DOCUMENTATION OF A COMPUTER PROGRAM FOR DATA RETRIEVAL FROM THE U.S. GEOLOGICAL SURVEY NATIONAL WATER-DATA STORAGE AND RETRIEVAL SYSTEM

U.S. GEOLOGICAL SURVEY
Open-File Report 92-105

DOCUMENTATION OF A COMPUTER PROGRAM FOR DATA RETRIEVAL FROM THE U.S. GEOLOGICAL SURVEY NATIONAL WATER-DATA STORAGE AND RETRIEVAL SYSTEM

By James E. Morris

U.S. GEOLOGICAL SURVEY
Open-File Report 92-105

Rolla, Missouri

1992

U.S. DEPARTMENT OF THE INTERIOR
MANUEL LUJAN, JR., Secretary

U.S. GEOLOGICAL SURVEY
Dallas L. Peck, Director

For additional information
write to:

District Chief
U.S. Geological Survey
1400 Independence Road
Mail Stop 200
Rolla, Missouri 65401

Copies of this report can
be purchased from:

U.S. Geological Survey
Books and Open-File Reports Section
Federal Center
Box 25425
Denver, Colorado 80225

CONTENTS

CONTENTS--Continued

ILLUSTRATIONS

TABLES

DOCUMENTATION OF A COMPUTER PROGRAM FOR DATA RETRIEVAL FROM THE U.S. GEOLOGICAL SURVEY NATIONAL WATER-DATA STORAGE AND RETRIEVAL SYSTEM

By
James E. Morris

ABSTRACT

This report contains the information on the installation and use of a computer program called PC-WATSTORE, which is a menu-driven computer program designed to run on an International Business Machines[1] (IBM) personal computer (PC) or compatible computer. The purpose of the program is to simplify the process of retrieving data from the U.S. Geological Survey National Water-Data Storage and Retrieval System (WATSTORE). Daily values tables, monthly and annual statistics, and daily statistics; water quality tables and retrievals (dumps); and peak flow retrievals (list) and flood frequency analysis can be obtained from WATSTORE by using PC-WATSTORE on a personal computer. A floppy disk containing the installation program, the PC-WATSTORE software, and support files is included in the pocket at the back of this report.

The requirements of the personal computer include a minimum of 425 kilobytes of random access memory (RAM), a hard disk, a 5.25-inch floppy disk drive, and a Hayes compatible modem. The quantity of disk space needed on the hard disk for PC-WATSTORE is less than 400 kilobytes. Additional space will be required when the results of the retrievals are stored on the personal computer. These requirements can change based on the method used to communicate with the U.S. Geological Survey's AMDAHL computer. PC-WATSTORE was written using KERMIT[2] and the modem to dial the AMDAHL computer. Remote job entry software and a synchronous modem also may be used. PC-WATSTORE works on Disk Operating System (DOS) 3.0 or higher.

INTRODUCTION

Since November 1971, the U.S. Geological Survey (USGS) has maintained a computerized system for the storage and retrieval of water data collected through its activities. This system is called the National Water-Data Storage and Retrieval System (WATSTORE) and presently consists of several databases, including the station header file, daily values file, unit values file, water-quality file, and ground-water site inventory. Additional information about WATSTORE databases can be obtained from the WATSTORE user's guide (U.S. Geological Survey, 1975a, 1975b, and 1979). A menu-driven computer program for personal computers called PC-WATSTORE has been developed to provide an interface for WATSTORE users to retrieve data from the databases on the USGS AMDAHL computer in Reston, Virginia. The purpose of this report is to provide the installation and user manuals for PC-WATSTORE. PC-WATSTORE is based on software called MAKORD written by Robert B. Main of the U.S. Department of the Interior,

---

[1] The use of brand names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

[2] KERMIT is a public domain communications program. The copyright is held by the Trustees of Columbia University in New York, New York.

Bureau of Reclamation. A floppy disk containing the installation program, the PC-WATSTORE software, and support files is included in the pocket at the back of this report.

Computer Hardware and Software Requirements

PC-WATSTORE is designed to run on an International Business Machines (IBM) personal computer (PC) or compatible computer. The requirements of the computer include a minimum of 425K (kilobytes) of random access memory (RAM), a hard disk, a 5.25-inch floppy disk drive, and a Hayes compatible modem. The quantity of disk space needed on the hard disk for PC-WATSTORE is less than 400K. Additional space will be required when the results of the retrievals are stored on the PC. These requirements can change based on the method used to communicate with the AMDAHL computer. PC-WATSTORE was written using KERMIT and the modem to dial the AMDAHL computer. Remote job entry software and a synchronous modem also may be used. PC-WATSTORE works on Disk Operating System (DOS) 3.0 or higher.

A user must have a userid, password, account number, and an assigned agency code to use the USGS AMDAHL computer (Burton, 1990). If this information has not been previously obtained, an application must be made to the Program Manager of the National Water Data Exchange at the following address:

Program Manager
National Water Data Exchange
U.S. Geological Survey
421 National Center
Reston, Virginia 22092
Telephone: (703) 648-6848

Software Design

PC-WATSTORE was developed using the C programming language. Most of the source code follows the standard set for C by the American National Standards Institute (ANSI), with some exceptions. These exceptions utilize compiler extensions to the standard that were not addressed and include file searching and character string manipulation. The C language was chosen because of its portability and ability to execute operating system commands.

PC-WATSTORE consists of more than 150 modules totaling more than 7,300 lines of source code. These modules were designed to perform a task or a group of tasks, which include prompting the user for information, determining which menu options to display, and generating some part of the card deck.

PC-WATSTORE is designed independently of the communications software, which allows the user the flexibility of selecting other communications software. When using communications software other than KERMIT, these steps need to be followed before PC-WATSTORE can use that software:

(1) Create scripts to automate the process of sending the submittals to the AMDAHL and, if possible, getting the results of the retrievals.

(2) Update WATSTORE\SYSTEM\WT_COMM.BAT by including the DOS statements necessary to get the communications software started and to start the

scripts. WT_COMM.BAT will receive four arguments from PC-WATSTORE. They include:

A. The complete path to the WATSTORE directory on the PC
B. AMDAHL userid
C. AMDAHL password
D. "UPLOAD" (for sending submittals) and "DOWNLOAD" (for obtaining the results of the submittals)

An additional step is necessary if the process of getting the results of the submittals back to the PC is automated. Change the line in the file WATSTORE\DATA\JOBSETUP.SDF that contains the statement "/*ROUTE PRINT RMT240" by replacing the "240" to the appropriate number or by completely removing the line. This number is dependent on the communications software. For information on the format of this file, see attachment A (at the back of this report).

PC-WATSTORE uses five file suffixes. They are:

.EXE--file can be executed by typing the filename
.BAT--file can be executed by typing the filename
.SDF--system data file of PC-WATSTORE; file is a text file
.BIN--system data file of PC-WATSTORE; file is a binary file and should not be modified with an editor
.K--file is a KERMIT script

Miscellaneous considerations in PC-WATSTORE design include the use of environment variables and error messages. PC-WATSTORE uses environment variables to find the programs that are executed and to find the location of its directory tree. PC-WATSTORE reports all error messages to the screen. For a list of error messages and their possible solutions, see attachment B (at the back of this report).

INSTALLATION OF PC-WATSTORE

Installation of the computer program needs to be completed before PC-WATSTORE can be used. The installation is completed through a three-phase process. The first phase is to use the installation program called INSTALL and install PC-WATSTORE onto the hard disk. The installation program, the PC-WATSTORE software, and support files are on the included floppy disk. The second phase is to reboot the system so that the changes to the system configuration files will take affect. The third phase is to create a user information file.

Using the INSTALL Program

Before PC-WATSTORE is installed onto the hard disk, the user is prompted for information that will control the installation process. The following information is required to complete the installation:

- Disk drive containing the installation diskette (default: A)
- Logical disk drive on which to install PC-WATSTORE (default: C)
- Logical disk drive from which to boot the computer (default: C)
- Is KERMIT to be used as the communications software (default: yes)
- The current time zone (default: none)
- Is daylight savings time used (default: none)

When all information has been provided, INSTALL will create the directory tree used by PC-WATSTORE (fig. 1), a subdirectory called WATSTORE in the root directory of the desired disk drive, and subdirectories under WATSTORE. The following is a list of the subdirectories created and their purpose:

DATA	Contains PC-WATSTORE system data files
DEFAULTS	Contains all user information files
EXEC	Contains executable files
OLDJOBS	Contains the submittals that previously were uploaded to the AMDAHL
RECEIVE	Contains the retrievals (if the scripts have been changed)
SUBMIT	Contains jobs that are to be submitted to the AMDAHL for retrieval
SYSTEM	Contains scripts that are used to upload the submittals to the AMDAHL
TMP	Contains temporary files generated during the creation of a submittal

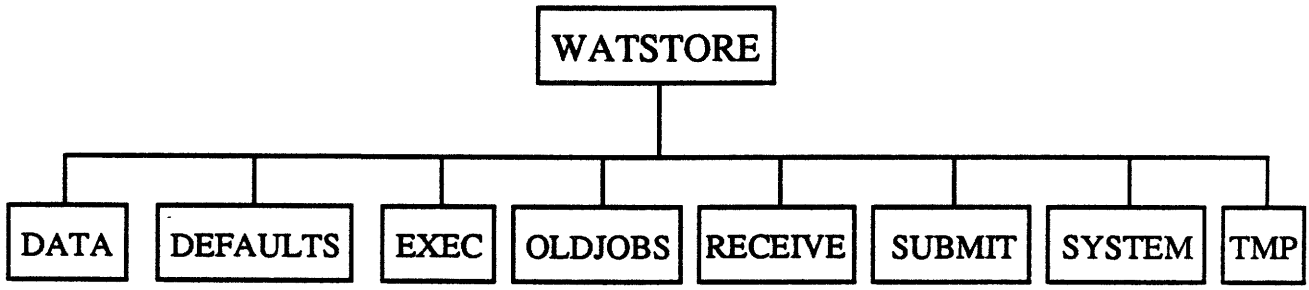


Figure 1.--WATSTORE directory tree.

Files used by PC-WATSTORE will be created and copied. If KERMIT is used as the communications software, the SETUP.K script is created in WATSTORE\SYSTEM. The WT_COMM.BAT file also is created in WATSTORE\SYSTEM. The FIPSCODE.BIN, FIPSCODE.SDF, JOBSETUP.SDF, JOBCLASS.SDF, and TAPEINFO.BIN files are copied to the WATSTORE\DATA subdirectory. WATSTORE.EXE, KERMIT.EXE (if KERMIT is used), and CONCAT.EXE are copied to the WATSTORE\EXEC subdirectory. If KERMIT is used, the rest of the KERMIT scripts, including AMDAHL.K, DIAL.K, LOGIN.K, UPLOAD.K, and LOGOFF.K, are copied to WATSTORE\SYSTEM.

The AUTOEXEC.BAT on the PC needs to be updated so PC-WATSTORE data files can be found. The environment variable PATH is updated to include the WATSTORE\EXEC subdirectory. Two new environment variables are added to the AUTOEXEC.BAT file. The first of these is the time-zone variable. The format is: 'set TZ=xxx[-][d]d[yyy]' (Microsoft Corporation, 1987; Borland International, Inc., 1990). The brackets indicate the optional components. The 'xxx' is replaced with the three-letter code for the standard time zone of the user. The '[-][d]d' is used to indicate offset from Greenwich Mean Time (GMT), in hours. The minus indicates location east of GMT. The 'd' indicates the

number of hours from GMT. The 'yyy' is used to indicate the three-letter name for the time zone during daylight saving time. If daylight saving time is not followed, the 'yyy' is omitted. The last environment variable added is the WATSTORE_DIR variable. This is used by PC-WATSTORE to determine the location of the WATSTORE directory. It should include the drive and root directory name of WATSTORE (for example, if WATSTORE is stored in the C drive, the variable would be C:\WATSTORE).

Prompts Found in the INSTALL Program

This section describes the various prompts a user might see when executing the INSTALL program. The user may not see all of the prompts because some of the prompts are dependent on the answers to previous prompts. Prompts and other computer generated comments will be shown in the text of this report in **bold** type.

Which drive is the installation diskette in [<CR> = A]: _____

With this prompt, the installation diskette can be found by the INSTALL program. The default is drive A. When a response is obtained, a check is done to verify that WATSTORE.EXE exists on that drive. If that file is not found, then the user is prompted for the same information again.

Which drive is PC-WATSTORE to be installed on? [<CR> = C]: _____

This prompt determines where PC-WATSTORE will be installed. The existence of the root directory on the specified drive is checked. If the root directory does not exist, the user is re-prompted for the same information.

Which drive is the PC booted from? [<CR> = C]: _____

INSTALL uses the results of this prompt to determine the location of the AUTOEXEC.BAT file. Only the existence of the root directory is checked. To keep the system file from being modified, select an alternate drive other than the one for the installation diskette. In this case, the AUTOEXEC.BAT file will contain the environment variables that must be set for PC-WATSTORE to execute. If the system file previously existed, then the original copy will be saved in a file ending with .BAK.

Do you want PC-WATSTORE to use KERMIT as its communications software? [<CR> = Y]: _____

The response to this prompt will determine if KERMIT will be used to upload the submittals to the AMDAHL computer. If "N" is entered, INSTALL will not create any of the KERMIT scripts that normally are used to upload the submittals. Also, the next prompt to be displayed will be the one listing the possible time zones.

Is it okay to install KERMIT Version 2.32/A? [<CR> = Y]: _____

The response to this prompt will determine if KERMIT version 2.32/A will be installed. Only answer "N" if version 2.32/A or a later version already exists on the disk. KERMIT must exist in the system path variable or the scripts will fail. The scripts that are created will not work with versions earlier than 2.32/A. If an older version of KERMIT does exist and both the older version and version 2.32/A are needed on the computer for other uses in addition to PC-WATSTORE, then WATSTORE\SYSTEM\WT_COMM.BAT must be modified. Replace the word KERMIT with the complete pathname of the new version KERMIT.EXE, which should include /WATSTORE/EXEC/KERMIT.EXE.

Which communications port should PC-WATSTORE use to call the AMDAHL? [<CR> = COM1]: _____

The communications (serial) port to use when uploading the submittals onto the AMDAHL computer is entered after this prompt. The default is COM1.

What should the baud rate of port COM1 be set to? [<CR> = 2400]: _____

The baud rate for the selected communications port is determined by this prompt. The default is 2,400 bps (bits per second).

Is this PC physically connected to the USGS Headquarters ROLM Phone System? [<CR> = N]: _____

Users who are located at USGS Headquarters in Reston, Virginia, should answer "Y" to this prompt. Users at USGS Headquarters do not have to call the AMDAHL computer. If "Y" is entered at this prompt, the next prompt will be the one displaying a list of possible time zones.

Is the phone line being used on the Federal Telephone System (FTS)? [<CR> = N]: _____

Only answer "Y" if the Federal Telephone System (FTS) will be used in calling the AMDAHL. Users who do not know if they will be using FTS should enter "N".

Enter the number to dial? [<CR> = 17036484200]: _____

Enter the telephone number to be used to call the AMDAHL computer. All numbers dialed, including special characters used to obtain outside lines, second dial tones, and pauses, must be entered. Commas can be used to cause the modem to wait 2 seconds for a second dial tone. Some HAYES compatible modems use the character "W" to cause the modem to wait for the second dial tone. Consult the owner's manual for the modem to determine if a "W" can be used. Do not use spaces, parentheses, or hyphens in the number that will be dialed. If a long distance telephone call has to be placed, all necessary digits needed to place such a call (usually the digit 1) are to be included. The telephone number for the AMDAHL computer is (703) 648-4100 or (703) 648-4200.

The responses to the prompts for the communications port, the baud rate, and the telephone number are placed in the file WATSTORE\SYSTEM\SETUP.K. If a mistake has been made, this file can be edited with a text editor to make the appropriate changes. The AMDAHL needs MARK parity or the files will not upload.

The INSTALL program will list the possible time zones.

