Menu
ENTER OPTION BY NUMBER (1 to 6): 0
    
```

You can add, print, or delete bedcodes from the Bed Code file. You also have the choice of abandoning all edits since the last save.

Using the Easy Edit dialog

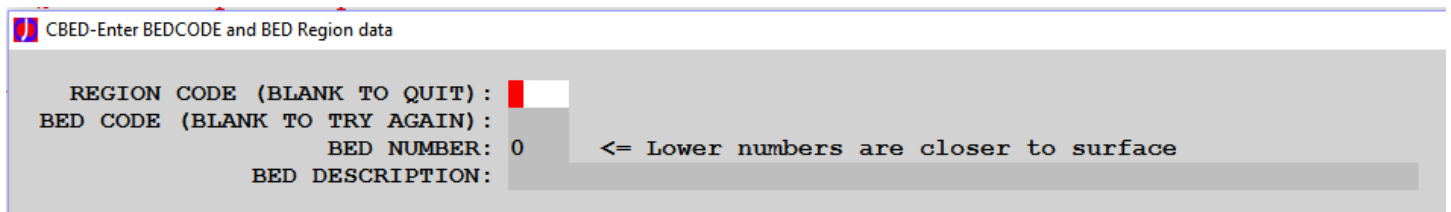


If you choose to use the “Easy Edit” option, you will be presented with a dialog box (such as this). The data has already been filled in for the 4 bed coding regions for which we have existing data¹⁷. To add a bed, just type the data in the boxes next to the “Add Bedcode” button. Just keep adding until you are done. The bed code list will be updated to reflect your additions. Note that you have additional editing options and can delete selected bed codes if you so choose.

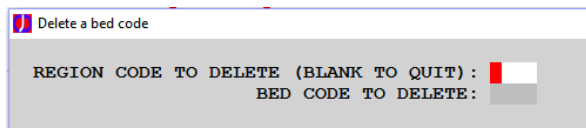
If you have data that is unique to your needs, or perhaps to the needs of a customer, you can create your own Region by entering a new name and adding a bed code. The only requirement is that the regional name and bed code should be alpha-numeric (no spaces) and be assigned an ID number where the lower numbers are closer to the surface.

Old Editing Method

Or, you can add the bedcode manually, using the old-style data entry.



To add a bed code, you need to know both the region into which it is to be added, and the stratigraphic position (bed number) that will be assigned. The process by which you go about assigning these data is beyond the scope of this document. Four regions have been preset in your data, or you may desire to create an entire data set anew.



To delete a bed, you’ll supply the region code and the bed name.

Printing options (Option 2 or 3) are sorted by the bed number or the name of the bed. The bed number sort will give you information on stratigraphic position assigned to the bed name, while the

¹⁷ If you have your own bed code set and wish to have it included for others to use, you can send it as an attachment in an e-mail to CJD Software and it will be incorporated. CJD Software reserves the right to include or exclude the data and alter its default Bed Code Region to meet internal criteria.

bed name sort will allow you correct errors or add a new name uniquely. Tract file Maintenance will not permit a duplicated name within a region.

Select Option 5 to save the edits, or Option 6 to abandon all the edits since the last save. The “Easy Edit” option can also save the bed codes back to the bed codes master file. When you click the “Edit Complete” after you have made changes, the program will ask if you wish to save the data as it currently exists to the bed code file. If you select Option 6, and changes have been made, you will be asked if you really wish to abandon the edits or if you wish to save the file.

Phrase and Lithology Codes

This entire C-Master system is built around the Ferm Lithology Coding System, a system of numeric codes that translate to standard English phrases used in different coal basins. This system is used in a number of core logging manuals that were prepared for certain sedimentary basins. An example is **Cored Rocks of the Southern Appalachian Coal Fields**.

<http://www.uky.edu/KGS/pubs/SappCoreBook/SAPP.html>

C-Master accommodates this system and variations in the phrases assigned to a code in multiple ways.

First, it was recognized early on that the Eastern and Western states have different English phrases for the same rock types. This system uses the numeric code to represent the same rock type in all areas and allows for a standard local rock description to be assigned to it. In addition, many times a core logger or driller will provide the core description, but only use English phrases. For this latter case, the geologist must be able to assign a standard code to the phrases to produce a strip log.

C-Master handles all these cases by creating a Phrase Dictionary from multiple, individual source files. The source files associate a numeric code with both standard and non-standard English phrases (or any other language). By specifying the region number (user defined, 1 to “n”) the phrases and codes are grouped in the dictionary. After a log has been entered, the dictionary is used to assign standard phrases to entered codes or to assign codes to entered non-standard phrases. This significantly reduces the time required to manually code each log. The new version of C-Master has added features that significantly streamline the management of phrase file data throughout the coding process.

To manage Phrase information, use the CPHRASE (Option 1) from the System Support menu.

The Phrase File consists of records that have been added in a sequence, and for specific coding regions. The coding region is a numeric code assigned to a set of phrases that are unique to a specific geographic region. Typically, the Eastern and Western U.S. lithology codes and phrases are assigned numbers 1 and 2, respectively. However, you might have many driller’s logs that use totally colloquial names of rock types. If you can make the assignment of a Ferm code to those names, then

you have a new phrase file, and should assign it a special number. That special number will be your driller-unique phrase file name.

CPHRASE - PHRASE FILE MAINTENANCE

```
Phrase Program Options Are:
1 = Initialize The Phrase File
2 = Add Phrases To File
3 = Return To Previous Menu (MAINTENANCE)
ENTER OPTION BY NUMBER (1 to 3): 0
```

There is no print or abandon option available for phrase file maintenance. A log file is kept (see below) that documents what you have done with the Phrase file so that you can re-create it, if needed. One can only **Initialize** the file (clears out all existing data) and **Add** phrases. It is in the adding of the phrases that you'll need to understand how the coding process works.

When one adds phrases to the Master Phrase File, the additions can be "standard" phrases or "non-standard" phrases. Standard phrases are added to the file twice; the first addition is to add the numeric code, and the second is to add the English phrase associated with that code. Non-Standard phrases are only added as English phrases. Here's how they differ in practice.

Most often, the numeric code for a given lithology is already known. In the process of preparing a log for entry, the Ferm codes are applied as raw data. Sometimes, the English phrase is known, but not the Ferm code, so the phrase is added as raw data. The Autocoding process will take either the code or the phrase and attempt to find these data in the Master Phrase file, then "fill in" the missing data (either English phrase or code) to complete the process. Sometimes, however, a set of non-standard phrases may be needed to apply to a log or set of logs to accomplish the assignment of the Ferm code. So, the term "non-standard phrases" is introduced.

These English phrases have an assigned numeric code but are added solely by their English phrase content. This prevents a duplication of the numeric Ferm code in the phrase file but allows the linking of the phrase to the code for purposes of autocoding. There should be only one "Standard" phrase set for any given region code, but there can be many non-standard phrases assigned to a single region code, depending on the nature of the input data. For a given log, only one region code can be applied.

CPHRASE - PHRASE FILE MAINTENANCE

```
Phrase Program Options Are:
1 = Initialize The Phrase File
2 = Add Phrases To File
3 = Return To Previous Menu (MAINTENANCE)
ENTER OPTION BY NUMBER (1 to 3): 0
```

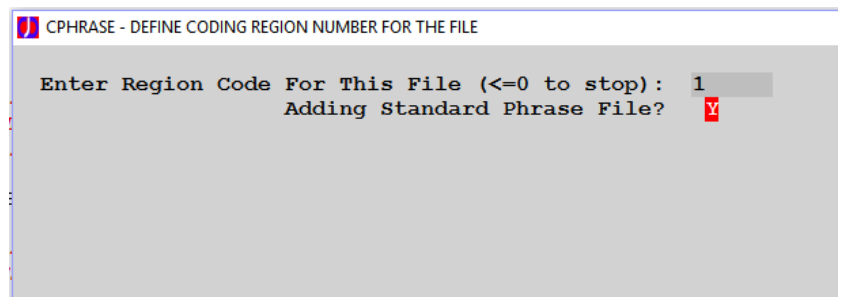
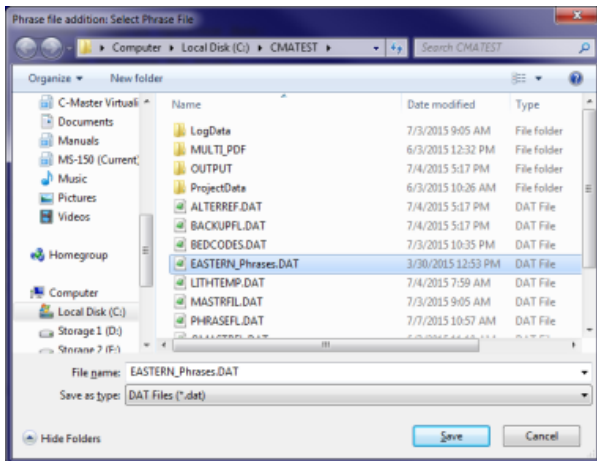
C-Master keeps a log of all the operations that have been performed on the Master Phrase file in a file named **phrasefile_logfile.txt** kept in the default folder. An example is shown below, and it details all the operations that occurred to the Master Phrase file. This will assist in rebuilding the Master Phrase file should you find it convenient or necessary to do so.

The log file will show the date/time and operation(s) performed.

```
Tuesday, 7 July 2015 11:01:01 Initialized Phrase File=.\PHRASEFL.DAT
Tuesday, 7 July 2015 11:07:23 Adding phrases to .\PHRASEFL.DAT. Coding Region= 1.
Standard first=T Filename=C:\CMATEST\EASTERN_Phrases.DAT
Tuesday, 7 July 2015 11:07:23 Phrase file:.\PHRASEFL.DAT. Added 362 phrases and/or
codes.
```

The main menu for Phrase File maintenance is simple. Initialize will clear the Master Phrase file; Add will prompt for a file name to add. The size of the Phrase File is set in the CONFIG file (default: 3853 entries max). This limit is the maximum number of phrases and/or codes added to the Master Phrase file for all coding regions. At 362 valid codes, you could add up to **10** different standard phrase files before the file would be full. If it does fill, you must change the CONFIG file to apply a new maximum size (max=32760) and rebuild the Master Phrase file from scratch, starting with the **Initialize** (this is where the Phrase file maintenance log file comes in to play to recreate the file with a larger size).

Adding a phrase file will prompt you for the name of the source file of the codes/phrases to be added. You will then be asked for the Region Code for which this file is being added. If you specify zero or a negative number, you will be returned to the menu selections. You will also be asked if this is a Standard phrase file. Answer "Y" to add both the codes and the phrases to the file. If it is not a standard file, enter "N" so only the phrases will be added.



You will get a prompt indicating the number of codes/phrase found and added to the file. If the file becomes full, you will receive an error.

The format of a file for phrases is very flexible, but there are a few rules. The numeric code must come first. You can have as many blanks as you like following the code, then the English phrase starts. There should be no extra spaces in the English phrase. As an example, a portion of the Eastern_phrases.DAT file looks like this. No leading zeroes are required on lithology codes.

```
0    NO ROCK RECOVERED
1    CASING OR SURFACE
2    OPEN SPACE
3    BURN
4    CORE LOST
5    OPEN MINE
10   DEFORMED ROCK
343.8    GRN SH W/SS STKS+BUR
```

Exceptions to the rules: Sometimes as data are entered in a lithology log, there are typographic errors made. If there are only one or two (or perhaps a dozen instances), then you may wish to correct them individually. If, however, you have many logs that contain perhaps hundreds or thousands of these typos, then you want to be able to code these “non-standard” phrases to fit the Ferm coding system. Similarly, a certain driller will have an expression for a lithology that is different from the standard.

If you have a LOT of these types of situations, it might be useful to create a master phrase file that is very specific to the data you have. Stated another way: while the standard phrases are fine, sometimes you need to accommodate data without having to spend a lot of time. This is where you can use multiple coding regions to your advantage. It does require some up-front work. You must re-create a master phrase file specific to your data. C-Master keeps a record of how the Phrase file has been built, to help you remember which region code you assigned to that phrase data. While the phrase file you create will be unique to your situation, you can maintain 100% control over the quality of the input data and assignments of phrases.

Lithology Data Entry and Input Formats

One of C-Master's key features is the flexibility of entering data, especially the lithology thickness or depth. Logs come in a variety of formats, including data entered in feet/inches/fractions, decimal feet, or meters. Sometimes data are recorded as depth down the hole, sometimes the individual lithology thickness, sometimes referenced to a core barrel. C-Master handles these possible formats of input data as well as any combination of them within the same log. The example of the data entry dialog shown below shows how easy it can be to enter and change data formats, even for an individual lithology entry. I've shown an existing lithology for this example.

CODED **Click to Code** **Click to Code and Continue**

Code/English

Thickness **Barrel**

Comment

Seam Tags

Analysis Tags

UserData 1

UserData 2

Litho Type Code English

Thickness Feet/In/Frac Dec. Feet Meters

Thickness Measures Individual Thickness Cumulative Thickness Core Barrel Thickness

Change Format(s)

Save Entered Data and Continue **Save Entered Data and End Entry** **Ignore Data and return to Menu**

Internally, C-Master holds the thickness data to an accuracy of 3 significant decimal places (0.001 feet).

Data for feet/inches/fraction (abbreviated FIF) is totally free format. Entering data as "10 0 1/2" yields the same as the decimal entry of 10.042 feet. The only rule is that if you have fractional inches, you must specify the inches as well. "10 1/2" is an error.

Some examples of the how this flexibility can be used are given below. Yes, these are a bit contrived, but it is likely that you have experienced one or more of these situations when logging data or using data logged by someone else.

Missed a lithology

You have been recording the cumulative thickness data for a core in decimal feet and discover after the fact that a layer of sandstone 4" thick was missed in the middle of a coal seam. Using the report data, you find that the bottom of the previous lithology as computed to be at a depth of 325.4 feet,

and the bottom of the coal seam was at 355.6 feet. The top of the sandstone was located 10.2 feet from the top of the coal seam.

Solution: You insert two lines of data before the original coal seam data. The first line is coded as coal and given a cumulative depth of 335.6 feet (the top of the sandstone layer). The next line is given an individual thickness of 4". The original line need not change because it is already entered as cumulative thickness and so its bottom of lithology depth is already correct.

The image shows two side-by-side screenshots of a data entry interface. The left screenshot is for a 'CODED' entry. It has a 'Code/English' field with '022' and a description 'COAL W/BONE LAYERS'. The 'Thickness' is '335.6' and 'Barrel' is '0'. Below are fields for 'Comment', 'Seam Tags', 'Analysis Tags', 'UserData 1', and 'UserData 2'. At the bottom, there are radio buttons for 'Litho Type' (Code, English) and 'Thickness Measures' (Feet/In/Frac, Dec. Feet, Meters, Individual Thickness, Cumulative Thickness, Core Barrel Thickness). A 'Change Format(s)' button is also present. The right screenshot is for a 'SANDSTONE' entry. The 'Code/English' field is empty, and the description is 'SANDSTONE'. The 'Thickness' is '0.40' and 'Barrel' is '0'. It has the same fields for 'Comment', 'Seam Tags', 'Analysis Tags', 'UserData 1', and 'UserData 2'. The 'Litho Type' radio buttons are 'Code' and 'English', and the 'Thickness Measures' radio buttons are 'Feet/In/Frac', 'Dec. Feet', 'Meters', 'Individual Thickness', 'Cumulative Thickness', and 'Core Barrel Thickness'. A 'Change Format(s)' button is also present.

Logging by multiple individuals

You are supervising a group of geologists that are each logging specific core barrels of data. Unbeknownst to you, the Canadian has chosen to use his metric tape measure, while each of your local geologists have chosen different English measures; one is logging to the nearest 1/16", while the other is using decimal footage.

Solution: When you begin data entry of the log, define the log to be in a combination of data entry formats, but in core barrel cumulative¹⁸ method of recording. Begin the data entry for each barrel by establishing the barrel number (1-n) and the input data format, then enter the data. When transitioning to the next barrel, set its barrel number and change its data entry format to the new type, and continue.

¹⁸ For core barrel cumulative, the data for each barrel must be entered sequentially; C-Master will not sort these data in barrel number order for you.

CONFIG File Commands

The CONFIG file (COALCNFG.TXT or equivalent) contains configuration commands to give you maximum control of the environment in which you'll run C-MASTER. This file is edited and maintained using a text editor (NotePad, for example)..

The configuration file is important; using it carefully, you can gain a great deal of flexibility in accessing and processing your data and sharing it (locally) within your group. You can, for example, create special configuration files that can be user-specific, like special Project/Sub-Project files. Or, you can create configurations that you can take on a USB-drive to a remote site.¹⁹

The following conventions are used to describe the commands:

filename name of a file, including a path, surrounded by quote marks (required if the name contains spaces)

pathname the full system file path that will point to a desired folder name (i.e. **C:\WINDOWS** is a path). If the pathname contains a space, it must be enclosed in quotes

UPPERCASE BOLD names are required in the context in which they are used.

All other lowercase descriptions indicate a data item that is user defined and is described below. Arguments surrounded by [] indicate an optional field. You can enter commands in either upper or lower case (except as noted below).

¹⁹ There are other commands that are not documented here. There are specialized commands for debug and testing of C-Master and for specialized configuration control. If you need them, they will be provided to you at the appropriate time.

These commands should appear in your configuration file at the top of the file to set the default folder and how reports are signaled and shown automatically (or not, as the case may be).

DEFAULT `pathname`

If present, this configuration command should be first. The command is executed immediately, and may affect all file/path commands that follow.

This redefines the default directory for C-Master. You will need to have this command present if you intend to load a configuration file dynamically (via a menu). It is a good idea to have this command in your configuration file to insure you are connected to the proper folder for your data operations.

PRINTPAUSE

This command will **enable** the pause message with the PDF report file name. The PDF report file name will also be recorded in the Status Window and the PDF report file will still be opened automatically. The default is not to pause at the creation of each PDF report. Not specifying this option is more efficient and allows “unattended” operations.

NOPRINTSPOOL

The default action is to open the PDF report for you. This option disables that feature. Instead, the name of the PDF file is available for you in the Status Window. On systems with limited display space, limited processor capacity, or on a tablet in the field, this option may be useful to you. The PDF outputs are placed in a specific folder (see **Special Folders in the Default Directory**).

The following commands control the coordinate conversion and datum selection options.

DATUM **datumname** **usedby**

Set the coordinate datum used for specific purposes (below) The datum names are NAD27, NAD83, and WGS84. The “**usedby**” field can be ALL, CATALOG, KML, LOGPLOT, or CATSEARCH. If CATALOG or CATSEARCH are specified, then when coordinates are output, they will be in the requested datum. As an example, your catalog is to be used by a firm that keeps its source materials in the NAD27 system, but you are entering coordinates in the NAD83 datum. You can set the default input datum to NAD83, while you set the CATALOG and CATSEARCH outputs in NAD27.

The defaults for coordinate display is:

- Initial Entry: NAD27
- Catalog Display and LOGPLOT: NAD27
- CATSEARCH file: NAD27
- KML Output: NAD27²⁰
- Log Strips: NAD27

In various programs, you can specify what you expect for either inputs or outputs.

When importing logs, the datum associated with the log is automatically used. For old logs (DOS days), the default datum is already NAD27.

Example: If you wish to use NAD83 for most functions, but wish your log strips to be in NAD27, the following configuration commands can be used:

```
DATUM NAD83 ALL            # set all inputs and outputs to NAD83  
DATUM NAD27 LOGPLOT      # for log strips, use NAD27
```

Use the “ALL” option first before setting the individual datum selections.

NADGRID LIST **datumshiftfile{,datumshiftfile,...}**

The list is a list of datum shift files that are applied to NAD27 data. Enclose the list in quotes if the shift file contains a space. The default list contains all the datum shift files for the continental US.

NADGRID **PATH** **pathname**

This is the file path to the location where the datum shift files can be found. The default value is the path to the executables.

²⁰ Google Earth uses WGS84. The displayed coordinates can be any desired datum (State Plane will always be as-entered).

INTERNATIONALFEET

This will force the State Plane coordinates in the NAD83 datum to be processed in International Feet, rather than the default of US Survey feet. This is also selectable on a per-log basis regardless of the default setting when NAD83 is the datum for State Plane.

The following commands control and modify the interactions between the user and the Main Menu screen, and Status Screen colors.

SCREEN COLOR[[*messagescale*] [[*mainscale*]]]

The option [*messagescale*] allows the user to change the size of the error, message, and pop-up message text that appear in dialog boxes. The default is 1.2. To make the messages larger, use 1.3, 1.4, 1.5, etc. This does not affect the size of text in the Status Window.

The option [*mainscale*] allows the user to adjust the size of the Menu Window. The default is 1.2. Sizing is not absolute, and several iterations of the sizing may be required to achieve your desired result (see FONT below). To make the Menu Window larger, use 1.3, 1.4, 1.5, etc.

If you wish to use the [*mainscale*] option, you must also specify the [*messagescale*] option.

This command can be used to enlarge the program window on very large monitors used in a training or presentation setting.

COLORTABLE *index* *rr,gg,bb* *rr,gg,bb*

Change the screen color definition *index* to the *text_color* and *background_color* as the indicated *rr,gg,bb* values. For *index*=0, you can only change the background color, but must also specify the text color. The colors are changeable in real-time by choosing "Show/Change Colors" on the Maintenance menu. Note that changing only some colors can render those elements difficult or impossible to read, if the color is similar to the background. For example, for a disabled field background, a value of 205 is almost indistinguishable from 210.

Show SYSTEM Menu Color Definitions

```

Color definitions - Listed by type
Use following syntax to put COLORTABLE definitions in you CONFIG file
Command: COLORTABLE nn r_text,g_text,b_text  r_back,g_back,b_back

Color name      nn  RGB for Text  RGB for Background
DEFAULT_COLOR   0  XXX XXX XXX   210 210 210   BACKGROUND
NOMINAL_BACKGROUND 1  0  0  0       210 210 210   Sample REGULAR STATIC TEXT
INPUT_FIELD     2  0  0  0       190 190 190   Sample INPUT FIELD IS ENABLED
DISPLAY_ERROR   3  0  0  0       190 205 0     Sample LINE COLOR FOR INPUT ERRORS
STATIC_BRIGHT   4  0  0  0       210 210 210   Sample HIGHLIGHTED FOR EMPHASIS
INPUT_BRIGHT    5  0  0  0       255 255 255   Sample HIGHLIGHTED FOR CURRENT FIELD
CURSOR_BLINK    6  255 255 255   255 0 0       Sample CURSOR COLOR IN INPUT FIELD
CLICKABLE_MENU  7  0  0  255     210 210 210   Sample CLICK TO EXECUTE MENU OPTION
AUTOFILL_SELECT 8  255 255 255   0 0 0         Sample CLICK ONCE TO EXECUTE SPECIAL
DISABLED_FIELD  9  170 170 170   210 210 210   Sample FIELD COLOR WHEN INPUT DISABLE

Press <ENTER> Key or Click DONE To Continue:
You can change any value to change the color (0-255)

Save Current Colors To File

Load Colors From File
  
```

FONT "xxxxxxx" [BOLD]

Change the default font for the Menu Screen from "Courier New" to the designated font "xxxxxxx". If the font name contains spaces, it must be surrounded by quotes. Upper/lower case matters, and the name must precisely match a font on your system. "Courier New" and "courier new" are not the

same! If you choose a proportional font, you may be surprised by what the screen shows. Some fonts are not scalable, so the *sizefactor* specified under the **SCREEN** option may not be applied and may cause an error to be displayed. The font you choose also may not be available as a **BOLD** font.

MENUCLICK nnn

You can change the number of mouse clicks required to select a menu item. This feature was added to facilitate the use of touch screens. Set to one (default), the menu item will immediately be selected.

YESNOCLICK nnn

You can change the number of mouse clicks required to select and toggle the yes/no selection. This feature was added to facilitate the use of touch screens. Set this to one (default), then the yes/no item will be selected and will toggle (Y to N, or, N to Y). If set to 2 (two clicks or a double-click) to select the item, then one click will perform the toggle after that.

ALWAYSONTOP

Make sure that the C-MASTER Menu Window is never overlaid by another window. This may not always be desirable, especially on small monitors or tablet devices.

SHOW MINIMIZE

Minimize the Status Window when this command is encountered in the CONFIG file. You can manually restore the window, or the window may be restored when certain errors occur that require you to look at the Status Window (see next command).

SHOW ERROR

Enable the option to have the Status Window restored (displayed) if previously minimized.

STATUSCOLOR n

Setting this option changes the color and font characteristics displayed in the Status Window for all pop-up format message and error messages. There are 9 possible options, and they can be displayed in the Status Window ("Show Configuration Files") so you can select the one you wish.

```
Config Command=STATUSCOLOR 1
Config Command=STATUSCOLOR 2
Config Command=STATUSCOLOR 3
Config Command=STATUSCOLOR 4
Config Command=STATUSCOLOR 5
Config Command=STATUSCOLOR 6
Config Command=STATUSCOLOR 7
Config Command=STATUSCOLOR 8
Config Command=STATUSCOLOR 9
```

Following commands will allow alternate filenames to be used for the specified reference files. These commands are provided for advanced C-Master users only.

BEDCODE *filename*

Specify the *filename* used for the BED CODE references, rather than using the default filename.

REFERENCE *filename*

Specify the *filename* used for the SOURCE/CONTRIBUTOR, rather than using the default filename.

TRACT *filename*

Specify the *filename* used for the TRACT references, rather than using the default filename.

MASTER *filename*

Specify the *filename* used for the MASTER CATALOG, rather than using the default filename.

PHRASES *filename*

Specify the *filename* used for the PHRASE FILE (used for auto coding of litho codes), rather than using the default filename.

PHRASEPATH *pathname*

The path for saving temporary phrase files and non-standard phrase text files.

QUAD *filename*

Specify the *filename* used for the QUADRANGLE MASTER CATALOG, rather than using the default filename.

TEMP *filename*

TEMPORARY *filename*

Specify the *filename* used for the TEMPORARY file(s), rather than using the default filename. Pointing this file to a local directory rather than a networked drive will improve performance.

PATH *pathname*

Specify the *pathname* of the folder containing your REFERENCE file(s) if a user specified file/path is not given. Default is the current directory. Use this command if your reference file names are not path names.

LOGPATH *pathname*

Specify the *pathname* leading to the LITHOLOGY LOGS. Default is the current directory.

PROJECTMASTER *filename*

Specify the *filename* used for the PROJECT MASTER CATALOG, rather than using the default filename²¹.

SUBPROJECTMASTER *filename*

Specify the *filename* used for the SUB-PROJECT MASTER CATALOG, rather than using the default filename.

PROJECTPATH *pathname*

Specify the *pathname* applied to the PROJECTDEF and PROJECTPARM template created files (below). The default is the current directory.

PROJECTDEF *template*

The first 1- to 10-characters of *template* are used to store the project definition data.

PROJECTPARM *template*

The first 1- to 10-characters of *template* is used to store the project parameter data.

²¹ Please note: When you build and maintain projects and sub-projects, changing the names of the files after you've created a project/sub-project is no longer an option. Some of the file names (from the templates) are built in to the raw data files.

The following commands allow the use of AutoCAD colors in the generation of log strips

AUTOCAD *index* *rr,gg,bb*

Change the color definition for *index* (1-255) as *rr,gg,bb* (0-255). *Index=0* will not be changed.

Currently, this does not actually change the color for generated AutoCAD log strips (LOGPLOT). It will change the colors used in PDF, BMP, or JPG log strips. Refer to **Using Background Colors** for more information and examples

These commands control the assignment of AutoCAD colors to lithology codes for log strips.

COLORCODE *CLEAR*

Reset all the default color assignments. This will assure no shading even if shading is requested. Issue this command first if you intend to reset all the default color assignments.

COLORCODE *litho_code* *index*

The *litho_code* can be a specific code (i.e. 543) or a wildcard match (i.e. 54* or 5?3). "*" or "?" are both allowable and define one-character position to be substituted with 0 through 9. The *index* is the AutoCad color code index to be assigned to this litho code (or range of codes). Also, for litho codes with an additional modifier (i.e. 563.5) the last digit can also be specified as a wildcard (i.e. 563.*).

The following commands control what log strip generation messages and actions will occur.

LOGPLOT PAUSE

Pause at the end of each file generation and wait for user to signal continuation. The default action is to continue, close the status window, and start the next log strip (if any). If you'd prefer to have your log strips generated without intervention, do not use this option. This option is most helpful if you are using a dot-matrix printer (setting the paper up correctly so as not to jam).

LOGPLOT SIZE_PAUSE

This option addresses a potential problem with log strips when an old command file is used to generate them.

If the size of the actual log strip is longer than the pre-determined size (when the original command file was built), then pause and give the user data that can be used to manually adjust the plot size. This is extremely important for PDF files, as the length of the PDF file cuts off all information after that pre-determined length. PDF log strips cannot be longer than 200 inches (Adobe-compatible PDF restriction). LOGPLOT restricts you to 190 inches. Note that LOGPLOT will also create (and add to) a file that records these exceedances so you can make minor tweaks/corrections to the parameters so that the data will fit. The default action is to record the exceedance and report this to you at the end of the session.

LOGPLOT SPOOL

Use the spool option if you do not have direct access to the dot-matrix printer or are using a compatible Windows system. You will need to provide a device driver interface to the printer to use spooling using a *printer_name* (see below).

LOGPLOTOPTIONS n{ n n ... n }

To speed your selection when producing log strips, you can pre-select the header and display options that you most commonly used by specifying this command.

The numbers correspond to the options that you'll see after device selection when producing log strips. Refer to **this section** for the number of the option(s) that you might wish to pre-set.

The following commands point to the printer drivers for log strip generation onto dot matrix printers.

You may have none or all these printers. These are not used when generation PDF, DXF, or direct image log strips²².

FXPRINTER printer_name

LQPRINTER printer_name

HPPRINTER printer_name

HP750 printer_name

While it is possible to command an LQ-style printer as if it is an FX-style printer, this is not advisable. The physical characteristics of the FX printer differ from the LQ printer, and, the log strips will NOT be produced at the appropriate scale.

²² The *printername* must not contain any special characters. It is recommended that you set the name of the printer to a short name. Refer to **Configuring Printers: Windows 2000, Windows XP and Windows 7**.

The following commands apply to log strip generation and files that are compatible with the PETRA program.

PETRA LICFOLDER *pathname*

The path to the location where the LIC files are stored. Can be the same as the image pathname.

Default is `.\PETRA_LIC`

PETRA IMAGEFOLDER *pathname*

The path to the location where the image files are stored. Can be the same as the image pathname.

Default is `.\PETRA_IMAGE`

PETRA FILETYPE *filetype*

The type of image file that will be produced (TIF, JPG, BMP, etc.). Default is **JPG**.

PETRA RESOLUTION *dddd*

Specify the resolution, in DPI, of the image to be imported into PETRA through an LIC file. Default is 100 DPI.

PETRA QUALITY *ddd*

The number indicates a quality parameter that can be used when converting to a JPG image. Default value is 50.

PETRA PDFCONVERT '*xxxxx.....xxxxx*'

Execute the command enclosed in quotes if producing a PETRA compatible image file (JPG, TIF, BMP) from a PDF output file using an external program. The command has parameters that can be substituted to "fill-in" values required by conversion programs. An example is shown below:

```
'''C:\Program Files (x86)\PDF2Image\pdf2img.exe'' -r %RESOLUTION% -q  
%QUALITY% %PDFFILE% %IMAGEFOLDER%'
```

- Note that the entire command is enclosed in single quotes. This is mandatory.
- The executable program is entirely enclosed in double quotes. Double quotes are what the Command Processor requires when an executable or filename contains spaces
- The parameters that can be substituted are enclosed by % marks (i.e. %QUALITY%).
- You place these parameters in the same place where you would have typed them if you were entering a command line. This allows you to have quite a complex command line.
- The following parameters are available:
 - %QUALITY%** - parameter used by JPG for image quality following compression (lossy)
 - %RESOLUTION%** - resolution in DPI of the final output (also use for other image files)
 - %PDFFILE%** - replaced by the name of the original PDF file
 - %IMAGEFOLDER%** - replaced by the expected folder and filename of the converted file

The following commands set the default page attributes for PDF log strips. These do not affect the reports that are generated as PDF's.

ADOBE COMPATIBLE

Sets the default values for the maximum width and length to be compatible with Adobe PDF products at 200 inches each. This is the default.

ADOBE MAX

Sets the default values for width and length to the maximum allowable PDF size of 22,000 inches.

ADOBE LENGTH xxx.xxx

ADOBE WIDTH xxx.xxx

Sets the length of width to the desired value. It is limited in the software to be no greater than 22000 inches.

Scout Ticket Processing

SCOUTTRANSLATION "*filename*"

Set the name of the file that contains formation abbreviations, formation formal names, and the Form code assigned to that formation. The format of the file can be found in the section **Scout Data Processing**.

Miscellaneous Configuration Commands

The following are miscellaneous commands that you might find useful.

AREAOFINTEREST *filename*

Provide a **boundary file** that defines the limits of your area or interest or work. When entering a log manually or importing a log, this boundary check is applied to tell you if the coordinate as supplied results in a coordinate that is inside this boundary. An example of use might be to limit data for a client to a specific geographic region. If the coordinates are outside this region, it will be flagged during initial entry.

CLASSICDUPLICATECHECK

The presence of this command will enforce the **old rules** for duplicate log checking when entering manually or importing logs. The old method uses the quadrangle name, state code, scale, source ID number and source drill hole (DDH). The new method uses only the source ID and source drill hole number.

KMLDATAOPTIONS n{n n n n}

This allows you to preset the KML Data Options (for KML file generation for Google Earth), replacing the standard (1 2 3 4 5 25 26).

METRIC

Default display of ANY thickness/depth/elevation data (other than the raw data in a lithology) will be in meters.

NODOUBLETSREQUIRED

This option will allow the use of a bed code alone to identify a bed. Used specifically for searching (Projects and Processing). Also affects Catalog Validation.

BOUNDARY *CREATE*

When processing Boundary files (specifically in CCATALOG, CLOGPLT and CEXPORT_CSV) allow the creation of a Latitude/Longitude file from the original boundary data, saved as *.latlon in the default data directory. This will occur only if the .latlon file does **not** already exist.

ATTRIBUTE RESET

Set the number of Attributes to zero. Use this command only if you intend to re-define the labels and descriptions of all attributes. This command must come first before all other ATTRIBUTE commands.

This will not affect any existing logs, nor any data already entered. Stated another way, whatever you set the attributes to now will be applied, retroactively, to logs already entered if the attributes in those old logs is already set to TRUE.

```
ATTRIBUTE nnn "Label" "Description"
```

These commands allow the user to control the meaning of the Log Attributes, a set of values that can be used to describe the log or data available for a log, depending upon the user requirements. While there are 10 "standard" settings, you have complete control of the meaning of these data. You can define up to 31 "attributes". Enclose the label and description in quotes. This command will accept both upper and lower case.

For example, the following will set the 21st attribute with a shortcut label of "WATER" with a description of "Flooded and no longer accessible":

```
ATTRIBUTE 21 "WATER" "Flooded and no longer accessible"
```

```
INCLUDE "filename"
```

You can "nest" configuration command files. One use for this might be in a multi-user situation, where people have their own Project file definitions. The common configuration commands could be included first, then followed by the user specific configuration options.

