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DATA MANAGEMENT SYSTEM FOR URBAN HYDROLOGY STUDIES PROGRAM

By W. Harry Doyle, Jr., and Joy A. Lorens

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JAMES G. WATT, Secretary

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Dallas L. Peck, Director

For additional information write to:

U.S. Geological Survey, WRD
Gulf Coast Hydroscience Center
National Space Technology Laboratories
NSTL Station, Mississippi 39529

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ABSTRACT

A data management system was developed to store, update, and retrieve data collected in urban stormwater studies jointly conducted by the U.S. Geological Survey and U.S. Environmental Protection Agency in 11 cities in the United States. The data management system is used to retrieve and combine data from USGS data files for use in rainfall, runoff, and water-quality models and for data computations such as storm loads. The system is based on the data management aspect of the Statistical Analysis System (SAS) and was used to create all the data files in the data base. SAS is used for storage and retrieval of basin physiographic, land-use, and environmental-practices inventory data. Also, storm-event water-quality characteristics are stored in the data base. The advantages of using SAS to create and manage a data base are many with a few being that it is simple, easy to use, contains a comprehensive statistical package, and can be used to modify files very easily.

Data base system development has progressed rapidly during the last two decades and the data management system concepts used in this study reflect the advancement made in computer technology during this era. Urban stormwater data is, however, just one application for which the system can be used.

CHAPTER 1. GENERAL INFORMATION

1.1 Introduction

The USGS/USEPA Urban Hydrology Studies Program has a general objective to supply local urban managers with urban-hydrology data and methods of analysis suitable to support management decisions. To supply local managers with data, an urban-hydrology data base was created and a data management system generated that does the following:

(1) Stores data in the data base;
(2) Updates data in the data base;
(3) Retrieves data from the data base for publication and application purposes; and
(4) Interfaces data files from the data base with user computer programs, statistical procedures, and rainfall-runoff quantity and quality models.

This report describes the data base and the data management system to handle the data base. It explains how different files of the system can be created, updated, or modified. The necessary procedures for accomplishing each operation are documented. The organization of the report is by chapters which allows for easier referencing of material and updating as needed.

1.2 System Requirements

An important component of any data intensive study is the creation of a data base that contains the collected data. There are several important needs to be considered when a data base management system is being designed. These considerations are:

(1) The computer system on which the data base will reside. It is desirable to have machine independence.
(2) The type of storage devices for the data base--disk, tape, drum, or other. The chosen storage device is influenced by the frequency of use and cost of storing the data.
(3) Users of the data base - who will put the data in and who will retrieve it?
(4) The data elements that make up the data base. The data base users need certain information which must be included, if possible. Usually programs set forth guidelines as to what data should be included, however, it is not always feasible or practical to include everything requested.
(5) Ease of entry and retrieval is very important. If the system is too complicated, users will be confused and discouraged and proportionally more errors will creep into the system. Programs should be easy to execute and efficient and economical when executed.

(6) Last, but by far the most important, is system and data base documentation. Without good documentation the system is useless.

If these concepts are considered and implemented then the best utilization of data in the data base will be obtained.

The aforementioned general requirements are associated with the design of any system. A specific requirement for this data management system is that it must be able to interact with the National Water Data Storage and Retrieval System, WATSTORE (Hutchison, 1975). Figure 1.1 shows a flow chart that depicts data as it moves into and through WATSTORE to this system.

The individual operations in figure 1.1, designated by letters A through J, show how data begin and flow through the system.

Operation A. An urban hydrology monitoring system (UHMS) records storm rainfall and information about runoff quantity and quality on 16-channel punched paper tape. The UHMS also controls an automated sampling device that collects water samples at preselected sampling time intervals that vary between 30 seconds and 1 hour. A punched data record on the 16-channel tape includes the following:

(1) Time in hours, minutes, and seconds.
(2) Julian day.
(3) Stage or discharge parameter(s).
(4) Accumulated rainfall (one or more sites).
(5) Sequential sample number if water-quality sample was taken.

As many as eight data channels are available for recording items (3) and (4) above. Between storms the UHMS operates on a standby mode recording only at a pre-selected interval such as twice a day or when rainfall occurs. The UHMS switches to a continuous mode when a threshold value of stage that corresponds to a preselected discharge is reached and exceeded.