List of Possible Time Zones

1: Atlantic Standard Time
2: Eastern Standard Time
3: Central Standard Time
4: Mountain Standard Time
5: Pacific Standard Time
6: Yukon Standard Time
7: Hawaii Standard Time

Select the number of the Standard Time Zone you are in?: _____

At this prompt, the number corresponding to the standard time zone the user is in will be entered. The time zone name is used when the time is displayed and the card decks are stamped with the time.

Do you follow daylight saving time? [<CR> = Yes]: _____

Users who follow daylight saving time (1 or 2 hours ahead of standard time) should indicate yes at this prompt.

Reboot the Computer

After the INSTALL program has been completed, the system will need to be rebooted before PC-WATSTORE will run correctly because the new environment variables have not yet been loaded into memory. To reboot the system, press the <Control> <ALT> <Delete> keys simultaneously.

User Information File

The final phase of the installation is to create a user information file, which is a file containing information needed to execute submittals on the AMDAHL computer. Submittals cannot be made until the user information file has been created. Some menus will not execute until a user information file has been created and selected. To create the user information file, invoke PC-WATSTORE by typing "WATSTORE" at the DOS prompt. The following will be seen the first time that PC-WATSTORE is invoked:

[PC-WATSTORE Rev. 1.00]

U.S. DEPARTMENT OF THE INTERIOR
MANUEL LUJAN, JR., Secretary
U.S. GEOLOGICAL SURVEY
Dallas L. Peck, Director

Please wait, checking file system and building file system table...

Please wait, loading messages...

Please wait, loading error messages...

Please wait, loading WATSTORE Sub-file Information...

Please wait, loading State Codes table...

Please wait, loading job submittal setup cards...

Please wait, loading job submittal priority classes...

Please wait, loading and building Tape Information table...

Warning: Unable to load User Information: File (DEFAULT) was not found.

```
*********************************************************************************************
*                                        PC-WATSTORE                                        *
*                                    WATSTORE DATA LINK                                     *
* Revision:  1.00                                  April 09, 1991 14:17:36 CDT (Tuesday)  *
* User Information File:  Not Selected                        AMDAHL Userid:               *
*                         Main Menu -- WATSTORE DATA LINK OPTIONS                           *
*********************************************************************************************
```

RETR -- Retrieve Data from a WATSTORE Sub-File
USER -- Create/Modify/List/Delete User Information File
SEL -- Select Alternate User Information File
COMM -- Send/Receive Submittals to/from the AMDAHL in Reston, VA
SYS -- PC-WATSTORE System Menu

QU--Quit Program **EX--Exit program**

Enter desired menu option ([CR] to restart list): _____

After the program is started, type "USER" at the prompt. This will display a sub-menu used to create and edit user information files. At that prompt, type "C". Information about this menu is in the section on creating user information files. After the user information file is created, type "EXIT" or "EX". The 'USER' sub-menu will be discussed in the section on the "User sub-menu (USER)".

USING THE SOFTWARE

After the software has been installed, PC-WATSTORE is ready to be used. To invoke PC-WATSTORE from any directory, type WATSTORE. PC-WATSTORE will try to locate the directory WATSTORE, which contains the WATSTORE system.

Command Usage

PC-WATSTORE has some command line options. The following possible command line options can be obtained by typing "WATSTORE -HELP".

Usage: WATSTORE [-Defaults <filename>] [-Screen <decimal>] [-COMPILED] [-Help]

The capital letters in the options signify the minimum characters that are needed to select the option. An item enclosed in brackets ([]) is optional and an item enclosed in angle brackets (<>) is needed to override the default. The "-COMPILED" or the "-Help" command line options will override anything placed on the command line and terminate the program after the information is displayed to the screen.

- **[-Defaults <filename>]**

  Selects an alternate user information file. The default file is DEFAULT. If the file does not exist or has become corrupted, then user information cannot be read in.

- **[-Screen <decimal>]**

  Allows the user to specify the size of the screen in lines. The value must be 25 or greater.

- **[-COMPILED]**

  Displays the date and time the current program was compiled. An example is shown on the next page. The date displayed by PC-WATSTORE should be the same or later as the date shown in the example.

F:\SOURCE\REPORT> watstore -compiled

[PC-WATSTORE Rev. 1.00]

U.S. DEPARTMENT OF THE INTERIOR
MANUEL LUJAN, JR., Secretary
U.S. GEOLOGICAL SURVEY
Dallas L. Peck, Director

PC-WATSTORE (Rev. 1.00) Compiled on Oct 18, 1991 at 11:22:38.

Normal processing ended. (PC-WATSTORE)

F:\SOURCE\REPORT>

- **[-Help]**

  Displays the usage information of PC-WATSTORE, such as

  Usage: WATSTORE [-Defaults <filename>] [-Screen <decimal>] [-COMPILED] [-HELP]

Menu Prompt

Most of the menus and prompts share some common features, including special commands to terminate the program, quit the current menu, and execute a DOS command. The following is a list of PC-WATSTORE special commands:

<Control>-C	terminate the program
EXIT	terminate the program
EX	terminate the program
<esc>	quit current menu and return to previous menu
QUIT	quit current menu and return to previous menu
QU	quit current menu and return to previous menu
! (when this is the first character of a prompt)	execute DOS command

If a <Control>-C is used to terminate the program, partially created submittals could be uploaded the next time submittals are sent to the AMDAHL computer. However, some of the prompts will not accept certain characters or number sequences and the character that was typed will not be echoed. Other prompts accept invalid characters but will display error messages after the <CR> is entered. Therefore, "EXIT", "EX", "QUIT", or "QU" may not always terminate the program or quit the current menu and return to previous menu. In this case, press the <ESC> key to get to a menu where the letters can be typed.

Menu Navigation

When a sub-menu or application is selected, the response is first checked for an explicit match in the current menu. If no match is found, the response then is checked to see if a partial match can be found. If a match is still not found and the current menu is not the main menu, the same algorithm is used against the main menu. For example, if the user is in the DV sub-menu and types "RE", then the DV sub-menu is searched for an option named "RE". No match will be found, then the DV sub-menu is searched to see if any options start with an "RE". No match will be found, then the main menu is searched to see if a sub-menu is named "RE". No match will be found, then the main menu is searched for a match that starts with "RE", the "RETR" retrieval sub-menu starts with "RE", thus the user is put into that menu. If more than one menu starts with "RE", then the first one located is used.

Menu Banner

The main menu, sub-menus, and applications all contain the menu banner. The menu banner is a message enclosed in a box of asterisks. An example of a menu banner is:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                        April 09, 1991 14:17:36 CDT (Tuesday)  *
* User Information File:  Not Selected                AMDAHL Userid:             *
*                    Main Menu -- WATSTORE DATA LINK OPTIONS                    *
*********************************************************************************
```

The menu banner contains the following information:

Line 1:	Name of program--PC-WATSTORE
Line 2:	Short description of program--WATSTORE DATA LINK
Line 3:	The current program revision number and the current date and time
Line 4:	The currently selected user information file and the current AMDAHL userid
Line 5:	The current menu or application and a short description

Menu Description

Menus currently available in PC-WATSTORE are shown in figure 2. Menus used to access an application are shown by regular boxes; applications are represented by three-dimensional boxes. However, applications also contain menus. The menus and applications will be discussed by starting at the main menu and progressing downward through each successive level, describing each menu or application completely.

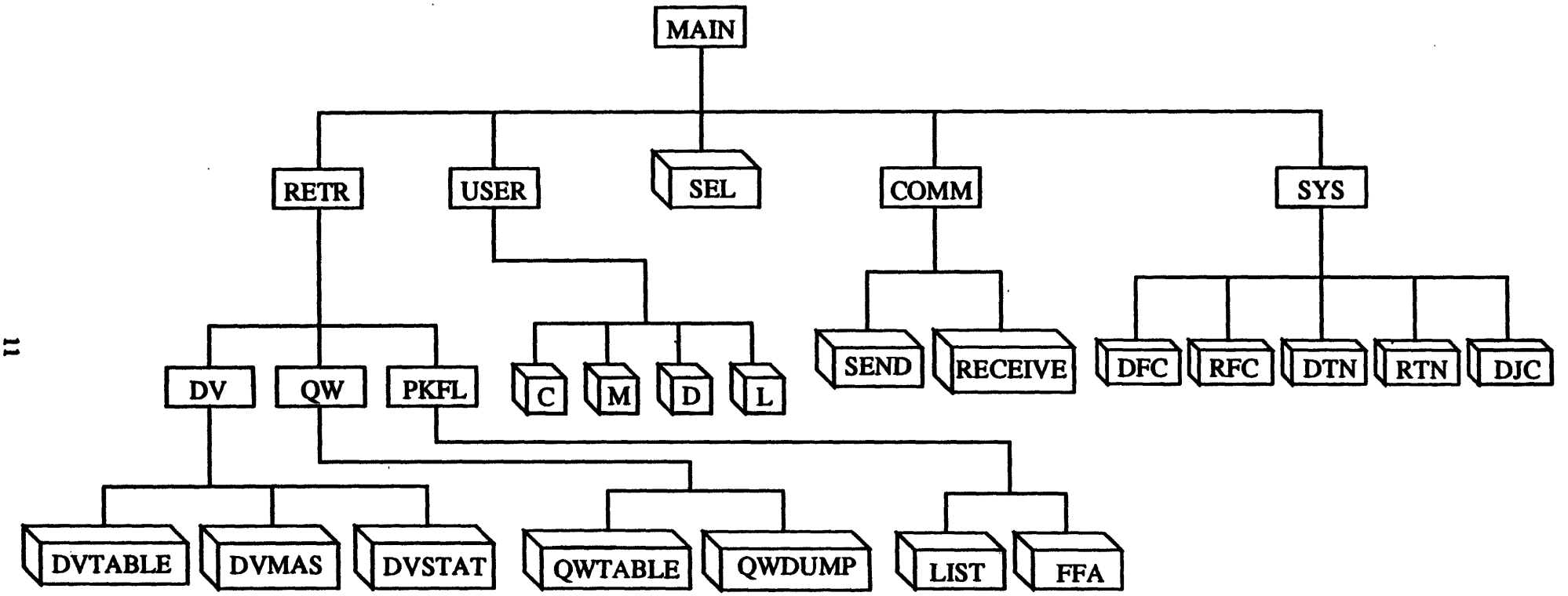


Figure 2.--Menu tree.

Main Menu (MAIN)

Before the MAIN menu is displayed, several data files are read from the disk. The user sees the following format when PC-WATSTORE is invoked:

```
[PC-WATSTORE Rev. 1.00]

                  U.S. DEPARTMENT OF THE INTERIOR
                   MANUEL LUJAN, JR., Secretary
                     U.S. GEOLOGICAL SURVEY
                    Dallas L. Peck, Director

Please wait, checking file system and building file system table...

Please wait, loading messages...

Please wait, loading error messages...

Please wait, loading WATSTORE Sub-file Information...

Please wait, loading State Codes table...

Please wait, loading job submittal setup cards...

Please wait, loading job submittal priority classes...

Please wait, loading and building Tape Information table...

Warning: Unable to load User Information: File (DEFAULT) was not found.

***********************************************************************************
*                                  PC-WATSTORE                                    *
*                               WATSTORE DATA LINK                                *
* Revision:  1.00                           April 09, 1991 14:17:36 CDT (Tuesday) *
* User Information File:  Not Selected                     AMDAHL Userid:         *
*                        Main Menu -- WATSTORE DATA LINK OPTIONS                  *
***********************************************************************************

          RETR -- Retrieve Data from a WATSTORE Sub-File
          USER -- Create/Modify/List/Delete User Information File
           SEL -- Select Alternate User Information File
          COMM -- Send/Receive Submittals to/from the AMDAHL in Reston, VA
           SYS -- PC-WATSTORE System Menu

     QU--Quit Program                    EX--Exit program

Enter desired menu option ([CR] to restart list): ____
```

The warning message about the user information file should disappear from the main menu once this file has been created. The main menu is shown at the end of this paragraph. The main menu (as shown on the next page) has five sub-menus that include applications necessary for creating and submitting the retrieval. The RETR sub-menu is used to select the type of retrieval to be made and to customize that retrieval. Two of the sub-menus, USER and SEL, are accessed in conjunction with the user information file. The COMM sub-menu is used to send a submittal for execution on the AMDAHL computer. The SYS sub-menu is used to list and update system data files.

```
*********************************************************************************************
*                                        PC-WATSTORE                                        *
*                                    WATSTORE DATA LINK                                     *
* Revision:  1.00                                  October 31, 1991 22:50:02 CST (Thursday)*
* User Information File:  DEFAULT                          AMDAHL Userid:  XXXXXXX         *
*                          Main Menu -- WATSTORE DATA LINK OPTIONS                          *
*********************************************************************************************

            RETR -- Retrieve Data From a WATSTORE Sub-File
            USER -- Create/Modify/List/Delete User Information File
             SEL -- Select Alternate User Information File
            COMM -- Send/Receive Submittals to/from the AMDAHL in Reston, VA
             SYS -- PC-WATSTORE System Menu

      QU--Quit Program                    EX--Exit program

Enter desired menu option ([CR] to restart list): _____
```

Retrieval Menu (RETR)

The RETR menu is used to select the type of data retrieval to be made. The menu choices are daily values data, water quality data, or peak flow data. The RETR menu is shown below.

```
*********************************************************************************************
*                                        PC-WATSTORE                                        *
*                                    WATSTORE DATA LINK                                     *
* Revision:  1.00                                  April 09, 1991 14:17:39 CDT (Tuesday)  *
* User Information File:  DEFAULT                          AMDAHL Userid:  XXXXXXX         *
*              (RETR) Sub-Menu -- Retrieve Data from a WATSTORE Sub-File                    *
*********************************************************************************************

              DV -- Retrieve Daily Values Data
              QW -- Retrieve Water Quality Data
            PKFL -- Retrieve Peak Flow Data

      QU--Return to previous menu         EX--Exit program

Enter desired menu option ([CR] to restart list): _____
```

All retrievals created with the following applications will prompt the user for a password, an account number, and in some instances, a job class. An example of this prompt is:

```
Please enter the following:

Your Amdahl Password: _____
Your Amdahl Account Number: _____
```

The password and account number are obtained from the program manager in Reston, Virginia. The job class will only be prompted if the job class prompt was enabled when the user information file was created, which is discussed in "Create User Information File." If enabled, the prompt will display a list of job classes and a selection will then be made.

Daily Values Retrievals Sub-Menu (DV)

The DV sub-menu selects the type of daily values retrieval to be made. For daily values data, the user can select a table, monthly and annual statistics,

or daily statistics. Examples of these retrievals can be found later in this report. The following is an example of the DV sub-menu:

```
**********************************************************************************
*                                  PC-WATSTORE                                   *
*                              WATSTORE DATA LINK                                *
* Revision:  1.00                        April 07, 1991 18:05:47 CDT (Sunday)    *
* User Information File:  DEFAULT              AMDAHL Userid:  XXXXXXX           *
*                  (DV) Sub-Menu -- Retrieve Daily Values Data                   *
**********************************************************************************

        DVTABLE -- Retrieve Daily Values Table
         DVMAS -- Retrieve Daily Values Monthly and Annual Statistics
        DVSTAT -- Retrieve Daily Values Daily Statistics

     QU--Return to previous menu          EX--Exit program

Enter desired menu option ([CR] to restart list): _____
```

Daily Values Table Application (DVTABLE)

One of the three applications available in the DV sub-menu is the DVTABLE, which is used to retrieve a daily values table from the AMDAHL computer. When this application is selected, a menu is displayed that shows the current selection of the retrieval parameters. There are five retrieval parameters.