```
LOGGING    LEVEL nnn
```

Set the threshold of error and informative messages that you will see on the Status Screen. The logging levels are (in decreasing order, but increasing frequency):

- 9 = Show the message regardless.
- 4 = Detailed error message – FATAL or SEVERE
- 3 = Detailed error message – Informative (**default**)
- 2 = Trace of routines, options selected, etc.
- 1 = Trivial Tracing
- 0 = For debugging new code

```
LOGGING FILENAME "user-defined-name" [append]
```

Define your own filename for the detailed LOG file (the default name incorporates your log-in username; i.e. *msdude-CMaster.log*). You can have the file added to for each invocation of

C-Master by using the APPEND after the file name (the default is NOT to append). This will record a running record of all sessions²³. This can be helpful when you have a problem, since what you did previously may have bearing on the current problem. Otherwise, the file will be created new each time you start the program.

If you have had an error or unanticipated result and want help, save the log file to a different file name so you can send it and a description of the errors to CJD Software. The log file is saved to the Default path folder at the time the C-Master program was started.

If the logging file exceeds 50 megabytes when first opened, it will be deleted as the program starts, and logging will be started over.

This command overrides the logging files created specifically for CMASTER, CREPAIR, and LOGPLOT.

²³ The log file can get quite large, depending upon what you are doing.

Catalog Functions – Maintenance, Searching, Reports

Once you have a set of logs input, there are several functions you can use to perform checks on the data as entered, to organize the litho log data into a project sets, or to find logs that meet a specific criterion or a set of criteria.

Using the Catalog Search to Find Logs

The Catalog Search is very powerful and has features that help you find logs of interest, or for selecting logs for log strip production or for inclusion in a Project.

CCATALOG - Catalog print and processing options are:
About Utilities

- 1 = Print *ENTIRE* Master Catalog
- 2 = Search For Specific Header Items
- 3 = Perform Catalog Validation Check(s)
- 4 = Perform full log data validation
- 5 = Return To Previous Menu

ENTER OPTION BY NUMBER (1 to 5): 0

```
SELECT THE OPTION AND FILL IN THE DATA OF THE SEARCH FIELD(S) DESIRED
PROJECT CODE Y
QUAD NAME N Choose QUAD
STATE CODE OF QUAD N
MAP SCALE OF QUAD N 0: 0
LOG ID NUMBER (RANGE) N 0 0
DDH OR PAGE # N
BOUNDED COORDINATES N 1=UTM, 2=L/L, 3=SP: 0 NO NAD83? Radial DX: 0 feet
Z: N: E:
LAT: LON:
SPZ: NS: EW: Feet NO International feet?
STATE CODE OF LOCATION N
COUNTY NAME N
TOWNSHIP NAME N
UPPER/LOWER BED CODE NAME N REG: UPPER: LOWER: Choose BEDS IGNORE IF UNK? Y
SOURCE OR CONTRIBUTOR N
ENTER SOURCE TYPE (1,2,3 OR 4): 0 Choose REFERENCE
UNPUB RECORD. COMP OR AGENCY NAME:
UNPUBLISHED PUBLIC AGENCY RECORD
U.S. OR POSTAL CODE: SOURCE ABBREVIATION:
SERIAL PUBLICATION.
PUB OR ORG: TYPE OF REPORT:
VOLUME: PAGE: MON: YEAR:
BOOK:
TITLE: AUTHORS NAME: YEAR: PAGE:
Boundary Filter Load Boundary Filter File Clear Boundary Filter File
0 Boundary File:
EXCLUDE logs if inside the boundary? N
Search Log Attributes? N Click to SET Attribute Search
```

Catalog Search can only use data that is present in the Master Catalog. The Master Catalog does not store, for example, the name of a company (Contributor), only its ID number. That is what will be used if you ask for a specific Contributor; you'll get all the Contributor companies that have that ID number.

There is a specific feature that you should take note. This is the "Bounded Coordinate".

The Bounded Coordinate search allow you to specify a center position (in UTM, Lat/Lon, or State Plane) and define a circle around that point of any distance (in feet) to include any/all logs that meet

that distance criteria²⁴. In addition to the bounded coordinate, you can also specify a Boundary File. If a Boundary File is loaded, any logs that would have been selected are also examined to see if they reside within the boundary. If not, those logs are excluded. If you have selected the **EXCLUDE** Logs if inside the boundary, then if the log is outside the boundary it will be included. This can be useful if you wish to eliminate logs from an area.

The Bounded Coordinate and the Boundary File can both be used; the result will be the intersection (or exclusion) of the two boundaries. For example, you could select all the logs within 10 miles of the center but contained within a geographic boundary defined in your boundary file. In such a case it is the AND of these terms that determine selection. Using the EXCLUDE option in the above example, all logs located within the bounded area that are NOT in the boundary file area will be selected.

If you have assigned Log Attributes to your data, you can "Search Log Attributes" to invoke an additional dialog. Using this, you can specify how to use the attributes field to select logs. The first dialog shown is the selection matrix, where you can choose the kind of attribute and whether the attribute is present or absent. The HELP dialog is also shown.

Press F1 for HELP

Search for...	Has Attribute?	Description
<input checked="" type="checkbox"/> Public	<input type="checkbox"/>	Log is available to the public
<input type="checkbox"/> Elog	<input type="checkbox"/>	Has geophysical logs
<input type="checkbox"/> Quality	<input type="checkbox"/>	Has coal quality analyses
<input type="checkbox"/> Core	<input type="checkbox"/>	Has available core
<input type="checkbox"/> Photos	<input type="checkbox"/>	Has photographs of core
<input type="checkbox"/> Strength	<input type="checkbox"/>	Has rock strength data
<input checked="" type="checkbox"/> Chem	<input checked="" type="checkbox"/>	Has rock chemistry data

Check the box below if ALL the selections must match the selected criteria (**AND**); uncheck if any ONE of the criteria will satisfy your query (**OR**).

ALL Selections must match (AND)?

Done/Accept Cancel

Select the desired Log Attribute for the search (left column), then choose whether the attribute is matched if **CHECKED** (present) or if it is **UNCHECKED** (not present). For example, uncheck the "Has Attribute?" for PUBLIC if you only want to get PRIVATE data.

Check the "Chem" box and check its "Has Attribute?" box to get the Chemical Analysis attribute. Using these two as an example, and checking the "AND" box below the selections, the search criteria would read:

Select logs that are **PRIVATE AND have chemical analysis data.**

If you unchecked the "AND" box (to be the OR condition), then your query would read:

Select logs that are **PRIVATE OR have chemical analysis data.**

So, any PRIVATE log would be chosen, **OR** any log (public or private) that has a chemical analysis could be chosen.

Done

²⁴ **TIP:** To find all logs with un-processed ("bad") coordinates, specify the center point at lat/lon of (0,0)

Search for more logs in the catalog

```
There are      1 entries awaiting print.
Search for logs is completed. If you wish
to add more logs to the current search
list, answer the next question as "Y".
Otherwise, the logs found so far will be
printed and can be saved.
Search for more logs? █
```

Once you have chosen all criteria for the search, the Master Catalog is searched and the logs meeting the criteria are added to the list. The number of logs that currently chosen are shown at the top. If you answer this question with a "Y", you will be re-directed to the previous selection screen to change the search parameters and perform another search.

Stated another way, you can perform multiple searches, building the number of logs that meet the criteria. For example, you could select all logs from the HANDSHOE quadrangle and the MIDDLETWN quadrangles. Once you are done, answer the question with a "N" to proceed to the next menu.

This menu has expanded from previous versions.

CCATALOG - SELECT PRINT OPTION FROM LIST BELOW:

Edit About Utilities

```
There are  886 entries.
```

```
You can "Edit" the searched list using option 4. This will also allow you to
edit the searched logs selectively before printing or saving, if you choose.
```

```
0 = Catalog Style Listing To PDF
```

```
1 =  80 Col Condensed Listing To PDF
```

```
2 = 132 Col Condensed Listing To PDF
```

```
3 = Create a Catalog Search File from Current Search results
```

```
4 = Add existing Catalog Search file to current results
```

```
5 = Select/Edit/Remove logs from the current search results
```

```
6 = Return to the Catalog Search/Validation Menu
```

```
7 = Exit To CLOG Menu (abandon search results)
```

```
ENTER OPTION BY NUMBER (0 to 7): █
```

You can choose one of three report formats (PDF reports), create a Catalog Search file, add an existing Catalog Search file to the current list, or edit the selection of logs. These last option will be covered next.

Select/Edit/Remove Logs

The search process creates, internally, a list of all the logs that satisfy the search criteria. Selecting this option will allow you to look at the logs that have been chosen and perform a few operations on this list. The window displayed below shows a sample of the display and the options available.

Quad	State	Scale	Log ID	Project	Src #	Company Drill Hole	Contrib #	Contrib Drill ^
HNSH	KY	2 1: 24000.	1		425	123456789012	167	1234567890
HNSH	KY	2 1: 24000.	2		167	S-19	167	S-19
HNSH	KY	2 1: 24000.	3		167	S-22	167	S-22
HNSH	KY	2 1: 24000.	4		167	S-28	167	S-28
HNSH	KY	2 1: 24000.	5		167	S-28A	167	S-28A
HNSH	KY	2 1: 24000.	6		167	S-29	167	S-29
HNSH	KY	2 1: 24000.	7		167	S-30	167	S-30
HNSH	KY	2 1: 24000.	8		167	S-31	167	S-31
HNSH	KY	2 1: 24000.	9		167	S-31A	167	S-31A
HNSH	KY	2 1: 24000.	10		167	S-31B	167	S-31B
HNSH	KY	2 1: 24000.	11		167	S-32	167	S-32
HNSH	KY	2 1: 24000.	12		167	S-33	167	S-33
HNSH	KY	2 1: 24000.	13		167	S-39	167	S-39
HNSH	KY	2 1: 24000.	14		167	S-39A	167	S-39A
HNSH	KY	2 1: 24000.	15		167	S-49	167	S-49
HNSH	KY	2 1: 24000.	16		167	S-50	167	S-50
HNSH	KY	2 1: 24000.	17		167	S-51	167	S-51
HNSH	KY	2 1: 24000.	18		167	S-52	167	S-52
HNSH	KY	2 1: 24000.	19		167	S-53	167	S-53
HNSH	KY	2 1: 24000.	20		167	S-54	167	S-54
HNSH	KY	2 1: 24000.	21		167	S-55	167	S-55
HNSH	KY	2 1: 24000.	22		167	S-56	167	S-56
HNSH	KY	2 1: 24000.	23		167	S-57	167	S-57
HNSH	KY	2 1: 24000.	24		167	S-70	167	S-70
HNSH	KY	2 1: 24000.	25		167	S-71	167	S-71
HNSH	KY	2 1: 24000.	26		167	S-72	167	S-72
HNSH	KY	2 1: 24000.	27		167	S-73	167	S-73

Sometimes a search might have added a few logs that you are not interested in, for one reason or another. For example, a search of a boundary may have included a few logs that belong to a mine you are not interested in, or from a contributor that you might wish to exclude. You can select those logs (CTRL-click to select multiple items, or you can select an entire range, just like a spreadsheet editor). Then, click the "Remove Logs" button. This only removes the logs from the Catalog Search results and does nothing to the logs in your system.

Similarly, you can select one or more logs and click "Edit Logs". This will bring up, in sequential order, the logs selected. This will give you full edit capability. Some users have found this to be helpful when extracting specific information from multiple logs rather than generating a report and looking through that listing.

You can save the selections in a Catalog Search file. Now that the list of logs has been culled down to only those logs of interest, saving these selections to a file, and then using it to generate coding reports, logs strips, etc. can be performed more easily and quickly.

Create Catalog Search File

The ability to create this file will assist you in performing several other common C-Master tasks, like the generation of log strips, populate lists of logs for projects, etc. The Catalog Search file is a plain text file that contains detailed log information that is useful to other C-Master programs. It also contains a great deal of other information that you may find useful.

If you select the creation of the Catalog Search Logs, a folder will be created in your default data folder named CATSEARCH. This is a convenient place to store these selection files. Give the file some descriptive name so you can come back later and remember what it contains.

Add a Catalog Search File to the Existing Catalog Search Results

This option is designed to assist you in making collections of logs from individual search results. For example, you might wish to have several individual Catalog Search files based on Tracts, and then combine them into one Catalog Search file to be put into Projects and Processing, or to generate log strips.

Report Formats

If you ask for a report to be generated, each log will also be opened and read completely.

You have a choice of 3 different formats of output for the printed report. Each of these has certain features to recommend it. Examples are given below.

- 132 Column:

This listing is quick and easy to read, but has limited information. The Source and Contributor are listed (by number) and the bed information, along with the UTM coordinates.

---QUAD---	ST	SC	--ID-	PRJ	ZNE	NORTHING	EASTING	SID#	CID#	ST	COUNTY	CREG	UPPER	BED	LOWER	BED	FILENAME	Entry Datum
HNSH	KY	2	1	17		4673790.	747065.	425	167	KY	KNOTT	APPL	100	51	12	54	KY001001.	NAD27
HNSH	KY	2	2	17		4152074.	326423.	0	167	KY	KNOTT	APPL	HZ9	31	HZD	34	KY001002.	NAD27
HNSH	KY	2	3	17		4151445.	325534.	167	167	KY	KNOTT	APPL	HZ9	9999	HZD	9999	KY001003.	NAD27
HNSH	KY	2	4	17		4151425.	328179.	167	167	KY	KNOTT	APPL	HZ9	9999	FCR	9999	KY001004.	NAD27
HNSH	KY	2	5	17		4151185.	328764.	167	167	KY	MAGOFFIN	APPL	TPT	9999	TPT	9999	KY001005.	NAD27
HNSH	KY	2	6	17		4151185.	329284.	167	167	KY	MAGOFFIN	APPL	HZ9	9999	HML	9999	KY001006.	NAD27
HNSH	KY	2	7	17		4148045.	327065.	167	167	KY	KNOTT	APPL	HZ9	9999	HZD	9999	KY001007.	NAD27
HNSH	KY	2	8	17		4149680.	327614.	167	167	KY	KNOTT	APPL	HZ9	9999	AMB	9999	KY001008.	NAD27
HNSH	KY	2	9	17		4148825.	328244.	167	167	KY	KNOTT	APPL	UNK	9999	UNK	9999	KY001009.	NAD27
HNSH	KY	2	10	17		4148828.	328247.	167	167	KY	KNOTT	APPL	UNK	9999	UNK	9999	KY00100A.	NAD27

- 80 Column:

This is a narrower version of the listing above.

***** MASTER CATALOG LISTING - CONDENSED ***** Coordinates displayed in Datum=NAD83																		
---QUAD---	ST	SC	--ID-	PRJ	COORDINATES	SID#	CID#	CREG/UBED	LBED									
HNSH	KY	2	1		4673790.	425	167	APPL 100	12	747065. Datum of Log As Entered:NAD27								
HNSH	KY	2	2		4152074.	0	167	APPL HZ9	HZD	326423. Datum of Log As Entered:NAD27								
HNSH	KY	2	3		4151445.	167	167	APPL HZ9	HZD	325534. Datum of Log As Entered:NAD27								

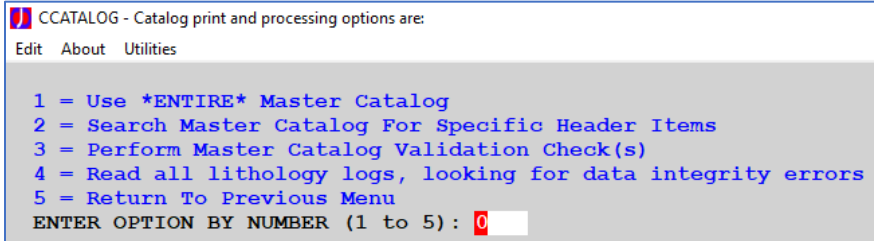
- Full Listing:

This listing has a great deal of information. This is most useful if you have limited the number of logs, or are

looking for a specific log that contains specific information.

```

***** MASTER CATALOG LISTING ***** Coordinates displayed in Datum=NAD83
ST QUAD      LOGID      --SCALE-- PRJ  ZON --N/E--  ---SOURCE & DDH/CONTRIBUTOR & DDH/DESCRIPTION/TRACT/BEDS---  ---ANCILLARY---
*KY HNDSSH   1          2 1: 24000  17 4673789 S:1/425/RJF COAL COMPANY          DDH:123456789012 File:KY001001.
ST:KY CNTY:KNOTT      TWN:PUBLICO          747064 C: 167/RJF COAL COMPANY          DDH:123456789012 Coding Region: 1
ELE: 1622.00 CUM: 989.60 DEP: 330.00 42 10 38.12N DESC:          Datum of Log As Entered:NAD27
USER: *****
*KY HNDSSH   2          2 1: 24000  17 4152073 S:1/ 0/UTAH INT          DDH:S-19          File:KY001002.
ST:KY CNTY:KNOTT      TWN:PUBLICO          326423 C: 167/UTAH INT          DDH:S-19          Coding Region: 1
ELE: 1554.00 CUM: 330.52 DEP: 331.00 37 29 57.45N DESC:          Datum of Log As Entered:NAD27
USER: *****
*KY HNDSSH   3          2 1: 24000  17 4151445 S:1/167/UTAH INT          DDH:S-22          File:KY001003.
ST:KY CNTY:KNOTT      TWN:PUBLICO          325534 C: 167/UTAH INT          DDH:S-22          Coding Region: 1
ELE: 1545.00 CUM: 319.41 DEP: 320.00 37 29 36.45N DESC:          Datum of Log As Entered:NAD27
USER: *****
  
```



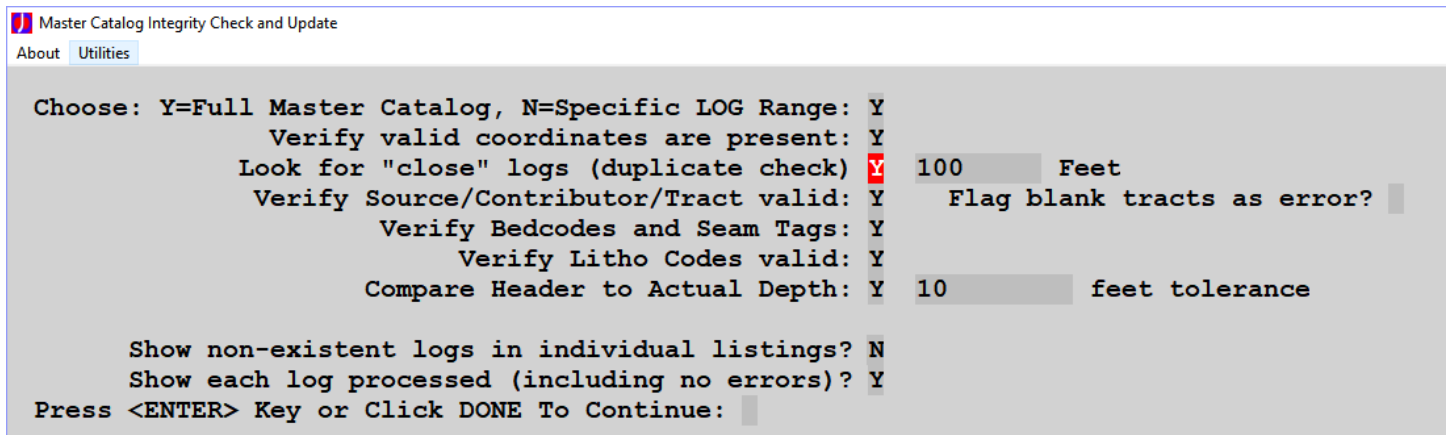
Next, we'll discuss the Catalog Validation.

Catalog Validation is a multi-step process that allows you to perform integrity and consistency checks on

all the data that resides in C-Master. Validation can be performed on the entire catalog or just a selected set of logs from a specific quad/state/scale. Validation can be useful when many logs have been imported, or an entire catalog from another user is made being used. This can spot problems with reference files and beds more easily.

Option 3 will start the Validation process. Option 4 will start an abbreviated process that looks only for "damaged" files and missing control information in the log file.

Option 3 has additional features that you might find useful when/if you have a large quantity of data.



You have the choice of the full catalog, or a selected set of logs. Following that, you have several validation options available. These checks will be performed on the logs you have selected for processing. From the report, you can see which logs may need some additional attention. We'll discuss the reports and contents next.

Validation Options and Report Contents

The examples here show the validation results that are given on a log-by-log basis. While these are useful data, sometimes knowing that a specific condition is prevalent in multiple logs is also useful. To this end, as items are flagged, a list is kept, and is appended at the end of the PDF report. The items in list are sorted by error type, not by log, so similar errors/warning are grouped together. In addition, the text of the condition may be slightly different than that seen for each individual log.

- Full Catalog or Specific LOG Range: This function will verify that the required logs exist on disk. The specific option chosen will also verify the following conditions
 - Full Catalog will perform a matching from the Quad Catalog to the Master Catalog, indicating whether there is a Master Catalog entry for every log that should have been tied to the Quad Catalog. Stated another way, this validation looks for “holes” in the catalog.
 - Specific LOG Range will not perform the “holes” check.

Logs in MASTER CATALOG, but not found on the System				
Quadrangle	St	---Scale---	LOGID	-----Filename-----
PINE	CO 1	1: 125000.	2	CO001002.
PINE	CO 1	1: 125000.	4	CO001004.
PINE	CO 1	1: 125000.	5	CO001005.
PINE	CO 1	1: 125000.	6	CO001006.

- Valid Coordinates: This function will verify that coordinates have been entered for each log. The validation looks only that the UTM Zone and coordinates in the header are valid and there are non-zero coordinates for the Northing and Easting present.

PINE	CO 1	125000.	7	AAB	CO001007.AAB	Valid Coordinates Detected
PINE	CO 1	125000.	8		CO001008.	Valid Coordinates Detected
PINE	CO 1	125000.	9		CO001009.	Coordinate(s) in error (no UTM)
PINE	CO 1	125000.	9	AAB	CO001009.AAB	Coordinate(s) in error (no UTM)

Summary View:

List of 30 issues found from this verification processing						
Coordinate error (no UTM)	Log=	ABCE.DEFG	/UN	/2/	34/	
Coordinate error (no UTM)	Log=	BLDS	/KY	/2/	3/	
Coordinate error (no UTM)	Log=	BLDS	/KY	/2/	19/	
Coordinate error (no UTM)	Log=	BLDS	/KY	/2/	45/	
Coordinate error (no UTM)	Log=	BLDS	/KY	/2/	142/	
Coordinate error (no UTM)	Log=	BLDS	/KY	/2/	172/	
Coordinate error (no UTM)	Log=	BLDS	/KY	/2/	174/	

- Source/Contributor/Tract valid: For each of these fields and their reference files, the following checks are made. Each log is also opened and examined, so this can take a bit of time.

- Does the Source/Contributor have a corresponding entry in the Reference File?

```
PINE      CO 1 125000.    7    C0001007.    Source not found. Type=1 MY COMPANY
PINE      CO 1 125000.    7    AAB C0001007.AAB Source not found. Type=1 MY COMPANY
PINE      CO 1 125000.    8    C0001008.    Source not found. Type=1 MY COMPANY
```

Summary View:

```
Contributor not found in Reference File: [MY COMPANY          ...]Log= PINE      /CO /1/ 7/AAB
Contributor not found in Reference File: [MY COMPANY          ...]Log= PINE      /CO /1/ 8/
Source not found in Reference File. Type=0 []Log= BEAUFORT    /SC /2/ 1/
Source not found in Reference File. Type=0 []Log= BEAUFORT    /SC /2/ 2/
Source not found in Reference File. Type=0 []Log= BEAUFORT    /SC /2/ 3/
```

- Does the Source/Contributor ID in the reference file match what is stored in the actual log?

```
PINE      CO 1 125000.    11   C000100B.    Log Contributor ID= 723 Reference Master ID= 107
PINE      CO 1 125000.    11   AAD C000100B.AAD Log Contributor ID= 723 Reference Master ID= 107
```

Summary View: In the Catalog, the ID is zero, while in the log file, the ID is 269.

```
Catalog Contrib ID= 0 <> Log Contrib ID= 269 Source=[GREENWOOD LAND & MINING ...]Log= HAIL      /KY /2/ 5/
Catalog Contrib ID= 0 <> Log Contrib ID= 269 Source=[GREENWOOD LAND & MINING ...]Log= HAIL      /KY /2/ 6/
Catalog Contrib ID= 0 <> Log Contrib ID= 269 Source=[GREENWOOD LAND & MINING ...]Log= HAIL      /KY /2/ 7/
Catalog Contrib ID= 0 <> Log Contrib ID= 269 Source=[GREENWOOD LAND & MINING ...]Log= HAIL      /KY /2/ 8/
Catalog Contrib ID= 0 <> Log Contrib ID= 269 Source=[GREENWOOD LAND & MINING ...]Log= HAIL      /KY /2/ 9/
Catalog Contrib ID= 0 <> Log Contrib ID= 269 Source=[GREENWOOD LAND & MINING ...]Log= HAIL      /KY /2/ 10/
```

- Does the Tract have a corresponding entry in the reference file?

Summary View:

```
Tract not found in Reference File: [16 MI.CREEK, #9 MAIN]Log= HZRDNRTH /KY /2/ 194/
Tract not found in Reference File: [ABBOTT MOUNTAIN      ]Log= PRSTNSBERG /KY /2/ 4/
Tract not found in Reference File: [ABOVE OLD DOMINO     ]Log= HZRDNRTH /KY /2/ 196/
Tract not found in Reference File: [ANDERSON PROPERTY    ]Log= JNKNSEST  /KY /2/ 4/
```

- Does the Tract ID in the reference file match the Tract ID in the log?

Summary View:

```
Log Header Tract ID= 1 <> Tract Ref File ID= 777 for Tract=[MY TRACT          ]Log= PINE      /CO /1/ 27/
Log Header Tract ID= 2 <> Tract Ref File ID= 6 for Tract=[ANOTHER TRACT      ]Log= PINE      /CO /1/ 17/
Log Header Tract ID= 2 <> Tract Ref File ID= 6 for Tract=[ANOTHER TRACT      ]Log= PINE      /CO /1/ 18/
```

- Bedcodes and Seam Tags:

Bedcodes are the 3-4 character descriptions of lithologies of interest. Seam Tags consist of a bedcode followed by a qualifier (a "doublet"). A lithology may have a seam tag field with more than one seam tag given. Validation makes sure that there are valid seam tags. Also, the bed code ID's within a log should be in ascending order as we go down the drill hole. In addition, the Upper and Lower bed codes given in the Header should bound the bed codes present in every seam tag. Bedcodes or qualifiers that are more than 4 characters long are flagged.

PINE	CO	1	125000.	1	AAB	CO001001.AAB	Scanning for bed code/seam tag problems Bad SEAM Tagging: Upper Bed=53 Lower Bed=19 **** Cannot assign upper/lower beds based on error(s) detected
PINE	CO	1	125000.	14		CO00100E.	Scanning for bed code/seam tag problems Line: 1 Cannot find Bedcode=FCA Line: 2 Cannot find Bedcode=FAB Line: 2 Cannot find Bedcode=PCB Line: 3 Cannot find Bedcode=FCX Line: 3 Cannot find Bedcode=QRS
HNSH	KY	2	24000.	5		KY001005.	Scanning for bed code/seam tag problems Line:14 Inconsistent Bed Numbers:30 - 31 Line:4 Bedcode(s) Seq Err (Upper):TPT B Upper ID:30 First Found=31 Prev lower bed= 31 Line:4 Bedcode(s) Seq Err (Lower):TPT B Lower ID:30 Last Found=31 Prev upper bed= 31 Line:14 Bedcode(s) Seq Err (Upper):TPT B 999 0 Upper ID:30 First Found=31 Prev lower bed= 31

Summary View:

In the summary below, these next two items point to inconsistencies (doublets required, but not found) and/or a non-existent bed code being used. Not that the same log and line are shown with these two errors.

Bed codes not in doublets or bad Bed Code Tag=[BOT	] Line:50	Log= HNSH	/KY /2/	1/AAC
Bed codes not in doublets or bad Bed Code Tag=[COP 6 COPB	] Line:75	Log= BLDS	/KY /2/	9/
Bedcode(s) in error:COP 6 COPB Line:75	Log= BLDS	/KY /2/	9/	
Bedcode(s) in error:COP 6 COPB Line:75	Log= BLDS	/KY /2/	9/	

The summary below states that the first bed number found and last bed number found are not stratigraphically increasing in value as the hole is descended.

Bad SEAM Tagging: First Bed Found=BNG (53)	Last Bed Found=AME (19)	Log= PINE	/CO /1/	1/AAB
Bad SEAM Tagging: First Bed Found=FCK (77)	Last Bed Found= (-1)	Log= PINE	/CO /1/	14/

The summary below notes that on the specified lithology line, the bed numbers are not the same. This may or may not be an error.

Inconsistent Bed Numbers:30 - 31	Line:9	Log= HNSH	/KY /2/	166/
Inconsistent Bed Numbers:30 - 31	Line:9	Log= HNSH	/KY /2/	166/AAC
Inconsistent Bed Numbers:38 - 39	Line:10	Log= BLDS	/KY /2/	163/
Inconsistent Bed Numbers:38 - 39	Line:24	Log= BLDS	/KY /2/	2/
Inconsistent Bed Numbers:38 - 39	Line:24	Log= BLDS	/KY /2/	166/

The summary below, when looking at the entire log, the indicated upper and lower bed numbers in the header do not bound the actual beds found in the log.

SEAM TAG Upper Bed#= 30 Hdr Upper#= 30/SEAM TAG Lower Bed#= 39 Hdr lower#= 40	Log= BLDS	/KY /2/	82/
SEAM TAG Upper Bed#= 31 Hdr Upper#= 29/SEAM TAG Lower Bed#= 39 Hdr lower#= 39	Log= BLDS	/KY /2/	13/
SEAM TAG Upper Bed#= 31 Hdr Upper#= 30/SEAM TAG Lower Bed#= 39 Hdr lower#= 39	Log= BLDS	/KY /2/	49/

The summary below, when scanning the lithologies in the forward direction (these examples)/reverse direction, the seam tags assigned are not monotonically increasing/decreasing.

Seq Seam [999 0	] Litho Lower=999 31 Next=TPT 30 Line:1	Log= HNSH	/KY /2/	158/
Seq Seam [999 0	] Litho Lower=999 31 Next=TPT 30 Line:1	Log= HNSH	/KY /2/	158/AAC
Seq Seam [FCL B FCR 2	] Litho Lower=FCL 39 Next=PCR 38 Line:7	Log= BLDS	/KY /2/	27/
Seq Seam [FCL B FCR 2	] Litho Lower=FCL 39 Next=PCR 38 Line:85	Log= BLDS	/KY /2/	167/

- **Litho Codes:** Verifies that the lithology codes that are specified, whether coded or not, are valid Fern codes and that an English phrase is present.

PINE	CO	1	125000.	7	CO001007.	Line:3	is uncoded
						Line:3	INVALID CODE= 456
						Line:3	Missing ENGLISH phrase

Summary View:

This section is sorted by the invalid code. May mean there is a data entry problem, or nomenclature mismatch

List of 432 issues found from this verification processing							
INVALID CODE= 006	Line:1	Log=	UNAMEIT	/WV	/2/	2/	
INVALID CODE= 006	Line:2	Log=	UNAMEIT	/WV	/2/	1/	
INVALID CODE= 008	Line:1	Log=	BEAUFORT	/SC	/2/	5/	
INVALID CODE= 008	Line:1	Log=	BEAUFORT	/SC	/2/	6/	
INVALID CODE= 008	Line:1	Log=	BEAUFORT	/SC	/2/	8/	
INVALID CODE= 008	Line:1	Log=	BEAUFORT	/SC	/2/	40/	
INVALID CODE= 008	Line:1	Log=	BEAUFORT	/SC	/2/	41/	
INVALID CODE= 008	Line:1	Log=	BEAUFORT	/SC	/2/	43/	

Lithology is marked as being entered in English, but there is no phrase entered. These logs will require manual editing.

Missing ENGLISH phrase	Line:13	Log=	PINE	/CO	/1/	14/
Missing ENGLISH phrase	Line:17	Log=	PINE	/CO	/1/	14/
Missing ENGLISH phrase	Line:5	Log=	PINE	/CO	/1/	21/
Missing ENGLISH phrase	Line:6	Log=	PINE	/CO	/1/	21/
Missing ENGLISH phrase	Line:9	Log=	PINE	/CO	/1/	14/

- **Header to Actual Depth:** This report compares the depth as given in the header to the actual depth of the data in the log.

Following logs exceed the depth comparison tolerance of 10.000 feet									
QUADRANGLE	ST	Scale	LOGID	PRJ	Filename	Status	message(s)		
JEFFERSON	CO	2	24000.	1	CO001001.	Depth Difference of	45.00 Header=	100.00 Actual=	55.00 Num Lithos= 10 /
JEFFERSON	CO	2	24000.	2	CO001002.	Depth Difference of	46.10 Header=	101.10 Actual=	55.00 Num Lithos= 10 /

If you deselect "Show Each Log Processed", this report only identifies discrepancies. There may be valid reasons for the difference. However, one of the problems this option can uncover is a data entry error in the original litho data entry process.

The "Read all logs" (Option 4) has different information. An example is shown below.

```

Quad/State/Scale/Log ID/Project=RUSH /KY /2 1: 24000./ 10/ (KY03T00A. ) Bad control value for litho data
Bad Method of Recording detected. Is:0 should be: 1 or 2 at line=14
Bad Method of Measurement detected. Is:0 should be: 1, 2, or 3 at line=14
Bad Units of Measurement detected. Is:0 should be: 1, 2, or 3 at line=14

Quad/State/Scale/Log ID/Project=WHTLYCTY /KY /2 1: 24000./ 106/ (KY02102Y. ) Bad control value for litho data
Bad Method of Recording detected. Is:0 should be: 1 or 2 at line=12
Bad Method of Measurement detected. Is:0 should be: 1, 2, or 3 at line=12

Quad/State/Scale/Log ID/Project=WHTSBRG /KY /2 1: 24000./ 271/ (KY00F07J. ) Bad control value for litho data
Bad Method of Recording detected. Is:0 should be: 1 or 2 at line=259
Bad Method of Measurement detected. Is:0 should be: 1, 2, or 3 at line=259
Bad Units of Measurement detected. Is:0 should be: 1, 2, or 3 at line=259
Premature EOF (original log) at litho record(type 2)=259

```

Full Log Verification is looking in the log for malformed, improperly formatted, or missing information. In addition, it can usually spot when/if a log was manually edited and mistakes were made during the edit that affected the log. In the report above, KY00F07J had a truncated lithology line 1 (of 2) which resulted in the "Bad" messages, and the second record of this lithology was also missing (Premature end of the file). Some of these errors would also be captured in the Catalog Integrity verification, but this test looks deep into the file structure for additional details. At the end of the report, you have an option to look at the list of log using the Catalog Search log list viewer, and can edit the logs that contain questionable data.

Exporting Log to Other Systems

C-Master allows the export of almost all its data in CSV format. CSV is the de facto standard for data sharing for many applications and is a handy way to get data into Microsoft Excel. To facilitate the export of data, C-Master provides a quick and easy way to select the data for the transfer and provides two different methods for the export.

C-Master allows either one or two files to be created for the export. The one file method places C-Master header data with every lithology line. While not necessarily efficient, it does identify every lithology with its source. Some programs require data to be in this kind of format. The two-file method places header data in one file and create a “link” field that uniquely identifies each lithology with the appropriate litho log header data.

C-Master also permits the user to store, as a template, the selections made so they can be used later.

Some options provided by C-Master also assist in the proper importation of data (especially into Excel) so text fields remain as text fields, and numeric fields are numeric fields. In addition, location data can be stored in different formats, and State Plane coordinates can be “created” on the fly.

How to Perform a CSV Export

From the Main Menu, select System Support Functions, then select the CSV Export option. The starting screen allows you to select whether a template²⁵ will be used, as well as the other data options.

You can also specify if the outputs should be in meters here, overriding the CONFIG file. Lat/Lon in DMS format presents data in a rather archaic format, but one that may be supported by your application. Normally, the Lat/Lon will be in decimal degrees, with West longitude as negative and South latitude as negative. For the State Plane zone name, all the data whose coordinates have not been specified as State Plane as input will be converted by the State Plane zone name given here. This means that if the litho log is in a different State Plane zone, the coordinates may be inaccurate.

²⁵ A template is a file that contains selections you have made in the past and wish to make again. Basically, it is a shorthand way to save work already performed.

Select the style of EXPORT (1 file or 2 files) and whether or not you want to use a previously recorded TEMPLATE file to speed your selections. If you use a template file, you will be prompted for the name next. You can also choose to use catalog search results file(s) to speed the selection process.

