

# Chapter 4

## Input Data Files

### 4.1 General

The HEC-1 program is a batch program. That means the necessary data for the program is provided as input at program execution and the program processes the entire job to completion. The program user does not interact with the program during execution. This section describes the sequence of an HEC-1 computation process, the input data format, and the basic steps for creating and storing an input data file.

### 4.2 Input Data Format

The structure of the HEC-1 input data file can be seen by reviewing any of the test data sets provided with the program. The detailed input description is provided in Section 10 of the HEC-1 User's Manual. See tables 10.4 through 10.11 of the HEC-1 User's Manual for summaries of data required for several different simulation options.

The format for the HEC-1 data is a "standard" HEC format. The concept is based on the eighty-column data card associated with batch input. The term card is used here even though the cards are more appropriately defined as records in a file. The first two columns are used for record identifier (ID); the program reads and sorts through the data based on the record ID. Each record is divided into ten (10) fields of eight columns each. However, a variable in field one may only occupy record columns 3 through 8 because the record ID is in columns 1 and 2. The HEC-1 User's Manual, and this text, refer to the individual records by their ID and the variable location of the record by the field number (1 through 10).

### 4.3 Creating an Input File

Data entry into fields requires careful counting of columns to ensure that the data are located in the correct fields. If a datum is entered across a boundary (column) between fields, the program will read part of the value as one variable and the remainder of the datum as the value for the variable in the next field.

There are several options available to assist the program user to enter data into fields without counting record columns to space data entries into the correct fields. The HEC-1 program will accept input data in "FREE" format and convert the data into fixed-format (see Section 4.3.3, "Other Methods"). The preferred data entry method is the Corps' interactive edit program, COED. It will automatically place input data into the standard (10 fields of eight columns) format. COED also provides on-screen help features that enhance the data entry function of the editor. The use of COED and other tools is described in the following sections.

### 4.3.1 Using COED

Creating or editing an input file from MENU1 calls COED. Calling COED from MENU1 also includes two parameters: **FS** and **HP HEC1**. If you run COED separately, these parameters can be entered while in COED. Entering **HP HEC1** will cause the HEC-1 input help file to be loaded, providing the tab settings for data entry and the input variables for HEC-1. Entering **FS** puts you into the Full Screen working environment. COED operates as a command editor (where you enter edit command codes and parameters) and also as a full screen editor (like a word processor). See the COED User's Manual for detailed documentation. Figure 5 shows an input data file in COED full screen edit mode, which is better for data entry.

```
TOF..
ID TEST EXAMPLE NO. 13
ID USE OF DSS TO READ AND WRITE DATA
ID USE OF THE DSPLAY PROGRAM TO PLOT RESULTS
IT 15 14SEP88 1200 100
KK SUB1
BA 5.7
BF 100 -.20 1.020
PB
ZR=PI A=EXAMPLE13 B=SUB1 C=PRECIP-INC E=1HOUR F=OBS
LU 0.3 0.15
UC 2.0 5.5
ZW A=EXAMPLE13 C=FLOW F=COMP
KK CMP
ZR=QO A=EXAMPLE13 B=SUB1 C=FLOW E=10MIN F=OBS
ZZ
EOT..

ID ..... Title information. ....
Help=F1 Col=1 Line=1
```

Figure 5. HEC-1 Input Data File in COED Full Screen Mode

Once in COED, with HEC-1 help file and full screen edit mode, data entry will automatically use the first two columns for the record identifier, the next six columns for Field 1, and the remaining nine sets of eight columns as Fields 2 through 10. With the cursor at the first column, enter any appropriate HEC-1 record identifier (e.g., ID). The bottom of the screen will display a line of input information for the entered identifier (e.g., "Title Information" for ID). If the identifier is not appropriate for HEC-1, the bottom of the screen will display an error message. For example, if the invalid record identifier ZX is entered, you will get the message:

**ZX >> >>> Record ID not valid for HEC-1 input <<< <<<**

For title record information the entire line is available to enter text; there are no fields. For data records, most fields represent variables, and the variables are shown on the line at the bottom of the screen. For example, enter IT, and the variables for the IT record are shown on the bottom line. Use the **<TAB>** key (usually shown with two horizontal arrows) to move the cursor from field to field. The cursor

automatically moves to the right of each field. Data entry will also fill the field from the right. Therefore, the data are always right justified.

Data entry only affects the field the cursor is on. Therefore, inserting or deleting data in a field only works in the one field. If you continue to enter data in a field, the previously entered data is displaced to the left until it is moved completely out of the field. Use the <TAB> key, or a cursor key, to move to another field. Use the <SHIFT><TAB> to move the cursor to the left.

Help information for COED is provided by pressing <F1>. The function keys are defined, and a list of additional help information is provided, as shown in Figure 6. The COED User's Manual is essentially provided through the help file.