```
**********************************************************************************
*                                  PC-WATSTORE                                   *
*                              WATSTORE DATA LINK                                *
* Revision:  1.00                        April 07, 1991 18:05:47 CDT (Sunday)    *
* User Information File:  DEFAULT              AMDAHL Userid:  XXXXXXX           *
*                  DVTABLE -- Retrieve Daily Values Table                        *
**********************************************************************************

     ----->                          NOTICE                          <-----
     -----> Any data less than 2 years old is considered PROVISIONAL unless  <-----
     -----> otherwise specified by the servicing Water Resources Division    <-----
     -----> District Office.                                                 <-----

          1: Retrieving Current Data Only
          2: Retrieval Dates: Period of Record
          3: No Site IDs selected
          4: No Parameter Codes selected
          5: No Statistic Codes selected

Enter option to change [<CR> when done]: _____
```

Option 1 determines the type of daily values to be retrieved, current or historical. Current data are 2 years old or less; historical data generally are more than 2 years old. Current data are maintained on disk and historical data are stored on cartridge tape that must be accessed while the retrieval is executing on the AMDAHL computer. When the user selects 1, the following prompt is displayed:

```
                    Type of data wanted:

          1: Current Data (Data less than 2 years old)
          2: Current and Historical (All Data)

Enter your selection [<CR> = 2]: _____
```

The default value, which is used when no option is selected, will always be the opposite of the current value. For example, the current value is for current data. Therefore, the default will be for current and historical data. Once a selection is made, the menu will be redisplayed showing the current selection.

Option 2 selects the range of dates of data to retrieve. The default is the period of record or all data on file. When option 2 is selected, a prompt is displayed to enter the starting date, which includes the month and year.

Date to start retrieval from [<CR>=Earliest Year on File]: MM YYYY

After the starting date has been selected, a prompt is displayed for the ending date.

Date to end retrieval on [<CR>=Latest Year on File]: MM YYYY

Depending on the responses, four possibilities exist that will be displayed by the menu.

2: Retrieval Dates: Period of Record
2: Retrieval Dates: Earliest Year on File -> 09 1989
2: Retrieval Dates: 10 1980 -> Latest Year on File
2: Retrieval Dates: 10 1987 -> 09 1988

Option 3 determines the site identifiers (IDs) that will be retrieved. For daily values data, site IDs are selected by entering the agency code, the station identifier (8 to 15 digits), and the Postal Service state abbreviation. In place of the state abbreviation, the two-digit Federal Information Processing Standard (FIPS) code can be used.

When this option is entered, the maximum number of station IDs that can be entered, the selected site IDs, if any, and a prompt will be displayed.

List of Selected Site IDs
Maximum: 30 Sites
No Site IDs selected.

Enter "A" to add Site IDs [<CR> when done]: A_____

To select the site IDs for which to retrieve data, select 'A' for add. After 'A' is selected, the agency code, the site ID, and a two-letter Postal Service state abbreviation must be entered at the prompt. A blank space is used to separate the various entries. If no agency code is entered, then the default code will be used, which is 'USGS'. The site ID should be 8 to 15 digits. Also, the two-digit FIPS code can be entered in place of the two-letter state code. There are no defaults for the site ID and the state abbreviation. When all of the sites have been selected, enter a <CR> at the prompt to return to the site ID sub-menu. An example of an input session follows:

Enter Agency Code, Site ID, and State Abbreviation #1 [<CR> when done]: 07010000 MO_____ __
Enter Agency Code, Site ID, and State Abbreviation #2 [<CR> when done]: 07020000 29_____ __
Enter Agency Code, Site ID, and State Abbreviation #3 [<CR> when done]: USGS 05495000 MO_____
Enter Agency Code, Site ID, and State Abbreviation #4 [<CR> when done]: USBR 08010000 IA____ __
Enter Agency Code, Site ID, and State Abbreviation #5 [<CR> when done]: 07030000 MO_____ __
Enter Agency Code, Site ID, and State Abbreviation #6 [<CR> when done]: USGS_ _____ __

The list of selected site IDs are displayed. At this level, site IDs may be added or deleted or the user can return to the DVTABLE retrieval menu. To add

sites, enter 'A' and to delete sites, enter 'D'. To return to the DVTABLE menu, enter <CR>. To delete site IDs, after entering 'D', the user will be prompted for the site IDs to be deleted. To delete a site, enter the agency code and the 8 to 15 digit site ID. If no agency code is entered, the default of 'USGS' is used. An example of an input session follows:

Enter Agency Code and Site ID to delete [<CR> when done]: USBR 08010000_____
Enter Agency Code and Site ID to delete [<CR> when done]: USGS 07030000_____
Enter Agency Code and Site ID to delete [<CR> when done]: 07020000_____
Enter Agency Code and Site ID to delete [<CR> when done]: USGS_ _____

Option 4 selects the parameter codes for data that will be retrieved. A partial list of WATSTORE parameter codes is shown in Attachment C. When this option is selected, a sub-menu displays the selected list of parameter codes and a prompt. At this prompt, enter 'A' to add parameter codes to the list, 'D' to delete parameter codes from the list, or enter <CR> to return to the DVTABLE menu. After 'A' has been entered, a prompt will appear requesting a parameter code. Enter up to a five-digit code to represent the data that is to be retrieved. For example, enter 60 for discharge and 65 for gage height. The software will insert the leading zeros. After 'D' has been entered, enter up to a five-digit code to represent the data that is to be deleted. To delete gage height from the list, for example, enter 65; the software will insert the leading zeros and remove the code from the list, if it exists. Once all changes have been made, enter <CR> at a prompt to go back to the parameter code sub-menu.

Option 5 determines the statistics codes to be retrieved. A partial list of the WATSTORE statistic codes is shown in Attachment D. If no codes are entered, then the retrieval will include all statistics codes that are stored. When this sub-menu is entered, the maximum number of statistics codes that can be entered is displayed with the selected list. At this prompt, enter 'A' to add to the list, 'D' to delete statistics codes from the list, or <CR> to return to the DVTABLE menu. After 'A' has been entered, a prompt will appear requesting a statistics code. Enter a one- to five-digit code representing the code to be retrieved. Generally, the user will enter 1 for maximum, 2 for minimum, and 3 for mean. The software will add the leading zeros. After all of the desired statistics codes have been selected, enter <CR>. After 'D' has been entered, enter the one- to five-digit code to remove the code from the list. The software will insert the leading zeros and remove the code from the list, if it exists. When all of the desired codes have been removed, enter <CR> to return to the statistics codes menu.

An example of a daily values retrieval, shown in table 1, has the following options:

- Retrieving both current and historical data
- Retrieval dates: 10 1980 -> 09 1981
- Site ID selected: USGS 07010000 MO
- Parameter Code selected: 60
- Statistic Code selected: 3

Table 1.--*Example of a daily values retrieval from WATSTORE*

UNITED STATES DEPARTMENT OF INTERIOR-GEOLOGICAL SURVEY PROCESS DATE IS 12-04-90

STATION NUMBER 07010000 MISSISSIPPI RIVER AT ST LOUIS MO STREAM SOURCE AGENCY USGS
LATITUDE 383744 LONGITUDE 0901047 DRAINAGE AREA 697000.00 DATUM 379.94 STATE 29 COUNTY 510

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
PROVISIONAL DATA MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	184000	131000	94400	75300	69200	184000	94800	171000	204000	321000	476000	210000
2	187000	130000	91100	76700	72800	172000	89700	167000	197000	332000	440000	204000
3	187000	130000	86800	76900	55100	168000	86200	168000	196000	351000	393000	209000
4	187000	129000	89100	75100	60600	168000	101000	167000	200000	338000	344000	218000
5	188000	126000	92800	66500	61700	174000	115000	174000	202000	343000	305000	220000
6	187000	122000	93800	68500	61900	168000	116000	173000	199000	369000	296000	221000
7	178000	118000	87300	71200	65600	153000	121000	170000	199000	397000	296000	215000
8	156000	117000	99600	69500	65600	148000	131000	172000	184000	406000	289000	204000
9	131000	110000	142000	72400	59200	138000	147000	174000	166000	397000	282000	193000
10	118000	102000	188000	71900	55400	126000	144000	183000	154000	368000	281000	188000
11	111000	97400	214000	71400	55800	120000	151000	217000	161000	322000	264000	184000
12	104000	96400	207000	71700	51800	110000	167000	233000	162000	284000	239000	181000
13	102000	102000	173000	69100	53900	105000	185000	226000	162000	259000	224000	170000
14	103000	104000	148000	65200	57000	100000	234000	220000	182000	242000	209000	162000
15	101000	99700	126000	62700	58500	96700	242000	222000	214000	227000	206000	161000
16	98700	104000	112000	63100	59800	98500	256000	248000	229000	227000	228000	149000
17	104000	97600	104000	62200	63600	99300	276000	282000	245000	241000	221000	141000
18	107000	101000	95500	61900	70100	100000	281000	341000	261000	243000	223000	122000
19	104000	105000	96800	62600	74700	101000	270000	438000	283000	247000	220000	104000
20	99400	98600	103000	65400	83900	97200	247000	490000	292000	314000	209000	91700
21	104000	97900	92400	65800	108000	93800	229000	507000	303000	352000	191000	91200
22	114000	89800	89400	65900	115000	93700	212000	490000	360000	344000	188000	104000
23	118000	97700	83500	66400	120000	94800	213000	434000	406000	322000	188000	103000
24	112000	104000	86200	68200	133000	86400	215000	331000	393000	369000	174000	110000
25	112000	103000	78000	73900	173000	77900	213000	301000	359000	412000	158000	106000

Table 1.--*Example of a daily values retrieval from WATSTORE*--Continued

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
26	113000	108000	76500	72500	191000	74800	203000	271000	353000	396000	149000	110000
27	118000	115000	75700	71800	201000	76400	192000	261000	385000	405000	160000	114000
28	132000	109000	76300	73600	201000	79400	189000	252000	392000	446000	158000	133000
29	126000	112000	77500	73800	---	89200	184000	244000	374000	476000	155000	140000
30	121000	94400	72200	71800	---	94500	172000	221000	341000	490000	161000	139000
31	127000	---	72800	67200	---	98500	---	208000	---	491000	176000	---
TOTAL	4031100	3251500	3324700	2150200	2498200	3588100	5476700	8156000	7758000	10731000	7503000	4697900
MEAN	130000	108400	107200	69360	89220	115700	182600	263100	258600	346200	242000	156600
MAX	188000	131000	214000	76900	201000	184000	281000	507000	406000	491000	476000	221000
MIN	96700	89800	72200	61900	51800	74800	86200	167000	154000	227000	149000	91200
CFSM	.19	.16	.15	.10	.13	.17	.26	.38	.37	.50	.35	.23
IN.	.22	.17	.18	.11	.13	.19	.29	.44	.41	.57	.40	.25
AC-FT	7996000	6449000	6595000	4265000	4955000	7117000	10860000	16180000	15390000	21280000	14880000	9318000

WTR YR 1981 TOTAL 63166400 MEAN 173100 MAX 507000 MIN 51800 CFSM .25 IN 3.37 AC-FT 125300000

Daily Values Monthly and Annual Statistics Application (DVMAS)

The DVMAS is used to perform a statistical analysis on the daily values data retrieved. The application is the same as the daily values table application except for an additional option. This option indicates the units that will be used to compute monthly runoff (either inches or acre-feet). The results of the DVMAS application are subject to interpretation.

```
**********************************************************************************
*                                  PC-WATSTORE                                   *
*                               WATSTORE DATA LINK                               *
* Revision:  1.00                        April 07, 1991 18:05:47 CDT (Sunday)    *
* User Information File:  DEFAULT              AMDAHL Userid:  XXXXXXX           *
*          DVMAS -- Retrieve Daily Values Monthly and Annual Statistics          *
**********************************************************************************

     ----->                          NOTICE                              <-----
     -----> Any data less than 2 years old is considered PROVISIONAL unless <-----
     -----> otherwise specified by the servicing Water Resources Division   <-----
     -----> District Office.                                               <-----

                1: Retrieving Current Data Only
                2: Monthly Runoff will be computed in Inches
                3: Retrieval Dates:  Period of Record
                4: No Site IDs selected
                5: No Parameter Codes selected
                6: No Statistic Codes selected

     Enter option to change [<CR> when done]: ____
```

There are six options that can be used to customize the retrieval. Options 1, 3, 4, 5, and 6 were discussed in the DVTABLE retrieval.

Option 2 is used to select the units in which the retrieval will be computed. This is the prompt you will see when you select '2':

```
                    Type of computed monthly runoff wanted:

          1: Inches
          2: Acre-Feet

     Enter your selection [<CR> = 2]: _
```

The possible units are inches or acre-feet. Enter '1' if you want inches or '2' for acre-feet. The resultant DVMAS menu will show one of the following values:

2: Monthly Runoff will be computed in Inches

or

2: Monthly Runoff will be computed in Acre-Feet

The following options produce the daily values monthly and annual statistics retrieval in table 2:

- Retrieving both current and historical data
- Retrieval dates: 10 1980 -> 09 1990
- Site ID selected: USGS 07010000
- Parameter code selected: 00060
- Statistics code selected: 00003

Table 2.--*Example of a daily values monthly and annual statistics retrieval from WATSTORE*

STATION 07010000 MISSISSIPPI RIVER AT ST LOUIS MO
DISCHARGE-(CFS)

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1981	130000	108400	107200	69360.0	89220.0	115700	182600	263100	258600	346100	242000	156600
1982	145600	152100	120700	96970.0	262300	349700	344400	331800	410900	312300	197400	196000
1983	163300	227800	452400	221300	210600	343000	585900	476900	316200	265600	139900	121100
1984	145300	214500	211500	137200	238100	385300	491400	451100	431800	54900	148200	119700
1985	153200	248000	171800	199300	217200	485300	349900	258800	252400	145400	151300	142800
1986	278500	359200	288000	151200	205300	260500	337800	382200	284800	299400	187400	228900
1987	575300	318900	256300	141800	162400	236800	314100	205400	184000	158100	150400	150500
1988	99230.0	117000	202700	160700	182500	192400	240000	135100	77140.0	67250.0	68910.0	72990.0

*** INDICATES A NO-VALUE MONTH**

STATISTICS ON NORMAL MONTHLY MEANS (ALL DAYS)

OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT

BY ROWS (MEAN,VARIANCE,STANDARD DEVIATION,SKEWNESS,COEFF. OF VARIATION,PERCENTAGE OF AVERAGE VALUE)

211300.00	218200.00	226300.00	147200.00	195900.00	296100.00	355800.00	313000.00	277000.00	243600.00	160700.00	148600.00
1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09	1.00E+09
156100.00	90780.00	110100.00	49440.00	52960.00	117600.00	129300.00	119300.00	115300.00	106400.00	50540.00	47970.00
2.29	0.30	1.25	-0.08	-1.12	0.06	0.69	0.02	-0.33	-0.65	-0.26	0.26
0.74	0.42	0.49	0.34	0.27	0.40	0.36	0.38	0.42	0.44	0.31	0.32
7.56	7.81	8.10	5.27	7.01	10.60	12.70	11.20	9.91	8.72	5.75	5.32

******* INDICATES NO-VALUE MONTH(S) FOUND OR NOT ENOUGH DATA, THEREFORE STATISTIC IS NOT COMPUTED**

This retrieval contains several pages of output, but only part of it is shown in table 2.

Daily Values Daily Statistics Retrieval Application (DVSTAT)

The DVSTAT retrieves daily statistics of daily values data. The application is the same as the daily values table application, except two options have been added. One option calculates monthly statistics and the other option performs a flood frequency analysis. The results of DVSTAT application are subject to interpretation.