```
Number of CSV files to create (1 or 2)? 1
Use an existing template file? N
Use a COMMA character to separate the fields? Y
Use a TAB character to separate the fields? N
Use ALTERNATE character to separate fields? N Use:
Enclose all TEXT fields in double quotes? Y
Add "=" in front of double quotes? Y Excel requires a "=" to ensure a true text field

If you wish output in State Plane, and your data was not entered with a SP Zone, enter the zone.
State Plane output in International feet? NO
Coordinate datum - Output in NAD83 datum? NO

Do you want thickness, elevation etc. in metric? N
Do you want Lat/Lon data in DMS format? N
Do you wish bench/seam/zone processing? N
Do you wish to make zero thickness values small? N <= Carlson S/W fix
X <== If you don't wish to export anything, set this to blank
```

The default separator character is a COMMA (the default whenever this function is used). However, you can select that the TAB character is used, or you may choose your own separator. This feature becomes useful when your data has within it text fields that contain a double quote mark or a comma. A double quote mark in the text in conjunction with selecting double quote marks to surround text fields may result in odd program behaviors.

The option regarding the use of quote marks are check as "Y" by default. Some programs will require the surrounding of any text in quotes; Excel would also prefer that a leading "=" sign be present.²⁶ This forces the cell attribute to become "Text". In this way, drill holes that are all numeric, possibly with leading zeroes, will be maintained exactly as entered. Also, if a text value were to have the form of "1234e56", without the quotes Excel would interpret this as the number 1234×10^{56} . If you have ANY single quotes in text fields within your data, you must surround text fields in quotes or Excel (and other programs) will not be able to properly decode your CSV Exported data. If you have double quotes within your text fields, then separate the text fields with TABS or some other character.

If you do not specify a State Plane zone on this screen and select State Plane coordinates in the output, you will be asked if this is correct and will be allowed to specify one. If you really don't care,

²⁶ It has been found that Excel has a problem with the "=" sign form if the field also contains a comma! This was unexpected, but is handled in the following manner: If a comma is present and the "=" has been requested, the "=" sign will be removed for that field only.

it's fine to be blank. Just be aware that the coordinates will be computed, and you can get some really odd results!

The bench/seam/zone tagging invokes special processing termed "InFill" processing. This processing will ask for a list of bedcodes and qualifiers (doublets) in a text file that are designated as seam, bench, or zone tags. This will scan the log for the designated bedcode type and create three additional columns of data (SEAM, BENCH, and ZONE) of all bedcode tags that match the appropriate file. Some processing programs require that all the seams of interest (i.e. from top to bottom) are marked as such on all intervening lithologies. This option will accomplish that function. For more information, refer to [Appendix D: Seam, Bench, and Zone Tagging System](#) for explanatory details of the tagging rules and how they are processed.

You have the choice when exporting zero thickness lithologies to make the thickness non-zero. The value will be set to 0.00001 feet. When/if this data is imported, C-Master will treat this as 0.000.

The final field has an "X" in it. If you set this field to blank, you can go through the export processing without creating a file. This will give you the opportunity to see if any errors are present in your data before committing to the export processing.

If you have opted to open a template file and pre-load the parameters, you will be taken back to the original screen to verify/reset any options.

I X	N L	C T	HEADER fields (reference)	Column Header Name	I X	N L	C T	HEADER fields (reference)	Column Header Name
1	<input checked="" type="checkbox"/>	Y	Quadrangle (1)	Quadrangle	27	Y	Hole Depth (25)	Hole Depth	
2	Y	Y	State (2)	State	28	Y	Bed Region Code (26)	Bed Region Code	
3	Y	Y	Scale (3)	Scale	29	Y	Upper Bed (27)	Upper Bed	
4	Y	Y	Log ID	Log ID	30	Y	Upper Bed Number (27)	Upper Bed Number	
5	Y	Y	Source (5)	Source	31	Y	Lower Bed (28)	Lower Bed	
6	Y	Y	Tract (6)	Tract	32	Y	Lower Bed Number (28)	Lower Bed Number	
7	Y	Y	Drill Hole # (7)	Drill Hole #	33	Y	Kind of Record (29.1)	Kind of Record	
8	Y	Y	Contributor (8)	Contributor	34	Y	Project Code	Project Code	
9	Y	Y	Company Drill Hole (9)	Company Drill Hole	35	Y	HeaderUserData1	HeaderUserData1	
10	Y	Y	UTM Zone (10.1)	UTM Zone	36	Y	HeaderUserData2	HeaderUserData2	
11	Y	Y	UTM Northing (10.2)	UTM Northing	37	Y	Original File Name	Original File Name	
12	Y	Y	UTM Easting (10.3)	UTM Easting	38	Y	Generic Key	Generic Key	
13	Y	Y	Latitude (11.1)	Latitude					
14	Y	Y	Longitude (11.2)	Longitude					
15	Y	Y	SP Zone (12.1)	SP Zone					
16	Y	Y	SP Northing (12.2)	SP Northing					
17	Y	Y	SP Easting (12.3)	SP Easting					
18	Y	Y	State of Hole (17)	State of Hole					
19	Y	Y	County (18)	County					
20	Y	Y	Township (19)	Township					
21	Y	Y	Ground Location (20)	Ground Location					
22	Y	Y	Hole Elevation (21)	Hole Elevation					
23	Y	Y	Hole Angle (21)	Hole Angle					
24	Y	Y	Elevation Method (22)	Elevation Method					
25	Y	Y	Logger Name (23)	Logger Name					
26	Y	Y	Year Drilled (24)	Year Drilled					

For both file options (1 or 2 files), the data presented next will be the same. The only difference will be that the data for the header will be in a separate file from the lithology data for the two-file option. The Header Fields represent the header data plus a few extras. The column with the "Y" is whether that item will be present in the output file²⁷.

I X	N L	C T	LITHOLOGY fields	Column Header Name
1	<input checked="" type="checkbox"/>	Y	Ferm Code	Ferm Code
2	Y	Y	English Phrase	English Phrase
3	Y	Y	Driller Comments	Driller Comments
4	Y	Y	Thickness	Thickness
5	Y	Y	Top Depth	Top Depth
6	Y	Y	Bottom Depth	Bottom Depth
7	Y	Y	Top Elevation	Top Elevation
8	Y	Y	Bottom Elevation	Bottom Elevation
9	Y	Y	Seam Tags	Seam Tags
10	Y	Y	Analysis Tags	Analysis Tags
11	Y	Y	LithoUserData1	LithoUserData1
12	Y	Y	LithoUserData2	LithoUserData2
13	Y	Y	Drill Hole #	Drill Hole #
14	Y	Y	Company Drill Hole	Company Drill Hole
15	Y	Y	Project Code	Project Code
16	Y	Y	Litho Number	Litho Number
17	Y	Y	Original File Name	Original File Name

The last item, Generic Key is a unique identifier constructed from the header data. For the two-file option, this is the key that ties to the lithology data. You can select the field number that supplies the linking key. The default is the generic key (35). The column labeled INC is selected (Y or N)

²⁷ Currently, you cannot change the order that fields will appear in the output file.

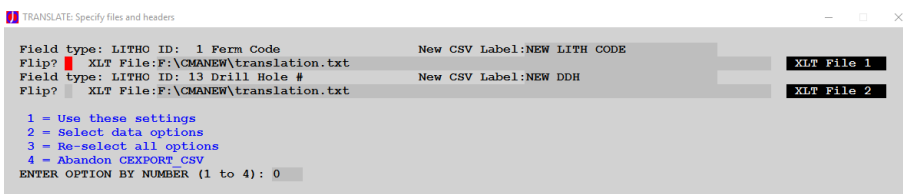
to be included in the exported data. The field labeled XLT is selected with X or Y to be translated²⁸ according to a file (to be chosen later).

The “Column Header Name” field is editable. If your application must have a specific name for a specific data type, enter that information into this field. When the file is created, it will have this name as its header name (first line of the file). Any entered text will be in upper case.

I	X		Column Header Name
		LITHOLOGY fields	
1	Y	Ferm Code	Ferm Code
2	Y	English Phrase	English Phrase
3	Y	Driller Comments	Driller Comments
4	Y	Thickness	Thickness
5	Y	Top Depth	Top Depth
6	Y	Bottom Depth	Bottom Depth
7	Y	Top Elevation	Top Elevation
8	Y	Bottom Elevation	Bottom Elevation
9	Y	Seam Tags	Seam Tags
10	Y	Analysis Tags	Analysis Tags
11	Y	LithoUserData1	LithoUserData1
12	Y	LithoUserData2	LithoUserData2
13	Y	Drill Hole #	Drill Hole #
14	Y	Company Drill Hole	Company Drill Hole
15	Y	Project Code	Project Code
16	Y	Litho Number	Litho Number
17	Y	Original File Name	Original File Name

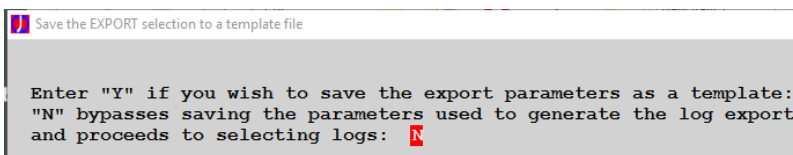
You may choose up to 12 fields (total between the header and the lithology data) to have a translation applied. You do not need to mark the original field data for output. If in the process of performing the translation the data cannot be matched, it will be logged to the Status Window for you to look at after the export has completed.

For the lithology data, all the possible fields in the record are available, including some of the Header data.



If you have chosen to perform a translation, then this screen is displayed to allow you to select a new column heading for the translated data, and the data file to

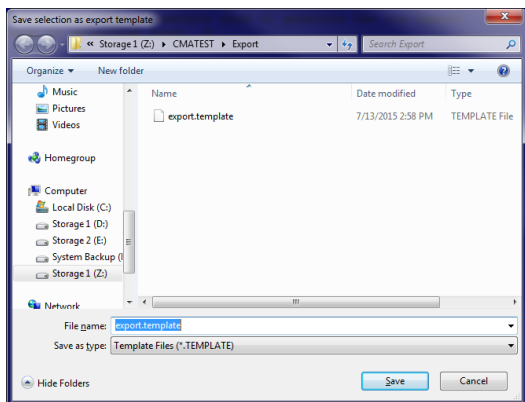
be used. Both the original header name will be shown as well as the source of the data (header or litho) for that field. To choose the physical file that contains the translation instructions, click the white tab “XLT File x” to change the name. All the data shown on this screen will be saved in the template file, if you choose to save it. If there are any errors in processing the translation files, the errors will be displayed to the Status Window and you can then choose what to do.



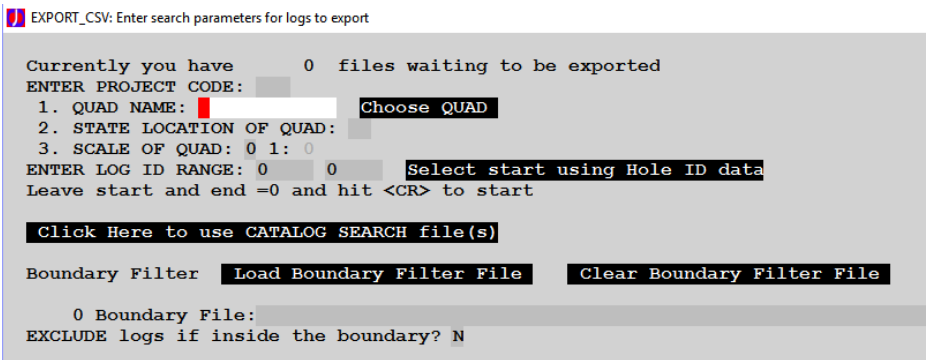
At this point, you can save the export parameters to a file by setting the highlighted field to “Y”. The Header and Lithology selections are stored in a single

file. In addition, the translation file selections are also stored, and the default State Plane Zone are saved.

²⁸ Translation requires that a text file be built that specifies the translation to be performed. Refer to [Appendix H: Translation File for Export of CSV Formatted Data](#) for details about the contents of the file and how it can be used to solve some common problems.

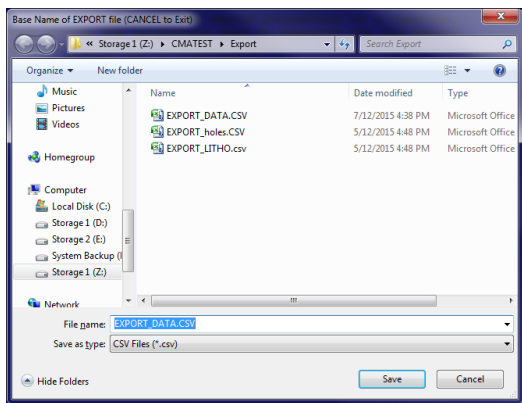


Note the Caption bar on this dialog shows that the **Export Template** will be selected here.



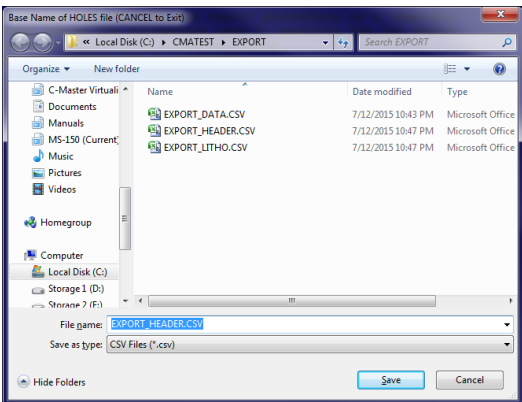
This next screen is where the logs are selected for this Export. You can enter a log or group of logs or use the Catalog Search results files to specify the logs you wish to use. You can add up to 32760 logs to be exported.

Here is also where you can specify a boundary file that will filter the selection that you make. If you have loaded a boundary file, then wish to remove its effect, you can CLEAR the boundary file data.

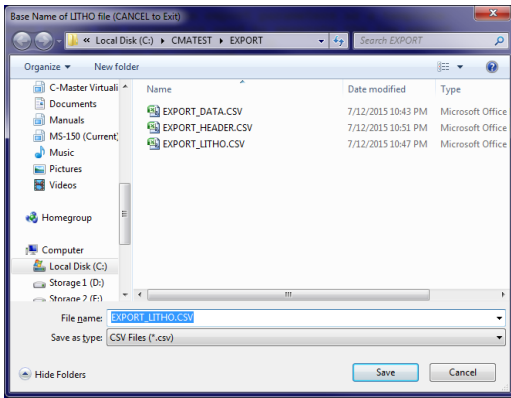


Once you have all the logs selected, entering a Log ID start number of zero will begin the processing steps, and you'll be asked for the name(s) of the file(s) that will contain the data. Here the BASE NAME of the export file is chosen. For a single file (what we selected earlier), the default name is EXPORT_DATA.CSV.

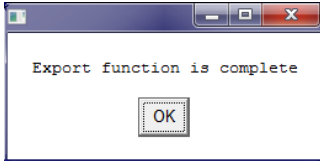
Note the other file names shown.



For the two-file output option, you will be asked to supply the two file names that identify the file that contains the header data, and the file that contains the lithology data. In this example, EXPORT_HEADER.CSV file has the header data, and EXPORT_LITHO.CSV file has the lithology data. You can choose any name you wish, but each name must be unique.



If there are errors, you will be informed of this at the end of the export.



Once completed, Export returns to the Maintenance Functions window.

IMPORT CSV – Converting a CSV-Style File Into C-Master Files

The importing of CSV-style files is accomplished by matching data fields to the same (or similar) data fields in a C-Master file. This process is controlled by a set of rules through which data are assigned to the appropriate C-Master data item. This process will create an intermediate file that has the proper format of a C-Master log. To get the log incorporated into your system you will need to perform an actual import of C-Master formatted logs into C-Master. You can do this as part of CIMPORT_CSV or you can manually perform the import of a C-Master formatted log. To learn about that step of the process, read **Importing Logs (CIMPORT for C-Master Formatted Lithology Logs)**.

The data are assumed to be in a form of rows and columns of data. Each row is a set of data values, and each column is associated with a label. This first row of data is special and is called the “*header line*”; the values in each cell of this row are labels separated by a specific character (comma, tab, other) that then define the data that can be found in this column. So, each label defines the contents of its column of data. This description is then tied to the appropriate C-Master data field.

The order of these columns of data (i.e. which named field comes first, etc.) does not matter. The Import process will scan your data and determine where the data is located and make the linkages appropriately. You **do not** have to manually re-order your data for the Import to work!

The program reads these data from a text file, separating the labels and data into “columns”, and making the link between the labels and the C-Master internal data.

Not every column of data that you may have in the file has to have a corresponding C-Master data field. Similarly, there may be C-Master data that have no corresponding columns of data in your file. It may not be possible to assimilate all your data, nor to satisfy every data field that C-Master logs files have.²⁹

The Import process also adds an additional feature to make the import of data easier. Like the Export function, the Import of data can use a translation file. This allows you to transform data from a non-C-Master system into C-Master easily and repeat-ably. Refer to Appendix H for some examples.

Starting an Import

From the maintenance menu, select CIMPORT_CSV. You will receive a prompt to load a Template file. We’ll get to templates later. For now, let’s see what options and selections are available (and what the template file can save).

²⁹ If your data files have been created through the C-Master Export processing, every significant data field available to C-Master can be Imported.

The opening screen allows you to select how data will be processed and which files will contain the data. Let's look at the options one-by-one, from top to bottom.

```
Number of CSV files to input (1 or 2)? 1
File 1: Choose file
File 2: Choose file
Import to: .\IMPORT Choose folder

Choose type of file to import (Comma, Tab, Alt)? C (C,T,A) Use: <=Enter ALT Character

Enter the SP Zone to be used if missing in data: <= default SP Zone
Search USGS Standard quad file for coordinates? N <= Fill in missing quadrangle from translation file
Coordinates - Assume NAD83 datum for coordinates? NO
Are thicknesses Cumulative (versus individual)? N Meters? N
Using CODE versus English Phrases? Y
Mark non-blank Code/English as properly coded? N <== if "N", you should run the CPRTCOD to recode

Select the naming style for logs that are created: 0 1=Use "Generic Key" field
If you select 3, then choose Option 3 below 2=Use "Original File Name" field
to reselect the field number to use. 3=Pick an existing, named field 0 <=Current Selection
4=Use a temporary filename

Use Original: Read the Original file if on disk? N
Log File Template in use:
Perform a trial import (no files created)? N 0 <== Set Coding Region for Batch

1 = Load Template file (options)
2 = Save current options as a Template
3 = Select fields for importing
4 = Select file as a log template during import
5 = Process with these options
6 = Clear all selections (Start from Scratch)
7 = Quit to prior menu
ENTER OPTION BY NUMBER (1 to 7): 0
```

Number of CSV files to input (1 or 2)? C-Master allows you to separate the data associated with a C-Master data header from the lithology data (2 file option) or import all the data in a single file (1 file option). If the two-file option is chosen, the **HOLES** file is expected to contain data that would normally be in the C-Master header file. That is, data that is relevant to the description of the hole itself, not the contained lithology data. The second file, the **LITHO** file, contains lithology specific data and sufficient other information fields to allow the data between the two files to be “linked” by common data. Shown below the files selection is the folder into which the log files will be created.

To change the files or the folder, click on the white quick-fill buttons to the right of the names. A standard Windows dialog will be shown, and you can select your data there. You can have C-Master create a folder, if you so choose.

Type of file to import You can choose comma, tab, or some other character, depending on how your data is configured. If you choose alternate character, there is a spot for you to type the character.

INPUT in State Plane... If you chose the header items that converts State Plane coordinates, you will supply here the State Plane zone code (4 characters) that matches your data. This is will be used if the State Plane zone field contains no data.

Search USGS Standard quad file for coordinates? If selected and coordinates have been imported, the data will be searched and, based on the coordinate, the standard USGS topo name and state will be displayed. If you have also selected to **not import** the quadrangle name, then this option will

automatically search the topographic quad translation file, choose the appropriate C-Master compatible name, and assign this quadrangle, state, and scale code to this log.

Coordinates – Assume NAD83 datum for coordinates This will set the datum that is used for coordinate conversion. It also sets the default datum for each log. You cannot mix datums in the imported file

Are thicknesses cumulative? If the thickness data associated with each lithology are cumulative, then answer this “Y”.

Meters: If the data to be imported is entered in metric units, answer “Y”. You cannot mix metric and English measures in a single import session.

Using CODE versus English Phrases? If the lithologies are identified in Ferm Code, answer “Y”.

Mark non-blank Code/English as properly coded? If you do not wish to run the coding process on the log, answer in the affirmative. If Code/English is blank (see previous option), then the lithology is marked as uncoded.

Select naming style for logs that are created: You can (1) choose the Generic Key (as created by the Export function), (2) use the original file name (as created from the Export function), (3) use some other distinguishing field (for example, the drill hole number), or (4) have the program assign a sequential but unique filename. Usually, a drill hole number is available and unique for data not created by C-Master. The choice is yours.

Use Original: Read the Original file...: If you have selected option 2 (Use Original File Name), then this option will allow you to read this exact file to pre-load the fields in the log. By selecting the header data on the next screen, you can over-write this default data, in effect merging the original log header with your imported data.

Perform a trial Import (no files created)? This will allow you to perform the entire sequence, looking for problems in the data, etc. without generating any C-Master compatible logs. This is a good way to make sure that your choices and label changes (see below) were correct.

Set Coding Region for Batch: This will force the coding region to be set for each log as it is being created from the raw data. The default of 0 indicates no region has been set.

You then have a menu block to choose what actions you wish to perform. It is suggested that you load your template first (this will set the options) first. If you don't have a template, then set your options, then select Option 3 (select fields for importing). This will get your options in sync with your data files. Then, save your selections as a template (Option 2). Choose your files and folder, then select Option 4 (Start processing).

For this example, we are importing an existing C-Master exported file (2 file option) to illustrate all the possible options. We will also set the State Plane zone to KYS and use naming option 2 (Original File Name). We then select Option 3 so we can make a few tweaks to the input labels.

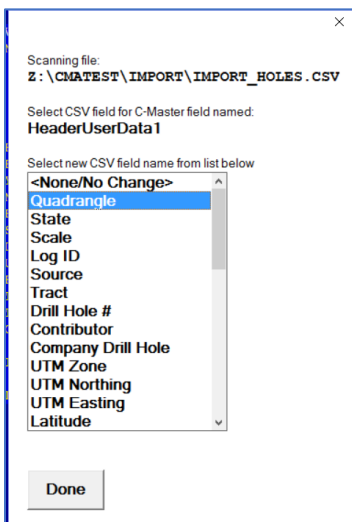
S	X	L	T	HOLES	fields (reference)	CSV File Header
1	Y				Quadrangle (1)	QUADRANGLE
2	Y				State (2)	STATE
3	Y				Scale (3)	SCALE
4	Y				Log ID	LOG ID
5	Y				Source (5)	SOURCE
6	Y				Tract (6)	TRACT
7	Y				Drill Hole # (7)	DRILL HOLE #
8	Y				Contributor (8)	CONTRIBUTOR
9	Y				Company Drill Hole (9)	COMPANY DRILL HOLE
10	Y				UTM Zone (10.1)	UTM ZONE
11	Y				UTM Northing (10.2)	UTM NORTHING
12	Y				UTM Easting (10.3)	UTM EASTING
13	Y				Latitude (11.1)	LATITUDE
14	Y				Longitude (11.2)	LONGITUDE
15	Y				SP Zone (12.1)	SP ZONE
16	Y				SP Northing (12.2)	SP NORTHING
17	Y				SP Easting (12.3)	SP EASTING
18	Y				State of Hole (17)	STATE OF HOLE
19	Y				County (18)	COUNTY
20	Y				Township (19)	TOWNSHIP
21	Y				Ground Location (20)	GROUND LOCATION
22	Y				Hole Elevation (21)	HOLE ELEVATION

S	X	L	T	HOLES	fields (reference)	CSV File Header
23	Y				Hole Angle (21)	HOLE ANGLE
24	Y				Elevation Method (22)	ELEVATION METHOD
25	Y				Logger Name (23)	LOGGER NAME
26	Y				Year Drilled (24)	YEAR DRILLED
27	Y				Hole Depth (25)	HOLE DEPTH
28	Y				Bed Region Code (26)	BED REGION CODE
29	Y				Upper Bed (27)	UPPER BED
30	Y				Upper Bed Number (27)	UPPER BED NUMBER
31	Y				Lower Bed (28)	LOWER BED
32	Y				Lower Bed Number (28)	LOWER BED NUMBER
33	Y				Kind of Record (29.1)	KIND OF RECORD
34	Y				Project Code	PROJECT CODE
35	Y				HeaderUserData1	HEADERUSERDATA1
36	Y				HeaderUserData2	HEADERUSERDATA2
37	Y				Original File Name	ORIGINAL FILE NAME
38	Y				Generic Key	GENERIC KEY

Field number unique to each log: **36**

Field number for FILE NAME: 38

Here is where we chose the labels that we expect to be present in the CSV files. All those items that are defined in a C-Master Header are shown with their corresponding item number. The column labelled SEL are those items that we wish to include in the import, the XLT column will allow us to apply a translation to that field. The field number for uniqueness is set to the Drill Hole # (field # 7), and the field to be used as the filename for the log file is set to 37 (Original File Name). We will also translate a field named Quadrangle and place the data in HeaderUserData1. This will translate the data in the CSV file whose label is "Quadrangle" and translate it according to a file (supplied later).



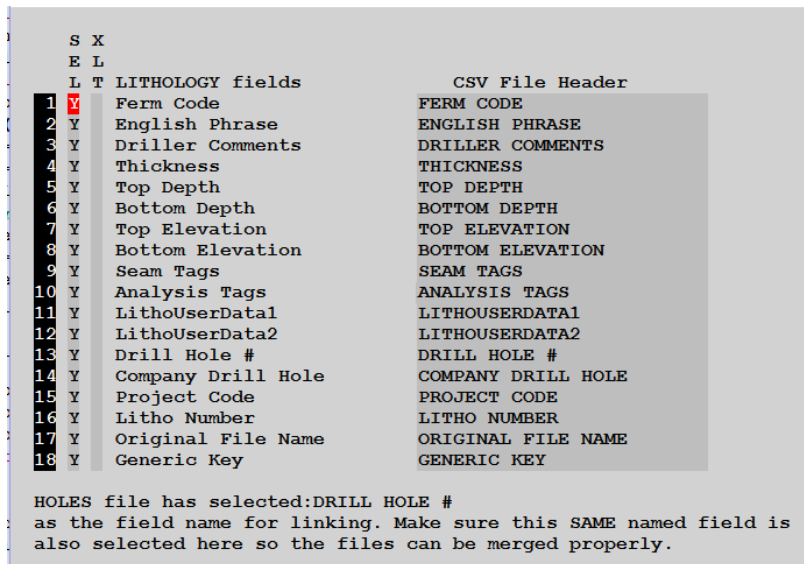
The Header data item shown was selected by clicking on the white "35". Clicking this will bring up a selection menu based on the file chosen in the previous menu screen. The file being used and the C-Master item to be changed are shown, followed by a pull-down menu for your selection. The CSV file header line is scanned and presented to you in this pulldown, allowing you to choose the column header without re-typing it. This feature will only work if you have chosen a File 1 from the previous menu. This selection process also works for the Lithology data. For lithology data, if a File 2 is not specified (single CSV import), the File 1 is used to create the pulldown selection.

Stated another way, select your files used to import data, then edit the fields, and select the CSV header item to be used from the pull-down menu that is based on your CSV file. Then save these selections in a template for later use.

The Scale Code (Item 3) is unique. You can either use the C-Master scale codes of 1, 2, or 6, or you can have the scale of 125000, 24000, or 62500. If you are using a non-standard scale, you must put the actual scale in this field. It will be identified as a type of 9 and reflect the scale entered (i.e.123456).

Note that the label QUADRANGLE shows twice, once in its “normal position (item #1) and to populate the header variable HeaderUserData1. There is not a problem grabbing the same data more than once.

Important Note: The fields named HeaderUserData1 and HeaderUserData2 are special in the import process. The standard for C-Master data is upper case text, and all data that is transferred to the C-Master Header should be in upper case. However, the User Data fields (both here and in the Lithology records) can contain URL’s, file names, etc. that may need to retain the upper/lower case as originally input. When these fields are used as a linkage field, however, the linkage comparisons are performed in upper case.

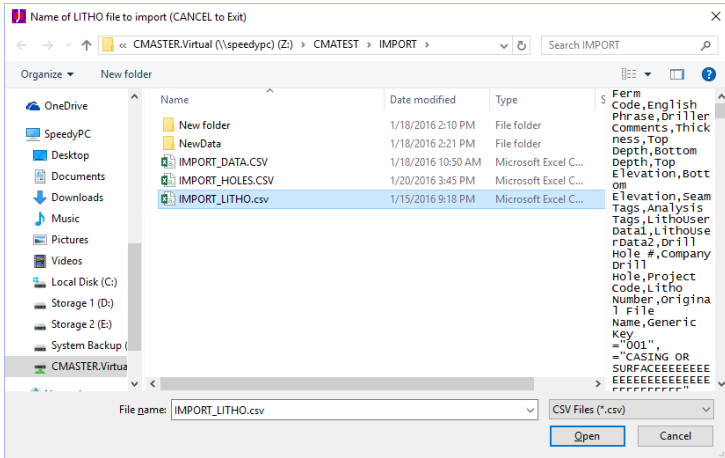


For the lithology data, the Drill Hole # (field 13) matches the field from the header data, so the link is therefore established. The link field must have the same name in both files if the 2-file option is used.



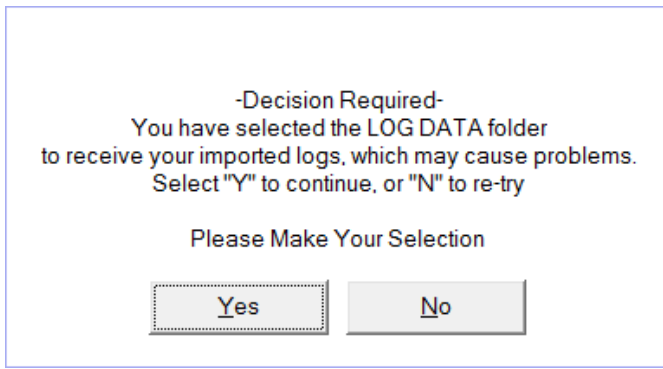
Because we have asked for a translation to take place, we must specify the translation file to be used. This file contains a translation from the USGS standard names to the shortened C-Master names. We specify the FLIP option because we will perform the selection from the shortened name to the USGS full name (i.e. right-to-left).

The menu options will allow us to re-enter/specify all the options from the beginning, or to continue process steps. Option 2 will allow you to save the selections as a template. You can use this template later to speed the selection process. This can save you a great deal of time and effort; especially if you receive data from the same source often, you can speed the process of ingesting the data. Also, it will help you spot problems with your data source, like inconsistent header labels, etc. Basically, it will automate much of the effort that would otherwise be associated with editing files manually to make the header data match, or to manually perform the translations processes.³⁰

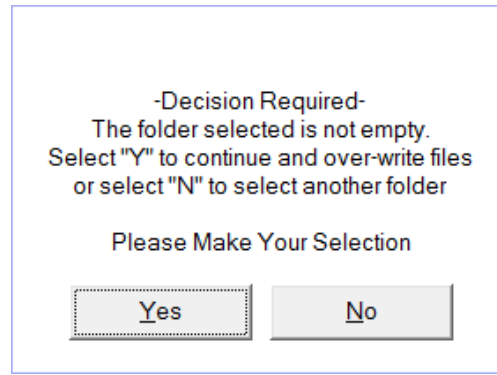


If we are importing data that does not have all the C-Master fields, you can specify a Log Template (Option 4) to be applied to every imported log. In this way, data that is common to the imported logs can be set appropriately using the Log Template. We are choosing to proceed to the processing (Option 5). The first check to be performed is whether you are storing logs into your default LOGDATA folder, and if you have selected the Original File Name as the chosen name. If this is the case, you will be asked to verify that this is what you wish to do. C-Master will attempt to save the old logs in the BACKUP_LOGS folder before overwriting the log with the imported data. The destination folder for the logs is also checked to see if it is empty. If not, you will be prompted to verify that this is what you wish to do.


³⁰ If you need help with this feature, or want additional information, contact CJD Software directly.



OR



Important Enough To Repeat: If there are files in the output folder, you will be warned that there are files that might be overwritten. You will have to choose whether to use this folder. Please be aware that if you have selected “Use Original File Name” and the folder for import is your LOGDATA folder, you may over-write existing logs³¹. As part of the process that retrieves the original data, a copy of this data will be made in the sub-folder BACKUP_LOGS before the data are imported. Every possible attempt will be made to save your original data, should you decide to rebuild it from your imported data. ALWAYS make a backup of your data before performing such an import.

 IMPORT_CSV: Verify the files to be processed

Folder for LOGS to be written: `.\IMPORT`

HOLES file for data input: `Z:\CMATEST\IMPORT\IMPORT_HOLES.CSV`

LITHO file for data input: `Z:\CMATEST\IMPORT\IMPORT_LITHO.csv`

Will use GENERIC KEY field as file name

Perform a trial import (no log files created)? **Y**

1 = Begin Processing

2 = Re-enter parameters, fields, and files

3 = Exit without processing to previous menu

ENTER OPTION BY NUMBER (1 to 3): `0`

The program will pause at this screen and display the file(s) to be processed, the folder into which the logs will be placed, and a couple of options. You can also go back and re-specify the files/linkages if you desire, or just exit to the previous menu.

It is important to note the “Trial Import” option. It is always worthwhile to perform a trial import on a new data file, or if changes to the header fields has been performed. Once the trial is completed, the PDF report will show, in detail, potential problems that you might encounter when/if you perform

³¹ It is **always** a good idea to make a backup of your LOGDATA folder before you attempt to save logs in this over-write mode.

the next step and physically import the logs. For example, if you have made a typo in defining the header field name, the CSV file will not be properly converted. Once the basic format of the file and the headers have been processed, the processing proceeds. These fields are checked for errors. Numeric fields are scanned for non-numeric data, but not for valid ranges. Some fields require more checking, like converting coordinates and these may generate errors as well. If coordinates are being processed, processing will also include searching the complete list of USGS 1:24000 quadrangles for a coordinate match, and the name and state found will be reported, along with the calculated Lat/Lon for a secondary check on the location. For example, a set of logs thought to have all been contained in a specific quadrant might be found located in some other quadrant (NAD 83 vs. NAD 27, or improperly entered coordinates), or not in a USGS quadrant at all (coordinate error that resulted in a Lat/Lon result of [0,0]). Or, the quad/state/scale provided is not one of those on your system. To be sure, some errors would be expected, such as no Source or Contributor when none is available in the CSV file, or if missing certain header fields that are not critical but are checked during the processing of the CSV file.

If you are using the ORIGINAL FILE NAME field as the file name (and it is a C-Master filename), you can select whether to read the original file and merge the imported data into this file³². The original file will be saved to the folder BACKUP_LOGS and renamed with date/time of this import process. This is to prevent a system problem from being found and destroying the original log file. This backup only occurs when the folder into which the imported file will be stored is the same as your LOGDATA folder. Remember, all the original lithologies will be replaced by the lithologies in the imported file.

If you are not attempting to store the original file names back into the LOGDATA folder, you will be asked if you wish to immediately process all the created log files and place them in your C-Master system. If you answer in the affirmative, you have a choice of either using the quadrangle information stored in your intermediate logs or re-assigning a new quadrangle name to the ENTIRE batch. If you choose the former (let the log itself determine the quadrangle assignment), the quadrangle is checked to make sure it is a valid quadrangle. If it is not, an error is generated, and the next log is processed. If you have chosen the REFILE option, your choice of quadrangle is verified to be valid, and processing continues. A duplicate log check is performed, but duplicate logs can be saved.

If you wish to change your mind for a trial import, you can change before you begin processing.

Once processed, you can look at the Status Window for any messages that might be relevant, and in your target folder for the logs created.

³² The merge reads the original file first, then processes the imported file to change those selected fields. For the lithology data, all the lithologies are replaced with the imported data.

In summary, there are 9 steps in the Import process; they are:

1. Load an existing template (optional);
2. Specify the file(s) to be processed. The header line will be processed to make sure that all the fields desired are present.
3. Specify the folder into which the logs will be stored.
4. Specify certain data and formatting options to be during the Import processing;
5. Specify the HOLES data items that should be present (and if a translation should be applied), select the field for uniqueness (and filename [opt]);
6. Specify the LITHOLOGY data items that should be present (and if a translation should be applied);
7. Specify the translation files to be used (if any)
8. Save the current label selections and translations as a template (optional)
9. Verify the files to be processed, folder for the created logs, etc. Begin processing, or go back to re-specify

Data will be validated, and limit checked as it is processed. The progress of the import processing is shown on the Status Window.

Various Errors During Import

Sometimes the data isn't quite you expected. The Import process does extensive error checking to help you identify endemic problems. Errors will terminate further processing. Warnings will be given, but processing will continue. Some of the potential problems are:

1. ERROR: Link field defined in the header data does not exist with the same name in the litho fields. This can occur because of a typo, and you will be asked if you wish to retry the selection. This error can only occur when the two-file import is being processed.
2. ERROR: The link field data does not exist. The field used to determine log uniqueness cannot be found in the data file. This might affect either the HOLES or LITHO file.
3. ERROR: Cannot create temporary file for HOLES data. This might occur if you do not have write access to the data folder, or the disk is full.
4. ERROR: Cannot find the field for making file names. You can specify a field that is not to be imported, yet can be used as a file name. If the label for that field cannot be found in the header data, this is a severe error and must be corrected before continuing.
5. ERROR: Premature end-of-file on xxxxxx. There are no data records in the indicated file.
6. ERROR: Error reading original file. If the original file cannot be read, then the process of saving the original data cannot be performed, and the process is terminated.
7. ERROR: Attempt to write a backup file. If the backup file cannot be written, the process will terminate.
8. WARNING: No match in the HEADER line to the field(s) found in the file(s). This can be as simple as a typographic error in either the header definitions just entered, or something "wrong" in the data file. The best response is to correct the problem at the appropriate source and re-try. The error is identified with the file in which the error occurred.
9. WARNING (2 file option): There exists a LITHO record whose link field cannot be found in the HOLES file. This can be referred to as an orphaned litho record (no parent). This error will occur for as many lithology records there are that refer to missing HOLES data.³³

³³ The Import processing does not identify HOLES data for which there were no matching lithologies, nor lithologies that may have been out of sequence and caused a log file to be created twice.

10. WARNING: Number of fields detected is different from the header. The data are expected to have the same number of data fields as there are header fields. When data are exported to a CSV file, if there are commas in the data, then this will be interpreted as a field delimiter, and the count of fields is greater than the software expects. If you have commas in ANY data field, then you should consider having the data delimited by TAB characters or some other delimiter.
11. WARNING: Data Error. When reading what should be a number, some non-numeric data is encountered.
12. WARNING: Cannot translate header data. If a translation has been requested and the data to be translated has no match in the translation file, this warning is issued, and the data that cannot be displayed is shown.
13. WARNING: UTM Conversion error. If you have requested a match of the data by coordinate to the USGS quadrangle database, this indicates the coordinates have a problem and will not yield the desired results.
14. WARNING: Cannot open or process the USGS Translation file.
15. WARNING: CODE of [xxxxxx] has a syntactical problem. The data form of the code does not meet the criteria of a Ferm code.
16. WARNING: Coordinate Conversion Error. Coordinate data, as entered, cannot be converted properly.
17. WARNING: No valid coordinates. UTM Zone as calculated or input is zero (invalid).
18. WARNING: Log not saved. An error occurred when trying to save the log header data to the destination folder. The name of the file is shown.

Sample Output (Trial Mode)