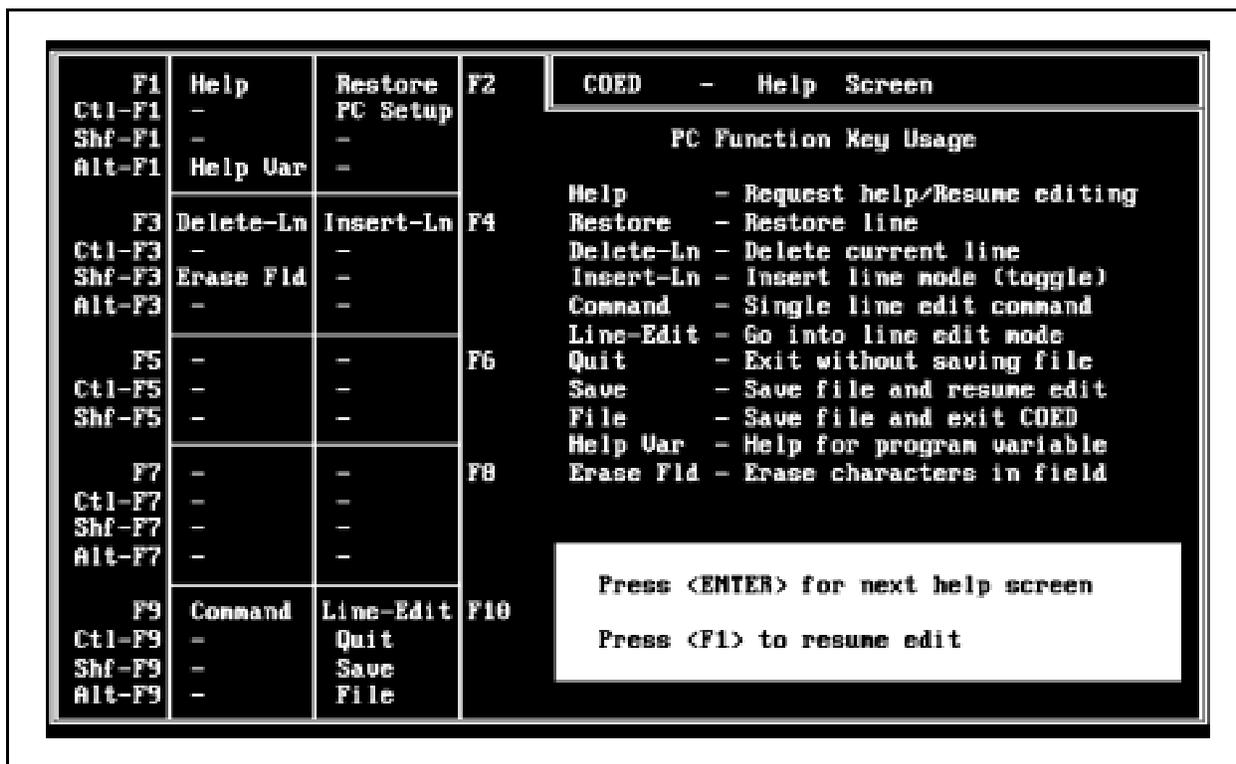


Figure 6. COED Help Screen

Help information for HEC-1 variables is provided by pressing <ALT><F1>. The HEC-1 ID in columns one and two provides the line of variables, for that record type, listed at the bottom of the screen. Moving the cursor to any field on the data input line and pressing <ALT><F1> provides the input description for that field's variable. Therefore, while you are entering data, you can obtain the input description for any input variable in the HEC-1 program.

With the HEC-1 help file loaded, COED can recognize legal input types. That is, the program will not accept a letter <O> for an entry that requires a number. This feature should reduce illegal input data errors.

### **4.3.2 Using the Interactive Input Program, HEC1IN**

The HEC1IN program was designed to aid beginning and first-time users in developing the correct sequence of records for an HEC-1 input file. Currently the program is limited to the basic rainfall-runoff processes available in the HEC-1 program. The use of this program consists of filling out a series of tables that describe the watershed and the type of hydrologic techniques that will be used to analyze the basin. Once all of the necessary information is entered, a skeleton HEC-1 input file can be created. The skeleton file will contain all of the data records needed to simulate the rainfall-runoff process for the user's watershed, but not all of the actual data. The file will contain the two-character alphabetic codes in columns one and two for each line of input. It is the users responsibility to edit the file (using COED or any other text editor) and fill in the necessary data associated with each record. Review section 10 of Appendix A of the HEC-1 User's Manual for details about the input structure and specific data requirements for each records. Appendix A of this document is a detailed description of the Interactive Input Developer for HEC-1 (HEC1IN).

### **4.3.3 Other Methods**

COED and HEC1IN have been developed to facilitate the creation of input data files. However, any other program that creates text files can be used. This may be convenient when some of the data needed is already in the file format of another program. Conversely, if the data is a block of time series data, it may be more practical to incorporate it into an input data file that is created using COED or HEC1IN. There are avenues for doing this without manually retyping the data into an HEC-1 input data file. The data can be moved as a block using COED or some other text editor. See the GET command in the COED manual. Bringing blocks of data in from an external source does carry with it the burden of converting it into HEC-1 input file format. One method is to use the \*FREE command before the block of data and a \*FIX command after the data. All records between these commands will be preprocessed into the standard 8-character field structure. This method depends on the data meeting the minimal requirements of the free-format. See the HEC-1 User's Manual for more information on the \*FREE command. Another way to use time series data without retyping it into an HEC-1 input data file is to incorporate it into an input file for use with DSSTS. DSSTS creates a DSS file from the text data given in the input. This method accommodates up to 132 columns of data per line instead of the 80 columns allowed by the previous method. The following section gives references for DSSTS.

## **4.4 Using HEC Data Storage System (DSS) for Input Data**

Several DSS utility programs are included in the HEC-1 package. Programs DSSTS and DSSPD can be used to input time series data and paired function data into a DSS file. Once data are stored in DSS, program DSSUTL can be used to perform various tabulation and data manipulations. Plots and tables can also be generated with a program called DISPLAY. Detailed information on any of the utility programs can be found in the HECDSS User's Guide and Utility Program Manuals. Use of macros with DSS utility programs is described in the PREAD user's manual. The input records used to interface between HEC-1 and DSS are described in Appendix B of the HEC1 user's manual.