```
*****************************************************************************************
*                                      PC-WATSTORE                                      *
*                                   WATSTORE DATA LINK                                  *
* Revision:  1.00                                  April 07, 1991 18:05:47 CDT (Sunday) *
* User Information File:  DEFAULT                        AMDAHL Userid:  XXXXXXX        *
*                    DVSTAT -- Retrieve Daily Values Daily Statistics                   *
*****************************************************************************************

     ---->                              NOTICE                                  <----
     ----> Any data less than 2 years old is considered PROVISIONAL unless     <----
     ----> otherwise specified by the servicing Water Resources Division       <----
     ----> District Office.                                                    <----

                1: Retrieving Current Data Only
                2: Monthly Statistics will not be computed
                3: Flood Frequency Analysis will not be computed
                4: Retrieval Dates:  Period of Record
                5: No Site IDs selected
                6: No Parameter Codes selected
                7: No Statistic Codes selected

     Enter option to change [<CR> when done]: ___
```

There are seven options. Selecting the type of data for options 1, 4, 5, 6, and 7 is done the same way as in the DVTABLE retrieval.

Option 2 is used to determine if monthly statistics are to be computed. The prompt for this is:

```
     Computed Monthly Statistics:

          1: Yes
          2: No

     Enter your selection [<CR> = 1]: _______
```

Enter '1' to have monthly statistics computed and '2' not to have monthly statistics computed. The DVSTAT menu will display the following according to the selection made:

2: Monthly Statistics will not be computed

or

2: Monthly Statistics will be computed

The following options produce the daily values statistics retrieval in table 3:

- Retrieving both current and historical data
- Retrieval dates: 10 1980 -> 09 1990
- Site ID selected: USGS 07010000
- Parameter code selected: 00060
- Statistics code selected: 00003

This retrieval contains several pages of output, but only part of it is shown in table 3.

Water Quality Retrievals Sub-Menu (QW)

The QW sub-menu is used to select the type of water quality retrieval to be made. Only two retrievals are possible: table and dump. Examples of these retrievals are shown later in this report. The QW sub-menu is shown below.

```
**************************************************************************************
*                                  PC-WATSTORE                                       *
*                                WATSTORE DATA LINK                                  *
* Revision:  1.00                               April 07, 1991 18:05:47 CDT (Sunday) *
* User Information File:  DEFAULT                      AMDAHL Userid:  XXXXXXX       *
*                      (QW) Sub-Menu -- Retrieve Water Quality Data                  *
**************************************************************************************

          QWTABLE  --  Retrieve Water Quality Table
          QWDUMP   --  Retrieve Dump of Water Quality Data

       QU--Return to previous menu             EX--Exit program

 Enter desired menu option ([CR] to restart list): ________
```

Water Quality Table Application (QWTABLE)

The QWTABLE retrieves water quality data from the AMDAHL computer in tabular format. This application can be customized according to the type of data, retrieval date, site IDs, and parameter codes to be retrieved.

```
**************************************************************************************
*                                  PC-WATSTORE                                       *
*                                WATSTORE DATA LINK                                  *
* Revision:  1.00                               April 07, 1991 18:05:47 CDT (Sunday) *
* User Information File:  DEFAULT                      AMDAHL Userid:  XXXXXXX       *
*                     QWTABLE -- Retrieve Water Quality Table                        *
**************************************************************************************

       --->                          NOTICE                                  <---
       ---> Any data less than 2 years old is considered PROVISIONAL unless  <---
       ---> otherwise specified by the servicing Water Resources Division    <---
       ---> District Office.                                                 <---

                    1: Retrieving Current Data Only
                    2: Retrieval Dates: Period of Record
                    3: No Site IDs selected
                    4: No Parameter Codes selected

 Enter option to change [<CR> when done]: ________
```

Table 3.--*Example of a daily values statistics retrieval from WATSTORE*

USER IS RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION.

STATION NUMBER 07010000

DURATION TABLE OF DAILY VALUES FOR YEAR ENDING SEPTEMBER 30

DISCHARGE-(CFS)
MEAN
MISSISSIPPI RIVER AT ST LOUIS MO

CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
YEAR	NUMBER OF DAYS IN CLASS																																		
1981		5	5	14	9	24	6	10	23	37	21	12	19	7	15	34	8	24	18	12	6	10	4	11	9	10	5	2	5						
1982					3	4	6	7	9	14	13	23	29	16	14	22	7	16	9	20	8	19	18	33	16	23	11	11	14						
1983								1	1	8	14	15	26	14	18	29	10	12	8	16	23	26	16	24	18	12	20	5	13	7	6	9	12	2	
1984										12	29	27	30	18	22	26	7	5	6	9	9	7	9	25	11	12	22	48	27	4	1				
1985									2	25	32	19	29	16	16	38	19	25	24	12	14	13	10	12	14	9	13	3	3	2	5	7	3		
1986										1	2	2	20	12	12	33	15	34	35	16	23	31	22	27	30	15	20	4	6	4	1				
1987									4	3	11	17	48	31	30	34	12	25	23	14	20	16	14	11	10	4	5	5	9	4	4	4	5	2	
1988			12	26	35	26	9	10	20	30	10	16	27	25	23	27	11	19	13	8	8	5	5	1											

CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.0	0	2922	100.00
1	51800.0	5	2922	100.00
2	56000.0	17	2917	99.83
3	61000.0	40	2900	99.25
4	66000.0	47	2860	97.88
5	71000.0	54	2813	96.27
6	77000.0	21	2759	94.42
7	84000.0	28	2738	93.70
8	91000.0	59	2710	92.74
9	98000.0	130	2651	90.73
10	110000.0	132	2521	86.28
11	120000.0	131	2389	81.76
12	130000.0	228	2258	77.28
13	150000.0	139	2030	69.47
14	160000.0	150	1891	64.72
15	170000.0	243	1741	59.58
16	190000.0	89	1498	51.27
17	200000.0	160	1409	48.22
18	220000.0	136	1249	42.74
19	240000.0	107	1113	38.09
20	260000.0	111	1006	34.43
21	280000.0	127	895	30.63
22	300000.0	98	768	26.28
23	320000.0	144	670	22.93
24	350000.0	108	526	18.00
25	380000.0	85	418	14.31
26	410000.0	96	333	11.40
27	450000.0	78	237	8.11
28	480000.0	77	159	5.44
29	520000.0	21	82	2.81
30	570000.0	17	61	2.09
31	610000.0	20	44	1.51
32	670000.0	20	24	0.82
33	720000.0	4	4	0.14
34				

VALUE EXCEEDED 'P' PERCENT OF TIME

P95 = 75100.0
P90 = 99900.0
P75 = 136000.0
P70 = 149000.0
P50 = 194000.0
P25 = 300000.0
P10 = 427000.0

Table 3.--*Example of a daily values statistics retrieval from WATSTORE*--Continued

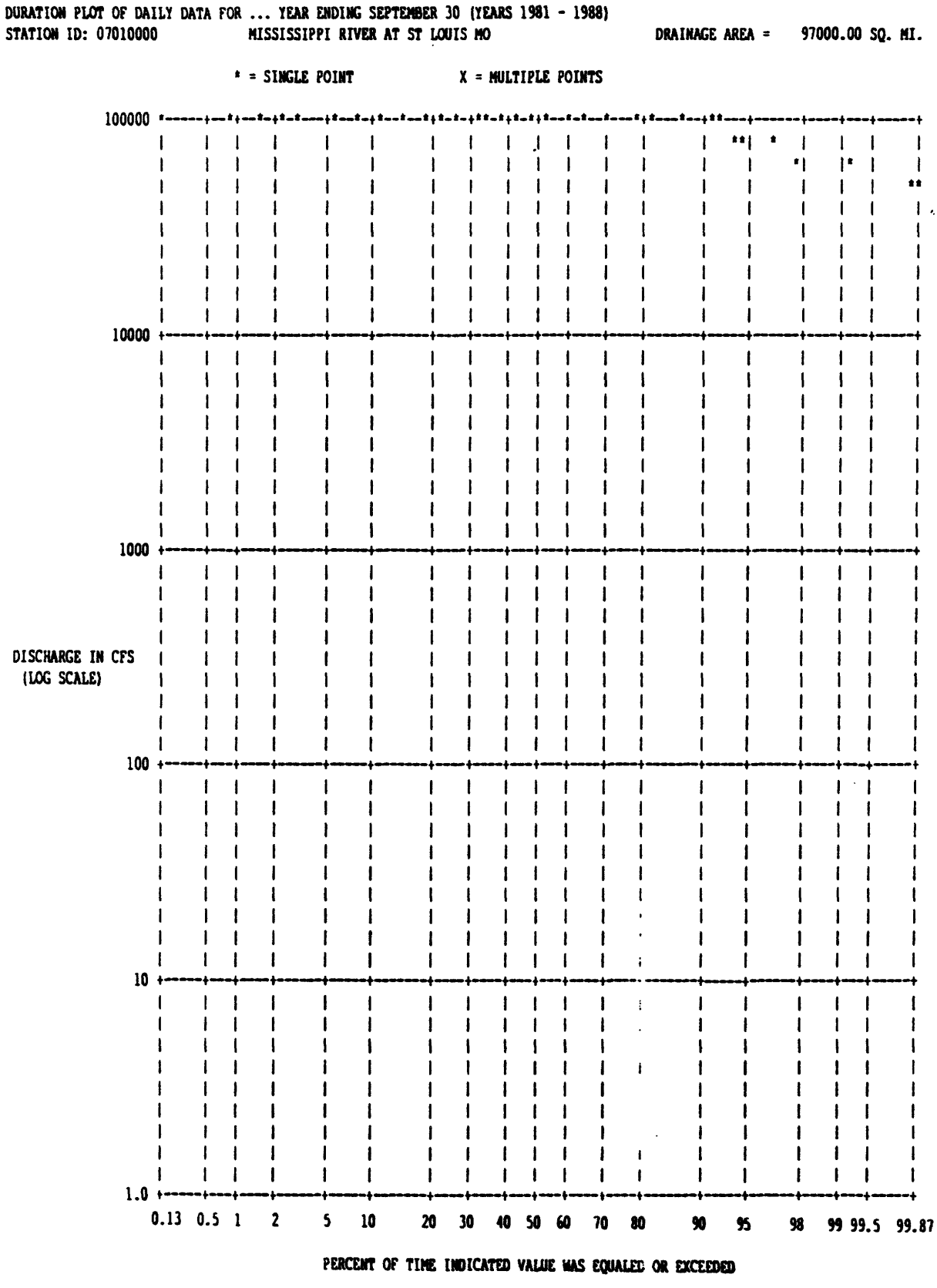


Table 3.--*Example of a daily values statistics retrieval from WATSTORE*--Continued

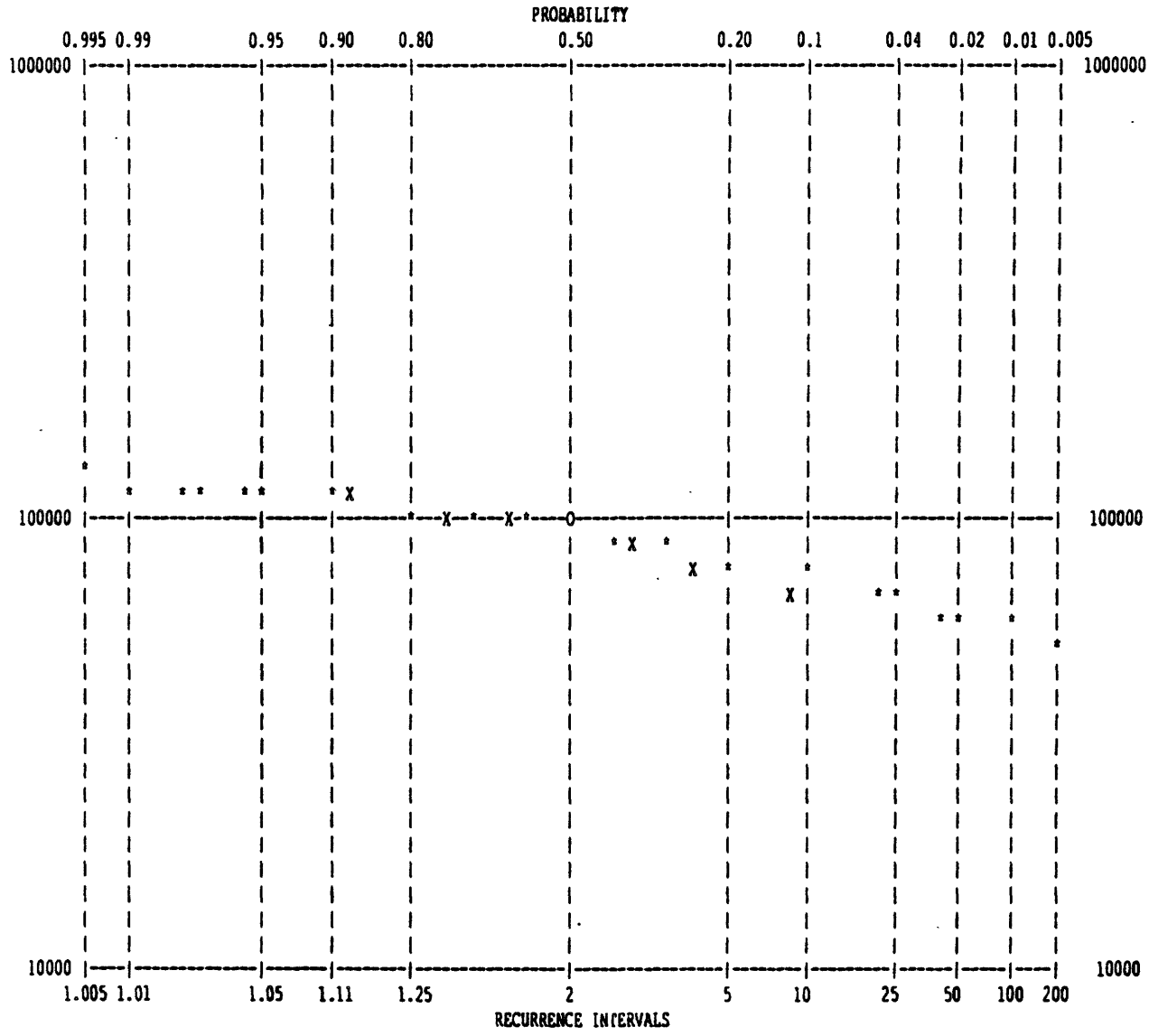
```
     USER IS RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION.

STATION - 07010000          MISSISSIPPI RIVER AT ST LOUIS MO                    N =    7    NZI =    0

1982-1988,  12 MON PERIOD ENDING MARCH 31

  1-DAY LOW VALUE

INPUT DATA (ZERO VALUES OMITTED)

   68300.000   111000.000    89200.000    95200.000   100000.000   103000.000    81500.000

*** THE FOLLOWING STATISTICS (MEAN THROUGH COEFFICIENT OF VARIATION) ARE BASED ON ONLY THE NON-ZERO VALUES ***

MEAN =    92600.000
VARIANCE = ************
STANDARD DEVIATION =    14338.176
SKEWNESS =       -0.632
STANDARD ERROR OF SKEWNESS =        0.794
SERIAL CORRELATION COEFFICIENT =       -0.756
COEFFICIENT OF VARIATION =        0.155

MEAN LOGS =        4.962
VARIANCE LOGS =        0.005
STANDARD DEVIATION LOGS =        0.071
SKEWNESS LOGS =       -0.928
STANDARD ERROR OF SKEWNESS LOGS =        0.794
SERIAL CORRELATION COEFFICIENT LOGS =       -0.718
COEFFICIENT OF VARIATION LOGS =        0.014