```

UNIQUENESS Data:HNDSH0001_KY
Processed NAD83 coordinates as LL          37.5944986900          -82.7240799900
onverted NAD83 coordinate: UTM=  17 4162221.8  347794.8
USGS Search: Coordinates Lat:   37.594491 Lon:  -82.724080 Matched to Harold, KY
Writing out log=HNDSH0001_KY          109 lithologies using file name:[hndsh0001_KY]
Absolute path=[.\IMPORT\HNDSH0001_KY]
WARNING: Tract [] was not found in Tract file.
WARNING: Upper bed code/region of      /APPL not found
WARNING: Lower bed code/region of      /APPL not found
DEPTH OF LOG IS      326.5999 FEET(     99.5476 METERS)
DEPTH GIVEN AS      330.0000 FEET(    100.5840 METERS)

```

Importing Logs (CIMPORT for C-Master Formatted Lithology Logs)

The importation of logs from an existing C-Master installation can be quite easy. There are a few things to be aware of. If you have performed maintenance on the Quad or Master Catalog and need to get logs put back into the C-Master system, then the Import function is the way to do it. Refer to **Appendix E: Making Fixes to Your Quadrant and Master Catalogs** for more information and suggested work flows.

Importing C-Master logs is as easy as selecting logs from a source. If there are many logs especially from external sources (whose data quality you cannot control), it may be preferable to import small batches (less than 50) at a time. That said, the program limit for the number of logs to import is currently 8192.

The menu for selection of logs is designed to allow you maximum flexibility. As such, it deserves a close look to make sure you can get the desired results.

Import C-Master file(s)

To import or validate a file (or files), make sure the folder name is set properly (Option 1) then set the filename pattern (default *.*). To select the files you want choose Option 2, or, select the individual files you wish to import (Option 3). Keep repeating this until you have selected all the files you need to (one big batch).

You have currently selected 200 files and there are 200 of those enabled for IMPORT

Wild-Card Search - Folder: Z:\CMATEST\LOGDATA

Wild-Card Search - Filename Pattern: KY003*

To use the wildcard search, first select the folder (Option 1 below). This folder should contain the logs that you wish to import. Then set the wildcard filename (above) manually with the wildcard pattern that will find your files of interest. For instance, to import all the files in the folder use the pattern *.* To select only those files whose names start with KY05A, use the pattern KY05A*.* Refer to the User Manual for additional details and examples.

- 1 = SELECT THE FOLDER where your Import files are located
 - 2 = Select file(s) using WILDCARD SEARCH (folder and pattern above)
 - 3 = Select file(s) INDIVIDUALLY from a folder
 - 4 = VALIDATE current selections
Depth Tolerance: 0.1 feet Distance tolerance: 100 meters
 - 5 = VIEW the list of file(s) (and optionally deselect files)
 - 6 = Begin IMPORT using current selected list and tolerances above
 - 7 = EXIT to previous menu
- ENTER OPTION BY NUMBER (1 to 7): 0

Some helpful instructions are included in this menu because the import of files might be a rare even for you, and to use wildcard searches for file may be something for which you would wish a reminder. If you are using a wildcard search for log files, then you'll be using Option 1 to set the folder that is to be searched, then manually entering the search pattern (currently highlighted above)³⁴. This search yielded 200 matches.

Option 5 (View the current list) is used to exclude logs from being imported. You may find this useful when many logs have been selected, but some of the logs are not of value, or may duplicate existing data. The Source and Contributor DDH of the logs to be imported are shown to assist you in this determination.

Select/Deselect Files for Import

Number of files in Master List: 200
Number selected for import: 194

Select/Deselect log(s) below. SELECTED Logs will be marked
(does not physically remove them from the Master List)
Only MARKED logs will be imported or validated

Sort Files? Done

Import this file?-File Name	Source DDH	Contrib DDH
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY003001	43	43
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY003002	44	44
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY003003	SS-A	SS-A
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY003004	45	45
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY003005	81	81
<input type="checkbox"/> Z:\CMATEST\LOGDATA\KY003006	82	82
<input type="checkbox"/> Z:\CMATEST\LOGDATA\KY003007	83	83
<input type="checkbox"/> Z:\CMATEST\LOGDATA\KY003008	136	136
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY003009	605-85	605-85
<input type="checkbox"/> Z:\CMATEST\LOGDATA\KY00300A	602-85	602-85
<input type="checkbox"/> Z:\CMATEST\LOGDATA\KY00300B	DB-6	DB-6
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY00300C	DB-7	DB-7
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY00300D	DB-8	DB-8
<input type="checkbox"/> Z:\CMATEST\LOGDATA\KY00300E	DH-1-86	DH-1-86
<input checked="" type="checkbox"/> Z:\CMATEST\LOGDATA\KY00300F	DH-2-86	DH-2-86

Option 5 will show all the logs that are currently in the list. I excluded some logs by clicking the checkbox next to the file name. These logs have been deselected and will not be imported.

You can also re-select the log if you've made an error and deselected it by mistake. In this way, you can see which files have been selected and adjust the list before you begin

³⁴ To select all the files in the folder, use *.*. If you want all the non-project logs that start with KY05A, use "KY05A*.". If you wanted all the KY05A project logs for projects AAA to AAZ, use "KY05A*.AA?".

the import. You can select or deselect as many or as few logs as you'd like.

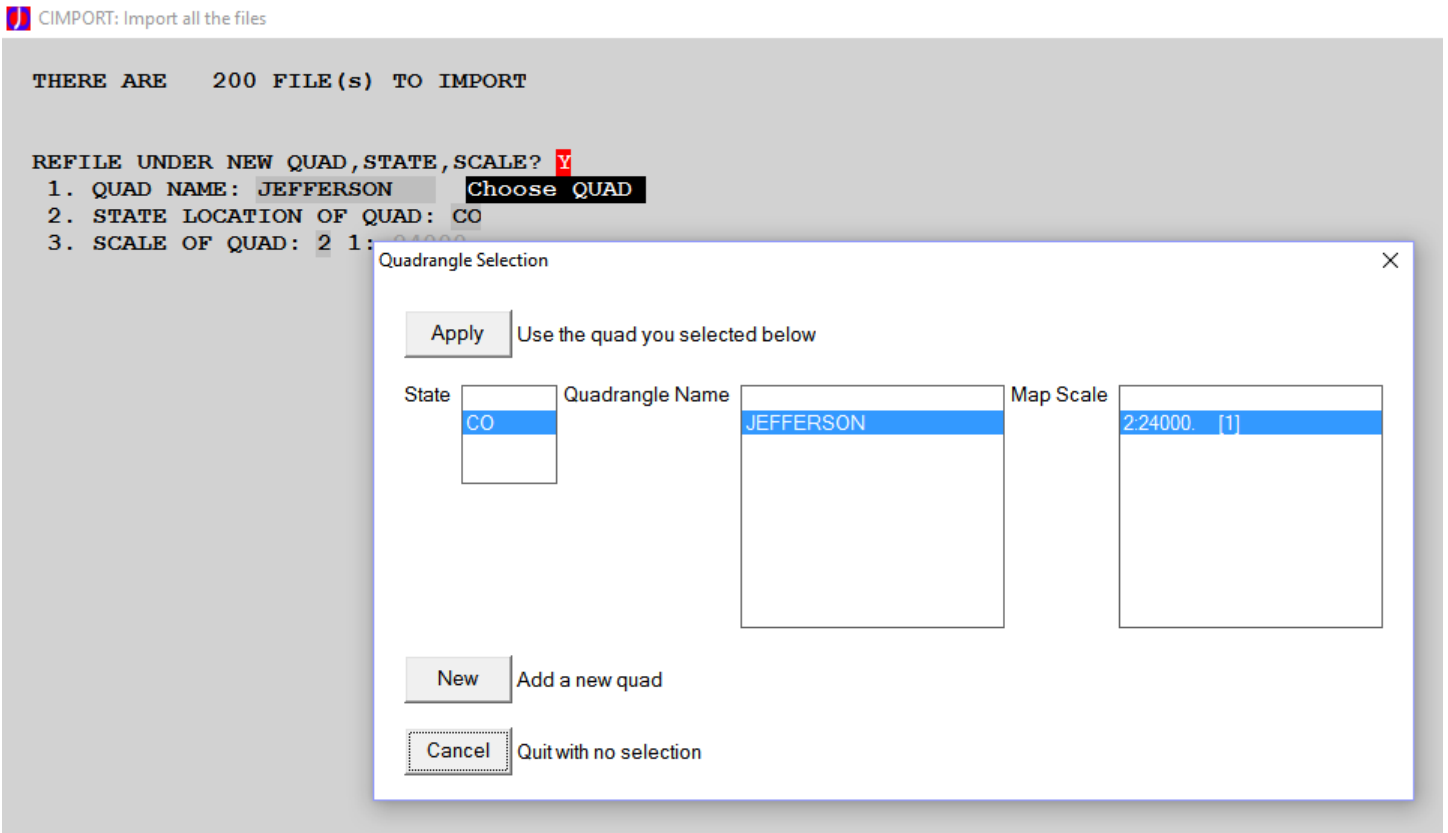
Also, the order of the files as shown will be the order by which they are imported into C-Master. This enforces the proper order if you wish to rebuild a quadrant's worth of data from the original files, for example. Refer to the [C-REPAIR](#) program for further details of the catalog editing and rebuild process.³⁵ The list is sorted file name. This will insure that similar logs will be grouped for import together, maintaining their relative placement with each other. This is especially useful if you wish to merge other data in a specific order/sequence.

```
=====>BYPASSING Z:\CMATEST\LOGDATA\KY003001 File#=      1 <=====  
  
=====>VALIDATING Z:\CMATEST\LOGDATA\KY003002           File#=      2 <=====  
WARNING: This log may be a duplicate of an existing log.  
WARNING: Tract [] was not found in Tract file.  
**Close (    0.) meters from BLDS           /KY /1:  24000. ID#    2 Proj:  
  
=====>BYPASSING Z:\CMATEST\LOGDATA\KY003003 File#=      3 <=====  
  
=====>VALIDATING Z:\CMATEST\LOGDATA\KY003004           File#=      4 <=====  
WARNING: This log may be a duplicate of an existing log.  
WARNING: Tract [] was not found in Tract file.  
**Close (    0.) meters from BLDS           /KY /1:  24000. ID#    4 Proj:  
  
=====>BYPASSING Z:\CMATEST\LOGDATA\KY003005 File#=      5 <=====  
  
=====>VALIDATING Z:\CMATEST\LOGDATA\KY003006           File#=      6 <=====  
WARNING: This log may be a duplicate of an existing log.  
WARNING: Tract [] was not found in Tract file.  
**Close (    0.) meters from BLDS           /KY /1:  24000. ID#    6 Proj:
```

Selecting a validation run (Option 4) is a good thing to do before you commit to actually importing the logs; it spots problems with individual logs before they are entered into or affect your Catalogs. Validation reads the logs to be imported and performs a series of checks on the internal data within the log. Specifically, the Quad, State, and Map Scale, the Source/Contributor, the Tract and the Bed Codes are verified against your CONFIG options and files. In addition, all the lithology records are read, and the depth of the log is compared to the depth entered in the header (with a tolerance). The log coordinates are recomputed as well. Using these, the distance to any other drill hole that currently exists in your catalog (with a distance comparison criterion that you can select) is also computed, just in case the log might be a duplicate of an existing log. The seam tags are all processed to make sure they comply with the currently selected tagging format. The lithology code is checked to see if it is a valid Ferm code. Once the Validation is complete, you will be presented with a listing of the success/failure of the validation process. From here, if the logs are good to import, you can select Option 6 to begin the import process. This will also generate a report showing the original file name

³⁵ Once you have clicked the PROCESS button, the logs excluded from the import are removed from the list. Also, since the sort is performed on the full path name, if you add logs from different folders or devices, this will affect the order in which the logs are imported.

and the new name to which it was assigned. Any errors encountered in the import will also be noted, and you may correct these later.



Option 6 will allow you to change the quad/state/scale (aka REFILE) for the **entire** batch to be imported. If you do not specify that you wish to “re-file” under a new quad/state/scale, then the quad/state/scale of the **original log** must exist in the Quad Catalog prior to importation.

If you are importing logs from outside your organization³⁶, it is strongly suggested that you perform the validation process first, then import the logs (with the REFILE option selected if necessary). If there are logs whose quad/state/scale are in question or you know there are different quadrants involved, import these as smaller batches and then choose the REFILE option when performing the import. Continue with each set of logs from each different quad/state/scale in a similar manner until all the logs have been imported.

Once you have performed the import, the import report will be shown for your review, this function will exit, and you’ll be returned to the previous menu.

³⁶ It is always advisable to make a backup copy of your Master Catalog and Quadrant Catalog before attempting a massive log importation process. In this way, should the process go wrong, you can always restore these two catalog files and try again, just as if nothing had happened.

Bed Code Tagging

Bed codes are codes that are intended to designate the stratigraphic position of rock units within a project set of logs. The primary function of bed codes in the C-Master system are as reference points in the CPROCESS programs where information relative to the tagged positions can be processed. Bed codes are applied to lines of entry in logs through the litho edit portion of the CANTED program (Section 5.2.3) and consist of two parts: 1) the designator occupying up to four characters and a modifier³⁷ of up to four characters. Designator and modifier are separated by a space and, if more than one tag is entered on a single line of entry, they are also separated by at least one space. Bed codes listed in Appendix B can be used as designators, but other bed codes can be generated by the user. If you generate your own bed codes, the code should be unique for that region. The modifier, generally indicating bench identification, may consist of four characters.

Although bed codes can be applied to any kind of rock unit, the original use was the designation of coal seams. Examples given below will illustrate applications of bed code tagging. The examples shown are a suggestion for usage. You may have other needs, and C-Master will allow you to do whatever you like with the tags. C-Master will perform basic checking based on a doublet being present and the tags/modifiers being only a max of 4 characters long.

The following examples indicate how the codes or modifiers can be used; you can choose any system that works for you! While these examples are specifically for coal, you could use a similar system for limestone or any other mineral extraction.

Single Benched Seams

The simplest example is a seam consisting of one bench of coal as follows:

	Litho	Designator	Modifier
	Shale 5.0'		
SEAM	Coal 6.0'	XYZ	0
	Shale 5.0'		

The single tag "XYZ" is applied to the entry and the modifier is zero. Zero is used for a general bed code or where the bench modifier cannot be specified. In the CPROCESS program, specification of reference points at "TOP" and "BOTTOM" of "XYZ" will permit processing of elevation and thickness data for the seam.

³⁷ The usage of a modifier is the default. If you decide to use just the descriptor (bed code) and no modifier, you can include the CONFIG command 'NODOUBLETSREQUIRED'. This is a global selection; it will apply to all logs.

Multiple Benched Seams

Many coal seams consist of more than one bench or layer of coal and, if a general designator is used, the tag is placed only on the upper and lowermost benches.

		Designator	Modifier
	Shale 5.0'		
	Coal 2.0'	XYZ	0
	Shale 1.0'		
SEAM	Coal 2.0'		
	Shale 1.0'		
	Coal 2.0'	XYZ	0
	Shale 5.0'		

Reference points in CPROCESS specified as "TOP" and "BOTTOM" of XYZ will recognize a position at the top of the upper coded entry and bottom of the lower code.

In other multiple benched seams, where each bench can be widely recognized in a set of logs, the benches can be tagged using single digit modifier.

		Designator	Modifier
	Shale 5.0'		
	Coal 2.0'	XYZ	1
	Shale 1.0'		
SEAM	Coal 2.0'	XYZ	2
	Shale 1.0'		
	Coal 2.0'	XYZ	3
	Shale 5.0'		

In this case, selection of reference points in CPROCESS will depend on what information is needed. If data for individual benches is required, the TOP and BOTTOM of XYZ 1, XYZ 2, and XYZ 3 should be specified. In other data sets, the recognition of benches may be unimportant, and the seam may be designated from the TOP of XYZ 1 to the BOTTOM of XYZ 3. In such cases, however, it is more efficient to designate the TOP of XYZ to the BOTTOM of XYZ. Unless the modifier is specified in CPROCESS, only the designator will be recognized.

Finally, some seams may consist of two or more benches that are of different recognizable stratigraphic positions, hence:

		Designator	Modifier
	Shale 5.0'		
	Coal 2.0'	XYZ	1
	Shale 2.0'		
SEAM	Coal 2.0'	XYZ	2
	Shale 1.0'		
	Coal 2.0'	PQR	1
	Shale 5.0'		

In such cases the entire seam can be designated from the TOP of XYZ 1 or XYZ to the BOTTOM of PQR 1, or PQR.

Merged Seams

In some sets of logs, benches which can be recognized individually in part of the area are merged into one bench in another part. If, in the previous example, XYZ 1 and XYZ 2 are merged, tagging can be designated as follows:

	Shale 5'	
	Coal 4'	XYZ 1 XYZ 2
SEAM	Shale 1.0'	
	Coal 2.0'	PQR 1
	Shale 5.0'	

Reference points given in CPROCESS concerning the merged bench can be from the top of XYZ 1 to the bottom of XYZ 2 or more simply from the TOP to the BOTTOM of XYZ.

However, if all benches in the above example are merged, as this case:

	Shale 5'	
SEAM	Coal 6	XYZ 1 XYZ 2 PQR 1
	Shale 5'	

The reference point designation should be from the TOP of XYZ 1 or XYZ to the BOTTOM of PQR 1, or PQR. The total number of characters and spaces for multiple tags cannot exceed 40.

Seams With "0.00" Thickness

In some sets of logs, a given bench or seam in some logs may not be present at all, either due to pinch out, channeling or other causes. In such cases, it may be desirable to have this data recorded by Projects and Processing. Since there is no coal entry to which the tag may be applied, it is necessary to insert a "0.00" thickness and "020" code (coal) entry through the litho edit. Inserting such an entry can be done in two ways depending on circumstances. If an underclay or other similar rock marks the position of the pinchout, a line coded "020" with "0.00" thickness and the tag can be inserted between the underclay and the next overlying rock entry. If, on the other hand, there is no obvious place where the coal should be (e.g., the coal has been totally eroded by a channel sandstone), it will be necessary to delete the entry for the rock into which the coal has disappeared (sandstone in this example) and insert three new entries into its place. One entry represents the rock above the assumed tagged position, the second the tagged position itself and the third representing the rock below. The example below illustrates this situation.³⁸

<u>ORIGINAL LOG</u>	<u>NEW LOG</u>
124 10.0'	124 10.0'
541 70.0'	541 60.0'
124 10.0'	021 0.00' <i>this is your zero thickness seam</i>
	541 10.0'
	124 10.0'

³⁸ Some commercial software does not like zero thickness lithologies. If you EXPORT data to one of these programs, C-Master can place a very thin lithology in its place (0.0001 feet).

Other Tagging Systems

The examples of tagging with bed codes and modifiers given above represent one possible system in which geological aspects are emphasized. Within the constraints of the bed designator and modifier, however, the user(s) are at liberty to use any system that best fits their particular need. For one example, geological differentiation of benches may not be as important as the characteristics of the seam that is to be mined. In such a case the designator may be the same as the geological code, but the modifier may be used to indicate alternative sets of benches in an underground or surface mining plan. For example, the following section shows two alternatives for underground mining modified by "U" and one for surface mining modified by "S".

	Underground	Surface
Shale 5.0'		
Coal 2.0'	XYZ 1U XYZ 2U	XYZ 1S
Shale .2'		
Coal 2.0'	XYZ 2U	XYZ 1S
Shale 1.0		
Coal 2.0'	XYZ 1U	XYP 1S

Note that, in the surface mining option, the lower two-foot bench has been given a different tag (XYP) to differentiate it from the upper (XYZ) seam. Also note that, in this example, the codes have been applied to the coal benches. In many mining examples the "0.00" thickness type tags at the top and bottom of seams may be more convenient to designate alternative mining schemes.

Potential Tagging Problems

A potential problem with a flexible system of tagging occurs where there are many users in a team, and each is generating his own tagging system which is unknown to other members of the team. In such a case, it is advisable that team members agree in advance to rules to be followed and each member follow these rules. In this way, all members of the team will be able to recognize the meaning of each other's work. Even after the project is concluded and the project material archived, later workers will be able to examine the data and understand what has been done.

Searching Logs for Reference Points

The algorithm used to establish reference points for Projects and Processing are both straightforward and complex. The straightforward portions are described first below, then we can explain the more complex parts.

It is important to know the criteria for reference point selection. The rules are:

- Reference Point 1
 - Searches for tags search each lithology unit in order (from the top or bottom as specified by the user)
 - The bedcode file is searched for the indicated tag, and the bed code number is used for the comparisons
 - Searches for rock types search each lithology unit in order (from the top or bottom as indicated). A thickness can be input to limit the matching based on unit thickness.
 - Search by distance will identify the lithology in which the desired depth is found.
 - Search by elevation uses the top of hole elevation of each log to determine the equivalent “Search By Distance” criteria
- Reference Point 2:
 - Searches for tags search each lithology unit in order (from the top or bottom as specified by the user)
 - The bedcode file is searched for the indicated tag, and the bed code number is used for the comparisons
 - Searches for rock types as reference point 2 are always relative to the first reference point. As such, the specific lithology unit at which reference point 1 was found is not used, but the search (up or down) is made from the previous or next litho unit (depending on direction). A thickness applied to the subsequent lithologies can be used to limit the matching based on unit thickness.
 - Search for distance will identify the lithology at the desired depth, either up to or down from reference point 1
 - Search by elevation uses the top of hole elevation of each log to determine the equivalent “Search By Distance” criteria
- Reference Point 3:
 - Searches for tags search each lithology unit in order (from the top or bottom as specified by the user)
 - The bedcode file is searched for the indicated tag, and the bed code number is used for the comparisons
 - Searches for rock types at reference point 3 are always relative to the second reference point. As such, the specific lithology unit at which reference point 2 was found is not used, but the search (up or down) is made from the previous or next litho unit (depending on direction). A thickness applied to the subsequent lithologies can be used to limit the matching based on unit thickness.
 - Search for distance will identify the lithology at the desired depth, either up to or down from reference point 2
 - Search by Elevation uses the top of hole elevation of each log to determine the equivalent “Search By Distance” criteria
 - Search between Reference Points 1 and 2 is done as a percentage of the total distance. For example, to split the distance in half, use 50 for 50%.

When searching by absolute elevation, if the desired point is not within the log, the reference point will be marked as “Not Found”.

See below for an image of the reference point fields.

Logs that have Tags

Logs that have tags are easily searched. Refer to Bedcode Tagging for explanations of tagging systems. Simply stated, if you have logs that are tagged, you can establish the reference points easily by choosing the tag and the direction of the search. Some examples of how the tags can be used would be to identify a minable area.

The bedcode file is searched for the indicated tag, and the bed code **number** is used for the comparisons. This allows for searching for seams that have different names, but represent the same lithology.

Select the tag at the top of the minable section, searching from the Top for reference point 1. Select the lowest minable section by its tag, looking for the bottom. You have now defined Interval 1 to contain the rocks within the minable area. From here, you can perform a Rock Interval selection, or compute Rock Units data.

Logs That Do Not Have Tags

You may have a set of logs for which no tagging was done. In cases such as this, you can use the Rock Types to establish the reference points.

Using the previous example, select the Rock Type of the minable material, and choose a minimum thickness required. This will allow you to find the first significant thickness of the material, ignoring thin sections of this rock type.

The second reference point could be by rock type, distance, or absolute elevation. If by rock type, you can search to find the next rock type that defines the end of the minable material (let's assume sandstone, code=500).

If by distance, you could choose a distance that would encompass the entire minable area, then further select using reference point 3 to find a rock type of significant thickness.

Similarly, you can specify the absolute elevation of one or more reference points to perform the initial processing, and other forms of search to extract the information of value.

Examples

As a test of the software, and other capabilities, a set of processing steps was performed to select, then minimize, the log selections.

I have access to a large data set of public domain data. The entire catalog was selected (12,000+ entries) for any log that contains the interval HZ9 to HZ4 in the APPL region. The initial selection found 4,000+ logs that contains one or both reference points.

The process used was:

1. Select all logs that might contain the desired bed code range (using the Catalog Search function).
2. Save the selection as a Catalog Search file
3. Set up the project and sub-project.
4. Use the Catalog Search file to select all the logs
5. Set the parameters used to down-select the logs

```
Current Project Data: Project=AAA Sub-Project:00
Sub-Project Bed Code Range is: Upper BedCode= 122 (# 51 ) Lower BedCode= 10 (# 57 )
NUMBER OF REFERENCE POINTS (0,1,2,3): 3

REFERENCE POINT 1 - Tagged,Distance/Elevation,or Rock type (T,D,R): T
Top/Bottom (T,B): T of TAG: HZ9 Click to select bedcode
Up from bottom, or Down from top (U,D): D
DISTANCE: 0 FEET <==Use Elevation?
Rock Type For Search: Minimum Thickness: 0
001

REFERENCE POINT 2 - Tagged,Distance/Elevation,or Rock type (T,D,R): D
Top/Bottom (T,B): T of TAG: Click to select bedcode
Up/Down from Reference Point 1: D
Distance: 39.25 FEET <==Use Elevation?
Rock Type For Search: Minimum Thickness: 0
500

REFERENCE POINT 3 - Tagged,Distance/Elevation,Rock type,or % (T,D,R,%): D
Top/Bottom (T,B): B of TAG: Click to select bedcode
Up/Down from Reference Point 2: U
Distance: 10 FEET <==Use Elevation?
Rock Type For Search: Minimum Thickness: 0
000

% Of Distance Between Ref 1 And Ref 2: 10

Is this all correct? 
```

These parameters were processed against the entire list and resulted in the following match criteria (one or both reference points defined, section displayed).

Select/Remove Entries from Project Log list

There are 4796 Catalog Entries available

Log Display and/or Removal

Quad	State	Scale	Proj	Log ID	Elevation	Depth	Drill Hole Number	UTM	1?	2?
BLDS	KY	2[1: 24000]		6	1350.000	0.000	82	17/4092630/298225		Y
BLDS	KY	2[1: 24000]		7	1370.000	0.000	83	17/4092570/298535		Y
BLDS	KY	2[1: 24000]		8	1711.000	0.000	136	17/4092890/296925		
BLDS	KY	2[1: 24000]		9	1879.400	0.000	605-85	17/4090751/295307		Y
BLDS	KY	2[1: 24000]		10	1784.290	0.000	602-85	17/4090335/295138		Y
BLDS	KY	2[1: 24000]		11	2252.700	0.000	DB-6	17/4093535/292850	Y	
BLDS	KY	2[1: 24000]		12	2166.700	0.000	DB-7	17/4093955/292620	Y	Y
BLDS	KY	2[1: 24000]		13	2126.500	0.000	DB-8	17/4094755/294470	Y	Y
BLDS	KY	2[1: 24000]		14	1126.500	0.000	DH-1-86	17/4091685/293460		
BLDS	KY	2[1: 24000]		15	1055.300	0.000	DH-2-86	17/4091618/293435		
BLDS	KY	2[1: 24000]		16	1050.900	0.000	DH-3-86	17/4091575/293415		
BLDS	KY	2[1: 24000]		17	1192.500	0.000	DH-4-86	17/4091435/293540	Y	
BLDS	KY	2[1: 24000]		18	1388.700	0.000	DH-5-86	17/4091125/293810	Y	
BLDS	KY	2[1: 24000]		19	500.000	0.000	CS 1-42	0/0/0		
BLDS	KY	2[1: 24000]		20	1740.000	0.000	JOC-3	17/4090290/294685	Y	
BLDS	KY	2[1: 24000]		21	1760.000	0.000	JOC-4	17/4090710/293775	Y	
BLDS	KY	2[1: 24000]		22	1560.000	0.000	JOC-5	17/4091990/295500	Y	
BLDS	KY	2[1: 24000]		23	1345.000	0.000	JOC-7	17/4092900/295035	Y	
BLDS	KY	2[1: 24000]		24	1197.000	0.000	HW-2	17/4096770/295820	Y	
BLDS	KY	2[1: 24000]		25	1240.000	0.000	HW-1	17/4097080/296060	Y	
BLDS	KY	2[1: 24000]		26	1200.000	0.000	HW-3	17/4096200/295930	Y	
BLDS	KY	2[1: 24000]		27	1175.000	0.000	HW-4	17/4095892/296386	Y	
BLDS	KY	2[1: 24000]		28	1225.000	0.000	HW-5	17/4095305/296720	Y	
BLDS	KY	2[1: 24000]		29	1225.000	0.000	HW-6	17/4094850/296290	Y	
BLDS	KY	2[1: 24000]		30	1260.000	0.000	HW-8	17/4093785/296940	Y	
BLDS	KY	2[1: 24000]		31	1255.000	0.000	HW-9	17/4093840/297320	Y	Y
BLDS	KY	2[1: 24000]		32	2298.000	0.000	RCH1-85	17/4092300/294640	Y	Y

Now, clicking on the column marked 1? will sort the column. The column was clicked until the column show blank in 1? (reference point 1). All the logs without reference point 1 are selected, then deleted. It left this (section highlighted) of 1396 logs that definitely contain reference point 1.

Select/Remove Entries from Project Log list

There are 1396 Catalog Entries available

Log Display and/or Removal

Quad	State	Scale	Proj	Log ID	Elevation	Depth	Drill Hole Number	UTM	1?	2?
BLCKY	KY	2[1: 24000]		45	2050.000	0.000	28	17/4117090/326010	Y	
BLDS	KY	2[1: 24000]		11	2252.700	0.000	DB-6	17/4093535/292850	Y	
BLDS	KY	2[1: 24000]		12	2166.700	0.000	DB-7	17/4093955/292620	Y	Y
BLDS	KY	2[1: 24000]		13	2126.500	0.000	DB-8	17/4094755/294470	Y	Y
BLDS	KY	2[1: 24000]		32	2298.000	0.000	RCH1-85	17/4092300/294640	Y	
BLDS	KY	2[1: 24000]		43	2342.910	0.000	CH-721-85	17/4090625/294337	Y	Y
BLDS	KY	2[1: 24000]		48	2155.780	0.000	CH-752-86	17/4090353/293730	Y	Y
BLDS	KY	2[1: 24000]		49	2240.000	0.000	138	17/4092750/296530	Y	Y
BLDS	KY	2[1: 24000]		50	2220.000	0.000	118	17/4094860/295480	Y	Y
BLDS	KY	2[1: 24000]		53	2120.000	0.000	55	17/4091605/291590	Y	Y
BLDS	KY	2[1: 24000]		56	2046.350	0.000	CH-754-86	17/4092867/294519	Y	Y
BLDS	KY	2[1: 24000]		57	2052.130	0.000	CH-753-86	17/4092480/293898	Y	Y
BLDS	KY	2[1: 24000]		62	2302.010	0.000	CH-755-86	17/4091737/294721	Y	Y
BLDS	KY	2[1: 24000]		82	2336.100	0.000	CH-571-84	17/4090946/294795	Y	Y
BLDS	KY	2[1: 24000]		83	2223.360	0.000	CH-572-84	17/4091211/295199	Y	Y
BLDS	KY	2[1: 24000]		84	2280.000	0.000	CH-121-81	17/4092475/294430	Y	
BLDS	KY	2[1: 24000]		85	2405.000	0.000	CH-122-81	17/4091285/294595	Y	
BLDS	KY	2[1: 24000]		86	2333.000	0.000	CH-123-81	17/4090199/294105	Y	
BLDS	KY	2[1: 24000]		88	2391.480	0.000	CH-722-85	17/4091140/295660	Y	Y
BLDS	KY	2[1: 24000]		89	2423.150	0.000	CH-723-85	17/4090135/295870	Y	Y
BLDS	KY	2[1: 24000]		96	2273.000	0.000	CH-1031-2	17/4090100/295845	Y	
BLDS	KY	2[1: 24000]		99	2342.000	0.000	CH-P-6A	17/4089450/289545	Y	
BLDS	KY	2[1: 24000]		101	2530.600	0.000	CH-724-85	17/4090164/296754	Y	Y
BLDS	KY	2[1: 24000]		102	2342.490	0.000	CH-725-85	17/4091424/297038	Y	Y
BLDS	KY	2[1: 24000]		110	2216.440	0.000	CH-816-87	17/4092778/295754	Y	Y
BLDS	KY	2[1: 24000]		111	2247.890	0.000	CH-817-87	17/4092464/296271	Y	Y
BLDS	KY	2[1: 24000]		112	2287.560	0.000	CH-818-87	17/4092275/296867	Y	Y

The process was repeated for reference point 2, sorting by 2? and eliminating those logs that do not contain the second reference point.

This yields the following results (335 logs):

Select/Remove Entries from Project Log list

There are 335 Catalog Entries available

Log Display and/or Removal

Quad	State	Scale	Proj	Log ID	Elevation	Depth	Drill Hole Number	UTM	1?	2?
BLDS	KY	2 [1: 24000]		12	2166.700	0.000	DB-7	17/4093955 / 292620	Y	Y
BLDS	KY	2 [1: 24000]		13	2126.500	0.000	DB-8	17/4094755 / 294470	Y	Y
BLDS	KY	2 [1: 24000]		43	2342.910	0.000	CH-721-85	17/4090625 / 294337	Y	Y
BLDS	KY	2 [1: 24000]		48	2155.780	0.000	CH-752-86	17/4090353 / 293730	Y	Y
BLDS	KY	2 [1: 24000]		49	2240.000	0.000	138	17/4092750 / 296530	Y	Y
BLDS	KY	2 [1: 24000]		50	2220.000	0.000	118	17/4094860 / 295480	Y	Y
BLDS	KY	2 [1: 24000]		53	2120.000	0.000	55	17/4091605 / 291590	Y	Y
BLDS	KY	2 [1: 24000]		56	2046.350	0.000	CH-754-86	17/4092687 / 294519	Y	Y
BLDS	KY	2 [1: 24000]		57	2052.130	0.000	CH-753-86	17/4092480 / 293898	Y	Y
BLDS	KY	2 [1: 24000]		62	2302.010	0.000	CH-755-86	17/4091737 / 294721	Y	Y
BLDS	KY	2 [1: 24000]		82	2336.100	0.000	CH-571-84	17/4090946 / 294795	Y	Y
BLDS	KY	2 [1: 24000]		83	2223.360	0.000	CH-572-84	17/4091211 / 295199	Y	Y
BLDS	KY	2 [1: 24000]		88	2391.480	0.000	CH-722-85	17/4091140 / 295660	Y	Y
BLDS	KY	2 [1: 24000]		89	2423.150	0.000	CH-723-85	17/4090135 / 295870	Y	Y
BLDS	KY	2 [1: 24000]		101	2530.600	0.000	CH-724-85	17/4090164 / 296754	Y	Y
BLDS	KY	2 [1: 24000]		102	2342.490	0.000	CH-725-85	17/4091424 / 297038	Y	Y
BLDS	KY	2 [1: 24000]		110	2216.440	0.000	CH-816-87	17/4092778 / 295754	Y	Y
BLDS	KY	2 [1: 24000]		111	2247.890	0.000	CH-817-87	17/4092464 / 296271	Y	Y
BLDS	KY	2 [1: 24000]		112	2287.560	0.000	CH-818-87	17/4092275 / 296867	Y	Y
BLDS	KY	2 [1: 24000]		136	2411.920	0.000	CH-819-87	17/4090901 / 296005	Y	Y
BNHM	KY	2 [1: 24000]		44	3735.700	0.000	5601	17/4090009 / 330814	Y	Y
BNHM	KY	2 [1: 24000]		126	3289.700	0.000	8627	17/4087207 / 322822	Y	Y
BNHM	KY	2 [1: 24000]		129	3355.400	0.000	8632	17/4086418 / 324312	Y	Y
BNHM	KY	2 [1: 24000]		130	3142.500	0.000	8633	17/4086412 / 323696	Y	Y
BNHM	KY	2 [1: 24000]		295	3721.000	0.000	9027	17/4084311 / 323607	Y	Y
BNHM	KY	2 [1: 24000]		296	3669.800	0.000	9028	17/4084902 / 324386	Y	Y
BNHM	KY	2 [1: 24000]		489	3232.900	0.000	I 15	17/4089337 / 326717	Y	Y

It is from these logs that we can further process and analyze the data.

The sample screen below shows more of the fields for the various options.

```

REFERENCE POINT 1 - Tagged,Distance/Elevation,or Rock type (T,D,R) : T
Top/Bottom (T,B) : B of TAG: HZ9 
Up from bottom, or Down from top (U,D) : U
DISTANCE: 0 FEET <==Use Elevation?
Rock Type For Search: Minimum Thickness: 3
02*

REFERENCE POINT 2 - Tagged,Distance/Elevation,or Rock type (T,D,R) : T
Top/Bottom (T,B) : B of TAG: HZ4 
Up/Down from Reference Point 1: U
Distance: 0 FEET <==Use Elevation?
Rock Type For Search: Minimum Thickness: 3
02*

REFERENCE POINT 3 - Tagged,Distance/Elevation,Rock type,or % (T,D,R,%): R
Top/Bottom (T,B) : of TAG: 
Up/Down from Reference Point 2: U
Distance: 0 FEET <==Use Elevation?
Rock Type For Search: Minimum Thickness: 12.3
02* 501
% Of Distance Between Ref 1 And Ref 2: 0
  
```

Only coals (02*) and type 501 are considered rocks in this scenario. The thickness parameter (right) is used to qualify the selection.

For rock types only, the minimum thickness is indicated here.

Log Strips Production (CLOGPLT and LOGPLOT)

Production of log strips is a two-step process. The first step is the choice of the device or file type on which to display the log and the selection of the logs to plot with the parameters to display (CLOGPLT). After those are complete, then the next step is to run the log strip generator (LOGPLOT) using the selected display device and log/parameter selections.

PLTSEL: GRAPHICS SELECTION

```
Do not use FX selections with LQ printers
 2 = Epson FX @60H/120V (fastest)           Len=600.0 Width=8.5 Wide=13.1
 3 = Epson FX @120H/108V (finest resolution) Len=600.0 Width=8.5 Wide=13.1
 4 = Epson FX @120H/72V (best compromise)   Len=600.0 Width=8.5 Wide=13.1
 5 = Epson FX @120H/108V (w/fast mode)     Len=600.0 Width=8.5 Wide=13.1

 6 = HP LaserJet+ @100H/100V

Do not use LQ selections with FX printers

 7 = EPSON LQ1500 180H/180V                 Len=600.0 Width=8.5 Wide=11.3
 8 = EPSON LQ1500 60H/180V (fast)          Len=600.0 Width=8.5 Wide=13.1
 9 = EPSON LQ1500 90H/180V (compromise 7-8) Len=600.0 Width=8.5 Wide=13.1

10 = HP/GL 100 DPI 25 ft X 35 in. wide     not implemented at this time
11 = HP LaserJet WIDE (HP 750C) (30.42")   not implemented at this time

12 = AutoCAD compatible                    Len=99999.0 Width=8.5 Wide=8.5
13 = Adobe PDF                             Len=200.0 Width=8.5 Wide=8.5
14 = Direct Image: BMP format (up to 600") Len=600.0 Width=8.5 Wide=8.5
15 = Direct Image: JPG format (up to 600") Len=600.0 Width=8.5 Wide=8.5

20 = Exit from Plotter selection

Options 2-11 MAY require direct LPT connection (if no printer driver installed)

WIDE PLOT?  < == Wide Plot option is only valid for dot-matrix devices (2-5,7-9)
ENTER OPTION BY NUMBER (0 to 20): 0
```

A wide variety of devices is available. Choices 1 through 11 refer to physical printers. Configuring a dot matrix printer under Windows 7, 8, or 10 can be done in a myriad of ways; there is a separate document to assist you with that. Choices 12 (AutoCAD) and 13 (PDF) create files in your folder that you can then use with drafting programs, etc. Choices 14 and 15 are used (typically) to make image files directly compatible with PETRA®. These image files are also used in conjunction with **KML files**.

When Printers 1 through 9 or 13 is chosen, the width of the strip is set to 8.5" wide. If the WIDE option is selected, then the width is 11". AutoCAD files contain only one log per strip there is no actual width or length restriction.

Do not attempt to use the FX printer settings for LQ printers, or vice versa. The command sequences are incompatible. For example, the 72V command sequence for an FX printer (72 DPI vertical) causes a 60 DPI vertical response for the LQ printer. For example, a 10 feet/inch long log

strip is **produced** at 10 feet/1.2-inches, so the actual scale of the output will be incorrect, and any thicknesses taken manually will be incorrect.