Operations B, C. The punched tape is converted to a USGS ADP tape by using software developed by Water Resources Division Data Management Section in Reston.

Operations D, E. Data conversion programs are then used to enter the data into WATSTORE. The three WATSTORE files that provide for the general storage, retrieval, and publication of meteorological, discharge, and water-quality data are:

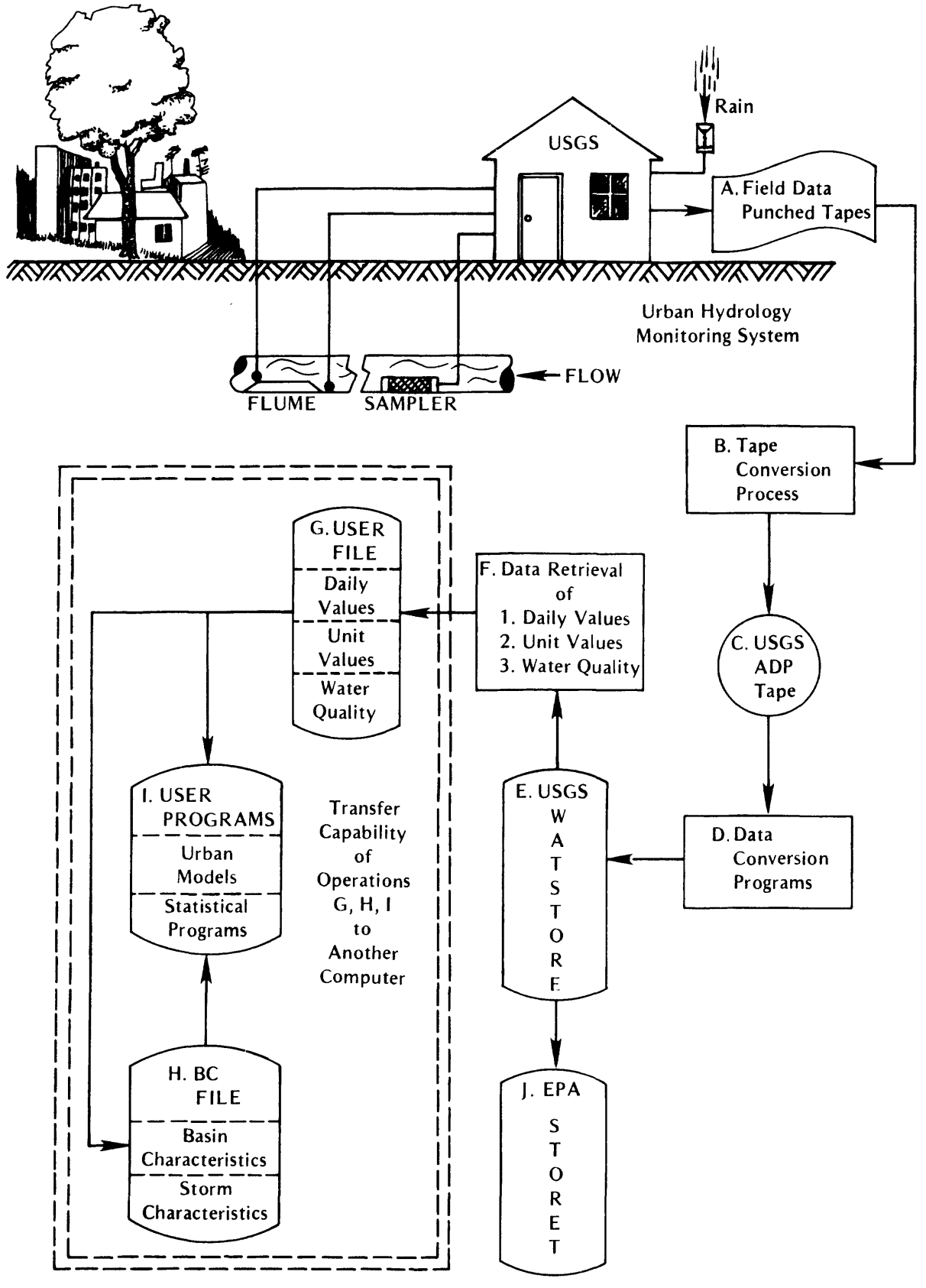


Figure 1.1--Flow chart of Data Management System for USGS/USEPA Urban Hydrology Studies Program.