NON EXCEED PROB     RECURRENCE INTERVAL    PARAMETER VALUE

     0.0100              100.00             56304.781
     0.0200               50.00             60754.125
     0.0500               20.00             67529.937
     0.1000               10.00             73574.562
     0.2000                5.00             80806.750
     0.5000                2.00             93895.875
     0.8000                1.25            105296.437
     0.9000                1.11            110374.687
     0.9600                1.04            115052.937
     0.9800                1.02            117663.562
     0.9900                1.01            119740.437
```

Table 3.--*Example of a daily values statistics retrieval from WATSTORE*--Continued

STATION - 07010000 MISSISSIPPI RIVER AT ST LOUIS MO N = 7 NZI = 0

1982-1988, 12 MON PERIOD ENDING MARCH 31

1-DAY LOW VALUE



THE FOLLOWING SYMBOLS MAY APPEAR IN THE PLOT
X - AN INPUT DATA VALUE
* - A CALCULATED VALUE
O - A CALCULATED VALUE AND ONE DATA VALUE AT SAME POSITION
2 - TWO INPUT DATA VALUES PLOTTED AT SAME POSITION
3 - THREE INPUT DATA VALUES PLOTTED AT SAME POSITION
A - A CALCULATED VALUE AND TWO DATA VALUES AT SAME POSITION
B - A CALCULATED VALUE AND THREE DATA VALUES AT SAME POSITION

There are four options. Options 1, 2, and 4 are the same as those in the DVTABLE application. Option 3, site selection, is the same as option 3 in the DVTABLE application except that the state code does not have to be entered. The following options produce the water quality retrieval in table 4:

- Retrieving both current and historical data
- Retrieval dates: 10 01 1988 -> 09 30 1989
- Site ID selected: USGS 06934500
- Parameter codes selected: 61, 95, 400, 10, 300, 301, 31625, and 31673

Table 4.--*Example of a water quality table retrieval from WATSTORE*

PROCESS DATE 02/15/91

UNITED STATES DEPARTMENT OF INTERIOR-GEOLOGICAL SURVEY
ANALYSES OF MISCELLANEOUS STATIONS

DATE	STREAM-FLOW, INSTAN-TANEOUS (CFS) (00061)	SPE-CIFIC CON-DUC-TANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
06934500 - MISSOURI RIVER AT HERMANN, MO (LAT 38 42 36 LONG 091 26 21)								
OCT, 1988								
12...	39600	680	8.60	14.0	9.0	88	500	K48
NOV								
01...	41100	735	8.60	9.5	11.6	104	82	K18
DEC								
05...	28500	668	8.30	5.0	11.5	91	K24	K6
JAN, 1989								
09...	31100	551	8.20	1.5	13.2	95	68	410
FEB								
07...	35500	566	8.20	.5	15.8	110	82	68
MAR								
08...	33500	665	8.30	2.5	13.3	98	96	K22
APR								
06...	87700	478	8.10	12.0	9.0	85	K1600	4800
MAY								
03...	39900	719	8.40	18.5	8.4	91	K36	K16
JUN								
05...	49400	685	8.20	23.0	6.9	82	260	140
JUL								
19...	49600	748	8.20	28.0	7.0	89	270	88
AUG								
02...	49200	614	8.10	27.0	7.3	91	480	330

Water Quality Dump Application (QWDUMP)

The QWDUMP is an alternate method of retrieving water quality data. This application will list all of the data available for a site within a specified time. The menu is shown below:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                        April 07, 1991 18:05:47 CDT (Sunday)   *
* User Defaults File:  DEFAULT                 AMDAHL Userid:  XXXXXXX          *
*                 QWDUMP -- Retrieve Dump of Water Quality Data                 *
*********************************************************************************

      ----->                        NOTICE                              <-----
      -----> Any data less than 2 years old is considered PROVISIONAL unless  <-----
      -----> otherwise specified by the servicing Water Resources Division    <-----
      -----> District Office.                                                 <-----

                1: Retrieving Current Data Only
                2: Retrieval Dates: Period of Record
                3: No Site IDs selected

     Enter option to change [<CR> when done]: _____
```

There are only three options to customize this retrieval. Option 1 is used to determine the type of data, and option 2 is used to specify the range of dates to retrieve. These options are the same as options 1 and 2 in the DVTABLE application. Option 3 is used to select the site IDs to be retrieved and is the same as option 3 of the QWTABLE application. The following options produce the water quality dump in table 5:

- Retrieval of both current and historical data
- Retrieval dates: 07 01 1989 -> 07 30 1989
- Site ID: USGS 06934500

Peak Flow Retrieval Sub-Menu (PKFL)

The PKFL sub-menu is used to select the type of peak flow retrieval to be made. A listing or a flood frequency analysis can be retrieved. The following is an example of the PKFL sub-menu:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                        April 07, 1991 18:05:48 CDT (Sunday)   *
* User Information File:  DEFAULT              AMDAHL Userid:  XXXXXXX          *
*                   (PKFL) Sub-Menu -- Retrieve Peak Flow Data                  *
*********************************************************************************

            LIST -- Retrieve Listing of Peak Flow Data
             FFA -- Retrieve Peak Flow Flood Frequency Analysis

      QU--Return to previous menu          EX--Exit program

     Enter desired menu option ([CR] to restart list): _____
```

Table 5.--*Example of a water quality dump retrieval from WATSTORE*

STATION ID. NO.	LAT-LONG-SQ.NO.	SITE CODE	STATE CODE	DIST CODE	CNTY CODE	STATION NAME OR LOCAL WELL NO.
06934500	384236091262100	SW	29	29	073	MISSOURI RIVER AT HERMANN, MO

DATES: 89/07/19- TIMES: 1300- MEDIUM: 9 GEOLOGIC UNIT: STATUS: 7 SOURCE: 9 HYDRO.: 9 EVENT: 9 SAMPLING: 9

TEMP WATER (DEG C)	28.0000	4 3	PRESSURE, AIR (MM HG)	765.0000	4 3	COLLECTING AGENCY	1028.0000	4 3
ANALYZING AGENCY	80020.0000	3 3	DISCHARGE, INST (CFS)	49800.0000	4 3	TURBIDITY (NTU)	50.0000	3A3
CONDUCTIVITY US/CM	748.0000	4 3	OXYGEN DISSOLVED	7.0000	4 3	PH FIELD	8.2000	4 3
PH (LABORATORY)	8.1000	3A3	ALKALINITY, W.F.FET	166.0000	4 3	BICARBONATE, W.F.FET	203.0000	4 3
CARBONATE, W.W.F.FET	0.0000	4 3	CARBONATE, W.D.F.INCT	0.0000	AB3	BICARBONATE, D.F.INCT	203.0000	AB3
NITROGEN, NH4, DIS.ASN	0.0200	3B3	NITROGEN NH4 ASN TOT	0.0300	3B3	NITROGEN NO2 ASN DIS	0.0100	13B3
NITROGEN TOTKJD AS N	0.8000	3A3	NITROGEN, NO2+NO3 ASN	0.3800	3B3	PHOSPHOROUS, TOT, ASP	0.2400	3B3
PHOSPHOROUS DIS AS P	0.0900	3B3	PHOSPHOROUS, ORTH ASP	0.1000	3B3	CALCIUM, DISSOLVED	56.0000	3D3
MAGNESIUM, DISSOLVED	20.0000	3C3	SODIUM, DISSOLVED	66.0000	3C3	POTASSIUM, DISSOLVED	7.0000	3B3
CHLORIDE, DISSOLVED	19.0000	3E3	SULFATE, DISSOLVED	180.0000	3D3	FLUORIDE, DISSOLVED	0.5000	3B3
SILICA DISSOLVED	8.2000	3D3	ARSENIC, DISSOLVED	3.0000	3B3	BARIUM, DISSOLVED	100.0000	3C3
BERYLLIUM, DISSOLVED	0.5000	13B3	CADMIUM, DISSOLVED	1.0000	13D3	CHROMIUM, DISSOLVED	1.0000	3F3
COBALT DISSOLVED	3.0000	13C3	COPPER, DISSOLVED	7.0000	3F3	IRON, DISSOLVED	7.0000	3D3
LEAD, DISSOLVED	1.0000	13F3	MANGANESE, DISSOLVED	65.0000	3C3	MOLYBDENUM, DISSOLVED	10.0000	13A3
NICKEL, DISSOLVED	5.0000	3F3	SILVER, DISSOLVED	1.0000	13F3	STRONTIUM DISSOLVED	470.0000	3B3
VANADIUM, DISSOLVED	6.0000	13B3	ZINC, DISSOLVED	8.0000	3B3	ALUMINUM, DISSOLVED	10.0000	13E3
LITHIUM DISSOLVED	41.0000	3B3	SELENIUM, DISSOLVED	2.0000	3A3	COLIFORM FECAL 0.7	270.0000	4 3
FECAL STRPT KF AGAR	88.0000	4 3	ALKALINITY, D, FE, F	163.0000	AA2	ALKALINITY, W.D.INC.T	166.0000	AB3
RESIDUE DIS 180C	454.0000	3A3	MERCURY, DISSOLVED	0.1000	13B3	CONDUCTANCE, LAB	718.0000	3A3
ALKALINITY	160.0000	3A3						

Peak Flow List Application (LIST)

The LIST application is used to obtain a listing of peak flow data.

```
*****************************************************************************************
*                                      PC-WATSTORE                                      *
*                                   WATSTORE DATA LINK                                  *
* Revision:  1.00                          April 07, 1991 18:05:48 CDT (Sunday)         *
* User Information File:  DEFAULT                AMDAHL Userid:  XXXXXXX               *
*                    LIST -- Retrieve Listing of Peak Flow Data                         *
*****************************************************************************************

      ---->                              NOTICE                                <----
      ----> Any data less than 2 years old is considered PROVISIONAL unless   <----
      ----> otherwise specified by the servicing Water Resources Division     <----
      ----> District Office.                                                  <----

                1: Retrieval Dates: Period of Record
                2: No Site IDs selected

     Enter option to change [<CR> when done]: _________
```

There are only two options available in this application. Option 1 sets the retrieval date and is the same as option 2 in the DVTABLE application. Option 2 is the same as option 3 in the DVTABLE application. The following options produce the peak flow listing in table 6:

- Retrieval dates: 10 1984 -> latest year on file
- Site ID: USGS 05495000

Peak Flow Flood Frequency Analysis Application (FFA)

The peak flow flood frequency analysis retrieves a flood frequency analysis based on peak flow data. The results of this retrieval are subject to interpretation. The FFA application is shown below.

```
*****************************************************************************************
*                                      PC-WATSTORE                                      *
*                                   WATSTORE DATA LINK                                  *
* Revision:  1.00                          April 07, 1991 18:05:48 CDT (Sunday)         *
* User Information File:  DEFAULT                AMDAHL Userid:  XXXXXXX               *
*                FFA -- Retrieve Peak Flow Flood Frequency Analysis                     *
*****************************************************************************************

      ---->                              NOTICE                                <----
      ----> Any data less than 2 years old is considered PROVISIONAL unless   <----
      ----> otherwise specified by the servicing Water Resources Division     <----
      ----> District Office.                                                  <----

                1: Retrieval Dates: Period of Record
                2: No Site IDs selected

     Enter option to change [<CR> when done]: _________
```

There are only two options available in this retrieval. Option 1 is used to select the retrieval dates and is the same as option 1 in the DVTABLE application. Option 2 is used to select the site IDs to retrieve and is the

Table 6.--*Example of a peak flow listing retrieval from WATSTORE*

STATION 05495000 **FOX RIVER AT WAYLAND, MO.**

AGENCY:	**USGS**	**STATION LOCATOR**		**DRAINAGE AREA:**	**400.00** **SQ MI**
STATE:	**29**	**LAT.**	**LONG.**	**CONTRIBUTING DRAINAGE AREA:**	**SQ MI**
COUNTY:	**045**				
DISTRICT:	**29**	**402333**	**0913550**	**GAGE DATUM:**	**501.52** **(NGVD)**
				BASE DISCHARGE:	**4000.00** **CFS**

WATER YEAR	DATE	PEAK DISCHARGE (CFS)	DISCHARGE CODES	GAGE HEIGHT (FT)	GAGE HT CODES	HIGHEST SINCE	MAX GAGE HEIGHT (FT)	DATE	GAGE HT CODES	NUMBER OF PARTIAL PEAKS
1985	2-22-85	11500.00		18.24						4
	10-19-84	4220.00		12.37						
	11-02-84	11000.00		17.94						
	3-05-85	10500.00		17.67						
	3-11-85	4670.00		12.99						
1986	5-19-86	13200.00		18.80						8
	11-01-85	4100.00		12.19						
	11-14-85	5160.00		13.53						
	11-19-85	4200.00		12.34						
	2-27-86	5690.00		14.08						
	5-07-86	4120.00		12.21						
	9-22-86	11400.00		18.17						
	9-25-86	6350.00		14.73						
	9-30-86	5950.00		14.34						
1987	10-03-86	9300.00		16.92						1
	10-26-86	4990.00		13.34						
1988	2-20-88	1860.00		8.23						0
1989	9-10-89	946.00		6.12						0

same as option 3 in the QWTABLE application. The following options produce the peak flow flood frequency analysis retrieval in table 7:

- Retrieval dates: 10 1980 -> 09 1990
- Site ID selected: USGS 07010000

This retrieval contains several pages of output, but only part of it is shown in table 7.

User Sub-Menu (USER)

The USER sub-menu manipulates user information files. User information files contain information about the user that is needed to make a retrieval. Most of the information contained in this file is used by the AMDAHL computer. The first time PC-WATSTORE is invoked, the user information file will not exist and the user will not be able to initiate any retrievals until the file has been created. To create a user information file, select the USER sub-menu and then select the C sub-menu, "C -- Create New User Info File". The USER sub-menu is shown in the following:

```
**********************************************************************************
*                                    PC-WATSTORE                                 *
*                                 WATSTORE DATA LINK                             *
* Revision:  1.00                          April 09, 1991 14:17:38 CDT (Tuesday) *
* User Information File:  Not Selected                AMDAHL Userid:             *
*         (USER) Sub-Menu -- Create/Modify/List/Delete User Information File     *
**********************************************************************************

              C -- Create New User Info File
              M -- Modify User Info File
              D -- Delete User Info File
              L -- List User Info File