```
Adobe(R) PDF Output has been selected
Enter "Y" By The Options Desired For All Logs in this batch
Option 2 => 3.33 Inch Headers
Options 3, 4, 5, and 7 => 5 Inch Header
Option 11 will force an 8 inch header

Y 1:LITHOLOGY CODE          PDF Plot Width= 8.5      Length= 200
Y 2:LITHOLOGY THICKNESS    **** Adobe Limit: 200" Width or Length ****
N 3:COMMENTS
N 4:LITHOLOGY ENGLISH      0 [ ] Scaling for plot (ft/in or m/2.54 cm).
N 5:BED CODES (SEAM TAGS)  0.000 == 10 ft/in or 3 m/2.54 cm
Y 6:COORDINATES Y 15:Use SP or Lat/Lon
Y 7:COMPANY NAME          0 [ ] Length (in inches) to add to the plot
N 8:OUTPUT IN METERS
N 9:SHOW LITHO LINE NUMBERS N [ ] "Y"=enable plot optimization, "N" to disable
N 10:FORCE LOG TO NEW PAGE [ ]
N 11:EXTRA-WIDE/SINGLE LINE ID [ ] Text to be appended to PLOT files generated
Y 12:Apply BACKGROUND Colors Use to save plot selections for later
N 13>Create PETRA LIC file
N 14:Use UNLIMITED PDF Width/Length
N 16:Show lithology base elevation

Enter "Y" to Proceed or "N" to Abandon [ ]
```

The screen above is the one for non-project logs. While this screen is a little busy, here are the points to consider. The currently selected output is shown on the top line. The top menu items (numbered 1 through 16) are selecting data to be included when the log header is printed or select which data associated with each lithology is to be printed. Item 11 tags each lithology with a very wide/long line of data of fixed content. Item 12 applies only to AutoCAD, DXF, PDF, and Direct Image files, and signifies that a background color may be applied to the output that is keyed to the lithology code. Item 10 can also be used to separate logs into their own uniquely named (KYGS named) files³⁹.

If the output device selected can support PETRA Log Image Calibration (LIC) file creation, an additional selection (Item #13) will be displayed. Selecting this option forces one log per file. Using this interface allows the direct use of C-Master logs within PETRA.

Option 14 is shown only for PDF files. Note that since PDF output is specified, the width of the PDF log strip can be changed using the input box (currently showing 8.5). The default is 8.5". PDF files, while great for their portability, have several limitations on length and width. Refer to **Appendix F: What's the Concern with PDF Files?** for details. If not selected, then the length is assumed to be at most 200 inches in length. It is this maximum length that will determine the number of logs that can be placed on a plot. Before you commit the PDF to a plotter, it is suggested that you look at how the strips are placed to see if you do wish to print/plot this.

³⁹ By creating individual log strip in JPG format, you can then "attach" these log strips in a KML file. This may be valuable to you in presenting data to a client, or for your own reference.

Generating a PDF also creates, within the PDF file, a list of the logs contained in the PDF. These are called "Bookmarks". If you click on a bookmark, you will be shown the header box of that log. From there, you can zoom out or navigate the log strip. The bookmark contains the KYGS name of the log as well as the Source and Contributor drill hole number.

Option 15 is used in combination with Option 6 to control the display of coordinates in the log header box. If you choose Option 6, the default will be the display of the coordinates in UTM. If you also specify Option 15, either Lat/Lon or State Plane may be displayed, depending on what coordinate system you used originally when inputting the log. For logs entered in UTM, then UTM will be displayed

Option 16 will annotate the log strip with the elevation at the bottom of the lithology.

To the right side are options for scaling the log strip; default is 10'/inch or 3 meters/cm.

The next parameter is the length that will be added to the plot to accommodate annotations that extend past the nominal end of a log⁴⁰. This may occur when there are multiple, thin lithologies at/near the end of a drill hole and the annotations go past the estimated length. PDF files must have a specified length when they are initially created; if the length is too short, then the output is truncated. This option gives you some extra "wiggle room". The program attempts to compute the actual length based on the options chose. It is very close in its estimate but may not be precise.

"Plot Optimization" is not selected by default. If selected, the program will sort the selected logs by length and begin producing the strips in this manner. This can be useful for wide plotters, but is of little use for dot-matrix devices. Under development is a method to pack the log strips for plotters in the most efficient way possible, minimizing paper usage.

The "Text To Be Appended" field allows you to add text to the files created to generate log strips. What this does is to create a unique set of command files/parameter files so you can repeat the log strip process at any time without going through the device and log selection processes.

The last selectable field is a Yes/No question. If you answer "N", you will be returned to the previous C-Master menu. This gives you an easy way out of log strip generation.

Log strips are produced in a standardized way, depending on the display options chosen. In this way, additional annotation regarding which displayed data is a code, English, or thickness is not needed. These data will always display in the same location when selected. Because the number and type of annotations may vary, LOGPLOT will place annotations consecutively on the right-hand side, and point to the appropriate symbology with a solid line. If there are large number of thin lithologies,

⁴⁰ CLOGPLT is very good at computing the true length of a log strip. That said, you may find this useful at times to make sure enough paper is also used at the end of log strips produced on wide format plotters.

this can cause the annotation to appear some distance from the actual lithology. If this is an issue, consider producing log strips with a smaller scale factor and/or use intervals (see below) to select specific areas of interest. LOGPLOT will do the best that it can in producing a log strip for you, but there are limits to what it can do for you.

```

Adobe (R) PDF Output has been selected      There Are Currently  0 logs awaiting processing
ENTER PROJECT CODE: 
1. QUAD NAME:  Choose QUAD
2. STATE LOCATION OF QUAD: 
3. SCALE OF QUAD: 0 1: 0
ENTER LOG ID RANGE: 0 0 Use Hole ID data
0 = Process log selection (Q/St/Sc + LOG ID Range)
1 = Read Catalog Search File/Apply current intervals
2 = Edit List of Currently Selected Logs
3 = Save log selection in Catalog Search format
4 = Begin Log Strip processing
5 = Quit/Abandon selections
ENTER OPTION BY NUMBER (0 to 6): 0

You can select/deselect the plot display options below for the NEXT set of log selections
X:Ferm Code X:Thick  :Comments  :English  :Beds  :Line #'s X:Background  :Elevation

INTERVAL SELECTION? N To go through the end of the log, specify 99999 for depth
Use ELEVATION for Intervals? N or -99999 for Elevation Clear all interval selections
1:0 ->0 F 11:0 ->0 F 21:0 ->0 F 31:0 ->0 F
2:0 ->0 F 12:0 ->0 F 22:0 ->0 F 32:0 ->0 F
3:0 ->0 F 13:0 ->0 F 23:0 ->0 F 33:0 ->0 F
4:0 ->0 F 14:0 ->0 F 24:0 ->0 F 34:0 ->0 F
5:0 ->0 F 15:0 ->0 F 25:0 ->0 F 35:0 ->0 F
6:0 ->0 F 16:0 ->0 F 26:0 ->0 F 36:0 ->0 F
7:0 ->0 F 17:0 ->0 F 27:0 ->0 F 37:0 ->0 F
8:0 ->0 F 18:0 ->0 F 28:0 ->0 F 38:0 ->0 F
9:0 ->0 F 19:0 ->0 F 29:0 ->0 F 39:0 ->0 F
10:0 ->0 F 20:0 ->0 F 30:0 ->0 F 40:0 ->0 F
Log Scaling: 10 feet/inch

Boundary Filter Load Boundary Filter File Clear Boundary Filter File

0 Boundary File: 
EXCLUDE logs if inside the boundary? N

```

We can now select the project/quad/state/scale and log ID range from which logs are chosen for processing with these parameters. Note the QuickFill button is available to select by quad/state/scale/logid/project or by drill hole number, or you can use a Catalog Search file by picking Option 1. The total number of logs currently selected for processing is shown on the top line.

Next are the available header/display options available for the header box size (see initial selection on previous page). You can turn on or off each optional display item. When you perform a selection, all logs in that selection will have the current header/display options applied.

Following this are the intervals (if selected). The specification is the start and end of the interval in the default units (feet or meters). They must be non-overlapping. For example, an interval from 0 to 10 feet and 9 to 12 feet will not be permitted as this is an overlap. However, you could create two intervals from 0 to 10 feet and 10 feet to 12 feet.

You will also see that there is an option (currently not selected) to use ELEVATION for the intervals. If you chose this option, the from/to are given in the appropriate elevation units (feet or meters). For instance, if interval was given as (between 1153 and 1165), then the second interval might be (between 1123 and 1152). This would place interval 2 to start just 1 foot below interval 1. This option can be extremely helpful when logs are drilled at very different elevations, yet intercept lithologies of interest at known elevations within the log.

You can enter the intervals in any order you wish. Just remember that the intervals cannot overlap. Once the intervals are processed, you will see them show on this screen in the proper sequential order.

CLOGPLT will compute the expected length of the log strip for each log selected. It utilizes the same algorithm that LOGPLOT uses. This feature will flag you if the log absolutely will NOT fit on the plot device (its length is beyond the SW or device capabilities). If this occurs, the ID of the offending log will be recorded to the Status Window, recorded in the file **LOGS_TOO_LONG_TO_FIT.TXT**, and the log will be removed from the list of logs to be plotted. If you are doing intervals and the tail-end of the data is not shown (i.e. flowed off the end of the page), then add some length to each plot when selecting the display options, or manually edit each PLOTxxxxx.PLOT file to have a longer length.

If you load a Boundary File, the logs you offer for selection will be included/excluded based on whether the logs coordinates place it inside (or outside) the boundary area.

When the program returns from selecting logs, the number of logs awaiting final processing are shown at the top.

If you select "Read Catalog Search Results File", you will be prompted to select a file that is formatted as a Catalog Search File (the importable file option in CCATALOG). The Catalog Search file will be processed, any boundary file selected will be applied to these logs, and those logs added to the current list of logs to be processed with the current intervals you have chosen.

You can also save your log selections (but not the intervals themselves) as a Catalog Search formatted file. You can use this file in other C-Master modules. This option can be especially useful if you have a very complex selection of logs and later would wish to apply a different interval selection (for example). Also, this file can be used to create **KML files**. If the file exists, you will be asked if you wish to append or overwrite. The append option is there to allow you to add to an existing file, thus creating a larger selection for your next usage. Otherwise, the file will be overwritten.

Once your log selections are done, select Option 3 and the program will proceed to build the batch file from the options you have chosen. Depending on how many logs and how long they are, several invocations of the appropriate processing program may be added to the batch file.

Following this, you'll be asked if you'd like to start LOGPLOT and generate the strip logs. If you answer "Y", the command file BATCHLOG.CMD⁴¹ will be run from the default folder and the log strip generation process will commence. Generally, it takes only a few seconds per log to generate AutoCAD, PDF, or image files. Sending these data directly to a physical printer will take a bit longer! Where you will find the logs on your system (for non-printer types of outputs) will depend on the

⁴¹ If you have requested additional text to be used, then BATCHLOG.CMD will become BATCHLOGextratext.CMD.

type selected. AutoCAD documents are in the ACADPLOT sub-folder and are identified by the quad, ID, state, and Project of the log. PDF files are in PDF_MULTI or PDF_SINGLE, BMP files are in BMP_MULTI or BMP_SINGLE, and JPG files are in JPG_MULTI or JPG_SINGLE. The KYGS Name is used for all *_SINGLE folders and for any AutoCAD DXF files. If during the running of this batch, some of the logs are found to have exceeded their physical limits, then these file names are recorded in the file "LOGPLOT_LENGTH_EXCEEDANCES.TXT" and will be displayed at the end of the command file for your convenience.

Log Strips for Project Logs

The device selection is identical, but the options and log selection differs. Project data processing has already computed the interval(s) for each individual target log. The user's task is to specify if all or some of those logs in a sub-project will have strip logs created, and which interval (and extended boundaries) will be used.

```
Adobe(R) PDF Output has been selected      There Are Currently  0 logs awaiting processing
      Enter PROJECT Code: AAA <= BLANK to end selections
          Sub-Project:  0
Enter the interval (1, 2, or 3)      2
of the sub-Project you wish to use
Enter the distance above AND below the interval to be plotted 3.00      feet
                                          Log Scaling: 10      feet/inch

=> 1 : All logs in the sub-project      2
=> 2 : Choose logs in the sub-Project
=> 3 : Edit List of Selected Logs
=> 4 : End sub-Project select/Start plot

Project code of Log within the Project:  *

  1. QUAD NAME:      Choose QUAD
  2. STATE LOCATION OF QUAD:
  3. SCALE OF QUAD: 0 1: 0
ENTER LOG ID RANGE: 0      0      Use Hole ID data Leave ID's =0 to begin Processing

Boundary Filter      Load Boundary Filter File      Clear Boundary Filter File

  0 Boundary File:
EXCLUDE logs if inside the boundary? N
```

Here, we've chosen Project AAA, sub-project 0, interval 1, all logs, and we'll plot 3 feet above and below the computed interval. Each log will have different depths, for example, but the interval number chosen will apply to all logs in the data set. If a log does not contain the interval data you've selected, it will not be included in the set of log strips.

If you decide to select some of the logs from the sub-project, there are additional considerations. You can have logs in this project that are not identified with the Project's project code. Stated another way, the original logs can be included into a project (not a Project copy), or a log from a different project can be included. For example, this project is AAC, but can contain logs whose project code is blank (original logs) or are from Project AAA (yes, you can "share" logs between Projects). An unintended consequence of flexibility is this ability to include data from various "sources". And, this inclusion

means that there are two Project codes that you must specify. One is for the Project and Sub-Project that you are taking data from, and the other is specifying the project associated with the log itself.

If you load a Boundary File, the logs selected (manually or all within the Sub-Project) will be included/excluded based on whether the log coordinates place it inside the boundary area.

Annotation Differences Based on Header Size

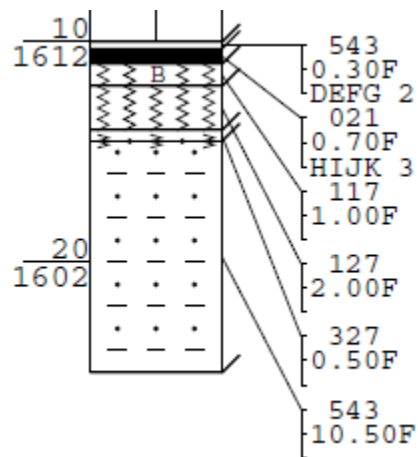
The amount of annotation shown with each lithology differs with the size of the header. The examples below show both the header boxes and the maximum annotation associated with each header box size.

2.50" Headers

Only allowable display items are the lithology code, thickness, and the first 13 characters of the seam tag. You can also request the bottom of lithology elevation to be displayed as a separate annotation for each lithology.

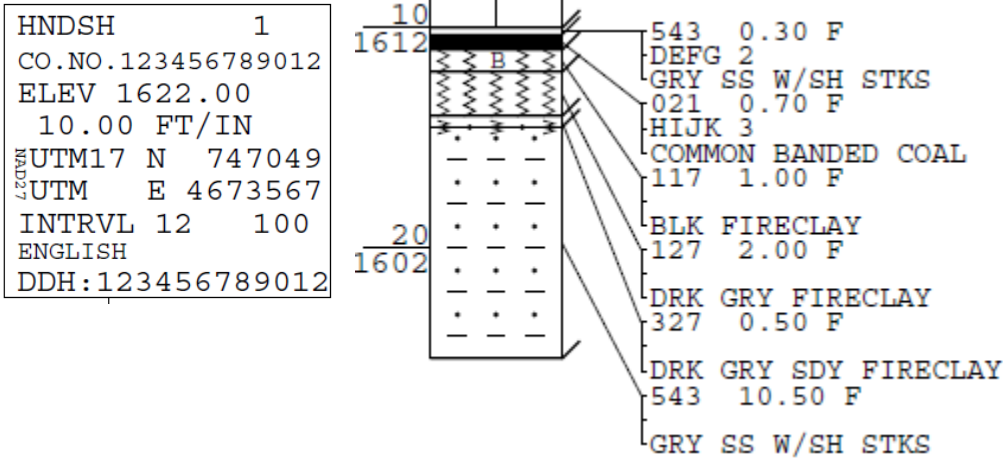
```

HNDSH      1
CO.NO.123456789012
ELEV 1622.00
  10.00 FT/IN
UTM17 N 747049
UTM  E 4673567
INTRVL 12  100
ENGLISH
DDH:123456789012
  
```



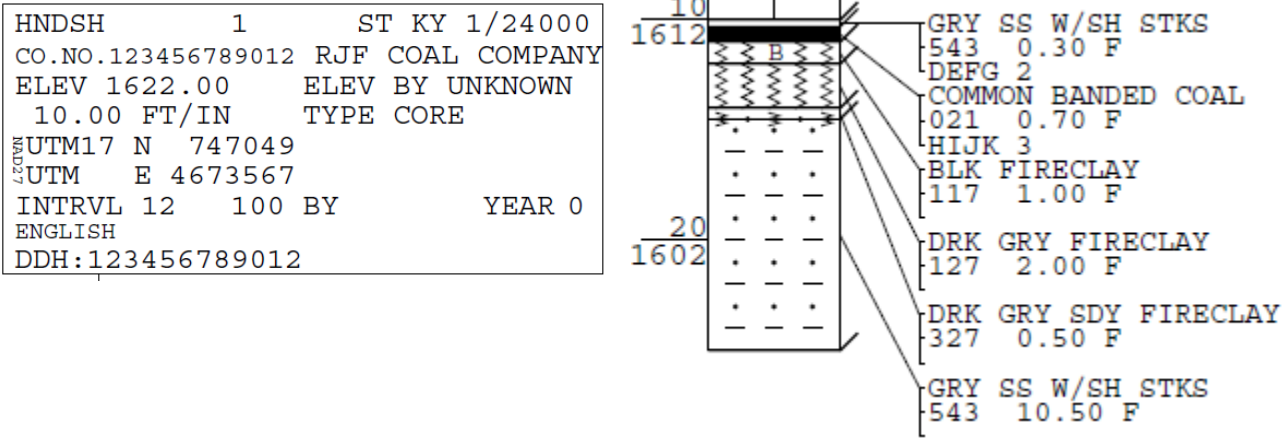
3.33" Headers

Only allowable display items are the lithology code, thickness, drillers comment, up to the first 23 characters of the seam tag, first 23 characters of the English phrase, and the bottom of lithology elevation can be selected for this header size. You can also request the bottom of lithology elevation to be displayed as a separate annotation for each lithology.



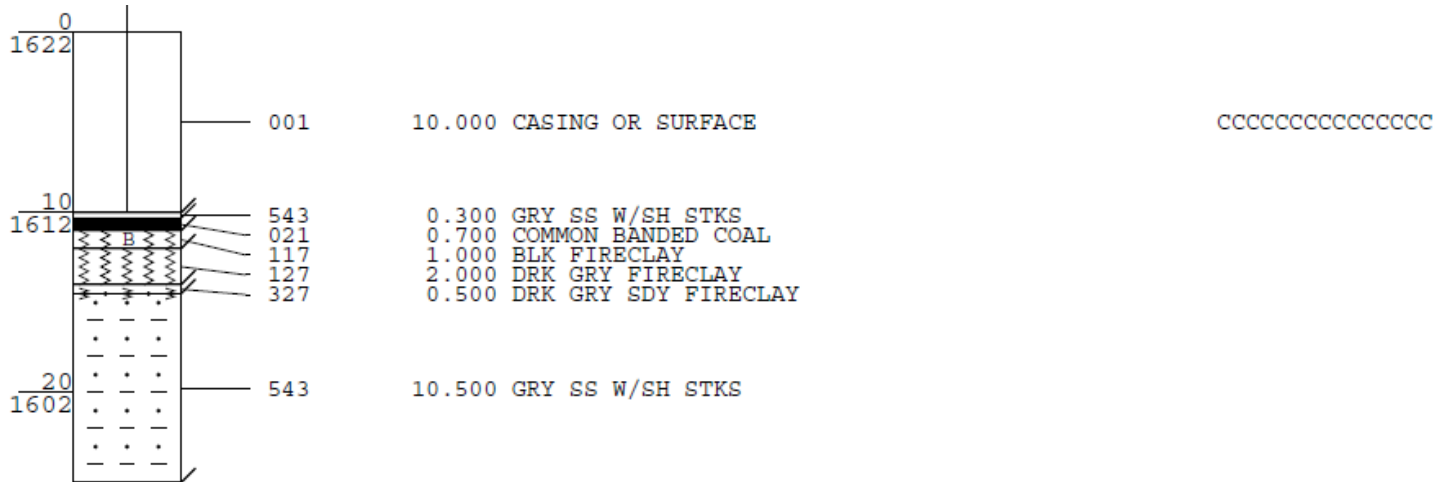
5.00" Headers

Any other combinations of displayed annotations will create a 5" header. You can also request the bottom of lithology elevation to be displayed as a separate annotation for each lithology.



8.00" Headers

Display depends on the header options selected for display (see above) but is expanded in size to 8" for a single line for lithology annotation. This will always contain the lithology code, the thickness, the English phrase, and the driller's comment. You can also request the bottom of lithology elevation to be displayed as a separate annotation for each lithology.



How LOGPLOT Arranges the Logs (Limitations)

If multiple logs are being displayed in a single “batch”⁴², LOGPLOT can attempt to organize the logs in such a way to use the least amount of “paper”⁴³. If you have requested 2.5” headers to be used and the width of the paper is 7.5 inches or wider, then three logs (or more) across will be produced. LOGPLOT will start at the left, top and place the first log there, the next log to its right, and the third log to its right. After that, the location (column) in which the fourth and subsequent logs will be placed is dependent on how long each column has become. LOGPLOT computes where the last lithology annotation and/or symbol was placed in each column and will choose the shortest column for the placement of the next log. This process continues for all logs in the “batch”.

During the selection process, CLOGPLT (the program segment that you interacted with to select the logs) assumes that the actual length of the strip can be computed using the scale and the number of intervals defined. The annotations are placed further and further away from the lithology they are associated with and can easily extend past the nominal end of the symbols plotted for the log. In this case, two things can happen. If the actual length of the plot has exceeded the capabilities of the plotting software, the data will be truncated at that limit and an error message will be shown. If the estimated length of the plot has been exceeded, then LOGPLOT will sense that this has occurred and will present an error display to the user, informing them that the limit has been exceeded and what a new limit might be set to. For dot matrix printers, the plot will still be produced, up to the physical limit imposed by the software. This limit is dependent on the resolution (dots per inch) that was requested when the plotting device was selected.⁴⁴

Using Background Colors

As explained in the Configuration File section, a background color can be applied for AutoCAD, PDF, or Direct Image (BMP or JPG) log strips. The default colors are as defined by AutoCAD. You will get this color if you link a lithology code to the index (1-255). The default color (black) is pre-defined as Color Index=0 [RGB=(0,0,0)], and white is defined as Color Index=255 [RGB=(255,255,255)]. These are the color settings that you cannot modify. All lines and text are set to be black in color. This is to maintain compatibility with the older dot-matrix printer output.

⁴² AutoCAD log strips are, by definition, placed in a single file and not subject to these restrictions.

⁴³ The algorithm for this is limited in scope and is not designed to be fully optimal (at this time).

⁴⁴ Refer to the section on program limits for more details on log strip lengths.

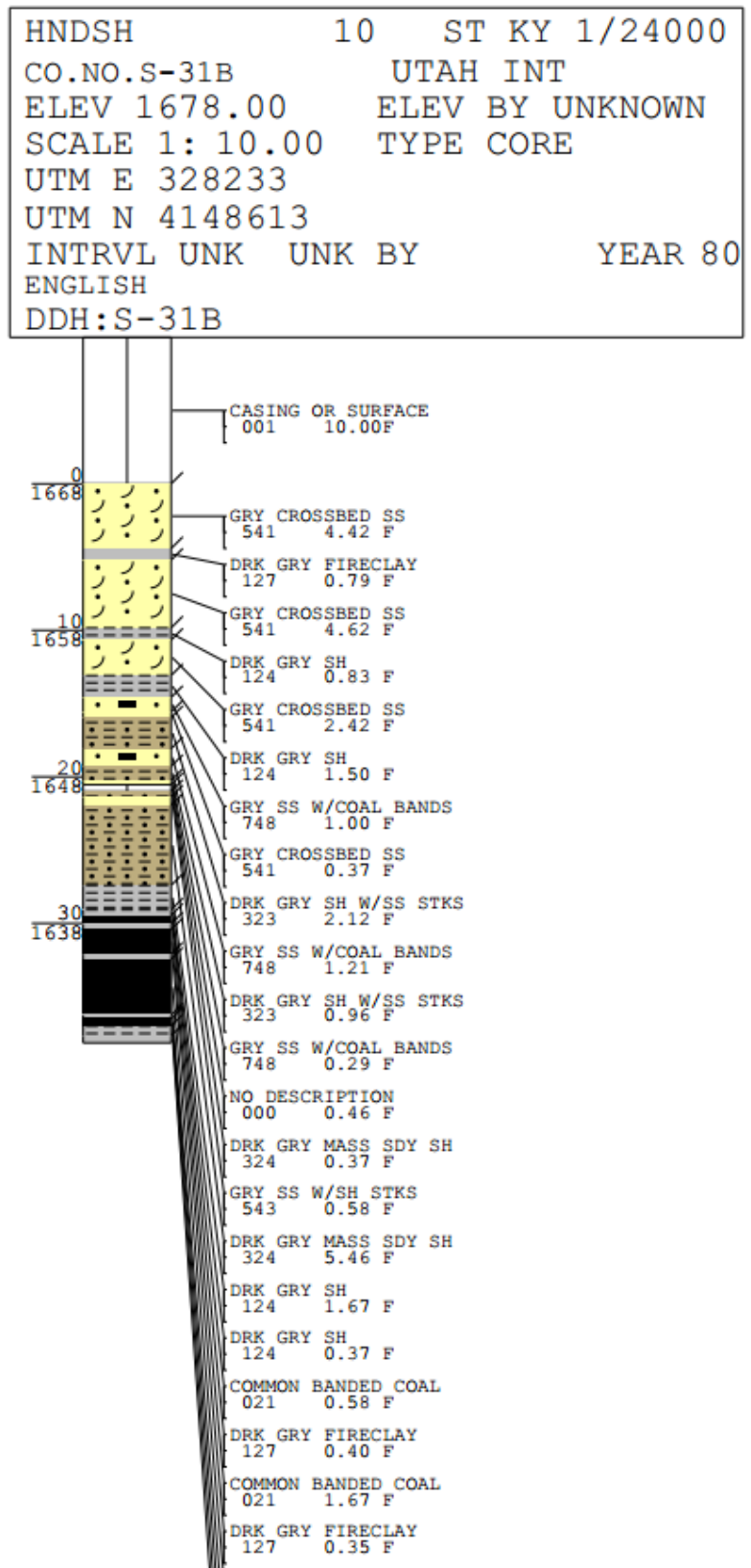
AUTOCAD: At present, if you wish to specify a color for AutoCAD shading output, you may specify the color index only. Changes to that specific color definition from within AutoCAD are not yet supported. Stated another way, for AutoCAD outputs, you can only specify the index of the color, not the color itself.

PDF or Direct Image log strips use the RGB value assigned to the color index. So, with these files, you can specify the color (RGB) that is assigned to a color index. For full compatibility, however, it is suggested that you do not actually modify the RGB color that is associated with a color index. Since there are 254 different color combinations already assigned that you can change, the colors you wish are probably already there (or at least, very close!). You can only redefine color indices 1 through 254.

Using the CONFIG file, you can assign a color index to a litho code or a block of codes. The CONFIG file documentation gives the list of default assignments of colors to litho codes. However, for your application you may change those color index assignments. The possibilities are up to you. Please note that not every color combination is visually compatible with the black used to produce the symbologies.

If you have chosen to use background colors and have directed the output at a dot-matrix or HP printer, the color choices will be ignored, and no shading performed.

This is an example of using a background color with annotation, and how thin lithologies move the annotations.



LOGPLOT with PETRA® Compatible Output

To interface with PETRA⁴⁵, C-Master provides a simple interface with which the strip logs can be imported into this application. As of this writing, there is one manual (or external) step that may need to be completed to make a compatible log image available.

If you chose the PETRA option, this will force one log strip per file. PDF output will require a process specified to run a PDF to Image conversion program (not supplied), or you can set the output format to JPG or BMP to create the Petra compatible file directly. After you run the LOGPLOT batch file, a set of LIC files will be created, and there will be a reference in this file to the image created.

PDF Conversion for Petra Outputs

The process described here uses the PDF output from LOGPLOT. There are many PDF to image converters available on the open market, some of them being free or available at low cost. The process (step by step) assumes that the PDF outputs must be manually converted.

- Select PDF as your output device. Currently, this is the only available output device option that will create the PETRA Log Image Conversion (LIC) file.
- Create the log strip files, one log per file, using the selection menu. When you select the PETRA option, this also forces the selection of one log per file.
- Execute the LOGPLOT command file. This will create all of the individual log strips and store them in the PDF_SINGLE folder.
- At the same time, the LIC file(s) will be created and stored in the LICFOLDER pathname with a name that matches the PDF file. For example, HNDSH0007_KY.PDF matches HNDSH0007_KY.LIC.
 - The expected resolution of the final image file is set in the CONFIG file and must match the conversion process that you use. The default is 200 DPI.
 - The expected file type of the image file is also set using a CONFIG file option.
- Now, convert the PDF file using the utility program you have⁴⁶ and place the resulting images into the appropriate image folder.
 - The image folder must match the image folder chosen (or defaulted) in the CONFIG file. The LIC file has this folder name referenced.
 - You must request the conversion program produce the image at the same resolution chosen in the CONFIG file.

Also, with PDF, if you have Acrobat (not just Reader), you can open the PDF file and do a “Save As” to save the PDF file in a variety of formats (TIF, JPG, etc.).

⁴⁵ PETRA is a software product of IHS Inc. Information is available at <https://www.ihs.com/products/petra-geological-analysis.html>.

⁴⁶ Some conversion programs will allow a “monitor” of a folder that will automatically begin the conversion process for you. Note that some of these programs will delete the PDF file after conversion.

Direct Image (BMP and JPG Format)

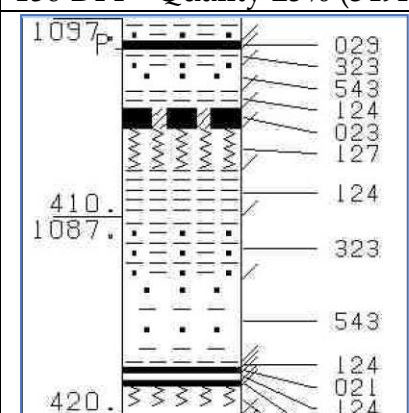
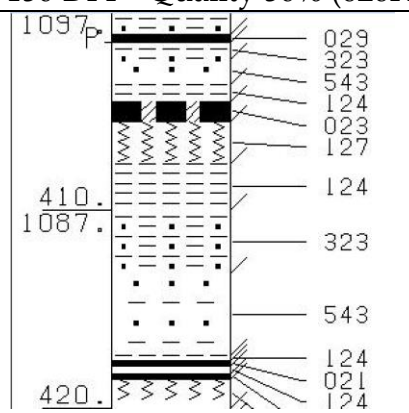
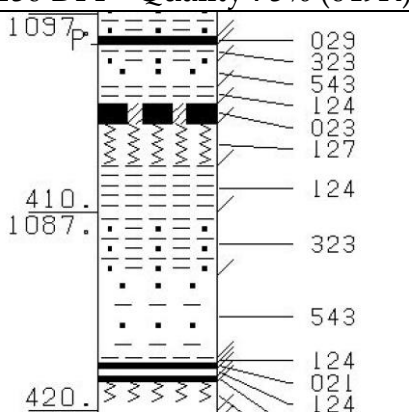
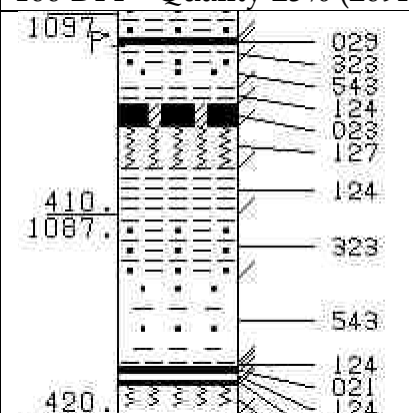
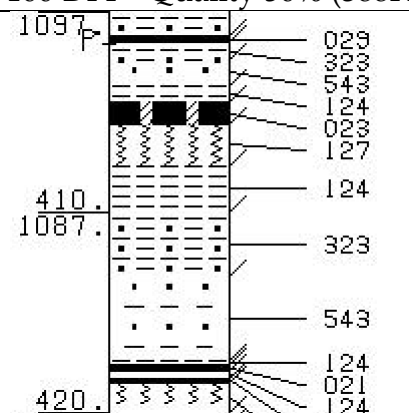
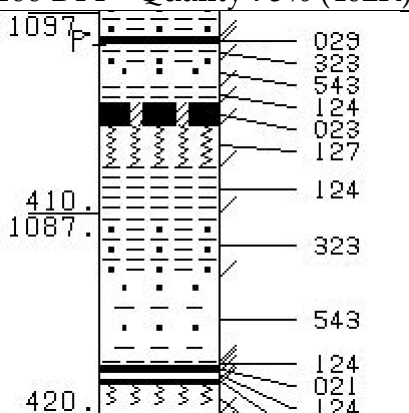
With Direct Image output, there is no additional conversion step to make the image compatible with PETRA. The files are already in the proper format, and the LIC file properly references the appropriate markers in the file.

You can change the degree of readability in the character data by specifying a higher DPI for the image that was created. LOGPLOT was designed originally for a 100 DPI black and white printer, so the readability is adequate at 100 DPI. 150 DPI will gain some readability, and after 200 DPI, it is difficult to tell any differences.

The disadvantage of higher DPI is that the file size gets much larger, and LOGPLOT has limits. For Direct to Image, the practical limit for BMP is 300 DPI, resulting in a BMP image that is 8.5" wide and 300 inches long. At this resolution, the resulting file would be in about 230 megabytes.

(8.5" * 300dpi * 300" * 300DPI). While JPG files are smaller, this is still a very large image file!

Look at some JPG examples below. Each is of a section of a log where the image is 150 or 100 DPI resolution and the quality parameter is varied. Higher resolutions are not currently supported.

150 DPI – Quality 25% (349K)	150 DPI – Quality 50% (626K)	150 DPI – Quality 75% (649K)
 A section of a log plot at 150 DPI and 25% quality. The plot shows a series of data points and lines. The text is very blurry and difficult to read. The y-axis labels are 1097, 410, 1087, and 420. The x-axis labels are 029, 323, 543, 124, 023, 127, 124, 323, 543, 124, 021, 124.	 A section of a log plot at 150 DPI and 50% quality. The plot shows a series of data points and lines. The text is more legible than the 25% quality version. The y-axis labels are 1097, 410, 1087, and 420. The x-axis labels are 029, 323, 543, 124, 023, 127, 124, 323, 543, 124, 021, 124.	 A section of a log plot at 150 DPI and 75% quality. The plot shows a series of data points and lines. The text is very clear and legible. The y-axis labels are 1097, 410, 1087, and 420. The x-axis labels are 029, 323, 543, 124, 023, 127, 124, 323, 543, 124, 021, 124.
100 DPI – Quality 25% (209K)	100 DPI – Quality 50% (388K)	100 DPI – Quality 75% (402K)
 A section of a log plot at 100 DPI and 25% quality. The plot shows a series of data points and lines. The text is very blurry and difficult to read. The y-axis labels are 1097, 410, 1087, and 420. The x-axis labels are 029, 323, 543, 124, 023, 127, 124, 323, 543, 124, 021, 124.	 A section of a log plot at 100 DPI and 50% quality. The plot shows a series of data points and lines. The text is more legible than the 25% quality version. The y-axis labels are 1097, 410, 1087, and 420. The x-axis labels are 029, 323, 543, 124, 023, 127, 124, 323, 543, 124, 021, 124.	 A section of a log plot at 100 DPI and 75% quality. The plot shows a series of data points and lines. The text is very clear and legible. The y-axis labels are 1097, 410, 1087, and 420. The x-axis labels are 029, 323, 543, 124, 023, 127, 124, 323, 543, 124, 021, 124.

At 75%, a JPG file may be about 1/6th the size of an equivalent BMP file.

For JPG files, you can experiment with the QUALITY parameter. Specify the number as a percentage, where 100=100%. 50% quality yields a smaller image with reasonable visual quality. You can go lower, but at some point, the logs will be unreadable at reasonable visual scales. JPG uses what is called “lossy” compression. This means that there is some reduction of the quality of the image (soft edges, smearing, grey color in places where white only should exist, etc.). Even at 100% quality, there is some small loss.

Options for Long Logs

Occasionally, you may have a log so deep it cannot be converted to a single strip and/or a single page. Each output device has its limitations, and some outputs (Adobe® PDF, specifically) has a “hard coded” limit. There are ways to accommodate these logs, but it will take some additional effort to set them up properly.

Here are a few ways. Please note some devices have a horizontal limit as well. This will be addressed below also. The examples will assume you have a 4000-foot-deep drill hole that you need at 10 feet/inch. We’ll also assume a PDF file output that is set to WIDE mode (11 inches). This can accommodate three 2.5” or 3.3” headers, or two 5” headers, or one header if you’ve chosen the single line display option for annotation.

Imaging Options for Strip Logs

- **Side-by-Side Strips:** Depending on the device and the display options, you may place 1, 2, or 3 strips side by side. To do this, you’ll need to use intervals. You will want to do one log at a time to make sure the display is done in the proper order. We’ll use the PDF display option limits in this example. Perform the following steps:
 - Make sure you have NOT set the “Force each log on a new page” option
 - Select the log and set the first interval so that it ends before 190”. Press enter to accept the log.
 - Select the same log and set the interval to that it starts where the last interval ended, and it ends at the equivalent of the 380” point. Press enter to accept the log.
 - Select the same log and set the interval to that it starts where the last interval ended, and it ends at the equivalent of the 400” point. Press enter to accept the log.
 - Now, select no additional logs to have the command file built with these three segments of the single log.
 - Depending on the header options chosen, you will get one, two, or three PDF files, each with a portion (or all) of the strips within the 190” limit. Note that if there are a large number of small units near the break point for a log, you may need to try a few times to get the strips correct.
- **Single Strips:** For image-oriented output types (i.e. Direct Image) you can use this process to create multiple images and combine them using other off-the-shelf software. This option requires a bit more manipulation of the files but can be done relatively easily so long as the rules are followed. The rules are detailed below and are written as if you are doing this with PDF’s. This will also require you to set a CONFIG file option to assist you in performing these steps.
 - This time make sure that the “Force each log on a new page” option is set.
 - Perform the log selections exactly as described above.
 - Because you’ve asked for a single log per page, each time LOGPLOT creates a new PDF file, it will use the same base name plus the sequential number corresponding to its selection position. For example, if the base PDF file was named HNDSH0001_KY.PDF, it will be named HNDSH0001_KY-0001.PDF. The next log plotted from the same source log will be named HNDSH0001_KY-0002.PDF
 - The PDF software you have (not READER software) can collect all these files to produce a single document with multiple “pages”. Use that to make a single document.

A similar process can be used when producing strip logs on dot-matrix printers, or when creating JPG or BMP files. In these last two cases, however, you cannot “join” the files into multiple pages. Leaving the file names with a -1, -2, etc. is the only real option. Note also that if you use the PETRA option, you cannot specify intervals. If you need a PETRA compatible document, you’ll have to reduce the scaling to accommodate size limits.

LOGPLOT “Silent” Features

LOGPLOT has a few “silent” features that you may wish to use.

- If you are primarily interested in only lithologies that have bed codes, just specify only the bed codes (Option #5) to be displayed. While all lithologies will be processed and shown with the appropriate symbology, only the lithologies that have bed codes (seam tags) will show annotation⁴⁷. If you also select Option 16 (Elevation display), the elevation will show only on those lithologies with bed codes (seam tags).
- The “Extra Wide Single Line” (#11) will force a header box size of 8” and ignore any other annotation options (except elevation display) you may have selected. This can be a useful tool to “shorten” the length of a log strip when there are many small lithologies. This presents these data in more of a tabular format.

The contents of this single line of data is:

- Lithology code, individual thickness, English phrase, lithology comments

⁴⁷ If you request any other annotations to be present (including thickness), all lithologies will contain all those selected annotations.

Standard AUTOCAD Color Table

Shown with black numbers so you can see how black on shading will appear

Index	Red	Green	Blue
0	0	0	0
1	255	0	0
2	255	255	0
3	0	255	0
4	0	255	255
5	0	0	255
6	255	0	255
7	255	255	255
8	65	65	65
9	128	128	128
10	255	0	0
11	255	170	170
12	189	0	0
13	189	126	126
14	129	0	0
15	129	86	86
16	104	0	0
17	104	69	69
18	79	0	0
19	79	53	53
20	255	63	0
21	255	191	170
22	189	46	0
23	189	141	126
24	129	31	0
25	129	96	86
26	104	25	0
27	104	78	69
28	79	19	0
29	79	59	53
30	255	127	0
31	255	212	170
32	189	94	0
33	189	157	126
34	129	64	0
35	129	107	86
36	104	52	0
37	104	86	69
38	79	39	0
39	79	66	53
40	255	191	0
41	255	234	170
42	189	141	0
43	189	173	126

Index	Red	Green	Blue
44	129	96	0
45	129	118	86
46	104	78	0
47	104	95	69
48	79	59	0
49	79	73	53
50	255	255	0
51	255	255	170
52	189	189	0
53	189	189	126
54	129	129	0
55	129	129	86
56	104	104	0
57	104	104	69
58	79	79	0
59	79	79	53
60	191	255	0
61	234	255	170
62	141	189	0
63	173	189	126
64	96	129	0
65	118	129	86
66	78	104	0
67	95	104	69
68	59	79	0
69	73	79	53
70	127	255	0
71	212	255	170
72	94	189	0
73	157	189	126
74	64	129	0
75	107	129	86
76	52	104	0
77	86	104	69
78	39	79	0
79	66	79	53
80	63	255	0
81	191	255	170
82	46	189	0
83	141	189	126
84	31	129	0
85	96	129	86
86	25	104	0
87	78	104	69

Index	Red	Green	Blue
88	19	79	0
89	59	79	53
90	0	255	0
91	170	255	170
92	0	189	0
93	126	189	126
94	0	129	0
95	86	129	86
96	0	104	0
97	69	104	69
98	0	79	0
99	53	79	53
100	0	255	63
101	170	255	191
102	0	189	46
103	126	189	141
104	0	129	31
105	86	129	96
106	0	104	25
107	69	104	78
108	0	79	19
109	53	79	59
110	0	255	127
111	170	255	212
112	0	189	94
113	126	189	157
114	0	129	64
115	86	129	107
116	0	104	52
117	69	104	86
118	0	79	39
119	53	79	66
120	0	255	191
121	170	255	234
122	0	189	141
123	126	189	173
124	0	129	96
125	86	129	118
126	0	104	78
127	69	104	95
128	0	79	59
129	53	79	73
130	0	255	255
131	170	255	255

Index	Red	Green	Blue
132	0	189	189
133	126	189	189
134	0	129	129
135	86	129	129
136	0	104	104
137	69	104	104
138	0	79	79
139	53	79	79
140	0	191	255
141	170	234	255
142	0	141	189
143	126	173	189
144	0	96	129
145	86	118	129
146	0	78	104
147	69	95	104
148	0	59	79
149	53	73	79
150	0	127	255
151	170	212	255
152	0	94	189
153	126	157	189
154	0	64	129
155	86	107	129
156	0	52	104
157	69	86	104
158	0	39	79
159	53	66	79
160	0	63	255
161	170	191	255
162	0	46	189
163	126	141	189
164	0	31	129
165	86	96	129
166	0	25	104
167	69	78	104
168	0	19	79
169	53	59	79
170	0	0	255
171	170	170	255
172	0	0	189
173	126	126	189
174	0	0	129
175	86	86	129
176	0	0	104
177	69	69	104
178	0	0	79
179	53	53	79

Index	Red	Green	Blue
180	63	0	255
181	191	170	255
182	46	0	189
183	141	126	189
184	31	0	129
185	96	86	129
186	25	0	104
187	78	69	104
188	19	0	79
189	59	53	79
190	127	0	255
191	212	170	255
192	94	0	189
193	157	126	189
194	64	0	129
195	107	86	129
196	52	0	104
197	86	69	104
198	39	0	79
199	66	53	79
200	191	0	255
201	234	170	255
202	141	0	189
203	173	126	189
204	96	0	129
205	118	86	129
206	78	0	104
207	95	69	104
208	59	0	79
209	73	53	79
210	255	0	255
211	255	170	255
212	189	0	189
213	189	126	189
214	129	0	129
215	129	86	129
216	104	0	104
217	104	69	104
218	79	0	79
219	79	53	79
220	255	0	191
221	255	170	234
222	189	0	141
223	189	126	173
224	129	0	96
225	129	86	118
226	104	0	78
227	104	69	95

Index	Red	Green	Blue
228	79	0	59
229	79	53	73
230	255	0	127
231	255	170	212
232	189	0	94
233	189	126	157
234	129	0	64
235	129	86	107
236	104	0	52
237	104	69	86
238	79	0	39
239	79	53	66
240	255	0	63
241	255	170	191
242	189	0	46
243	189	126	141
244	129	0	31
245	129	86	96
246	104	0	25
247	104	69	78
248	79	0	19
249	79	53	59
250	51	51	51
251	80	80	80
252	105	105	105
253	130	130	130
254	190	190	190
255	255	255	255

Standard Color Assignment to Litho Codes

The assignments in the table below can be used as values for the **COLORCODE** command. Notice that the most encompassing wild cards are specified first, and then the more specific ones follow. For example, 7** gets all the 700 codes assigned color 121, then 7*8 and 7*9 change only those sets of codes to color 51. You can modify this color scheme in any way to suit your own needs.

CODE	Color
9**	140
8**	121
7**	30
7*8	51
7*9	51
6**	51
5**	51
4**	43
3**	43
2**	254
1**	254
09*	190
07*	210
11*	253
14*	72
15*	10
16*	10
18*	10
24*	72
25*	10
26*	10
28*	10

CODE	Color
31*	44
35*	10
36*	10
34*	72
45*	10
46*	10
44*	72
01*	43
019	51
015	51
018	43
014	43
017	254
013	254

Scout Data Processing

Scout data are used primarily in the oil and gas industry. The C-Master function that assists in processing scout data is specifically tailored to one format of these data. That said, the software can be used in the more general case to input scout data.

The scout data (hereinafter referred to as “data”) would be scanned into a program that can optically character recognize (OCR) these data so that the text can be copied and pasted. This process, while laborious, can be much faster than typing in all the data. Except that the OCR process can have severe limitations in recognition. Many times, an “I” may be interpreted as a “1”, or “T”, or “L”. Spaces might disappear. So, some care in the copy/paste operation is required.

With those caveats in mind, let’s go through the process of entering data from Scout Tickets, a specific form of Scout Data.

Raw Data

The raw data for which C-Master is tailored consists of an index-card onto which are typed the data for a Scout Ticket (referred hereinafter as the Ticket). The data presented is a representation of the data encountered by the driller and perhaps logged onto other documents, then transcribed onto the Ticket. The Ticket can be scanned into a computer, OCR’ed, and these data copied/pasted into C-Master.

Here is an example of the Ticket, with the different sections highlighted.

Kentucky Barren D&A Coral Hill North	Onyx Int’l Exploration, LLC #14 Wendell Froggett Estate spud 3/10/2014	1-G-44 1910’FNL 2043’FWL Sec elev 764 gr, comp 3/12/2014
Gilco: Ft. Payne 270 NA 480 Waldron 533 “Blue Sd” 588 s/gas Osgood 590 Leipers 750 DTD 931	#12 – 4/20/2017 – per #110843 7” 147’ w/25 sx D&A Cont: Rebell Oil of Ky Scout Check	

The upper three sections are the equivalent of the Header information of a standard C-Master litho log. The lower left section is the lithology data, but in a highly different form. The lower right section contains additional information about the drill hole and how it was made and (possibly) plugged.

In the next section, we will copy and paste the data from the Ticket into the Scout processing software, showing how the software and OCR processing need some help, and getting additional information input to complete the process.

Input of Scout Tickets

From the Log Entry/Edit menu, choose Option 3, Scout Tickets.

CLOG: **** Log Entry/Edit ****
Edit About Utilities

1 = Header Entry (New Log) and Lithology Entry
2 = Existing Log: Edit Header and Lithologies

3 = Enter a New Scout Ticket log

10 = "IMPORT" C-MASTER Log(s) (CIMPORT)
11 = Build a Log Entry Template File
12 = Enter a NEW Log Using An Existing Template

20 = Print And Code Logs (CPRTCOD)
21 = Print/Search Log Catalog (CCATALOG)
22 = Strip Logs (CLOGPLT)

30 = Return To Main Menu

40 = Show Current Files Configuration

50 = Exit This Program (RETURN TO WINDOWS)
ENTER OPTION BY NUMBER (1 to 50): 0

The Copy/Paste of the OCR'ed data (Adobe Acrobat in this case) yielded the initial results you see below. There are a few edits that need to take place.

Scout Ticket OCR Processing - Header

PASTE in the data from the OCR'ed Scout Ticket. Uncheck the ENABLE box(es) to make manual changes
Drag and drop a file here to populate User Data 1

<p>Top Left <input checked="" type="checkbox"/> Enable Processing</p> <p>KENTUCKY BARREN D&A CORALHILL NORTH</p>	<p>State (17) 1: KENTUCKY</p> <p>County (18) 2: BARREN</p> <p>Tract (6) 4: CORALHILL NORTH</p> <p>Add Tract</p>	<p>Quad: <input type="button" value="Select Quad"/></p> <p>State: Scale: 0 1:0</p> <p><input type="button" value="OK/Done"/> <input type="button" value="Cancel"/> <input type="button" value="Refresh"/></p>
<p>Top Center <input checked="" type="checkbox"/> Enable Processing</p> <p>ONYXINT'L EXPLORATION, LLC #14 WENDELL FROGGETT ESTATE SPUD 3/10/2014</p>	<p>Source (5.1) Contributor (8) 1: ONYXINT L EXPLORATION LLC</p> <p>Add Source/Contrib</p> <p>Ground Location (20) 2: #14 WENDELL FROGGETT ESTATE</p> <p>Synthesized DDH (7 and 9) 3: #14WFE</p>	<p>5.1:8. Company (ID=0): ONYXINT L EXPLORATION LI 6. Tract (ID=0):CORALHILL NORTH 7. Source DDH:#14WFE 9. Contrib DDH:#14WFE 11.1 Lat: Lon: 13.1 CARTER: L-G-44 **** FNL **** FEL 17. State:KY 18. County:BARREN 19. Township: 20. Ground Description:#14 WENDELL FROGGETT EST 21. Elevation: 764.00 ft. 24. Year Drilled:2014 32. Date Submitted:3/12/2014</p>
<p>Top Right <input checked="" type="checkbox"/> Enable Processing</p> <p>L-G-44 1910' FNL2043' FWLSEC ELEV 764 GR, COMP 3/12/2014</p>	<p>Carter Coordinates (13.x) 1: L-G-44</p> <p>2: 1910 FNL2043 FWLSEC</p> <p>Elevation (21) 3: ELEV 764 GR</p> <p>Date Entered (32) Drilled (24) 4: 3/12/2014</p>	<p>Dupe Distance(ft): 100</p> <p>Manual Entry-> Lat: <input type="text"/> Lon: <input type="text"/> <input type="checkbox"/> NAD83</p>
<p>Log Header User Data</p> <p>1: <input type="text"/> 2: <input type="text"/></p>		<p>22. Method SCOUT_TICKET 23. Logger SCOUT_TICKET</p>

There are two simple OCR issues, one in the Top Left and one in the Top Center boxes. These are the Tract name and Source/Contributor, respectively. There is a space missing, and these items will be edited later (see **Source/Contributor and Tract Editing** below).

The Top Right box contains the coordinates (Carter in this case), and the first character was OCR'ed as an "L". It should be a "1" so the coordinate conversion can take place. Note that in the box to the right, the Carter coordinates have "****" for the distances, and there is no Lat/Lon data. This indicates an error in the coordinates. Notice also that the Lat/Lon boxes just below this are shown, indicating that the user can enter coordinates manually if so desired. More on that later. Carter Coordinates are converted if, and only if, the State (17) is Kentucky.

With the coordinate conversion is successful, the manual Lat/Lon input fields are disabled. Also, the coordinate (NAD27) is compared to the quadrant list internal to C-Master, and that places the drill hole in the Hiseville quadrangle in Kentucky. Click on the Select Quad to be presented with the normal selection dialog. If your desired quadrangle name does not yet exist, then click "New", and "Select from Standard List". Click "Apply", then "Save", and the quadrangle is added.

Note that the Source and Tract are showing the ID number is not yet assigned. If the Source or Tract is not found in the reference file, and the ID shows as zero, the buttons just below each item will be enabled, and you can add the Source and/or Tract to the reference files.

Source/Contributor and Tract Editing

If the source/contributor name and/or tract do not match an existing reference file entry, you can edit the data directly in the input field or click the appropriate button to choose the desired data from the reference file. Doing so will disable the processing of the OCR'ed data in the matching block, so only do this when all other data has already been edited. Stated another way, manually editing either the source/contributor name or tract name using these buttons should be the **final** editing of the header data performed.

Click on the "Add Tract" button. The Tract Name is filled in and you can either choose an existing Tract name or enter the description and ID number to create a new entry. I have chosen to insert the space in the name and assign the ID # 12. In either case, select "Save" to select this entry, or "Cancel" to ignore the choice. Below, you can see how the Tract name has been added.

Edit/Choose Tract Name ×

Tract Name:

Tract Description:

Set ID #:

Current Defined Tracts - Click line to select

Tract ID	Tract Name	Tract Description
5	ABCD	
6	ANOTHER TRACT	Another Annotation
4	DEFG	
991	DEFG.ABCD	THIS IS TEST TEXT
3	EDFG	
1	GRIFFITH	
2	KJHGF	
777	MY TRACT	
321	THIS IS A TRIAL	

Selecting "Add Source/Contrib" shows a similar selection box. Note that the quote mark in the original name has been removed. Special characters should not be retained in the reference file. Click "Save" after editing the Source ID number to add this entry, or after choosing an existing entry.

Source/Contributor Edit/Choose

Source Name:

Set ID #:

Current Source Company Names

ID #	Company Name
136	APEX COAL
33	ANTON
336	ANTHOSTON COAL
388	ANKER MINING

Returning to the main dialog, you can see that the Top Left and Top Center are showing as grey. Because we have edited the tract and source (respectively), those OCR boxes cannot be processed as this will negate the editing work done (but not the addition of the data). Also note that the "Add ..." buttons are not enabled. The indicated tract and source have been located in the reference file and therefore no longer need to be changed.

Scout Ticket OCR Processing - Header

PASTE in the data from the OCR'ed Scout Ticket. Uncheck the ENABLE box(es) to make manual changes
 Drag and drop a file here to populate User Data 1

<p>Top Left <input type="checkbox"/> Enable Processing</p> <p>KENTUCKY BARREN D&A CORAL HILL NORTH</p>	<p>State (17) 1: KENTUCKY</p> <p>County (18) 2: BARREN</p> <p>Tract (6) 4: CORAL HILL NORTH</p> <p><input type="button" value="Add Tract"/></p>	<p>Quad: HISEVILLE State: KY Scale: 2 1:24000</p> <p><input type="button" value="Select Quad"/></p> <p><input type="button" value="OK/Done"/> <input type="button" value="Cancel"/> <input type="button" value="Refresh"/></p>
<p>Top Center <input type="checkbox"/> Enable Processing</p> <p>ONYX INT'L EXPLORATION, LLC #14 WENDELL FROGGETT ESTATE SPUD 3/10/2014</p>	<p>Source (5.1) Contributor (8) 1: ONYX INT L EXPLORATION LLC</p> <p><input type="button" value="Add Source/Contrib"/></p> <p>Ground Location (20) 2: #14 WENDELL FROGGETT ESTATE</p> <p>Synthesized DDH (7 and 9) 3: #14WFE</p>	<p>5.1;8. Company (ID=889): ONYX INT L EXPLORAT 6. Tract (ID=12):CORAL HILL NORTH 7. Source DDH:#14WFE 9. Contrib DDH:#14WFE 11.1 Lat: N 37.0780875 Lon:W 85.8429997 USGS ST:KY QUAD:Hiseville 13.1 CARTER: 1-G-44 1910 FNL 2821 FEL 17. State:KY 18. County:BARREN 19. Township: 20. Ground Description:#14 WENDELL FROGGETT I 21. Elevation: 764.00 ft. 24. Year Drilled:2014 32. Date Submitted:3/12/2014</p>
<p>Top Right <input checked="" type="checkbox"/> Enable Processing</p> <p>1-G-44 1910' FNL2043' FWLSEC ELEV 764 GR, COMP 3/12/2014</p>	<p>Carter Coordinates (13.x) 1: 1-G-44 2: 1910 FNL2043 FWLSEC</p> <p>Elevation (21) 3: ELEV 764 GR</p> <p>Date Entered (32) Drilled (24) 4: 3/12/2014</p>	
<p>Log Header User Data</p> <p>1: <input type="text"/></p> <p>2: <input type="text"/></p>		<p>Dupe Distance(ft): <input type="text" value="100"/></p> <p>Manual Entry-> Lat: <input type="text"/></p> <p>Lon: <input type="text"/></p> <p><input type="checkbox"/> NAD83</p> <p>22. Method <input type="text" value="SCOUT_TICKET"/></p> <p>23. Logger <input type="text" value="SCOUT_TICKET"/></p>

Scout Ticket Duplicate Search

So, in the space of under a minute the data have been entered, edited, and we are ready to go to the next step, the lithology data. Click on OK/Done. This will look for potential duplicates, just like for manually entered C-Master logs. The distance for coordinate comparisons can be set (look just above the manual Lat/Lon on the previous screen capture). The example below was forced to show the duplicate check.