      QU--Return to previous menu          EX--Exit program

Enter desired menu option ([CR] to restart list): _________
```

Create New User Information File (C)

The C application is used to create a new user information file. Most of the information in this file is used by the AMDAHL computer when executing submittals. The user information file is created to eliminate prompts for user information each time a retrieval is created. This list contains the prompts and their purposes.

Your Amdahl Userid:

The AMDAHL userid assigned by the program manager (seven characters).

Your Agency Code:

The four- to five-character agency code assigned by the program manager.

Your Billing Code:

The four character code that can be assigned to distinguish costs from other users at the same site.

Table 7.--Example of a peak flow flood frequency analysis retrieval from WATSTORE

PGM J407 VER 3.7 (REV 11/5/81)

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

RUN-DATE 3/ 4/92 AT 2102 SEQ 1.0001

OPTIONS IN EFFECT -- PLOT BCPU LGPT NODB PPOS NORS EXPR CLIM

STATION - 07010000 /USGS MISSISSIPPI RIVER AT ST LOUIS MO 1981-1990 07010000 /USGS

INPUT DATA SUMMARY

-- YEARS OF RECORD -- SYSTEMATIC	HISTORIC	HISTORIC PEAKS	GENERALIZED SKEW	STD. ERROR OF GENERAL. SKEW	SKEW OPTION	GAGE BASE DISCHARGE	USER-SET OUTLIER CRITERIA HIGH OUTLIER	LOW OUTLIER
9	0	0	-0.389	--	WRC WEIGHTED	0.0	--	--

********* NOTICE -- PRELIMINARY MACHINE COMPUTATIONS. *********
********* USER RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION. *********

**WCF118W-SYSTEMATIC RECORD SHORTER THAN WRC SPEC. 9
WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF198I-LOW OUTLIERS BELOW FLOOD BASE WERE DROPPED. 1 353136.0
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 801614.6
**WCF233W-EXPECTED PROB OUT OF RANGE AT TAB PROB. 0.00001 0.00200
WCF002J-CALCS COMPLETED. RETURN CODE = 2

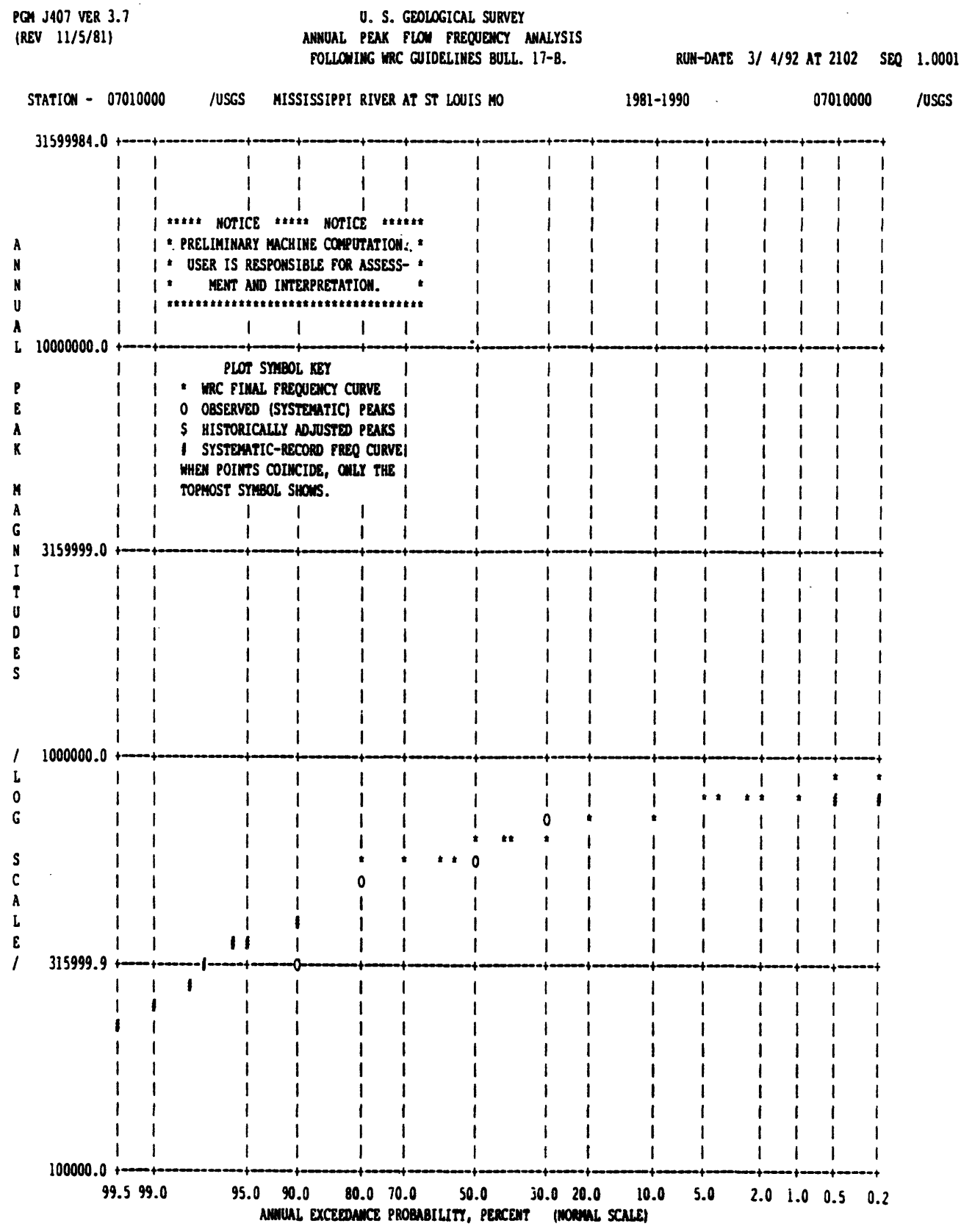
ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE DISCHARGE	FLOOD BASE EXCEEDANCE PROBABILITY	LOGARITHMIC MEAN	LOGARITHMIC STANDARD DEVIATION	LOGARITHMIC SKEW
SYSTEMATIC RECORD	0.0	1.0000	5.7605	0.1075	-1.581
W R C ESTIMATE	353136.0	0.8889	5.7806	0.0652	-0.240

ANNUAL FREQUENCY CURVE ORDINATES -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	W R C ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR W R C ESTIMATES LOWER	UPPER
0.9950	--	215360.4	--	--	--
0.9900	--	249705.1	--	--	--
0.9500	--	354620.9	--	--	--
0.9000	--	414484.8	--	--	--
0.8000	532884.0	487036.9	523226.4	465790.3	579559.9
0.5000	607014.6	613082.6	607014.6	555248.4	665224.5
0.2000	685614.8	705513.7	696271.6	630225.6	785700.0
0.1000	728256.3	737664.1	749287.7	664634.1	861487.8
0.0400	774748.8	760789.1	812692.1	699411.4	950160.5
0.0200	805277.2	770653.9	859580.6	721206.6	1011298.1
0.0100	833031.6	776861.1	909132.7	740489.1	1068665.0
0.0050	858649.0	780808.1	966331.7	757919.1	1123058.0
0.0020	889937.9	783941.9	**********	778804.6	1191281.0

Table 7.--*Example of a peak flow flood frequency analysis retrieval from WATSTORE*--Continued



Your Last Name:

Last name, can be 1 to 20 characters.

Amdahl Job Submittal Class Priority Level [<CR> = C]:

Select the job submittal priority level that will be used as the default level. The default is C, which is a normal daytime job. The list of valid job classes along with their turnaround time and billing factors are listed below:

Class	Description	
A	Turnaround Time: 30 minutes,	Billing Factor: 3
B	Turnaround Time: 2 hours,	Billing Factor: 2
C	Turnaround Time: 5 hours,	Billing Factor: 1
E	Turnaround Time: 24 hours (overnight),	Billing Factor: .6
G	Turnaround Time: Weekend,	Billing Factor: .3

The turnaround time of the job class is the time in which the retrieval is supposed to be executed. However, the retrieval is not guaranteed to be finished in the indicated time frame. During the development of PC-WATSTORE, most of the retrievals assigned to class C were completed in 1 hour.

Prompt for Job Class at every retrieval? (Y or N) [<CR> = N]:

Enter "Y" to prompt the job class whenever a submittal is created. Otherwise, the default job class that was previously selected will always be used.

Maximum Execution Time of submittal in minutes [<CR> = 2]:

Because CPU (Central Processing Unit) time on the AMDAHL computer is rather expensive, this option limits CPU time for jobs that go awry. The default is 2 minutes and usually is more than enough time for most retrievals to execute. If the job tries to execute for longer than this time, the retrieval is terminated.

Maximum Number of Lines of output in thousands [<CR> = 12]:

This specifies the maximum number of lines of output that can be created for a retrieval on the AMDAHL computer. If a retrieval tries to generate more than the specified number of lines of output, then the retrieval is terminated. The default is 12, which limits the output to 12,000 lines.

Number of Lines Per Page (0 disables page ejects) [<CR> = 0]:

If a character other than 0 is entered, the AMDAHL computer will put a code in the retrievals to force the printer to do a page eject.

After the user information has been obtained, a menu is displayed allowing changes to any of the responses. An example of this menu is on the next page.

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                              WATSTORE DATA LINK                               *
* Revision:  1.00                        April 09, 1991 14:17:38 CDT (Tuesday)  *
* User Information File:  Not Selected                AMDAHL Userid:            *
*                        C -- Create New User Info File                         *
*********************************************************************************

Your Amdahl Userid: _____
Your Agency Code: _____
Your Billing Code: _____
Your Last Name: _____

     Class      Description

       A        Turnaround Time: 30 minutes,        Billing Factor: 3
       B        Turnaround Time: 2 hours,           Billing Factor: 2
       C        Turnaround Time: 5 hours,           Billing Factor: 1
       E        Turnaround Time: 24 hours (overnight), Billing Factor: .6
       G        Turnaround Time: Weekend,           Billing Factor: .3

Amdahl Job Submittal Class Priority Level [<CR> = C]:
Prompt for Job Class at every retrieval? (Y or N) [<CR> = N]: ____
Maximum Execution Time of submittal in minutes [<CR> = 2]: ____
Maximum Number of Lines of output in thousands [<CR> = 12]: ____
Number of Lines per Page (0 disables page ejects) [<CR> = 0]: ____
```

When the desired changes have been made, the user is given the option of naming the user information file. PC-WATSTORE provides the capability to create and store multiple user information files. This allows several users to use PC-WATSTORE and each user can have their own set of defaults. The default filename is DEFAULT. If the file is named DEFAULT, then PC-WATSTORE will automatically load the file DEFAULT every time PC-WATSTORE is started.

Modify Existing User Information File (M)

The M application is used to modify an existing user information file. After a filename has been obtained, a menu displays the options and their values. After the desired changes have been made, an opportunity to save the changes is given. The following is an example of the M application:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                              WATSTORE DATA LINK                               *
* Revision:  1.00                        April 09, 1991 14:17:39 CDT (Tuesday)  *
* User Information File:  Not Selected                AMDAHL Userid:            *
*                          M -- Modify User Info File                           *
*********************************************************************************

     1: Your Amdahl Userid                                :
     2: Your Agency Code                                  :
     3: Your Billing Code                                 :
     4: Your Last Name                                    :
     5: Amdahl Job Submittal Class Priority Level         : C
     6: Prompt for Job Class at every retrieval?          : No
     7: Maximum Execution Time of submittal in minutes    : 2
     8: Maximum Number of Lines of output in thousands    : 12
     9: Number of Lines per Page (0 disables page ejects) : 0

Enter number of item to change (<CR> when done): _____
```

Delete Existing User Information File (D)

The D application is used to delete an existing user information file. After the filename has been obtained, the options and their values are shown to the user to verify that the desired file will be deleted. The user is then prompted to verify that the file is to be deleted. If this prompt is acknowledged, the file is deleted. The following is an example of the D application:

```
*******************************************************************************
*                                  PC-WATSTORE                                *
*                               WATSTORE DATA LINK                            *
* Revision:  1.00                      April 09, 1991 14:17:39 CDT (Tuesday)  *
* User Information File:  Not Selected                AMDAHL Userid:          *
*                          D -- Delete User Info File                         *
*******************************************************************************

     1: Your Amdahl Userid                                  :
     2: Your Agency Code                                    :
     3: Your Billing Code                                   :
     4: Your Last Name                                      :
     5: Amdahl Job Submittal Class Priority Level           : C
     6: Prompt for Job Class at every retrieval?            : No
     7: Maximum Execution Time of submittal in minutes      : 2
     8: Maximum Number of Lines of output in thousands      : 12
     9: Number of Lines per Page (0 disables page eject)    : 0

Okay to delete? [<CR> = No]: _____
```

List Existing User Information File (L)

The L application is used to list the contents of an existing user information file. After the filename has been obtained, the options and their values are shown to the user. The following is an example of the L application:

```
*******************************************************************************
*                                  PC-WATSTORE                                *
*                               WATSTORE DATA LINK                            *
* Revision:  1.00                      April 09, 1991 14:17:38 CDT (Tuesday)  *
* User Information File:  Not Selected                AMDAHL Userid:          *
*                          L -- List User Info File                           *
*******************************************************************************

     1: Your Amdahl Userid                                  :
     2: Your Agency Code                                    :
     3: Your Billing Code                                   :
     4: Your Last Name                                      :
     5: Amdahl Job Submittal Class Priority Level           : C
     6: Prompt for Job Class at every retrieval?            : No
     7: Maximum Execution Time of submittal in minutes      : 2
     8: Maximum Number of Lines of output in thousands      : 12
     9: Number of Lines per Page (0 disables page ejects)   : 0

Press any key to continue:
```

Select Alternate User Information File (SEL)

The SEL application is used to select a user information file. User information files contain information about the user that is needed to make a submittal. Most of the information contained in this file is used by the AMDAHL computer. An example of the SEL application is shown on the next page.

```
*****************************************************************************************
*                                      PC-WATSTORE                                      *
*                                   WATSTORE DATA LINK                                  *
* Revision:  1.00                                  April 09, 1991 14:17:39 CDT (Tuesday) *
* User Information File:  Not Selected                        AMDAHL Userid:            *
*                     SEL -- Select Alternate User Information File                     *
*****************************************************************************************
```

Enter User Information Filename to select [<CR> = DEFAULT]: _____

Communications Sub-Menu (COMM)

The COMM sub-menu provides the user the ability to send the submittals to the AMDAHL computer and submit them for execution. There also is an option to retrieve the results, but this option can only be accessed by users who use a communications package other than KERMIT. This option is not available through KERMIT. The following is an example of the COMM sub-menu:

```
*****************************************************************************************
*                                      PC-WATSTORE                                      *
*                                   WATSTORE DATA LINK                                  *
* Revision:  1.00                                  April 07, 1991 18:05:48 CDT (Sunday)  *
* User Information File:  DEFAULT                        AMDAHL Userid:  XXXXXXX        *
*       (COMM) Sub-Menu -- Send/Receive Submittals to/from the AMDAHL in Reston         *
*****************************************************************************************

            SEND  -- Send Submittals to the AMDAHL
         RECEIVE  -- Receive Retrievals from the AMDAHL

      QU--Return to previous menu          EX--Exit program

Enter desired menu option ([CR] to restart list): _____
```

Send Submittals to AMDAHL (SEND)

The SEND application sends the card decks of submittals to the AMDAHL computer for execution. The following is an example of the SEND application:

```
*****************************************************************************************
*                                      PC-WATSTORE                                      *
*                                   WATSTORE DATA LINK                                  *
* Revision:  1.00                                  April 07, 1991 18:05:48 CDT (Sunday)  *
* User Information File:  DEFAULT                        AMDAHL Userid:  XXXXXXX        *
*                        SEND -- Send Submittals to the AMDAHL                          *
*****************************************************************************************

Please enter the following:

Your Amdahl Password: _____
Your Amdahl Account Number: _____
```

Retrieve Retrieval from AMDAHL (RECEIVE)

The RECEIVE application currently (1991) is not available in revision 1.0 of PC-WATSTORE. Because of limitations of the AMDAHL computer with respect to KERMIT, retrievals cannot directly be brought back to the user. This menu invokes a batch file that can be modified to get the retrievals when the option becomes available. Information on obtaining the retrievals is in the section on "Results of a Retrieval". An example of the RECEIVE application is shown on the next page.

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                          April 07, 1991 18:05:48 CDT (Sunday) *
* User Information File:  DEFAULT                AMDAHL Userid:  XXXXXXX       *
*                  RECEIVE -- Receive Retrievals from the AMDAHL                *
*********************************************************************************

Please enter the following:

Your Amdahl Password: _______
Your Amdahl Account Number: _______
```

System Sub-Menu (SYS)

The SYS sub-menu contains applications that create or display some data files of PC-WATSTORE. The only data files that are created are those for FIPS codes and tape numbers. The read state FIPS codes (RFC) and read tape numbers of historical data (RTN) applications convert text files to binary files. Program speed is increased by using binary files because no translation is needed (unlike text files). Also, PC-WATSTORE can determine if encoded binary files become corrupted, and alert the user. The files can then be restored from a backup or recreated from their text file counterparts. The following is an example of the SYS sub-menu:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                          April 07, 1991 18:05:48 CDT (Sunday) *
* User Information File:  DEFAULT                AMDAHL Userid:  XXXXXXX       *
*                  (SYS) Sub-Menu -- PC-WATSTORE System Menu                    *
*********************************************************************************

          DFC -- Display State (FIPS) Codes
          RFC -- Read State (FIPS) Codes
          DTN -- Display Tape Numbers of Historical Data
          RTN -- Read Tape Numbers of Historical Data
          DJC -- Display Job Submittal Priority Classes

     GU--Return to previous menu          EX--Exit program

Enter desired menu option ([CR] to restart list): _________
```

Display Federal Information Processing Standard (FIPS) Codes (DFC)

The DFC application displays the current FIPS state codes, their associated state names, and the Postal Service two-letter state abbreviations. These codes are read in from a binary file when PC-WATSTORE is invoked. To create this binary file, use the RFC application. The following is an example of the DFC application:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                          April 07, 1991 18:05:49 CDT (Sunday) *
* User Information File:  DEFAULT                AMDAHL Userid:  XXXXXXX       *
*                      DFC -- Display State (FIPS) Codes                        *
*********************************************************************************
```

State Code	State Abbrev	State Name
1	AL	Alabama
2	AK	Alaska
4	AZ	Arizona
5	AR	Arkansas
6	CA	California
8	CO	Colorado
9	CT	Connecticut
10	DE	Delaware
11	DC	District of Columbia
12	FL	Florida
13	GA	Georgia
15	HI	Hawaii
16	ID	Idaho
17	IL	Illinois
18	IN	Indiana
19	IA	Iowa
20	KS	Kansas
21	KY	Kentucky
22	LA	Louisiana
23	ME	Maine
24	MD	Maryland
25	MA	Massachusetts
26	MI	Michigan
27	MN	Minnesota
28	MS	Mississippi
29	MO	Missouri
30	MT	Montana
31	NE	Nebraska
32	NV	Nevada
33	NH	New Hampshire
34	NJ	New Jersey
35	NM	New Mexico
36	NY	New York
37	NC	North Carolina
38	ND	North Dakota
39	OH	Ohio
40	OK	Oklahoma
41	OR	Oregon
42	PA	Pennsylvania
44	RI	Rhode Island
45	SC	South Carolina
46	SD	South Dakota
47	TN	Tennessee
48	TX	Texas
49	UT	Utah
50	VT	Vermont
51	VA	Virginia
53	WA	Washington
54	WV	West Virginia
55	WI	Wisconsin
56	WY	Wyoming
60	AS	American Samoa
61	61	Canal Zone
62	62	Canton and Enderbury Islands
66	GU	Guam
67	67	Johnston Atoll
71	71	Midway Islands
72	PR	Puerto Rico
73	73	Ryukyu Islands, Southern
74	74	Swan Islands
75	75	Trust Territories of the Pacific Islands