```
SCOUT Ticket Log - Verify
Edit About Utilities

1. QUAD NAME: HISEVILLE
2. STATE LOCATION OF QUAD: KY
3. SCALE OF QUAD: 2 1: 24000.
5.1 UNPUB RECORD. COMP OR AGENCY NAME:
ONYX INT L EXPLORATION LLC
7. DRILL HOLE NUMBER: #14WFE
11.1 LATITUDE N/S: N 37.0780875
11.2 LONGITUDE E/W: W 85.8429997

*<>*
The Source ID and Source Drill Hole match a log already in the catalog
Duplicate of: Quad:DUMMY/State:XX/Scale:2 1:24000/Log ID:1/Source ID:889/Drill Hole:#14WFE
*<>*

This existing log is close to your coordinates. It is 0.00 feet away from the coordinate you entered
Quad:PINE/State:CO /Scale:1 1: 125000./Log ID:45/Project Code:
There are 6 total logs close to your new one. See Status Window to see all close logs.
If this is NOT OK, then select Option 2 below

1 = SAVE LOG and Proceed with Processing of Lithologies
2 = Go back and edit ticket data
3 = Return to Previous Menu (Quit)
ENTER OPTION BY NUMBER (1 to 3): 0

ARROW, TAB, HOME, or END TO NAVIGATE F5=CLR FIELD F6=CLR TO END F8=Swap Screens <ENTER>=DONE CTRL+F9=Clr All
See Message Details in Status Window

DONE! Show Status Hide Status OVERWRITE
```

We'll choose Option 1 to save the log and enter the lithology data. Creating a log in this way will also save the three editable blocks of data in the log file so you can have a record of what was OCR'ed and (perhaps) manually edited.

Scout Ticket – Lithology Data

The data entry screen will be displayed, and you can copy/paste the lithology entries.

Scout Ticket OCR Processing - Lithologies

Auto-formation name-to-Ferm code enabled. There are 54 abbreviations recognized.
 PASTE in the data from the OCR'ed Scout Ticket
 Uncheck the ENABLE box to make manual changes

000 <== Default Ferm Code Default Comment==>

931.0 <== Hole Depth (25)

Lithologies Enable

Lith #	Formation	From	To	Analysis	Std Formation	Ferm Code
From/...	FL PAYNE	270				
From/...	NA	480				
From/...	WALDRON	533			WALDRON	355
From/...	BLUE SD	588		S/GAS		
From/...	OSGOOD	590			OSGOOD	357
From/...	LEIPERS	750			LEIPERS & CATHEYS (?) LI...	361

“FT PAYNE” was mis-OCR’ed into “FL PAYNE”. And there are no “To” depths in the lithology data. These are indicated by the text in the lithology number field (“Lith #”) as “From/To Error”.

We can easily correct the formation name problem, but where are the missing “To” depths? The depths are in the original drilling log but were not typed onto the Ticket.

First, we correct the formation name. This will “fill in” the Standard Formation name (if one exists). Then, we use the original drillers record and go to each line and add the “To” depth. Doing this in the right-hand window will disable the left-hand data, preventing your changes to the depths from being wiped out. Alternatively (as I did), you can add the depths to the original OCR’ed data. In either case, we get:

Scout Ticket OCR Processing - Lithologies for Quad: State: Scale: 0 (1:0) Log ID: 0

Auto-formation name-to-Ferm code enabled. There are 54 abbreviations recognized.
 PASTE in the data from the OCR'ed Scout Ticket
 Uncheck the ENABLE box to make manual changes

000 <== Default Ferm Code Default Comment==>

931.0 <== Hole Depth (25)

Lithologies Enable

FT PAYNE 270-480
 NA 480-520
 WALDRON 53-542
 “BLUE SD” 588-590 S/GAS
 OSGOOD 590-620
 LEIPERS 750-760
 DTD 931

Reload Formation Translation File

Lith #	Formation	From	To	Analysis	Std Formation	Ferm Code
1	FT PAYNE	270	480		FORT PAYNE	337
2	NA	480	520			
FROM ...	WALDRON	53	542		WALDRON	355
4	BLUE SD	588	590	S/GAS		
5	OSGOOD	590	620		OSGOOD	357
6	LEIPERS	750	760		LEIPERS & CATHEYS (?) LI...	361

Note that the “NA” and “BLUE SD” formations did not have a standard name in the formation translation file. They will not be assigned a Ferm code when the litho log is written. Click on “OK, Save Lithos” to save these data. The next screen will allow you to perform standard lithology editing on these data, start another ticket, done with scout tickets in general, or just quit to Windows.

```

Select next action from the list below:

1 = Perform editing on this tickets' log
2 = Done with this ticket; Start another!
3 = Done with all tickets
4 = Quit to Windows
ENTER OPTION BY NUMBER (1 to 4): 0

```

Select Option 1 to edit the log, including header data, just like regular C-Master logs.

Looking at the lithology records, we can see the following:

Line	Thickness(V)	Depth(V)	?	Code	English	Original	Barrel	Comment	Seam	Analysis
1	270.000	270.000	*	000		270				
2	210.000	480.000		337	FORT PAYNE	480		FT PAYNE		
3	40.000	520.000	*		NA	520		SCOUT_DATA		
4	13.000	533.000	*	000		533				
5	9.000	542.000		355	WALDRON	542		WALDRON		
6	46.000	588.000	*	000		588				
7	2.000	590.000	*		BLUE SD	590		SCOUT_DATA		S/GAS
8	30.000	620.000		357	OSGOOD	620		OSGOOD		
9	130.000	750.000	*	000		750				
10	10.000	760.000		361	LEIPERS & CATHEYS ...	760		LEIPERS		
11	171.000	931.000	*	000		931.0				

All "000" coded lines are generated as default data (with the user specified default comment). You can edit these data to better reflect what was found if you have the original driller's log available. For formation names found in the formation substitution file, the English is filled in with the Standard Formation name, the Ferm code is set to it proper value, and the lithology is marked as "coded" (no "*" in the "?" column). "BLUE SD" does not have its code set, so it is assumed to be an English phrase (and should be run through the coding process). This line also has an analysis tag.

Note that the Formation Name translation file is user-built. If a standard file can be supplied as part of C-Master, it will be included. For now, refer to the next section on the process for building the translation file.

Formation Name Translation File (Example)

The file used to translate the formation name abbreviations to a “standard” name and to assign a Ferm code is built by the user. Using a text editor, follow the example below to create your own. The example below is not geologically correct but does illustrate the processing.

The formation abbreviation is “**FT PAYNE**”. From a KYGS file, the “standard” name is “**FORT PAYNE**”. I have chosen to assign the Ferm code of **337** (“LT GRY GRN SDY FIRECLAY”). The entry in the file will be as follows:

```
"FT PAYNE" :: "FORT PAYNE" :: 337
```

The “: :” is required to delineate the separation of the fields.

Some additional entries used in the ticket example above:

```
"WALDRON" :: "WALDRON" :: 355
```

```
"OSGOOD" :: "OSGOOD" :: 357
```

```
"LEIPERS" :: "LEIPERS & CATHEYS (?) LIMESTONE" :: 361
```

Note that two of these entries do not change the basic name. They are required to be present to assign the Ferm Code.

Any occurrence of two spaces will be replaced by one space, and no imbedded single or double quotes are permitted.

An alternate to using this translation file would be to define a non-standard phrase file to the basic coding region and run the log through the coding process. In that case, the non-standard phrase file would contain the abbreviation with the Ferm code. For the example given above, the non-standard phrase file would look like this:

```
337 FT PAYNE  
355 WALDRON  
357 OSGOOD  
361 LEIPERS
```

Boundary Filtering (Polygons)

Boundary filtering allows you to select a geographical region against which the geographic position of the log is compared. If you have selected a boundary file (it is displayed on the current Menu Window) and it has at least 3 vertices, then any logs selected (manually or via a Catalog Search file) will be filtered for use/display by this boundary region. If the log is inside the boundary or it is at one of the vertices of the polygon that defines the boundary, it is included in the selection; if not, it is excluded. Any log whose coordinate is not defined (i.e. UTM Zone as stored in the Master Catalog is zero) is assumed to be outside the boundary. You must have at least three points defined for the boundary to be considered valid. You should include the first coordinate at the end of the coordinate list also, but it is not necessary (i.e. you can define a square using only three stated coordinates).

You can also (when selecting logs) select on the coordinate **NOT** being inside the polygon.

You can use different boundary filters in the single session. Any logs selected with a boundary filter in effect will be filtered accordingly.

How to Build a Boundary File (Manual Method)

The boundary file can have a variety of commands and data formats and each one has its own advantages. Supported data commands/formats are:

- Datum selection
- Latitude/Longitude in decimal degrees; negative values are south and west (respectively),
- Longitude/Latitude as manually extracted from a KML file
- Latitude/Longitude in N/S dd mm ss.sss E/W ddd mm ss.sss format
- UTM
- State Plane Zone

Each boundary file has a header line to tell C-Master what form of the data is in this file, comment lines (any line whose first character is a #), and data lines. You can change the data format in mid-file by specifying a new type from one of the four available types. An example of a file with multiple formats is shown at the end of this section (Page [167](#)).

Any coordinate that is outside the US (including AK and HI) and territories will be processed as follows: If the DATUM is NAD27, the coordinate is assumed to be in the Clark 1866 spheroid; if the datum is NAD83, the coordinate is assumed to be in the WGS84 datum.

DATUM *datumname*

The datum name can be NAD27, NAD83, or WGS84. This establishes the datum of all data that follows. If the DATUM command is missing, the assumed datum is the datum chosen for coordinate input for new logs. This is selectable in the CONFIG file.

Note that you must still specify the State Plane Zone name in the appropriate datum (see below).

If the DATUM command is first, you must follow it by the proper data format command (i.e. "LATLON").

Latitude/Longitude ("LATLON"), the data format is:

+/-dd.dddddddd +/-dd.dddddddd

North/South is always first, followed by East/West. South and West coordinates are always specified as negative numbers. You may separate the data with commas, if you like.

Examples:

39.9 -105 *North 39.9 West 105*
-24.3, 0.356 *South 24.3 East 0.356*

Longitude/Latitude KML ("KMLLATLON"), the longitude is first, and the latitude is second, corresponding to the way Google Earth and KML coordinates (<coordinates></coordinates>) are specified. This format relieves the user from extensive reformatting of the data should they choose to convert a KML file manually to a boundary file. All KML data is in the WGS84 datum, regardless of the global setting for coordinate processing.

Examples:

-82.92623555211171, 37.56300755180530, 0 *comma and trailing zero are ignored*
-82.99458404105449, 37.51009446122170, 0

Latitude/Longitude DDMMS format ("LATLONDDMMSS"), the data format is:

N/S dd mm ss.sss E/W ddd mm ss.sss

Seconds must be specified; decimal seconds are not required. 1, 2, or 3 digits are all OK. No limit check is performed on these data.

Examples:

N 39 4 52.536 W 105 15 12
S 24 0 22.9 E 0 15 30

UTM ("UTM"), the zone number, easting and northing must be specified for each data point. Southern hemisphere northing values are given as negative numbers. The format is:

zzz eeeeeeeeeee.ee nnnnnnnnnn.nn

Examples:

17 347791.1 4162018.02
16 503465 -3456129

State Plane, State Plane Zone Name is required ("SPZ xxxx" or "SP27 xxxx" for NAD27, or "SP83 xxxx" for NAD83) to identify the data. The coordinate format is:

eeeeeeeeee.ee nnnnnnnnnn.nn

Examples (Complete, with zone change):

SPZ INW

481543.3 512531.5

SPZ INE

476059.9 507222.5

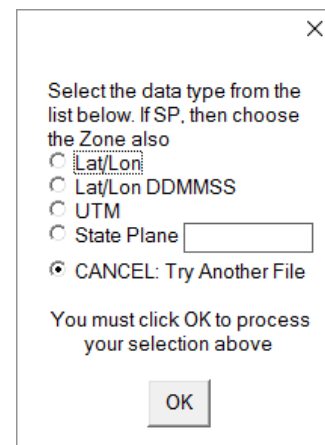
SP83 "KY S"

note: the NAD83 state plane zone names may have imbedded spaces; quotes required

3425977.14 5258616.84

To make this process as painless as possible, the initial header line that defines the data type does NOT have to be in the file. You may have files you use for other programs that would not view a header line kindly! If C-Master does not detect a valid header line, you will be prompted for the type of data C-Master will expect to see in the file. Note that only the **initial** State Plane zone will be applied to those data.

Also, if you wish to annotate the coordinate with additional information following the coordinate, please feel free to do so. Once the data are extracted from a line of data, the remainder of the line is ignored. You can use this to define "meets and bounds" and other identifying information easily within the file.



If an error is detected in the boundary file, it will be reported, and the input process ends, the number of vertices is set to zero, and the boundary file is set to blank. Stated another way, the boundary file will be used only if all the coordinates are specified and can be converted correctly.

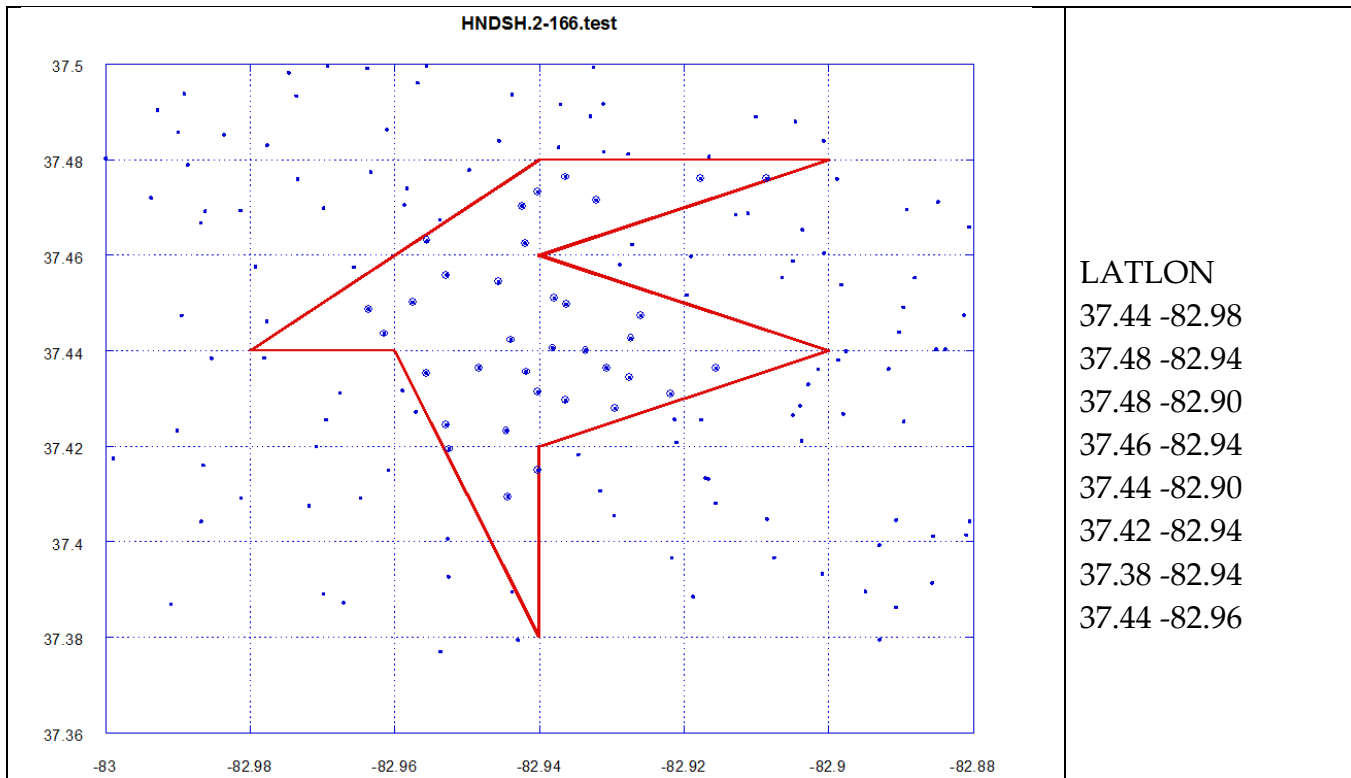
Boundary File Example

It is permitted to mix the data types within the same file. The example above, while not making logical sense, is fully permitted as a definition file; it contains all the possible data types, and shows some comments included.

```
LATLON
39.9 -105      # Near Coal Mine Avenue and Bowles
-24.3 0.356
KMLLATLON     # Like LATLON, but in KML format (lon first + elevation)
-105,40.01,0
0.456,-24.3,0
LATLONDDMMSS
N 39 4 52.536 W 105 15 12
S 24 0 22.9   E 0 15 30
UTM
17 347791 4162018
-16 503465 3456129
# This is also a comment that is ignored.
SPZ INW       # From Greg's Data
512531.5      481543.3
SPZ INE
507222.5      476059.9
```

Once processed, a latitude/longitude file may be created, using the original file name, appended with the file extent ".latlon". This requires the CONFIG file command "**BOUNDARY CREATE**" to be present. If the file being processed is already a .latlon file, a new file will not be created.

As an example, the boundary file below (right hand side) was applied the Handshoe, KY quadrangle. There are 168 logs in this quadrangle (not all of which are shown here). The boundary file coordinates are shown as the red lines. When the boundary file was applied to filter the logs based on their coordinates, the result consists of 38 logs whose coordinates are shown as small blue circles (with the dots).



Boundary Limitations

There are practical considerations to using a boundary file. The number of coordinates has a limit (see [Program Limitations](#)). The shape of the boundary is totally arbitrary; however, the boundary lines cannot form “islands”, meaning that the lines that would form the boundary cannot cross other lines; the only intersection can be at the vertices. No checks are performed to enforce the island requirement.

If a coordinate is extremely close to a boundary line, or very close to a vertex, it is possible that the log may or may not be included, depending on how close it is. This is an artifact of the math used to determine inclusion. Double precision arithmetic is used for all coordinates; as a rule of thumb, if a log coordinate is determined to be within +/- 0.00001 degrees of a boundary line or a vertex, it might be included or excluded incorrectly. It is the user’s responsibility to ensure the boundary lines meet this criterion, and that, in their specific case, the inclusion process is working successfully.

How to Build a Boundary File (KML File Conversion Method)

The same Google Earth file from which you could manually extract coordinate data can be processed automatically into a Boundary file using a function available on the System Support (Maintenance) Menu screen.