76	76	U.S. Miscellaneous Caribbean Islands
77	77	U.S. Miscellaneous Pacific Islands
78	VI	Virgin Islands
79	79	Wake Island
80	80	Mexico
81	81	Tamaulipas (Mexico)
82	82	Nuevo Leon (Mexico)
83	83	Coahiula (Mexico)
84	84	Chihuahua (Mexico)
85	85	Sonora (Mexico)
86	86	Baja California Norte (Mexico)
90	90	New Brunswick (Canada)
91	91	Quebec (Canada)
92	92	Ontario (Canada)
93	93	Manitoba (Canada)
94	94	Saskatchewan (Canada)
95	95	Alberta (Canada)
96	96	British Columbia (Canada)
97	97	Yukon (Canada)

Read FIPS Codes (RFC)

The RFC application is used to read the contents of a text file and recreate or update the binary file containing the FIPS codes, their associated state names, and the Postal Service two-letter state abbreviations. Attachment E contains information on the structure of the text file. The following is an example of the RFC selection:

```
**********************************************************************************
*                                  PC-WATSTORE                                   *
*                               WATSTORE DATA LINK                               *
* Revision:  1.00                          April 07, 1991 18:05:49 CDT (Sunday)  *
* User Information File:  DEFAULT                  AMDAHL Userid:  XXXXXXX       *
*                      RFC -- Read State (FIPS) Codes                            *
**********************************************************************************

Enter filename containing FIPS CODES [<CR> = D:\WATSTORE\DATA\FIPSCODE.SDF]: _______
```

Display Historical Tape Numbers (DTN)

The DTN application displays the current historical tape numbers for daily and water quality values. The actual tape numbers are shown with their contents and state names or site IDs, or both. These tape numbers are written to the card deck when creating the retrieval. Historical daily values data and water quality data are stored on tape. The tape numbers are needed when accessing historical data on the AMDAHL computer and are specified by PC-WATSTORE when historical data are selected by the user. These values are read from a binary file when PC-WATSTORE is invoked and can be recreated from a text file in the RTN application. The following is an example of the DTN application:

```
**********************************************************************************
*                                  PC-WATSTORE                                   *
*                               WATSTORE DATA LINK                               *
* Revision:  1.00                          April 07, 1991 18:05:49 CDT (Sunday)  *
* User Information File:  DEFAULT                  AMDAHL Userid:  XXXXXXX       *
*                  DTN -- Display Tape Numbers of Historical Data                *
**********************************************************************************
```

Historical Tape Listings of Daily Values Data

Tape Number	State(s) and Beginning and/or Ending Station IDs in parenthesis
561560	Alabama and Alaska
561561	Arizona and Arkansas
561562	California (to 11147070)
561563	California (from 11147500) (to 11381990)
561564	California (from 11382000)
561565	Colorado
561566	Connecticut, Delaware, District of Columbia, and Florida (to 02311600)
561567	Florida (from 02312000)
561568	Georgia
561569	Hawaii
561570	Idaho
561571	Illinois and Indiana
561572	Iowa and Kansas
561573	Kentucky, Louisiana, and Maine
561574	Maryland, Massachusetts, and Michigan
561575	Minnesota and Mississippi
561576	Missouri and Montana
561577	Nebraska, Nevada, and New Hampshire
561578	New Jersey and New Mexico
561579	New York
561580	North Carolina and North Dakota
561581	Ohio and Oklahoma
561582	Oregon
561583	Pennsylvania
561584	Rhode Island, South Carolina, South Dakota, and Tennessee
561585	Texas (to 08116700)
561586	Texas (from 08117200) and Utah
561587	Vermont and Virginia
561588	Washington
561589	West Virginia and Wisconsin
561590	Wyoming, American Samoa, Canal Zone, Canton and Enderbury Islands, Guam, Johnston Atoll, Midway Islands, Puerto Rico, Ryukyu Islands, Southern, Swan Islands, Trust Territories of the Pacific Islands, U.S. Miscellaneous Caribbean Islands, U.S. Miscellaneous Pacific Islands, Virgin Islands, Wake Island, Mexico, Tamaulipas (Mexico), Nuevo Leon (Mexico), Coahiula (Mexico), Chihuahua (Mexico), Sonora (Mexico), Baja California Norte (Mexico), New Brunswick (Canada), Quebec (Canada), Ontario (Canada), Manitoba (Canada), Saskatchewan (Canada), Alberta (Canada), British Columbia (Canada), and Yukon (Canada)

Historical Tape Listings of Water Quality Data

Tape Number	Starting Station ID	Ending Station ID
568240	00000001	01999999
568241	02000000	02319999
568242	02320000	03999999
568243	04000000	05999999
568244	06000000	03999999
568245	07000000	07239999
568245	07240000	07999999
568247	08000000	08999999
568245	08000000	09999999
568249	10000000	11999999
568250	12000000	99999999
568251	000000000000001	329999999999999
568252	330000000000000	399999999999999
568253	400000000000000	999999999999999

Read Historical Tape Numbers (RTN)

The RTN application creates the binary file containing the historical tape numbers and their contents. These contents are the FIPS codes or site IDs, or both. This application should only be used when recreating the binary file. The text file that is read is called TAPES.SDF on the installation diskette. For information on the structure of the text file, see attachment F. The following is an example of the RTN application:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                        April 07, 1991 18:05:49 CDT (Sunday)   *
* User Information File:  DEFAULT              AMDAHL Userid:  XXXXXXX           *
*                  RTN -- Read Tape Numbers of Historical Data                  *
*********************************************************************************

Enter filename containing the tape numbers: _____________________
```

Display Job Execution Priority Classes (DJC)

The DJC application lists the possible AMDAHL job priority classes. These classes determine how quickly a submittal may be executed. For instance, class A usually indicates that the submittal will be executed in 30 minutes or less, whereas class G indicates that the submittal will not be executed until the following weekend. This file is read when PC-WATSTORE is invoked. For details on creating this file, see attachment G. The following is an example of executing the DJC application:

```
*********************************************************************************
*                                  PC-WATSTORE                                  *
*                               WATSTORE DATA LINK                              *
* Revision:  1.00                        April 07, 1991 18:05:49 CDT (Sunday)   *
* User Information File:  DEFAULT              AMDAHL Userid:  XXXXXXX           *
*                  DJC -- Display Job Submittal Priority Classes                *
*********************************************************************************

Class     Description

  A       Turnaround Time:  30 minutes,          Billing Factor:  3
  B       Turnaround Time:  2 hours,             Billing Factor:  2
  C       Turnaround Time:  5 hours,             Billing Factor:  1
  E       Turnaround Time:  24 hours (overnight) Billing Factor:  .6
  G       Turnaround Time:  Weekend,             Billing Factor:  .3
```

RESULTS OF A RETRIEVAL

After submitting the job to the AMDAHL computer, sufficient time should be allowed for the retrieval to execute; this generally takes about 2 hours. The following steps are used to copy the results to the PC:

1. Start communications software (such as KERMIT) and dial the AMDAHL computer. The number is (703) 648-4100 or (703) 648-4200.

2. After connecting, press <CR> until "CALL, DISPLAY, OR MODIFY" message is displayed. After the message, enter "CALL FS".

3. After a call is complete, press <CR> until the "SPECIFY TERMINAL TYPE" message is shown. Enter your terminal type. Generally, this will be VT100.

4. After a subsystem menu is shown, enter "WYLBUR".

5. At the logon prompt, enter your AMDAHL logon id.

6. At the password prompt, enter your AMDAHL password.

7. List the jobs that have finished execution by entering "ST". More files probably will be listed than the number of jobs executed because the output of the job is kept in one file while the messages created during the execution are kept in another. Select the file you want to list by using the FETCH command.

8. The KERMIT commands used to store a copy of the retrieval include:

   • type "<Control>-]" and press "C".

   • type "LOG SESSION filename" replacing filename with a real filename, which causes all information sent to the screen to go to the file.

   • type "C" to connect back to the AMDAHL computer.

9. List the contents of the file by using "LIST". Selected parts of a file can be viewed by entering starting/ending line numbers when issuing the LIST command.

10. With KERMIT, to keep anything else from going to the file:

    • type "<Control>-]" and press "C".

    • type "CLOSE SESSION".

    • type "C".

11. After listing a file, remove the file from the fetch queue by issuing the PURGE command.

12. To look at other files, fetch the file and list it as previously done.

13. To logoff, issue the "LOGOFF" command. When this is done, estimated costs and the subsystem menu will be shown.

14. To break the connection, cause the modem to hangup. In KERMIT, this is done by issuing the HANGUP command.

QUICK STARTUP GUIDE

This section is an abbreviated guide to installation and use of PC-WATSTORE. The steps necessary to install PC-WATSTORE and to make a retrieval from the AMDAHL computer using PC-WATSTORE are outlined below. Each step contains a brief

description of what is to be done. In addition, references to other sections or commands to be typed into the computer are enclosed in parentheses.

The steps needed to install and use PC-WATSTORE are:

1. Install PC-WATSTORE (see section on "Installation of PC-WATSTORE")
    - Put installation diskette in a drive (for example, drive A:).
    - Select drive containing installation diskette by entering the drive letter at the DOS prompt followed by a colon.
    - Install PC-WATSTORE (type "INSTALL" at the prompt and answer the prompts).
    - Reboot the computer (press <CONTROL>, <ALT>, and <DELETE> keys at the same time).
    - Create user information file:
        - Start PC-WATSTORE (type "WATSTORE").
        - Select the USER sub-menu (type "USER").
        - Select the create sub-menu (type "C").
        - Enter the requested information [see section on "Create New User Information File (C)"].
        - Exit program (type "EXIT").
2. Start PC-WATSTORE (type "WATSTORE").
3. Select Retrievals sub-menu ("RETR").
4. Select type of data to be retrieved; if daily values data are desired, type "DV".
5. Select submittal to be made; if daily values table is desired and the "DV" sub-menu was selected above, type "DVTABLE" for the daily values table application.
6. Customize submittal.
    - Select site IDs, dates, parameter codes, and other information to be retrieved.
    - When customization is completed, enter your AMDAHL password, account number, and job priority class (if needed).
7. Repeat steps 4 through 6 to create other submittals, if needed.
8. Select the communications menu when ready to execute submittals (type "COMM").

9. Select the send application (type "SEND").

   - Enter the AMDAHL password. After the AMDAHL password has been obtained, all of the submittals are merged together, uploaded to the AMDAHL computer, and submitted for execution.

10. Exit PC-WATSTORE (type "EXIT").

11. Look at results after 1 to 2 hours (see section on "Results of a Retrieval").

REFERENCES CITED

Borland International, Inc., 1990, Turbo C++: Scotts Valley, Calif., 617 p.

Burton, J.S., reviser, 1990, Operational guidelines for assistance centers of the National Water Data Exchange: U.S. Geological Survey Open-File Report 90-352, 78 p.

Microsoft Corporation, 1987, Microsoft C for the MS-DOS operating system: Redmond, Wash., 687 p.

U.S. Geological Survey, 1975a, WATSTORE user's guide--Volume 1: Open-File Report 75-426, 5 appendices.

_____ 1975b, WATSTORE user's guide--Volume 3, water-quality file.

_____ 1979, WATSTORE user's guide--Volume 4, peak flow file, streamflow/basin characteristics file, and flood map file: Open-File Report 79-1336-I, revised 1981.

ATTACHMENTS

Attachment A

JOBSETUP.SDF

The contents of the JOBSETUP.SDF file (except for statements starting with "//*/*") are inserted into every card deck created. This file should contain any routing information and procedure libraries needed to execute a retrieval. By default, all jobs are routed to the WYLBUR fetch queue (indicated by the statement "/*ROUTE PRINT RMT240").