```

1 - Phrase File Maintenance          (CPHRASE)
2 - Quad Directory Maintenance      (CQUADBLD)
3 - Source/Contributor Maintenance (CSRCBLD)
4 - Bedcode File Maintenance       (CBED)
5 - Tract File Maintenance          (CTRACT)

6 - Sort Master Catalog             (CCATSORT)

7 - Import C-Master Logs            (CIMPORT)
8 - Export Logs To CSV             (CEXPRT_CSV)
9 - Import Logs in CSV format      (CIMPORT_CSV)

10 - Convert KML to Boundary File   (KML_CONVERT)
11 - Create KML file(s) for Google Earth (CKML)

12 - Return To C-Master Main Menu

13 - Show System Configuration (Files)
14 - Show/Change System Colors
15 - Load New Configuration File

16 - Exit To Windows
ENTER OPTION BY NUMBER (1 to 17): 10
    
```

Option 10 will ingest a KML file that you or another program has created and will extract the <coordinate> entry(s) in that file and make a Boundary file. When you select the option, you will be prompted first for the name of the KML file you wish to process. The second prompt will be for the name of the Boundary file you wish to create. If the file already exists, you will be asked to verify that you wish to overwrite the file.

The program KML_COORDINATES will be executed and the KML file converted⁴⁸. The number of coordinates found will be displayed in the Status window. If the file cannot be converted, or an error is detected, the program will pause to allow you to read the error message. As long as the file was created with Google Earth or is fully compatible with the KML standard⁴⁹ for the <coordinates> </coordinates> tags, the conversion should go smoothly.

To test your Boundary file, you should load the Boundary file into the KML file generator and generate a polygon file, then display this file using Google Earth. You can also open this file with a text editor.

⁴⁸ All coordinates in the file are extracted. If you have multiple pin points, or multiple boundaries in the KML file, it will pick up only the coordinates bounded by the <coordinate>...</coordinate> XML. Distinct blocks of coordinates are indicated in the resulting file by the comment "# Coordinate Block xxx".

⁴⁹ For more information on creating the data in Google Earth, you can use these Google search links.
<https://www.google.com/search?q=google+earth+draw+path&ie=utf-8&oe=utf-8> or
<https://www.google.com/search?q=google+earth+draw+polygon&ie=utf-8&oe=utf-8>.

Configuring Printers: Windows 2000, Windows XP and Windows 7

If you have an attached printer (dot matrix or HP LaserJet compatible) to print log strips, then this is the section for you!

There are two ways to modify your CONFIG file to accommodate the printer.

Execute this command from a command line prompt (Start>Run>cmd), type the command SPOOL, and get the results. On my computer, you'd see:

Spool 1.2

(c) Copyright 2008-2011, ITB CompuPhase, The Netherlands

USAGE: spool.exe filename [printer name]

Available printers:

- Quicken PDF Printer**
- PaperPort Image Printer**
- Microsoft XPS Document Writer**
- Generic**
- Fax**
- EPSONLQ**
- * Dell 3100cn PS**
- Dell 3100cn PCL6**
- CutePDF Writer**
- Adobe PDF**

The printer marked with a * is the default printer

If your computer identifies the default printer as being on port LPT1:, then your CONFIG file entry would read:

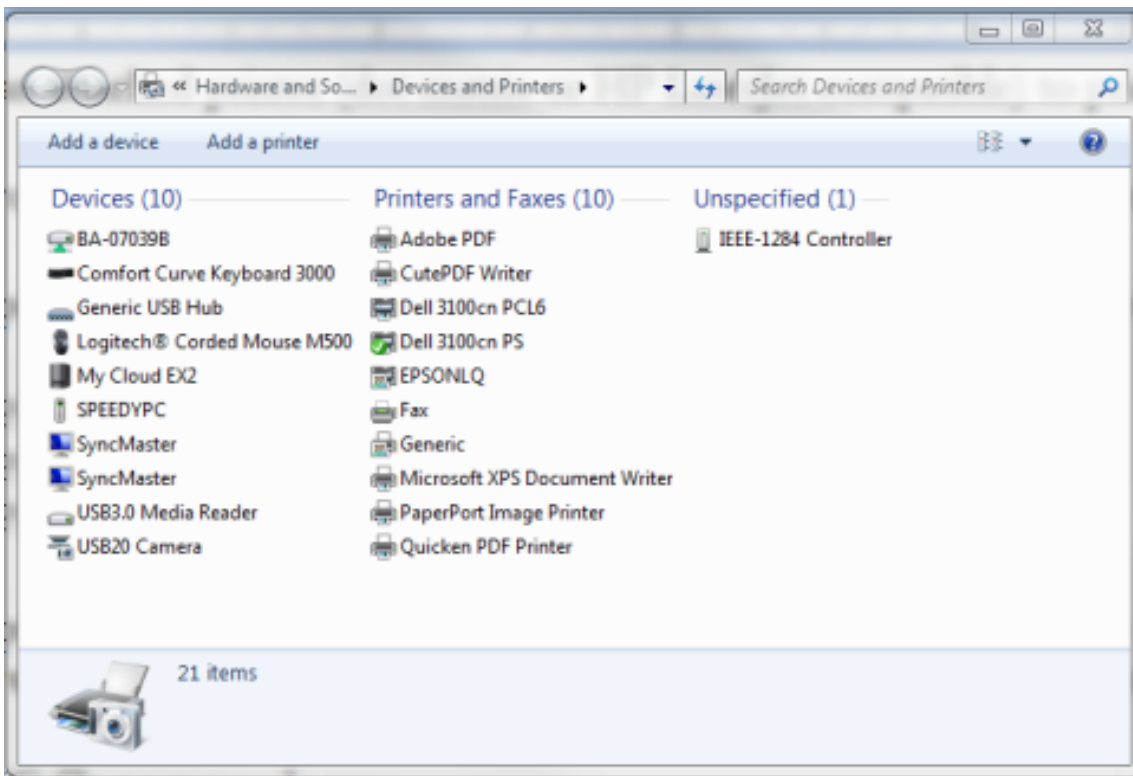
```
FXPRINTER LPT1: and/or  
LQPRINTER LPT1: and/or  
HPPRINTER LPT1:
```

If your computer identifies your printer with a name, you can take advantage of using the Print Spooler, allowing you to run LOGPLOT while queuing up the plots for printing. This option requires a couple of steps to implement.

The CONFIG file commands for me would be:

```
LOGPLOT   SPOOL           followed by  
FXPRINTER "EPSONLQ"50    and/or  
LQPRINTER "EPSONLQ"      and/or  
HPPRINTER "EPSONLQ"
```

The SPOOL option tells LOGPLOT to create a temporary file in a sub-folder of SPOOL_OUT, then perform the spooling operation once it is completed to the printer whose name is "EPSONLQ". This is the name of the printer as it would appear in a list of printers on your system (see example below, and the listing above).



⁵⁰ If the printer name has special characters (like /, :, <, >, ?), then you'll need to change the name of the printer. You can do this by opening the "Printer Properties" for the printer and changing the name shown there. It is suggested that you choose something short simple, with no spaces. For example, "Epson LQ-590 ESC/P 2 Ver 2.0" could be shortened to "EpsonLQ590".

I have the FX dot matrix printer installed as the printer called Generic because it has no pre-defined driver in Windows 7 or above. The Generic driver will allow you to print to the dot matrix printer from an application, like Word, but with no special fonts, etc. For our purposes, we will only be spooling the raw log strip data to the printer. So, my CONFIG file reads:

```
LOGPLOT   SPOOL
FXPRINTER "GenericFX"
LQPRINTER "EPSONLQ"
```

Note that the printer name is surrounded in quotes. Many times, a printer name will have spaces in it; this ensures that the proper printer name is chosen.

You cannot arbitrarily spool to ANY device and expect to get readable output. Since LOGPLOT outputs raw printer commands, a printer of a different type will not recognize the commands. You can end up with a lot of wasted paper this way!

If you have trouble, you can include the CONFIG command "**LOGPLOT PAUSE**" this will cause the spooling operation window to pause and be visible, and any error messages will appear. Contact CJD Software with the text of the message(s) for assistance. To clear the DOS window, type "EXIT", or close it with the mouse. In addition, LOGPLOT will create a logging file of the output screen (and additional information). If there is a problem, send this logging file to CJD Software also.

Special Folders in the Default Directory

To keep the default directory uncluttered, there are folders created dynamically that will contain various input and output files used and created by C-Master. Here is the list and the function of each folder:

ACADPLOT

Individual logs strips in DXF format. Files are identified by the C-Master file name followed by **.DXF**

CATSEARCH

Default for saved search(s) from CCATALOG. Files here can be used to speed up inclusion of logs into a project. User selectable names.

EXPORT

Default folder for CSV formatted exported file(s) and saved templates. User selectable names.

IMPORT

Default folder for CSV Import templates and a convenient place for importable data.

PDF_REPORT

All "listing" files are in this folder. They are identified by the type of output followed by the date and time of creation and ending in **.PDF**. If you keep this folder sorted by date/time, you can see the most recent output at the top of the list.

PDF_MULTI

Log strip output when multiple logs can be in a single PDF document. Files are identified by a 2-character identifier followed by the date and time of log strip generation and ending in **.PDF**. If you keep this folder sorted by date/time, you can see the most recent output at the top of the list.

PDF_SINGLE

Log strip output when one log per file and PDF are selected. Files are identified as the Quadrangle name, followed by the 4-digit log ID number, (optionally) scale, ' _ ', and the state code. If you keep this folder sorted by date/time, you can see the most recent output at the top of the list.

BMP_MULTI

Log strip output when multiple logs can be in a single BMP document. Files are identified by a 2-character identifier followed by the date and time of log strip generation and ending in **.BMP**. If you keep this folder sorted by date/time, you can see the most recent output at the top of the list.

BMP_SINGLE

Log strip output when one log per file and BMP are selected. Files are identified as the Quadrangle name, followed by the 4-digit log ID number, (optionally) scale, ' _ ', and the state code. If you keep this folder sorted by date/time, you can see the most recent output at the top of the list.

JPG_MULTI

Log strip output when multiple logs can be in a single JPG document. Files are identified by a 2-character identifier followed by the date and time of log strip generation and ending in .JPG. If you keep this folder sorted by date/time, you can see the most recent output at the top of the list.

JPG_SINGLE

Log strip output when one log per file and JPG are selected. Files are identified as the Quadrangle name, followed by the 4-digit log ID number, (optionally) scale, ' _ ', and the state code. If you keep this folder sorted by date/time, you can see the most recent output at the top of the list.

SPOOL_OUT

Contains the raw files that are sent to a dot-matrix printer via a spool operation. They are identified using the PLOT*.plot file name concatenated with a trailer of " .SPOOL_OUT". These files can also be manually spooled if you have a print problem and need to send it again. The names are re-used the next time you run the command file to generate more log strips.

Program Limits

The following constraints apply to C-Master and its processing. If you have a need to increase these limits for any reason, please contact CJD Software with your request and reasons. If your request can be accommodated, it will be implemented^{51, 52}.

Screen resolution	1024w x 768h ⁵³
<i>Minimum screen size for which C-Master has been tested</i>	
Maximum number of individual logs (Master Catalog limits)	65530
Maximum number of quadrangles in any one State	4352 ⁵⁴
Maximum number of “defined” States	75
<i>There are actually 54 “state” names for 1:24000 quadrangles</i>	
Maximum number of quadrangles in Quad Catalog	32760
<i>This is more than half of all the 1:24000 quadrangles in the US</i>	
Maximum number of logs to import in one batch	8192*
Maximum number of Source/Contributor References	8192*
<i>This is also the limit for Contributors</i>	
Maximum number of Tracts	32767
Maximum number of logs that can be CSV Exported	32760
Maximum number of lithologies in one log	32001*
Maximum number of Bed Codes (all regions)	160,000
<i>There can be up to 128 regions, and up to 5000 bedcodes within any region</i>	

⁵¹ Any item with a “*” can be modified to accommodate a larger limit if the need arises (and within reason). Call CJD Software to discuss your needs and whether the limit can be changed.

⁵² Other limits (such as the number of characters in the quadrangle name) are not changeable.

⁵³ This is the bare minimum on which the entire screen is (probably) readable when you start. You can change the character sizing (see the CONFIG file parameters) to accommodate smaller screens, but this has not been verified.

⁵⁴ There no states whose 1:24000 maps exceed this limit. This limit, however, applies to all scales, **combined**.

Maximum number of Codes + Phrases (phrase file limit) <i>All coding regions</i>	32765
Maximum number of unique temporary phrases (manual coding) <i>This limit only applies to CPRTCOD manual coding with phrase saving enabled</i>	997*
Maximum number of selected lithologies (Windows edit) <i>Limits how many lithologies can be simultaneously selected for edit or delete</i>	200*
Maximum number of logs selected for log strips	32767
Maximum length or width of PDF Log Strip Adobe® compatible	200 inches (PDF imposed limit)
Maximum length or width of PDF Log Strip (not Adobe®) <i>This represents a full box of continuous form paper</i>	22000 inches
Maximum size of log strip sent to physical printer <i>Number of dots/inch is variable depending on options selected</i>	20000 dots across (width) 90000 dots down (length)
BMP log strips ⁵⁵ <i>Size/format of the data presentation for these formats</i>	8.5" at 150 DPI* 600" long at 150DPI*
JPG log strips <i>Size/format of the data presentation for these formats</i>	8.5" at 150 DPI* 600" long at 150 DPI*
Maximum number of coordinates - Boundary File	20000*

⁵⁵ It is recommended that for long log strips (BMP or JPG), the resolution not exceed 100 DPI. 150 DPI is supported, but higher resolutions are not.

Coordinates

Coordinates are stored in any of the three pre-defined datums following the release of C-Master Version 8.0. Existing coordinates are assumed to be NAD27. You can now set C-Master to assume that newly entered logs are in NAD83, and all outputs are to be NAD83, as an example.

Coordinates can be displayed in a specific coordinate system regardless of the datum used for entry. By default, the entry and display of coordinates is NAD27. You can specify the display coordinate system used by changing the datum (**see CONFIG Commands - DATUM**).

Coordinates absolute accuracy is limited by (a) the original determination method, (b) the conversion from one coordinate system to another, and (c) the actual position on Earth relative to the central datum. For all these reasons, the coordinates calculated by C-Master use the most up-to-date software available through US government and other sources. The accuracy of any given coordinate as entered to the actual coordinate is only as good as the source data. In general, however, calculations of coordinate transformations are performed with an error generally less than one meter, and usually much better. Distance calculations performed in C-Master assume a spherical Earth and have no compensation for different altitudes of the points.

UTM coordinates, either as entered or calculated, are stored internally in a format that might introduce an error in the last significant digit. What this means to the user is that the UTM coordinate itself should only be relied on as being accurate to 2 meters.

Coordinates (NAD27 and NAD83)

C-Master will ingest coordinates in three different forms, keeping its internal coordinate system as UTM. Coordinates can be input as Latitude and Longitude (Lat/Lon), State Plane, and UTM.

The conversion from Lat/Lon to UTM coordinates produces a result that is accurate to within 1 meter when compared to various on-line coordinate conversion software (USFS, USGS, etc.). The conversion from State Plane (NAD27) to UTM produces a result that is internally accurate to within about 3 feet when compared to various on-line coordinate conversion software (USFS, USGS, etc.).

When computing a distance between two points, the coordinates are converted to Lat/Lon and the great circle distance is computed. CATALOG Search and Print is an example of using the coordinates to find all the drill holes within a specified distance of a reference point.

State Plane Zones

The following state plane zone names are supported. There is no assumed zone name; you must supply the name appropriate to the datum used.

For NAD27 and NAD83, all state plane zones must specify the coordinates in **feet**. For NAD83 zone names only, you may specify the State Plane zone as a numeric quantity.

The following table shows the coordinate transformation for each state in the union plus some of the territories. These samples are given to illustrate the state plane, UTM and Lat/Lon coordinates. Also, the state code shown below for each state is the method of identifying the state for the state plane conversion.

NAD27 State Plane Zone names

STATE NAME AND ZONE NAME	CODE	E/W	N/S	UTM.ZONE	EASTING	NORTHING	LAT	LONG
ALASKA 1	AK1	3124247.96	1035731.67	9	332514.	6058807.	54 39 2.654	131 35 45.431
ALASKA 2	AK2	500000.	916085.51	7	438452.	6262893.	56 30 30.000	142 0 .000
ALASKA 3	AK3	500000.	916085.51	6	561548.	6262893.	56 30 30.000	146 0 .000
ALASKA 4	AK4	500000.	916085.51	5	684614.	6266477.	56 30 30.000	150 0 .000
ALASKA 5	AK5	770312.64	2520850.03	5	528099.	6750589.	60 53 28.765	152 28 56.134
ALASKA 6	AK6	857636.17	6224356.32	5	427335.	7878425.	71 0 .002	155 0 .000
ALASKA 7	AK7	700000.	4111525.69	3	640111.	7239457.	65 14 59.998	162 0 .000
ALASKA 8	AK8	500000.	4111525.69	3	453284.	7236495.	65 14 59.998	166 0 .000
ALASKA 9	AK9	600000.	3410550.01	2	550075.	7022922.	63 20 .000	170 0 .000
ALASKA 10	AK10	5533424.39	1473805.13	3	562128.	6034725.	54 27 29.999	164 2 29.990
ALABAMA EAST	ALE	500000.	303093.75	16	610994.	3466947.	31 20 .000	85 50 .000
ALABAMA WEST	ALW	500000.	1212487.43	16	453467.	3688161.	33 20 .000	87 30 .000
ARKANSAS NORTH	ARN	1979150.16	361375.75	15	584539.	3909415.	35 19 34.269	92 4 11.627
ARKANSAS SOUTH	ARS	2000000.	758096.02	15	591532.	3845578.	34 45 .000	92 0 .000
AMERICAN SAMOA	AS	228654.49	287588.77	2	525162.	8415493.	14 20 .000	170 46 .000
ARIZONA CENTRAL	AZC	500000.	1364267.39	12	416096.	3845505.	34 45 .000	111 55 .000
ARIZONA EAST	AZE	397422.29	1500739.24	12	544673.	3886763.	35 7 28.243	110 30 34.948
ARIZONA WEST	AZW	500000.	1364312.87	12	248257.	3848568.	34 44 59.999	113 45 .000
CALIFORNIA I	CA1	2000000.	789314.68	10	583466.	4594534.	41 30 .000	122 0 .000
CALIFORNIA II	CA2	2000000.	606975.05	10	586187.	4354036.	39 20 .000	122 0 .000
CALIFORNIA III	CA3	2000000.	212394.02	10	722222.	4106838.	37 5 .000	120 30 .000
CALIFORNIA IV	CA4	2000000.	364036.10	11	320491.	4022576.	36 20 .000	119 0 .000
CALIFORNIA V	CA5	2000000.	454894.02	11	408468.	3845578.	34 45 .000	118 0 .000
CALIFORNIA VI	CA6	2000000.	424481.71	11	569800.	3688300.	33 20 .000	116 15 .000
CALIFORNIA VII	CA7	4186692.58	4294365.71	11	377589.	3818208.	34 29 59.998	118 20 .000
COLORADO CENTRAL	COC	2000000.	515936.22	13	456856.	4344431.	39 15 .000	105 30 .000
COLORADO NORTH	CON	1091086.83	414752.18	12	689568.	4477225.	40 25 33.504	108 45 55.379
COLORADO SOUTH	COS	2000000.	303425.09	13	455804.	4150254.	37 30 .000	105 30 .000
CONNECTICUT	CT	606832.14	163540.22	18	690512.	4572366.	41 16 55.847	72 43 30.515
DELAWARE	DE	462235.88	493228.86	18	452594.	4356023.	39 21 15.214	75 33 .748
FLORIDA EAST	FLE	824912.12	1061302.75	17	599000.	3014353.	27 15 .000	80 0 .000
FLORIDA NORTH	FLN	2551254.25	241240.01	17	329204.	3281329.	29 39 6.589	82 45 52.412
FLORIDA WEST	FLW	825635.4	970420.07	17	500000.	2986268.	27 0 .000	81 0 .000
GEORGIA EAST	GAE	719287.31	958818.26	17	457383.	3610633.	32 38 3.002	81 27 15.592
GEORGIA WEST	GAW	551805.03	636494.36	17	215803.	3516456.	31 45 .000	84 0 .000

STATE NAME AND ZONE NAME	CODE	E/W	N/S	UTM.ZONE	EASTING	NORTHING	LAT	LONG
HAWAII 1	HI1	332050.94	287068.34	5	186584.	2172401.	19 37 23.477	155 59 16.911
HAWAII 2	HI2	500000.	136197.58	4	743023.	2291484.	20 42 30.000	156 40 .000
HAWAII 3	HI3	500000.	121078.98	4	603584.	2377677.	21 30 .000	158 0 .000
HAWAII 4	HI4	500000.	90816.14	4	448418.	2441993.	22 5 .000	159 30 .000
HAWAII 5	HI5	500000.	12108.53	4	379316.	2399935.	21 42 .000	160 10 .000
IOWA NORTH	IAN	2006419.32	454523.08	15	461034.	4732643.	42 44 50.101	93 28 33.967
IOWA SOUTH	IAS	2000000.	485769.76	15	458161.	4575670.	41 20 .000	93 30 .000
IDAHO CENTRAL	IDC	500000.	668114.96	11	742546.	4820499.	43 30 .000	114 0 .000
IDAHO EAST	IDE	621017.48	778569.75	12	443024.	4849923.	43 48 7.616	111 42 29.824
IDAHO WEST	IDW	349231.3	2357247.27	11	547072.	5330815.	48 7 50.941	116 22 2.592
ILLINOIS EAST	ILE	558591.51	1858801.53	16	407028.	4624627.	41 46 11.856	88 7 6.790
ILLINOIS WEST	ILW	829221.87	1033854.06	16	328031.	4373965.	39 30 .000	89 0 .000
INDIANA EAST	INE	500000.	910470.79	16	613818.	4428399.	40 0 .000	85 40 .000
INDIANA WEST	INW	500000.	910470.79	16	492887.	4427551.	40 0 .000	87 5 .000
KANSAS NORTH	KSN	2341555.46	238196.37	14	690698.	4316781.	38 58 52.096	96 47 54.567
KANSAS SOUTH	KSS	1478219.22	202243.92	14	385381.	4118562.	37 12 30.000	100 17 30.000
KENTUCKY NORTH	KYN	2044414.78	270720.83	16	754207.	4236597.	38 14 35.963	84 5 43.283
KENTUCKY SOUTH	KYS	2327621.18	320518.46	16	710762.	4120423.	37 12 30.000	84 37 29.999
LOUISIANA NORTH	LAN	2285456.16	470671.77	15	634237.	3536395.	31 57 26.243	91 34 46.485
LOUISIANA OFFSHORE	LAO	2000000.	0.	15	667282.	2839663.	25 40 .000	91 20 .000
LOUISIANA SOUTH	LAS	2810181.64	236267.44	16	325966.	3241455.	29 17 30.000	88 47 29.999
MASSACHUSETTS ISLAND	MAI	200000.	0.	19	373842.	4539629.	41 0 .000	70 30 .000
MASSACHUSETTS MAINLAND	MAM	886823.95	246295.5	19	379277.	4614058.	41 40 15.808	70 27 .717
MARYLAND	MD	1029272.68	499353.15	18	397161.	4339628.	39 12 6.132	76 11 27.493
MAINE EAST	MEE	523379.87	989125.4	19	545459.	5154708.	46 32 46.920	68 24 25.488
MAINE WEST	MEW	543857.	425279.39	19	419823.	4872143.	44 0 .000	70 0 .000
MICHIGAN (LAMBERT) CENTRAL	MILC	2087349.58	340457.05	17	260480.	4903802.	44 15 .000	83 59 59.998
MICHIGAN (LAMBERT) NORTH	MILN	1748166.81	627585.21	16	423266.	5149871.	46 30 .000	88 0 .000
MICHIGAN (LAMBERT) SOUTH	MILS	2228532.81	300724.43	17	294954.	4688317.	42 19 19.299	83 29 17.920
MICHIGAN (TRANS) CENTRAL	MITC	432583.92	364474.13	16	582169.	4705564.	42 30 .000	86 0 .000
MICHIGAN (TRANS) EAST	MITE	944049.77	642146.16	17	418820.	4788848.	43 15 .000	82 0 .000
MICHIGAN (TRANS) WEST	MITW	688872.27	1823417.12	16	423266.	5149871.	46 30 .001	88 0 .000
MINNESOTA CENTRAL	MNC	1778474.46	441840.85	15	336072.	5119172.	46 12 30.000	95 7 30.001
MINNESOTA NORTH	MNN	2407087.31	237254.35	15	616459.	5221499.	47 8 19.177	91 27 51.184
MINNESOTA SOUTH	MNS	1705857.83	503257.75	15	330701.	4915504.	44 22 30.000	95 7 30.001
MISSOURI CENTRAL	MOC	500000.	882868.16	15	543745.	4234390.	38 15 30.000	92 30 .000
MISSOURI EAST	MOE	150919.61	561018.25	15	615008.	4136319.	37 22 5.932	91 42 4.297
MISSOURI WEST	MOW	500000.	758504.73	15	368746.	4234411.	38 15 .000	94 30 .000
MISSISSIPPI EAST	MSE	393805.81	308399.63	16	291714.	3377594.	30 30 51.338	89 10 14.013
MISSISSIPPI WEST	MSW	602197.95	909546.12	15	780306.	3655095.	33 0 .000	90 0 .000
MONTANA CENTRAL	MTC	2000000.	516664.3	12	613508.	5233819.	47 15 .000	109 30 .000
MONTANA NORTH	MTN	794693.44	725072.31	11	682416.	5416844.	48 52 46.764	114 30 43.122

STATE NAME AND ZONE NAME	CODE	E/W	N/S	UTM.ZONE	EASTING	NORTHING	LAT	LONG
MONTANA SOUTH	MTS	2000000.	455760.33	12	617711.	5011600.	45 15 .000	109 30 .000
NORTH CAROLINA	NC	1339854.04	519988.73	17	480980.	3890456.	35 9 31.049	81 12 31.789
NORTH DAKOTA NORTH	NDN	2422983.83	419525.82	14	517293.	5331344.	48 8 13.483	98 46 3.233
NORTH DAKOTA SOUTH	NDS	2000000.	303902.51	14	384899.	5150478.	46 30 .000	100 30 .000
NEBRASKA NORTH	NEN	3004688.24	293978.21	14	723504.	4661988.	42 4 48.305	96 17 52.927
NEBRASKA SOUTH	NES	2000000.	516100.16	14	458001.	4547917.	41 5 .000	99 30 .000
NEW HAMPSHIRE	NH	694907.5	233185.81	19	342508.	4777690.	43 8 15.006	70 56 11.287
NEW JERSEY	NJ	1947709.56	862915.9	18	512017.	4560985.	41 12 7.401	74 51 24.057
NEW MEXICO CENTRAL	NMC	500000.	909419.3	13	383887.	3707226.	33 30 .000	106 15 .000
NEW MEXICO EAST	NME	542236.92	832820.3	13	574945.	3683464.	33 17 21.732	104 11 42.411
NEW MEXICO WEST	NMW	500000.	545616.9	13	233787.	3599208.	32 30 .000	107 50 .000
NEVADA CENTRAL	NVC	694674.18	819647.52	11	588979.	4095137.	37 0 .000	116 0 .008
NEVADA EAST	NVE	726805.22	353637.07	11	697259.	3954803.	35 43 9.299	114 49 9.337
NEVADA WEST	NVW	949972.65	1551113.31	11	500000.	4316569.	39 0 .001	117 0 .000
NEW YORK CENTRAL	NYC	388536.11	1093335.53	18	336976.	4762541.	43 0 .000	77 0 .000
NEW YORK EAST	NYE	577147.69	832219.9	18	578474.	4681515.	42 17 1.775	74 2 53.671
NEW YORK (LONG ISLAND)	NYLI	2208197.57	146431.1	18	648016.	4498391.	40 37 30.000	73 15 .001
NEW YORK WEST	NYW	386745.7	728917.33	17	665643.	4651498.	42 0 .000	79 0 .000
OHIO NORTH	OHN	2467363.99	234305.74	17	514915.	4460579.	40 17 50.894	80 49 28.235
OHIO SOUTH	OHS	2000000.	546314.18	17	371025.	4373130.	39 30 .000	82 30 .000
OKLAHOMA NORTH	OKN	1791448.62	670119.44	14	525625.	4076823.	36 50 19.568	98 42 45.414
OKLAHOMA SOUTH	OKS	2000000.	424561.41	14	591807.	3817855.	34 30 .000	98 0 .000
OREGON NORTH	ORN	2000000.	559003.12	10	696357.	5007992.	45 12 .000	120 30 .000
OREGON SOUTH	ORS	2189746.36	999672.21	11	279112.	4920629.	44 24 25.943	119 46 26.560
PENNSYLVANIA NORTH	PAN	2876202.35	464358.76	18	537140.	4582693.	41 23 48.566	74 33 20.642
PENNSYLVANIA SOUTH	PAS	2000000.	273209.46	18	265525.	4440421.	40 5 .000	77 45 .000
PUERTO RICO/VIRGIN ISL.	PRVI	296314.91	237151.18	19	708940.	2044927.	18 29 7.954	67 1 16.215
RHODE ISLAND	RI	466943.55	114721.07	19	280929.	4586057.	41 23 53.266	71 37 13.730
SOUTH CAROLINA NORTH	SCN	2000000.	561019.07	17	500000.	3822022.	34 32 30.001	81 0 .000
SOUTH CAROLINA SOUTH	SCS	2000000.	621532.35	17	500000.	3711146.	33 32 30.000	81 0 .000
SOUTH DAKOTA NORTH	SDN	2208566.88	99065.79	14	483504.	4883035.	44 6 8.121	99 12 21.985
SOUTH DAKOTA SOUTH	SDS	2861013.61	183681.97	14	653350.	4739171.	42 47 30.000	97 7 29.998
ST. CROIX, VI	STCR	296314.91	337151.18	19	708940.	2044927.	18 29 7.954	67 1 16.215
TENNESSEE	TN	1201097.66	779285.6	16	346112.	4040838.	36 30 8.410	88 43 5.848
TEXAS CENTRAL	TXC	2000000.	515219.22	14	372815.	3439417.	31 5 .000	100 20 .000
TEXAS NORTH	TXN	1605118.92	267430.7	13	700143.	3844811.	34 43 39.249	102 48 50.950
TEXAS N CENTRAL	TXNC	2000000.	545699.63	14	639869.	3670574.	33 10 .000	97 30 .000
TEXAS SOUTH	TXS	2162444.81	575823.07	14	599000.	3014353.	27 15 .000	98 0 .000
TEXAS S CENTRAL	TXSC	2963503.91	254759.78	15	206326.	3156089.	28 30 .000	96 0 .000
UTAH CENTRAL	UTC	2000000.	124450.6	12	456506.	4280624.	38 40 30.000	111 30 .000
UTAH NORTH	UTN	2000000.	428093.8	12	458273.	4595098.	41 30 30.000	111 30 .000
UTAH SOUTH	UTS	1305706.24	186731.61	12	244015.	4115779.	37 9 18.788	113 52 56.922

STATE NAME AND ZONE NAME	CODE	E/W	N/S	UTM.ZONE	EASTING	NORTHING	LAT	LONG
VIRGINIA NORTH	VAN	1728704.62	46487.6	17	637471.	4183515.	37 47 25.852	79 26 19.475
VIRGINIA SOUTH	VAS	2000000.	427797.71	17	720974.	4153998.	37 30 30.000	78 30 .000
VERMONT	VT	316451.97	683472.68	18	643257.	4914659.	44 22 22.809	73 12 6.978
WASHINGTON NORTH	WAN	1228043.51	438306.77	10	425856.	5334134.	48 9 29.131	123 59 49.087
WASHINGTON SOUTH	WAS	1589237.36	353697.69	10	567398.	5126609.	46 17 30.000	122 7 30.000
WISCONSIN CENTRAL	WIC	2000000.	516468.47	15	735422.	5014885.	45 15 .000	90 0 .000
WISCONSIN NORTH	WIN	1437681.45	242373.84	15	561743.	5073021.	45 48 35.812	92 12 19.276
WISCONSIN SOUTH	WIS	2232958.84	471988.22	16	327609.	4795182.	43 17 30.000	89 7 30.001
WEST VIRGINIA NORTH	WVN	1418073.87	298900.6	17	452013.	4350271.	39 18 8.535	81 33 23.549
WEST VIRGINIA SOUTH	WVS	2000000.	455158.68	17	500000.	4233348.	38 15 .000	81 0 .000
WYOMING EAST	WYE	814620.34	670157.06	13	582169.	4705564.	42 30 .000	104 0 .000
WYOMING CENTRAL	WYEC	590603.74	485967.8	13	334357.	4651498.	42 0 .000	107 0 .000
WYOMING WEST	WYW	789808.22	852078.9	12	663024.	4762541.	43 0 .000	109 0 .000
WYOMING CENTRAL	WYWC	700636.02	851105.76	12	744540.	4764968.	43 0 .000	108 0 .000

NAD27 Mapped To NAD83 State Plane Zone Names

This table shows the general relationship between the NAD27 and NAD83 State Plane Zone names. Note that several NAD27 zones do not exist in NAD83 (i.e. now a single zone) and are marked as “xxxx”. In Michigan, the Transverse Mercator has been superseded by Lambert Projection.

NAD27	NAD83	NAD27	NAD83	NAD27	NAD83	NAD27	NAD83	NAD27	NAD83
ALE	AL E	CT	CT	LAO	LASH	NH	NH	TXN	TX N
ALW	AL W	DE	DE	MEE	ME E	NJ	NJ	TXNC	TXNC
AK1	AK 1	FLE	FL E	MEW	ME W	NME	NM E	TXC	TX C
AK2	AK 2	FLW	FL W	MD	MD	NMC	NM C	TXSC	TXSC
AK3	AK 3	FLN	FL N	MAM	MA M	NMW	NM W	TXS	TX S
AK4	AK 4	GAE	GA E	MAI	MA I	NYE	NY E	UTN	UT N
AK5	AK 5	GAW	GA W	MITE	xxxx	NYC	NY C	UTC	UT C
AK6	AK 6	GU	GU	MITC	xxxx	NYW	NY W	UTS	UT S
AK7	AK 7	HI1	HI 1	MITW	xxxx	NYLI	NY L	VT	VT
AK8	AK 8	HI2	HI 2	MILN	MI N	NC	NC	VAN	VA N
AK9	AK 9	HI3	HI 3	MILC	MI C	NDN	ND N	VAS	VA S
AK10	AK10	HI4	HI 4	MILS	MI S	NDS	ND S	WAN	WA N
AS	AS	HI5	HI 5	MNN	MN N	OHN	OH N	WAS	WA S
AZE	AZ E	IDE	ID E	MNC	MN C	OHS	OH S	WVN	WV N
AZC	AZ C	IDC	ID C	MNS	MN S	OKN	OK N	WVS	WV S
AZW	AZ W	IDW	ID W	MSE	MS E	OKS	OK S	WIN	WI N
ARN	AR N	ILE	IL E	MSW	MS W	ORN	OR N	WIC	WI C
ARS	AR S	ILW	IL W	MOE	MO E	ORS	OR S	WIS	WI S
CA1	CA 1	INE	IN E	MOC	MO C	PAN	PA N	WYE	WY E
CA2	CA 2	INW	IN W	MOW	MO W	PAS	PA S	WYEC	WYEC
CA3	CA 3	IAN	IA N	MTN	MT	RI	RI	WYWC	WYWC
CA4	CA 4	IAS	IA S	MTC	xxxx	SCN	SC	WYW	WY W
CA5	CA 5	KSN	KS N	MTS	xxxx	SCS	XXXX	PRVI	PRVI
CA6	CA 6	KSS	KS S	NEN	NE	SDN	SD N	STCR	STCR
CA7	xxxx	KYN	KY N	NES	xxxx	SDS	SD S		
CON	CO N	KYS	KY S	NVE	NV E	TN	TN		
COC	CO C	LAN	LA N	NVC	NV C				
COS	CO S	LAS	LA S	NVW	NV W				

NAD 83 State Plane Zone Names

The following table shows all the NAD83 State Plane Zones supported by C-Master. You may enter either the 4-character code, or the 4-digit zone number when using NAD83 State Plane coordinates. Please be aware that for NAD83 State Plane Coordinates, computations can consider whether US Survey Feet or International Feet is used. This is an option that must be selected if it to be used (default is US Survey Feet). Normally, this presents an error of about 2ppm in a reported location.

AK 1	5001	FL E	0901	MA I	2002	NY C	3102	WA N	4601
AK 2	5002	FL N	0903	MA M	2001	NY E	3101	WA S	4602
AK 3	5003	FL W	0902	MD	1900	NY L	3104	WI C	4802
AK 4	5004	GA E	1001	ME E	1801	NY W	3103	WI N	4801
AK 5	5005	GA W	1002	ME W	1802	OH N	3401	WI S	4803
AK 6	5006	GU	5400	MI C	2112	OH S	3402	WV N	4701
AK 7	5007	GU	5401	MI N	2111	OK N	3501	WV S	4702
AK 8	5008	HI 1	5101	MI S	2113	OK S	3502	WY E	4901
AK 9	5009	HI 2	5102	MN C	2202	OR N	3601	WY W	4904
AK10	5010	HI 3	5103	MN N	2201	OR S	3602	WYEC	4902
AL E	0101	HI 4	5104	MN S	2203	PA N	3701	WYWC	4903
AL W	0102	HI 5	5105	MO C	2402	PA S	3702		
AR N	0301	IA N	1401	MO E	2401	PRVI	5200		
AR S	0302	IA S	1402	MO W	2403	RI	3800		
AS	5300	ID C	1102	MS E	2301	SC	3900		
AZ C	0202	ID E	1101	MS W	2302	SD N	4001		
AZ E	0201	ID W	1103	MT	2500	SD S	4002		
AZ W	0203	IL E	1201	NC	3200	TN	4100		
CA 1	0401	IL W	1202	ND N	3301	TX C	4203		
CA 2	0402	IN E	1301	ND S	3302	TX N	4201		
CA 3	0403	IN W	1302	NE	2600	TX S	4205		
CA 4	0404	KS N	1501	NH	2800	TXNC	4202		
CA 5	0405	KS S	1502	NJ	2900	TXSC	4204		
CA 6	0406	KY N	1601	NM C	3002	UT C	4302		
COC	0502	KY S	1602	NM E	3001	UT N	4301		
CO N	0501	KY1Z	1600	NM W	3003	UT S	4303		
COS	0503	LA N	1701	NV C	2702	VA N	4501		
CT	0600	LA S	1702	NV E	2701	VA S	4502		
DE	0700	LASH	1703	NV W	2703	VT	4400		

Additional Coordinate Systems

Carter Section does have a conversion algorithm that you can use to “fill-in” UTM, Lat/Lon or KY Single Zone (NAD83) coordinates. You can access this “coordinate calculator” by selecting the “Utilities” menu item, and then choosing “Carter Coordinates”. The calculator can be used at any

time, and the transfer of Carter into one of the three aforementioned coordinate systems can occur if coordinates are displayed on the Main Menu screen.

If you use the calculator and you are editing a log header, you can “fill in” the coordinate in the log header directly from the calculator. If you want the data stored as UTM or Lat/Lon, the datum is set to NAD27. If you store in KY Single Zone, the datum is NAD83.

In addition to the three main coordinate inputs and Carter coordinates, C-Master allows the input of other coordinate systems as data but performs no coordinate conversions them. For reference, these coordinate systems are: Company Grid; and Township and Range.

Appendix A: Making a Copy of Your Existing Data (Manual Transition)

Whenever trying out new software, it is always a good idea to give it a “Test Drive”. When you install C-Master, it will **NOT** find our old data and make a copy of it for you, though. This is something you must do yourself. There are two main steps. The first step is COPY your existing data to a new folder without disturbing the old data, and the second is edit the CONFIG file in the **new** folder to reflect the new place where your data resides. The following example is put together to assist you in understanding the process.

The easiest way to copy your existing folder without disturbing the original is to single click the folder that contains your data, then type CTRL-C (copy), followed by CTRL-V (paste). Let’s walk through this process.

Your G: drive is on the network, and you’ve recently had a backup made. This is where your data resides. Let’s assume your data folder is called **G : \CMAOLD**. Single click the folder, then type CTRL-C. This will copy the folder and all the lower level contents. Then, type CTRL-V to paste the folder. This will create a copy of the folder, and it will be names **G : \CMAOLD - copy**.

Single click this folder, or right click this folder and rename it. For our purposes, we’ll call it **G : \CMANEW**. This will be where we’ll do some testing with the new software, and when we’re done, this will be the new location for all the data. Open this folder by double-clicking it. We’ll do the remainder of the work here.

First we’ll need to modify the COALCNFG.DAT file to point us to the new data folder. Then, we’ll need to have a shortcut that points us to the C-Master program **and** also starts us in this new data folder.

Since the COALCNFG.DAT file doesn’t open automatically when you double-click it, it’s probably a good idea to change its name, slightly. Rename the COALCNFG.DAT file to COALCNFG.TXT. We’ll use this latter file name for the remainder of this section. Having the file name end in TXT will allow you to use the standard text editor (like NOTEPAD) to edit the configuration file just by double clicking on it

It will be impossible for me to go through all the variations that can be present in the COALCNFG.TXT file. The assumption here is that every file name present is preceded by the name of the PATH that contains the file.

After you’ve renamed the file, double click on the configuration file to open it for editing. Do a global search and replace, replacing **G : \CMAOLD** with **G : \CMANEW**. This will point all the files appropriately. If you see any references to **G :** without a backslash and the folder **CMANEW**, then your CONFIG file is more complex. If you need help, call CJD Software and we’ll take you through it the best we can. Send us a copy of the file, though. It’ll help!

Once your COALCNFG.TXT file is complete, it's time to turn to the shortcut you'll use to start C-Master! Refer to the section on altering the shortcut (**SHORTCUT Method**) for how to change the appropriate fields. Or, refer to the next section (**Appendix B: Automated CONFIG file generation**), for an additional method.

Appendix B: Automated CONFIG file generation

The **CONFIGMAKER** program has a feature whereby you can specify the template to be used to build a configuration file. In addition, it can create for you the various files required for a new installation. After you have built the configuration you need, the creation of shortcuts to the C-Master programs can be done automatically for you. The remainder of this section gives information on how you can tailor the configuration file template to your needs.

CONFIGMAKER looks in the configuration file template for text in the form of %xxxxx%. For the specific %xxxxx% strings it is looking for, it will substitute folder names. Basically, it acts as an automated text editor, changing specific strings of characters into other characters according to specific rules.

Assume that CONFIGMAKER shows the “Log Data Folder” as “C:\CMATEST\LOGDATA\”. When CONFIGMAKER is creating a configuration file from a template and it runs across the string %LOGDATA% (or %logdata%), it will substitute the log data folder path.

For example, the configuration command in the template of:

```
LOGPATH “%logdata%”
```

would be changed to:

```
LOGPATH “C:\CMATEST\LOGDATA\”
```

Note: The substitution string is enclosed in quotes so that if a space appears in the folder name, C-Master will properly parse the name. This is always a good idea to do when specifying a file or path.

The following strings will be substituted automatically. More than one string can appear on a line; each will be substituted.

- **%DEFAULTPATH%** - The path to the C-Master Data Folder
- **%LOGDATA%** - The path to the LOGDATA folder in the C-Master Data Folder
- **%PROJECTDATA%** - The path to the Project Data folder within the C-Master Data Folder
- **%FXPRINTER_CHOICE%** – The name of the printer to which is attached an Epson FX-compatible printer
- **%LQPRINTER_CHOICE%** – The name of the printer to which is attached an Epson LQ-compatible printer
- **%HPPRINTER_CHOICE%** – The name of the printer to which is attached a Hewlett-Packard compatible printer

Appendix C: CSTARTUP: Starting a Configuration from Scratch

You may find yourself in a situation where you'd like to have a totally separate configuration from the bulk of your data (a new configuration). You could perform an installation of the software, but only selecting the install of the User Data Folder information. This is the quickest way and the most reliable.

However, it may be that you wish to restart a configuration from scratch. For this, there is an option within the Maintenance function (CMAINT) that is available by manually selecting the last possible option. Note that in the screen below, Option 16 is the last menu-selectable option, but option 17 is allowed. It is Option 17 that must be selected **manually**. This is to prevent inadvertent execution of this program through mouse clicks.

CMAINT - MAINTENANCE FUNCTIONS

```
1 = Phrase File Maintenance           (CPHRASE)
2 = Quad Directory Maintenance        (CQUADBLD)
3 = Source/Contributor Maintenance   (CSRCBLD)
4 = Bedcode File Maintenance          (CBED)
5 = Tract File Maintenance            (CTRACT)

6 = Sort Master Catalog               (CCATSORT)

7 = Import C-Master Logs               (CIMPORT)
8 = Export Logs To CSV                 (CEXPOR_CSV)
9 = Import Logs in CSV format          (CIMPORT_CSV)

10 = Convert KML to Boundary File      (KML_CONVERT)
11 = Create KML file(s) for Google Earth (CKML)

12 = Return To C-Master Main Menu

13 = Show System Configuration (Files)
14 = Show/Change System Colors
15 = Load New Configuration File

16 = Exit To Windows
ENTER OPTION BY NUMBER (1 to 17): 0
```

CSTARTUP will check to see if the Master Catalog and Quad Catalog specified in the CONFIG file (or, if defaulted, exist in the default directory). If they do, then CSTARTUP will not run. This is to prevent you from inadvertently deleting these key components of your data.

If these files do not exist, you will be asked three times whether you really want to perform the initialization. If you answer in the affirmative all three times, then the files will be initialized, and you can begin rebuilding using this “clean” new system.

While this is an option, the following are required to be in place to use the CSTARTUP option:

- The shortcut that has started C-Master has to reference a valid CONFIG file;
- The Master Catalog and Quadrant Catalog files cannot be present in the current data folder;

If you are truly starting a new configuration from scratch, using the [CONFIGMAKER](#) program would be a much better alternative.

Appendix D: Seam, Bench, and Zone Tagging System

The file of tags is simply produced. One places a bedcode and a qualifier, one pair per line in the file. The seam tag field of each lithology is scanned for matches against each of the three tag “types”.

Here is an example of one of the files:

```
AMB A
AMB B
BLR B
BRS A
BRS B
CLN B
COP A
COP B
DBY B
DOR A
EGL B
```

There are rules for how benches, seams and zones are processed. The same rules apply. These rules are:

1. The first occurrence of a tag in the lithologies marks the start.
2. The lithology log is then scanned from the bottom upward to find the first occurrence of the tag of interest.
3. All the lithology records from the starting record to the ending record are marked as the appropriate type.
4. Continued scanning for tags begins at the record immediately following the last lithology marked.

Using the list of tags above, the following sequences will cause the indicated result:

AMB A	AMB A	Rule 1: Overlaps: will ignore intervening tags
AMB B	AMB A	
AMB A	AMB A	Rule 2:
AMB B	AMB B	Rule 1 and Rule 2, and Rule 4

Appendix E: Making Fixes to Your Quadrant and Master Catalogs

Generally, it is not a good idea to remove/delete/change entries in the Quadrant or Master Catalog. Still, sometimes things go awry. Take the case of "T".

"T" had several C-Master logs that were supposed to be imported into his system. Due to an error that the provider made, all the logs had header information, but no lithologies. This was not detected until much later after additional logs had been added to this quadrangle. So, now "T" has a bunch of logs that are useless right in the middle of good logs. Top it off with an incorrectly specified quadrant for another set of logs (misfiled). "T" wants to eliminate the corrupted logs and to remove the incorrect quadrant definition.

This situation is why CREPAIR was created. Before you use this, **BACKUP YOUR DATA** and verify the backup is correct and complete. The Quad Master File (Quad Catalog) and Master Catalog are the only files affected in CREPAIR.

CREPAIR is a standalone program that uses your CONFIG file and allows you to make substantial changes to your Quadrant and Master Catalogs. The original lithology logs are never touched or deleted in any way. CREPAIR will allow you to remove from the Master Catalog links to corrupted logs. It will also allow you to reset the log counter associated with a quadrant, or to delete the quadrant data entirely. At each step, when you change the Quadrant Catalog, all the logs that are referred to by this quadrant will be removed from the Master Catalog, but not from your computer.

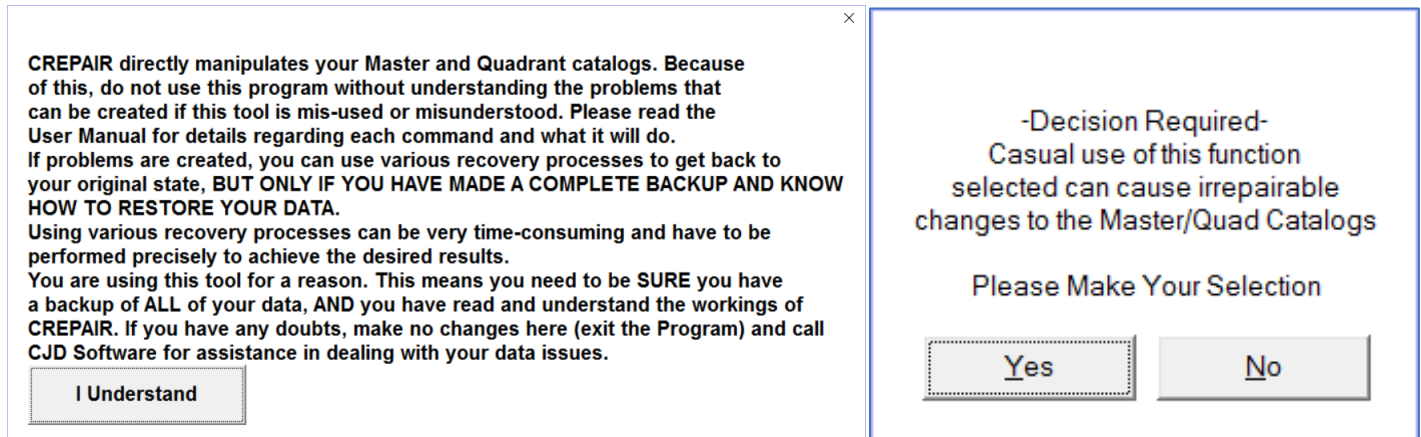
When a log is removed, both the original logs as well as any Project-specific logs will also be removed from the Master Catalog. Again, the lithology logs themselves are not deleted, only the Master Catalog entry is removed.

IMPORTANT NOTE: CREPAIR is extremely powerful, and potentially damaging to your data if misused or misunderstood. Be absolutely **SURE** that you understand the ramifications of what you are about to embark upon, and you should be prepared for the worst with a **COMPLETE** backup of all of your C-Master data **BEFORE** running CREPAIR.

When CREPAIR starts, it opens the Master and Quadrant Catalog files and makes a copy. It then records the file name in the PDF report that is created when CREPAIR is run. The file names into which the Master and Quadrant Catalogs are written are noted with the user name (login) of the person who ran CREPAIR along with the date and time that the backup was created.

Starting a Repair

The CREPAIR is a standalone program, and should have its own shortcut created, just like your shortcuts for C-Master. All throughout CREPAIR's actions, you will be required to verify that this is indeed what you wish to do.



C-MASTER - Repair the Master and Quad Catalogs

```
Operating on your configuration in: z:\CMATEST
Master Catalog: z:\CMATEST\MASTRFIL.DAT
Quadrant Catalog: z:\CMATEST\QMASTRFL.DAT

1 = Reset Quadrangle Log Counter
This will CLEAR the log counter for the selected quad,
meaning that you will have NO logs defined for that quad
Does not delete logs from your computer. Automatically
removes reference to ALL logs from this quad from the
Master Catalog.

2 = Remove A Quadrangle Definition
Does not delete logs from your computer. Automatically
removes reference to ALL logs from this quad from the
Master Catalog.


3 = Remove Damaged Logs from Master Catalog
You specify logs that contain no or bad data and are
clutter. Leaves a "hole" in the Catalog, does not
delete logs from your computer.

4 = Remove PROJECT-specific logs from the Master Catalog
Remove logs from the Master Catalog that END in a
Project code (i.e. .AAA). Does not delete any logs.

5 = EXIT This Program (Return To Windows)
ENTER OPTION BY NUMBER (1 to 5): 0
```

There are four processing options.


Option 1: Resetting the Quadrangle Log Counter. This function will reset a specific quadrant to contain no logs. This is a radical thing to do and should not be done lightly. If after performing this, you add logs to that quadrant, you are starting over, and your new logs will overwrite your original first log, and so on. This would only be performed if you were intent on rebuilding a quadrangle using some of the original logs and did not care about the log ID number assigned.

 Reset QUADRANT Catalog Entry - Log Counter

```
Enter the quadrant name, state, scale
to reset its counter
```

1. QUAD NAME: **Choose QUAD** Leave blank to go back to Menu
2. STATE LOCATION OF QUAD:
3. SCALE OF QUAD: 0 1: 0

Option 2: Remove a quadrangle definition. This is one step above resetting the counter. This will remove any references to that quadrangle both in the Quadrant Catalog as well as all the logs entered for that quadrant in the Master Catalog. For all intents and purposes, the quadrant will cease to exist. This would only be appropriate if a quadrangle name were entered incorrectly into C-Master, perhaps as a typographic error, or an improper quadrangle scale code was assigned. Because the quadrangle name would no longer be in the Quadrant catalog, you could then IMPORT these improperly categorized logs into the correct quadrangle name if so desired.

 Delete QUADRANT Catalog Entry

```
Enter the quadrant name, state, scale
you wish to remove completely
```

1. QUAD NAME: **Choose QUAD** Leave blank to go back to Menu
2. STATE LOCATION OF QUAD:
3. SCALE OF QUAD: 0 1: 0

Option 3: Remove specific logs. This option allows you to remove logs from the Master Catalog. You might use this function if you had entered a log in error and did not wish it to show up in Catalog searches, or blocks of log strips. Use of this option may leave a “hole” in your range of log ID’s. Other C-Master functions will recognize that a specific ID (or range of ID’s) is not in the Master Catalog. While this may generate an informational message, it will not generate any errors. If you remove a log or logs from the end of the range, then the Quadrant Catalog will be updated to completely remove those ID’s and “close the hole” at the end of the range. For example, if there are 50 logs, and you have “removed” 45 to 50, the Quadrant Catalog will be updated to show the last log ID for this quadrant is 44. **Note:** You should remove logs from the highest to lowest log ID. This is to ensure that you get the log count set properly for the quadrant. For example, if you had 5 logs, then removed log ID 1 through 4, then came back and removed 5, the quadrant indicators would still show that logs 1

through 4 still are in the Master Catalog.

```
Remove Corrupt or Damaged Logs

Enter the quadrant name, state, scale
and log ID range you wish to remove
from the Master Catalog
1. QUAD NAME:  Choose QUAD Leave blank to go back to Menu
2. STATE LOCATION OF QUAD: 
3. SCALE OF QUAD: 0 1: 0
ENTER LOG ID RANGE: 0  0  Select start using Hole ID data To go back to Menu, leave both=0
```

Option 4: Remove Project logs. This will remove all logs whose name ends in a project code (AAA to ZZZ). It removes these entries from the Master Catalog only, and for only logs with the specified Project code. The creation or removal of a Project log does not affect the Quadrant Catalog (since you created a Project log from an existing log). You might exercise this option if you had been using Project logs and since the Project is completed, keeping the logs would be unnecessary. Remember, the actual log files are not physically deleted and could be backed up and archived.

```
Remove PROJECT Logs from Master Catalog

Enter the PROJECT code you wish to remove: 
```

Each of these options will cause a specific prompt sequence to be shown, where the quad, state, and scale must be entered or selected using the “Choose QUAD” quick-fill button. For option 3, the log ID range prompt will also be added. Option 4 will only prompt for the Project Code. Once you have verified that this is indeed what you wish to do, the operation will proceed, the Quadrant Catalog and/or Master Catalog will be updated, and the listing file will be updated with your actions.

Once you have completed all your activities, the EXIT option will check to see what activities were performed (Quad and/or Master changes) and will rebuild the appropriate file(s). It is suggested that you go into C-Master and get a listing of the Quad Catalog and, perhaps, the Master Catalog to validate that all your changes have been accomplished and give you the desired results.

REMEMBER: If you begin entering logs at this point, you run the risk of overwriting the original log file data (the file names used for the logs may be re-used and overwrite with new data), the Catalog entry you have removed from the Master Catalog. Make sure that the changes you have completed are correct, and if they are not correct, restore the Master Catalog and Quadrant catalog from your backup (*you did make one before you started this, right?*) and give it another go. Remember, only these two files will be directly affected by CREPAIR.

Examples of Use

1. In "T"'s case, the following actions could be done:
 - Use CREPAIR Option 3 to remove the corrupt logs.
 - Repeat as necessary to eliminate all the corrupt logs.
 - Use CREPAIR Option 5 to re-write the Master Catalog.
 - Delete the corrupt logs from the system (manually) using the report that was generated.
 - Since only good logs remain, COPY them to a temporary folder.
 - Only copy the ones that have log ID's after the holes that were deleted. Use a Catalog listing if necessary to determine this.
 - Perform an IMPORT from the temporary folder of all the logs there. These logs will be sorted in alphanumeric order and will "fill in" after the first group of good logs.⁵⁶
2. You have incorrectly entered a quadrangle definition. No logs have yet been entered.
 - Use CREPAIR Option 2 and remove the quadrangle definition.
 - Use CREPAIR Option 4 to rewrite the Quadrant Catalog.
 - Go back to C-Master and, using the Maintenance menu, add the corrected Quadrangle definition back in.
3. You have incorrectly entered a quadrangle definition and now have entered 50 logs into this quadrangle.
 - Copy all the log data for this quadrangle to a temporary folder.
 - Use CREPAIR Option 2 and remove the quadrangle definition.
 - Use CREPAIR Option 5 to save these changes
 - Start C-Master and from the Maintenance Menu perform a quadrangle add with the correct information.
 - Perform an IMPORT using the logs in the temporary folder.
 - a. Use the REFILE option to select the new quadrangle as the target for these logs.

⁵⁶ This process assumes that, for whatever reason, there should be no gaps in the data (i.e. missing log ID's). If you didn't care, then simply leaving the logs in place after re-creating the Master Catalog would suffice.

Appendix F: What's the Concern with PDF Files?

PDF files are both a blessing and a curse.

They are a blessing because almost every computer has some PDF viewing software already installed. You can e-mail log strips or reports to anyone and they will be able to view it. They don't need C-Master installed.

However, PDF files are cursed with a limitation. The length (and/or width) of a single PDF page is limited to 200 inches. This was placed in the original Adobe PDF specification and has remained as such since the 1990's. While some PDF viewers will display a PDF page that is much, much longer, not all will. Because of this, C-Master will normally produce pages that are up to 200" in length, in accordance with the PDF standards. You can override this limit if you desire, but the resulting files are not Adobe PDF compatible.

If you have a log that, when its log strip is produced, is longer than 200", then you cannot display the log using Adobe Acrobat. You must use third-party PDF software.

If one of the lithologies is itself greater than 200 inches (i.e. 2010 feet displayed at 10 feet/inch), then the entire log will NOT be displayed, only the first 200 inches of it.

Appendix G: What If...? How to Make C-Master Do Your Bidding

This section is designed to answer possible questions you may have about how C-Master can be used to solve your real-world problems. Hopefully, your questions will be answered here. If they are not, just send us an e-mail, or call, and let us know what you'd like to do!

How should I configure my system?

This is a hard one to answer, as the configuration of some options is dependent on your computer and personal work needs.

Some choices include how to name your quadrant data, how are your sources/contributors going to be referenced, how might you best use your tract data, phrase files, etc. Consider these possibilities:

- Quadrant data. You only have 12 characters to uniquely define the name of the quadrant. In the old days, removing all vowels would usually suffice to reduce the amount of typing you'd do. C-Master now allows you to click to select, so the quadrant name length is less important.

If you have data from multiple states and some of those quadrangle names are the same, then there is some small possibility that you might want to spell the quadrangles slightly different, just to make the selection more specific, especially when you are typing it. On the other hand, since the quadrant name can be uniquely selected by the state, it might not matter a great deal.

- Sources and Contributors. If the source/contributor of most of your data is a company, then choosing the company name uniquely is critical. You would not wish to have a spelling error incorrectly match to a different source. Also, inclusion of punctuation (commas specifically) should be avoided as it might restrict you from exporting these data easily.

One of the biggest decision here is the assignment of the ID number. Companies change names, and you may wish to have all incarnations of the company to be assigned the same number. Many searches are based on this ID number, so if you want all incarnations of the company to be matched in a search, assign the same ID number.

Since sometimes company sell assets, the Source and the Contributor need not be the same entity.

Do not change the ID number once it has been assigned. The data are stored with the ID number as determined when the log is entered or modified. If you change it in the source/contributor reference file, it will not be changed in the lithology log nor anywhere else the data are referenced.

- Tracts. The use of tracts is very dependent on your usage and your clients/customers. If you have a tract, it should probably be tie to a client. This can create a problem if the tract name might be duplicated for other customers. There is only one tract name that can be tied to the ID number. If you think that a tract might be duplicated elsewhere, takes steps to make the name of the tract unique. Sometimes tracts change ownership, so tying the ID to a source/contributor

might or might not be the thing to do.

Do not change the ID number once it has been assigned. The data are stored with the ID number as determined when the log is entered or modified. If you change it in the tract reference file, it will not be changed in the lithology log nor anywhere else the data are referenced.

- Phrase Files. Establishing the linkage between a Ferm code and a phrase is done through this file. And it is through this file that we can accommodate differences in drillers and loggers.

The Master Phrase file is built from the supplied C-Master “standard” phrases files (Eastern or Western standard names), and, your job/location/driller unique data. Master Phrase files may occasionally require a rebuild. While unlikely, it is possible to fill up the file and need to make the file bigger to accommodate more phrases, or more drillers, etc. There is a log kept that keeps a running tally of any changes made to the Master Phrase file. You can use this to rebuild the file from the source data, but only if you keep those source data! So, keep the various phrase data in a folder so you can re-create the data more easily.

Once these initial data questions are asked/answered, you can proceed to the next level, the creation of support folders for various data. Usually, it is a good idea to have data that is associated with a specific Master Catalog/Quadrant Catalog kept resident with that data. In this way, when you back up your data, you will also capture the support files and folders at the same time. You can separate these data, but you may make your configuration management more difficult. This is especially true if some support information is on, say, a laptop, but you sometimes use the desktop machine when you are in the office. Why not have all these data in the same place? That is a question only you can answer. If you would like to talk about options available to you, call CJD Software and we’ll help in any way we can. Your data and the integrity of it is of supreme importance to CJD Software.

If you intend to import logs in CSV form, you should consider creating a folder in your C-Master data folder to hold various files and folders used to import logs. For example, if you typically deal with data from a variety of sources, they likely format their data in a specific way. Perhaps you would prefer to store various importation templates and support data in a folder named for each potential source. Or, for a source of logs that has a varied data capability, perhaps sub-folder for the various sub-categories of data.

If you intend to EXPORT data in CSV format, there are a different set of templates and support files that are created. The template files are NOT cross compatible, so you’ll want to save IMPORT and EXPORT template separately or have in the file name something that tells you what the file is used for.

Poor Quality Logs

You have drillers logs that are spelled badly and/or contain inconsistencies and are not coded in the Ferm system. It’s the best you can get. How can you handle this data?

One way is to use the phrase file to your advantage! This process assumes that the driller has a consistent way of spelling what they saw in the core. If you can determine from the drillers words what the Ferm code should be, you will be successful.

You will create a text file for phrase to code conversion, with the Ferm code specified first, then the phrase the driller used. Load the master phrase file (CPHRASE) and enter the file you've created as a Standard phrase file. Do not use the same region code as you may have used in loading one of the Standard phrase files.

After having entered a log, perform the Autocoding on this log, by setting the region code to use the phrase file you just loaded. This will translate the drillers information into the Ferm code. Any typos will show up in the log of the conversion process. You can manually code these or edit the phrase of those lithologies and re-run the autocoding process.

The great thing about using this process and assigning a specific code is efficiency. If you have more logs from this driller, you can use this special phrase file to repeat this autocoding process and get the logs in better shape, and not duplicating your efforts.

One additional benefit: If you must manually enter an additional lithology, you can enter the data as the Ferm code and then assign the same phrase that the driller would have used.

Mis-filed my logs. How can I recover?

Sometimes things just don't go right. Here's how to recover the data.

First, you'll need to record the State/Quad code that is on the existing logs. We'll assume it is HNDSH in Kentucky at 1:24000 (type=2). The first 5 characters of the file name is also what you'll need. You can also get that from the Quadrant Listing. Let's assume it is KY005, and there are 135 logs.

Create a folder and **copy** (do not **move** them) all the logs that start with KY005 to this folder. This will insure that when you redefine the quadrangle, if the new State/Quad name just happens to be the same KY005, you can successfully import the logs. Also, copy the Quad Catalog and Master Catalog to a safe place. You now have everything saved to a safe place!

Run C-REPAIR and select the Quad/State/Scale to be removed from the Quad Catalog. This action will also mark the Master Catalog entries for removal. Exit C-REPAIR to rebuild the Quad and Master Catalogs.

Run C-Master and run CQUAD to enter the proper quadrant information.

Run CIMPORT and select the folder for the import to be the folder where you had saved all the "KY005*.*" logs. Set the WildCard pattern to "KY005*.*" to only select the basic logs. You cannot import Project specific logs. Your log count should now be 135, matching the original data. Start the import and select to **REFILE** the data under a new quad/state/scale. Select the new quadrangle

definition you've just entered a bit ago, and let the process begin. Examine the printed log for any discrepancies that were found in the import process.

Congratulations!

You have now corrected the quadrangle data and the logs now reflect the new quadrangle!

Non-Standard Coding of Logs

You may get log data that has pretty much everything you need, but the lithology coding is totally a non-Ferm system. If you can provide a 1:1 correspondence between the input code to a Ferm code, you will be good to go! You can use the [Phrase file](#) and [Autocoding](#) to assign the appropriate Ferm code.

To do this, you would construct a special Phrase input file. This phrase input file would contain the data you wish to match to a Ferm code. For example, let's say that the source data has lithologies coded as:

Lith Modifiers

1 Casing or Surface Material

1.0 CASING

1.1 SAND/GRAVEL

1.1 SAND AND GRAVEL

1.2 FOSSILS

You would might construct a Phrase input file to map these special codes into:

001 1 Casing or Surface Material

001 1.0 CASING

001 1.1 SAND/GRAVEL

001 1.1 SAND AND GRAVEL

001 1.2 FOSSILS

In all these cases, the original data is maintained as the English Phrase associated with the lithology, while the symbology chosen to be plotted is the symbol for Casing/Surface.

By having the phrase match the intent precisely (the log is entered as English type), one can then perform the AutoCoding process and have the association made automatically. Any lithologies that

do not autocode can be manually coded, or you can modify the phrase input file, and rebuild the phrase database.

One note of caution: The way the phrase file is usually built is that you add the standard phrases first. In this case, you should choose one of the lines to be the standard way you will present the codes, just in case you do manually code the log. The other lines would be part of the non-standard phrase file that would be added AFTER the standard phrases are added. So, the standard phrase file would contain:

001 1 CASING OR SURFACE MATERIAL

While the non-standard phrase file would contain:

001 1.0 CASING

001 1.1 SAND/GRAVEL

001 1.1 SAND AND GRAVEL

001 1.2 FOSSILS

Appendix H: Translation File for Export of CSV Formatted Data

The translation file is used to change the contents of a C-Master data field of data into a different value for output. In the CEXPORT_CSV function, every header field and every lithology field can be subjected to a translation (although some fields don't make a lot of sense to translate).

A translation file may contain between 1 and 1024 lines of data. You can also include comments in the file so you can review how the file was constructed, etc. Anything that helps you maintain the data in the file.

One of the obvious uses of a translation would be to use the English phrase to create a special code type for use by another program. Another might be to translate a tract name into a new tract name; perhaps to obfuscate the tract by assigning a numeric code for the tract instead of a real place name. Or, to change the Ferm code into a code for use by another coding system.

As of this writing, the translation can be used for any field. However, some field have specific formats. For example, the SEAM tag field (if standard) may contain several doublets of bed codes and qualifiers. If you have multiple doublets, then the translation process may not work properly. However, if you have your SEAM tags as a single doublet, or use your own scheme, so long as the contents of the SEAM tag field is unique, you can translate the field uniquely (a 1:1 translation).

File format

The file is created as a simple text file. The general format of a line for translation can be:

```
from_field :: to_field           or
"from_field" :: to_field         or
from_field:: "to_field"         or
"from_field" :: "to_field"     or
# this is a comment
```

The "::" is required to separate the *from* and *to* fields. When the contents are enclosed in quotes, then the ENTIRE field (including leading spaces) will be used as-is. If the quotes are not used, then the fields are stripped of any leading spaces.

You can have any number of comment lines.

There are some examples of how a file can be constructed to accomplish what you need it to be.

Example Translations

Ferm Code to Alpha Code

Ferm code to an arbitrary alphabetic code

001 :: A00

021 :: ACA

174 :: BHD

English Phrase to Numeric Code

Enclosed in quotes so it will scan as a single "entity"

"CASING OR SURFACE" :: 127700

Not enclosed in quotes is OK because

it'll still be scanned as if it was enclosed in quotes

COMMON BANDED COAL :: 37546

It can be that a single "from" field can be

translated into something more complex

if the using program permits

"GRY/GRN SH" :: "89432 // GRAY % GREEN % SHALE"

Appendix I: Alternatives to Quadrangle Names

While the intent would be to reference a base map (i.e. a quadrangle sheet), other references can be used instead of a quadrangle name. C-Master does not require that an actual quadrangle name be used.

For example, you might manage several properties, all located in the same quadrangle. Rather than using the single quadrangle name, you could use the property name or other unique identifier. There is no restriction.

The State name associated with the quadrangle cannot be left blank but can be a single letter or number. If you use a single letter or number, the blank data will be set to the number 0.

Appendix J: Running Your C-Master Configuration

There are multiple ways to execute C-Master. You can use command files (*.CMD), shortcuts, or run directly from a command line. The most common way will be to use shortcuts, and there are two ways of creating the shortcuts for your system.

With your PATH environment variable set to include the C-Master installation folder, you can open a CMD window, change to a specific folder where your data will reside and a COALCNFG.DAT file also resides, then execute "C-MASTER.EXE". Alternately, in CMD, you can execute a command file (.cmd or .bat) which you have previously built and in which you have include the appropriate commands.

You can create a Shortcut (manually or using CONFIGMAKER), then double click on the shortcut to execute C-Master. If you create a shortcut manually, you should edit its properties to specify which CONFIG file you wish to use and in which folder your C-Master data resides. CONFIGMAKER is a more foolproof way to get your shortcut built. See examples below.

CONFIGMAKER Method

This is the easiest of all the methods described. You can create as many shortcuts as you like, apply folders to a pre-built configuration template to make it your own, and copy initial data to a C-Master folder of your choice by selecting the program CONFIGMAKER from your Start Menu. Using this program does not require detailed knowledge of Windows or DOS to achieve the goal of a working configuration file. Please refer to **CONFIGMAKER** description for more details.

DOS Method

Create a command file that will attach to the proper data folder and execute the desired code. On your Desktop, create a TEXT file, and rename it to **RunCmaster.CMD**. Right-click on this file and select "Edit" to insert the following lines of text. The first line selects the folder in which the C-Master configuration and data is located. The second line executes the main C-Master program and supplies the CONFIG file of "**MYNEWCONFIG.TXT**".

```
CD C:\CMasterDATA
"C:\PROGRAM FILES (X86)\CMaster\C-MASTER.EXE" MYNEWCONFIG.TXT57
```

The executable is enclosed in double quotes since there is a space in the folder name. The file "**MYNEWCONFIG.TXT**" contains the configuration commands.

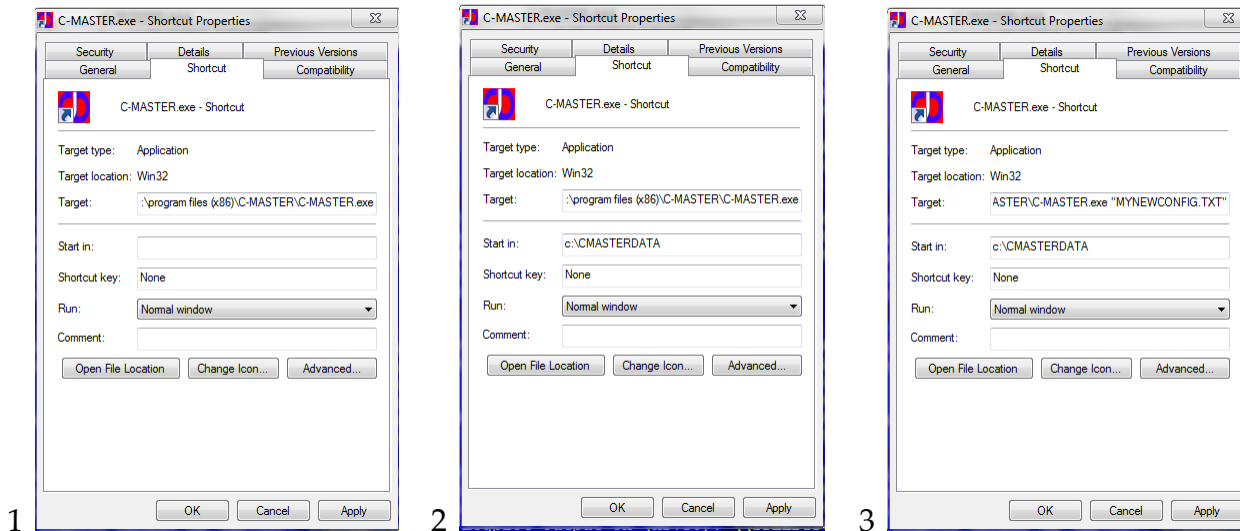
⁵⁷ You can avoid typing the full path of the executable by updating your environment variable. Please refer to this Microsoft KB article (<https://support.microsoft.com/en-us/kb/310519>) for more information. Or, add this line to the start of your CMD file: "**PATH=%PATH%;C:\PROGRAM FILES (X86)\CMaster**".

You should create a CMD file (or use **CONFIGMAKER**) for C-REPAIR to complete the process.

Manual SHORTCUT Method

To create a shortcut manually, you can follow this procedure. It is preferable to use CONFIGMAKER to perform this task, as all the shortcuts you need are created at one time.

Go to the folder that contains the C-MASTER executable, right-click on the executable you wish to create a shortcut for and select "Create Shortcut". The shortcut will be created in that folder. You can move this to your Desktop or to any other folder that is more convenient to remember. Then, right click on the shortcut and select "Properties" to make the needed changes. It will look like this:



- (1) The shortcut at the start.
- (2) Change the "Start In:" to C:\CMASTERDATA.
- (3) Add the CONFIG file to use in the "Target:" field. Make sure there is one space between the executable name and the CONFIG file name and enclose it in double quotes (just to be safe).
- (4) Click "Apply" to save your changes. If the executable cannot be found, or the "Start In:" folder does not exist, you cannot save the shortcut. Correct the entry(s) before proceeding.

Now, just double click on the shortcut to bring up C-Master with the correct CONFIG file and begin!

MAKELINK Method

The MAKELINK program is provided to be a repeatable but manual way to create a shortcut from the command line. This program is used by CONFIGMAKER to create shortcuts.

To start, Click the Start button and click Run (or WINDOWS+R). Enter CMD and hit enter. CD to the program directory (in this example **C:\Program Files (x86)\CMaster**). Type the command to build the link. The sequence will look like:

```
CD "C:\program files (x86)\CMaster"
```

```
MAKELINK "c:\program files (x86)\CMaster\c-master.exe" "coalcnfg.txt"  
"cmaster_new.lnk" "C-Master Special" 1 "D:\CMASTERDATA"
```

The MAKELINK command "reads" as follows:

- Create a link to "**c-master.exe**" in the Program Files folder where C-Master is installed
- And set the argument to the configuration file "**coalcnfg.txt**"
- Calling the link file "**CMASTER_NEW.LNK**" (*the .LNK is required*)
- Whose description is "**C-Master Special**"
- Start the program as a normal window (1)
- And make the default directory "**D:\CMASTERDATA**" when started

Once the shortcut is created, double click on it to verify that it operates properly. Move the shortcut to anywhere you like so you can gain access to it easily.

Note that I have enclosed all the text arguments in quotes. This is **required** if spaces are present in the text fields.