```
//*/* Do not include the JOB statement, //USERID and //PASSWORD cards.
/*ROUTE PRINT RMT240
//PROCLIB DD DSN=WRD.PROCLIB,DISP=SHR
```

Attachment B

ERROR_MESSAGE

The following table is a partial list of error messages that a user might see. Also included in this table are possible solutions that might help to solve the problem. Included in the error messages will be a "%s". This "%s" will be replaced by a string whenever the error message is displayed on the screen of the computer. This string can be a filename.

PC-WATSTORE Error Message	Possible Solution
Warning: Unable to load User Information File (%s) was not found.	Create a user information file using the "C" option of the "USER" sub-menu. or Select an existing one by using the "SEL" sub-menu.
The Environment Variable WATSTORE_DIR was not found or was invalid. Have you run the install program: INSTALL	If the main menu of PC-WATSTORE is displayed, then the WATSTORE directory tree was found and the environment variable "WATSTORE_DIR" should be set to the drive letter concatenated with "\WATSTORE". If the main menu did not come up, install PC-WATSTORE.
File System Object %s does not exist.	If a prompt was shown for a filename, then the filename probably was misspelled. If there was no prompt for the filename, then the file may have been deleted and needs to be restored from backup or recreated.
Cannot read %s because it is corrupted.	Usually signifies that a binary file has been corrupted. Either restore the file from backup or recreate it using the appropriate menu under the "SYS" sub-menu.

%s: Disk Full or Write Error Occurred.	Usually signifies that some kind of error occurred while writing the file. Check to make sure the disk is not full and try again. If the disk is full, then delete some files to make space. (Be sure you don't need the files you are about to delete and have a good backup.)
The Station Identifier %s is invalid.	An invalid site ID was entered.
%s menu aborted %s.	The menu aborted because of the error it will display. Usually caused by the User Information File not being loaded.

Attachment C

Partial List of Parameter Codes

PARAMETER CODE	CONSTITUENTS
00001	CROSS-SECTION LOCATION, FEET FROM RIGHT BANK LOOKING UPSTREAM
00002	CROSS-SECTION LOCATION, PERCENT FROM RIGHT BANK LOOKING UPSTREAM
00003	SAMPLING DEPTH (FEET)
00004	STREAM WIDTH (FEET)
00005	CROSS-SECTION LOCATION, VERTICAL (PERCENT OF TOTAL DEPTH)
00009	CROSS-SECTION LOCATION, FEET FROM LEFT BANK LOOKING DOWNSTREAM
00010	TEMPERATURE, WATER (DEG. C)
00011	TEMPERATURE, WATER, FAHRENHEIT
00012	TEMPERATURE, EVAPORATION, 48 IN. PAN (DEG. C)
00013	TEMPERATURE, EVAPORATION, 24 IN. PAN (DEG. C)
00014	TEMPERATURE, WET BULB (DEG. C)
00020	TEMPERATURE, AIR (DEG. C)
00021	TEMPERATURE, AIR, D FAHRENHEIT
00025	BAROMETRIC PRESSURE (MM OF HG)
00030	SOLAR RADIATION, INCIDENTAL, INTENSITY, IN CALORIES PER SQUARE CENTIMETER PER DAY
00035	WIND SPEED (MPH)
00036	WIND DIRECTION, IN DEGREES FROM TRUE NORTH (CLOCKWISE)
00045	RAINFALL, ACCUMULATED (INCHES)
00050	EVAPORATION, TOTAL (INCHES PER DAY)
00052	HUMIDITY, RELATIVE (PERCENT)
00054	RESERVOIR STORAGE (AC-FT)
00055	STREAM VELOCITY (FEET PER SECOND)
00060	DISCHARGE, IN CUBIC FEET PER SECOND
00062	RESERVOIR ELEVATION, WATER SURFACE (FEET ABOVE DATUM)
00065	GAGE HEIGHT (FEET ABOVE DATUM)
00070	TURBIDITY (JTU)
00076	TURBIDITY (NTU)
00080	COLOR (PLATINUM-COBALT UNITS)
00090	OXIDATION REDUCTION POTENTIAL (MILLIVOLTS)
00095	SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CENTIGRADE
00193	ATMOSPHERIC DEPOSITION, WET TOTAL FOR DEFINED PERIOD, INCHES
00196	WIND RUN (MILES)
00300	OXYGEN, DISSOLVED (MG/L)
00310	OXYGEN DEMAND, BIOCHEMICAL 5-DAY AT 20 DEG C (MG/L)
00400	PH (STANDARD UNITS)
00419	ALKALINITY, WATER, WHOLE, FIELD, INCREMENTAL TITRATION, (MG/L AS CACO3)
00440	BICARBONATE, WATER, WHOLE, FIELD, FET, (MG/L AS HCO3)
00447	CARBONATE, WATER, WHOLE, FIELD, INCREMENTAL TITRATION, (MG/L AS CO3)
00450	BICARBONATE, WATER, WHOLE, FIELD, INCREMENTAL TITRATION, (MG/L AS HCO3)
00530	SOLIDS, RESIDUE AT 105 DEG C, SUSPENDED (MG/L)
00535	RESIDUE, VOLATILE NONFILTRABLE (MG/L)
00600	NITROGEN, TOTAL (MG/L AS N)

00608 NITROGEN, AMMONIA, WATER, DISSOLVED, (MG/L AS N)
00610 NITROGEN, AMMONIA, TOTAL (MG/L AS N)
00613 NITROGEN, NITRITE, DISSOLVED (MG/L AS N)
00618 NITROGEN, NITRATE, DISSOLVED (MG/L AS N)
00625 NITROGEN, AMMONIA PLUS ORGANIC, TOTAL (MG/L AS N)
00630 NITROGEN, NITRITE PLUS NITRATE, TOTAL (MG/L AS N)
00650 PHOSPHATE, TOTAL (MG/L AS PO4)
00660 PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4)
00665 PHOSPHOROUS, TOTAL, WATER, WHOLE, TOTAL, (MG/L AS P)
00666 PHOSPHOROUS, DISSOLVED (MG/L AS P)
00680 CARBON, ORGANIC, TOTAL (MG/L AS C)
00681 CARBON, ORGANIC, WATER, DISSOLVED, (MG/L AS C)
00689 CARBON, ORGANIC, SEDIMENT, SUSPENDED, TOTAL, (MG/L AS C)
00915 CALCIUM, WATER, DISSOLVED, (MG/L AS CA)
00925 MAGNESIUM, WATER, DISSOLVED, (MG/L AS MG)
00930 SODIUM, WATER, DISSOLVED, (MG/L AS NA)
00935 POTASSIUM, WATER, DISSOLVED, (MG/L AS K)
00940 CHLORIDE, WATER, DISSOLVED, (MG/L AS CL)
00945 SULFATE, WATER, DISSOLVED, (MG/L AS SO4)
00950 FLUORIDE, WATER, DISSOLVED, (MG/L AS F)
00955 SILICA, DISSOLVED (MG/L AS SIO2)
01045 IRON, TOTAL (UG/L AS FE)
01046 IRON, WATER, DISSOLVED, (UG/L)
45584 GATE OPENING, WIDTH (M)
45585 GATE OPENING, WIDTH (FEET)
45586 LOCKAGE, COUNT OF LOCK OPENINGS (UNITS)
45587 TEMPERATURE, INTERNAL, WITHIN DATA COLLECTION PLATFORM, IN DEGREES CENTIGRADE
45588 TEMPERATURE, INTERNAL, WITHIN DATA COLLECTION PLATFORM, IN DEGREES FAHRENHEIT
45589 TEMPERATURE, INTERNAL, WITHIN EQUIPMENT SHELTER, IN DEGREES CENTIGRADE
45590 TEMPERATURE, INTERNAL, WITHIN EQUIPMENT SHELTER, IN DEGREES FAHRENHEIT
46568 IRON, BIOLOGICALLY REACTIVE TOTAL (UG/L AS FE)
70290 CHLORIDE, DISSOLVED (TONS PER DAY)
70291 SULFATE, DISSOLVED (TONS PER DAY)
70299 SOLIDS, RESIDUE AT 110 DEG. C, SUSPENDED TOTAL, (MG/L)
70300 SOLIDS, RESIDUE ON EVAPORATION AT 180 DEG C, DISSOLVED (MG/L)
70301 SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)
70302 SOLIDS, DISSOLVED (TONS PER DAY)
70309 COMPACTION SEDIMENT (FEET)
70331 SEDIMENT, SUSPENDED, <0.062 MM, SIEVE DIAMETER, PERCENT FINER THAN .062 MM
70507 PHOSPHORUS, ORTHOPHOSPHATE, TOTAL (MG/L AS P)
70969 BATTERY VOLTAGE (VOLTS)
71832 HYDROXIDE, WATER, WHOLE, FIELD, INCREMENTAL TITRATION, MG/L AS OH
72019 DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET)
72020 ELEVATION (FEET NGVD)
72021 RESERVOIR STORAGE (CFS-DAYS)
72022 CONTENTS, IN MILLIONS OF GALLONS
72023 RESERVOIR STORAGE (MILLIONS OF CUBIC FEET)
72036 RESERVOIR STORAGE, IN THOUSANDS OF ACRE FEET
72111 DIRECT READOUT GROUND STATION TRANSMISSION ERROR CODES

72112 DATA COLLECTION PLATFORM, SIGNAL TO NOISE RATIO (S + N) WH S=GOOD CHAR. N=BAD CHAR.(NOISE)
72113 DATA COLLECTION PLATFORM SIGNAL MODULATION INDEX,IN DECIBELS
72114 DATA COLLECTION PLATFORM, ESTIMATE OF TRANSMISSION POWER, DBM
72115 DATA COLLECTION PLATFORM FREQUENCY OFFSET FROM CHANNEL CENTER, IN HERTZ
72116 DATA COLLECTION PLATFROM, NUMBER OF BAD CHARACTERS TRANSMITTED, UNITS
72117 DATA COLLECTION PLATFORM TRANSMISSION DELIVERY DELAY TIME, IN MINUTES
74082 STREAMFLOW, DAILY, IN ACRE FEET
74207 SOIL MOISTURE (PERCENT OF T OTAL)
80154 SEDIMENT, SUSPENDED, (MG/L)
80155 SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY)
80156 SEDIMENT DISCHARGE, TOTAL, SUSPENDED PLUS BED MATERIAL (TONS/DAY)
80180 SEDIMENT, TOTAL, CONCENTRATION (MG/L)
80225 SEDIMENT DISCHARGE, BEDLOAD (TONS/DAY)
81026 WATER CONTENT OF SNOW (IN.)
81027 TEMPERATURE, SOIL (DEG. C)
81028 WITHDRAWAL OF GROUND WATER (MGPD)
81029 SNOW TEMPERATURE (DEG C)
81200 SILICA, DISSOLVED (TONS PER DAY)
81201 CALCIUM, DISSOLVED (TONS PER DAY)
81202 MAGNESIUM, DISSOLVED (TONS PER DAY)
81203 SODIUM, DISSOLVED (TONS PER DAY)
81204 POTASSIUM, DISSOLVED (TONS PER DAY)
81205 BICARBONATE (TONS PER DAY)
81904 STREAM VELOCITY,POINT (FPS)
82072 DIAL READING
82292 DATA RELAY GROUND STATION SOURCE NODE CODE
82632 AREA, CROSS-SECTIONAL, IN SQUARE FEET
82903 DEPTH TO BOTTOM FROM WATER SURFACE, AT SAMPLING LOCATION, IN METERS
82923 TYPE, ATMOSPHERIC DEPOSITION, WET, (CODES)
83205 TYPE, ATMOSPHERIC DEPOSITION, BULK, (CODES)
85599 ATM DEP, WET, TOTAL FOR DEFINED PERIOD, CM
90095 SPECIFIC CONDUCTANCE, LABORATORY, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CENTIGRADE
91006 NITRATE, DISSOLVED (TONS/DAY)
91007 PHOSPHORUS, TOTAL (TONS/DAY)
91008 PHOSPHORUS, DISSOLVED (TONS/DAY)
91009 IRON, TOTAL (TONS/DAY)
91010 IRON, DISSOLVED (TONS/DAY)
91012 NITROGEN, NITRITE, DISSOLVED (TONS/DAY)
91013 NITROGEN, AMMONIA + ORGANIC, TOTAL (TONS/DAY)
91014 NITROGEN, AMMONIA, DISSOLVED (TONS/DAY)
91015 NITROGEN, AMMONIA, TOTAL (TONS/DAY)
91016 OXYGEN DEMAND, BIOCHEMICAL 5-DAY AT 20 C (TONS/DAY)
91017 SOLIDS, RESIDUE AT 110 C, SUSPENDED (TONS/DAY)
91047 NITROGEN, ORGANIC, TOTAL, POUNDS PER DAY
91048 NITROGEN, AMMONIA, TOTAL, POUNDS PER DAY
91049 NITROGEN, NITRITE PLUS NITRATE, POUNDS PER DAY
91050 PHOSPHORUS, TOTAL, POUNDS PER DAY
91055 SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED(TONS PER DAY)
91056 RESIDUE, VOLATILE NON- FILTERABLE(TONS/DAY)
91057 NITROGEN, AMMONIA PLUS ORGANIC, TOTAL(POUNDS/DAY)
91058 NITROGEN, TOTAL, LOAD POUNDS PER DAY

99019 DEPTH BELOW LAND SURFACE DATUM (WATER LEVEL) METERS
99020 ELEVATION, IN METERS ABOVE NGVD
99060 DISCHARGE, IN CUBIC METERS PER SECOND
99061 DISCHARGE, INSTANTANEOUS, IN CUBIC METERS PER SECOND
99065 GAGE HEIGHT, METERS ABOVE DATUM

Attachment D

Partial List of Statistics Codes

CURRENT STATISTIC CODE LIST

CODES	NAMES
00001	MAXIMUM
00002	MINIMUM
00003	MEAN
00006	SUM
00008	MEDIAN
00011	INSTANTANEOUS
00012	EQUIVALENT MEAN
00021	TIDAL HIGH (DAILY)
00022	TIDAL LOW-HIGH DAILY
00023	TIDAL HIGH-LOW DAILY
00024	TIDAL LOW (DAILY)
30100	OBSERVATION AT 0100
30200	OBSERVATION AT 0200
30300	OBSERVATION AT 0300
30400	OBSERVATION AT 0400
30500	OBSERVATION AT 0500
30600	OBSERVATION AT 0600
30700	OBSERVATION AT 0700
30800	OBSERVATION AT 0800
30900	OBSERVATION AT 0900
31000	OBSERVATION AT 1000
31100	OBSERVATION AT 1100
31200	OBSERVATION AT 1200
31300	OBSERVATION AT 1300
31400	OBSERVATION AT 1400
31500	OBSERVATION AT 1500
31600	OBSERVATION AT 1600
31700	OBSERVATION AT 1700
31800	OBSERVATION AT 1800
31900	OBSERVATION AT 1900
32000	OBSERVATION AT 2000
32100	OBSERVATION AT 2100
32200	OBSERVATION AT 2200
32300	OBSERVATION AT 2300
32400	OBSERVATION AT 2400

Attachment E

FIPSCODE.SDF

The FIPSCODE.SDF is a text file that contains the Federal Information Processing Standard (FIPS) state code for the states and territories of the United States along with the two-letter postal service abbreviation and the state name. This text file is used to create a binary file (by using the RFC application of the SYSTEM menu) for use by PC-WATSTORE. The FIPS state codes and abbreviations are used to determine which tape is to be used when retrieving historical daily values data.

The FIPS code information is enclosed between two control cards. Control cards are lines that start with "<$$" and end with "$$>". The FIPS code is not interpreted until a "<$$BEGIN_FIPS_CODES$$>" is located and stopped when a "<$$END_FIPS_CODES$$>" is located. The FIPS code information starts with a two-digit FIPS state code followed by one or more spaces and the two-letter state abbreviation in parentheses. If there is not an abbreviation, then use "()". The state abbreviation is followed by one or more spaces and finally, the state name. This FIPS code information should not need to be changed and is provided for your information. The contents of FIPSCODE.SDF is the same as the output of the DFC application of the SYSTEM menu.

Attachment F

Watstore Tape Numbers

PC-WATSTORE must have tape numbers for retrieving historical daily and water quality data. The software reads a binary file containing this information. (This binary file can be created from a text file using the RTN option of the SYSTEM menu.) An example of the text file is provided below. This file contains control cards. The control cards start with "<$$" and end with "$$>". Daily values historical tape number are enclosed within the "<$$BEGIN_DV_TAPES$$>" and "<$$END_DV_TAPES$$>" control cards. Water quality historical tapes are enclosed within "<$$BEGIN_QW_TAPES$$>" and "<$$END_QW_TAPES$$>". Also, a control card must be specified, indicating the media that the tape number signify. These are the actual codes used in the /*SETUP cards in the card deck. A "C" indicates a cartridge tape. The format of the tape numbers themselves are the assigned tape number followed by one or more spaces and the range information. For daily values this range information is the starting FIPS code. These tape numbers should not need to be changed and are provided for your information.

```
<$$BEGIN_DV_TAPES$$>
<$$MEDIA_CODE=C$$>
    561560  01()  02() 3
    561561  04()  05()
    561562  06()  06(11147070)
    561563  06(11147500)  06(11381990)
    561564  06(11382000)  06()
    561565  08()  08()
    561566  09()  12(02311600)
    561567  12(02312000)  12()
    561568  13()  13()
    561569  15()  15()
    561570  16()  16()
    561571  17()  18()
    561572  19()  20()
    561573  21()  23()
    561574  24()  26()
    561575  27()  28()
    561576  29()  30()
    561577  31()  33()
    561578  34()  35()
    561579  36()  36()
    561580  37()  38()
    561581  39()  40()
    561582  41()  41()
    561583  42()  42()
    561584  44()  47()
    561585  48()  48(08116700)
    561586  48(08117200)  49()
    561587  50()  51()
    561588  53()  53()
    561589  54()  55()
    561590  56()  97()
```

```
<$$END_TAPE_LIST$$>

<$$BEGIN_QW_TAPES$$>
<$$MEDIA_CODE=C$$>

     568240                00000001              01999999
     568241                02000000              02319999
     568242                02320000              03999999
     568243                04000000              05999999
     568244                06000000              06999999
     568245                07000000              07239999
     568246                07240000              07999999
     568247                08000000              08999999
     568248                09000000              09999999
     568249                10000000              11999999
     568250                12000000              99999999
     568251         000000000000001      329999999999999
     568252         330000000000000      399999999999999
     568253         400000000000000      999999999999999

<$$END_TAPE_LIST$$>
```

Attachment G

JOBCLASS.SDF

The JOBCLASS.SDF file contains the list of job priority classes that are defined on the AMDAHL computer for WATSTORE procedures. The format is as follows:

Column 1	Code an asterisk to indicated the suggested default value. Only one line should be coded with the asterisk.
Column 2	Leave blank.
Column 3	Code the job priority class name. This can only be one character in length.
Column 4	Leave blank.
Column 5-80	Description of the job priority class.

A	Turnaround Time: 30 minutes,	Billing Factor:	3
B	Turnaround Time: 2 Hours,	Billing Factor:	2
* C	Turnaround Time: 5 hours,	Billing Factor:	1
E	Turnaround Time: 24 hours (overnight)	Billing Factor:	.6
G	Turnaround Time: Weekend,	Billing Factor:	.3

☆U.S. Government Printing Office : 1992 - 312-292/62208

James E. Morris--DOCUMENTATION OF A COMPUTER PROGRAM FOR DATA RETRIEVAL FROM THE U.S. GEOLOGICAL SURVEY--USGS/OFR 92-105
NATIONAL WATER-DATA STORAGE AND RETRIEVAL SYSTEM