(1) Daily-Values File.--Accommodates one value per day for a given parameter such as discharge, total rainfall, daily evaporation, etc.
(2) Unit-Values File.--Accommodates data collected at uniform time intervals for as many as 2,880 observations per day per parameter (30-second data), such as rainfall and runoff collected during a storm event.
(3) Water-Quality File.--Accommodates analyses of water samples. Each water-quality value is referenced as to time, date, site identification, and parameter code.

Standard USGS data input programs are used to input these different types of data (1-3) into WATSTORE.

Operations F, G. Next, standard USGS data retrieval programs retrieve first-time data or updated data for input into a User File (this process is documented in Chapter 2 of this report). The data are from the three WATSTORE files; the Daily-Values File, the Unit-Values File, and the Water-Quality File. Companion files similar to the WATSTORE files but containing only selected data comprise the User File. The User File contains data for application programs and has the capacity to store:

(1) About ten long-term daily time series per site in a daily-values file component. Example, 5 years of daily rainfall data, 5 years of daily evaporation data, etc. Data for all sites in a state program will be within one file.

(2) As many as eight unit-values time series (30 seconds to hourly time interval) per site in a unit-values file component. Storage allows data for each unit value time series (30 seconds to hourly time interval) per site. Storage accommodates data for each unit value time series for as many as 100 events for all sites in a state program.

(3) As many as 50 water-quality or other parameters per water sample. A variable number of samples per storm event can be stored so that the maximum capacity of the

water-quality file component of the user file for water sample data is

$$M \cdot N \cdot O \cdot P$$

where

M = number of sites;
N = number of storms per site;
O = number of water samples per storm; and
P = number of analyses for a given sample.

The User File accommodates multiple data collection sites; each site includes as many as 100 storm events of as long as several days duration at given time intervals. The User File is operational on the USGS Reston computer system and it, with other associated components (Operations H and I), are capable of transfer to a similar computer system. Chapter 3 can be referenced for more information.

Operation H. The Basin Characteristics File (BC File) contains specific site information data about basin characteristics such as generalized physiographic, land use, and climatic characteristics. Environmental practices data that are used to establish cause-and-effect relationships between management techniques and water-quality processes are also stored in the BC File. Also, computed storm and dry-weather characteristics are included in the BC File. Chapter 4 describes in detail, the BC File.

Operation I. The User File is interfaced with user programs, urban storm-water models, and statistical packages (Chapter 5).

Operation J. Data stored in WATSTORE are periodically transferred from WATSTORE to STORET. Data in WATSTORE and STORET are available for retrieval by USGS and EPA data file users.

1.3 SAS

For the User File and associated files, a file concept that meets the general requirements of transferring and storing data for the necessary operations is based on the Statistical Analysis System (Barr and others, 1979) known as SAS79. SAS was developed at North Carolina State University and is available on the Reston computer system and on many other computer systems. The files

that are created for the urban hydrology program, such as the User File and the BC File, are created using SAS. SAS includes a very comprehensive statistical package. It also has very flexible data file manipulation capabilities. Therefore, SAS is not only used to create the files in this system, but also as a data-base manager in manipulating the data.

A few of the advantages of SAS are:

(1) Available documentation;
(2) Simple and easy to use;
(3) Cost-effective;
(4) It contains a comprehensive statistical package; and
(5) SAS is currently used as an application program with WATSTORE.

The data management system created for the USGS/USEPA Urban Hydrology Studies Program has many interactive users. Adopting a standardized package like SAS made it easier not only to develop the system, but also to use it.

Since SAS is used as the Data Manager for the urban hydrology program, it is imperative that some information about SAS be given the user. Only a few rudiments of the system will be presented and readers are encouraged to consult Appendix A and the references at the end of this report.

First of all, what is SAS? The words stand for Statistical Analysis System, but SAS is much more than that. In broad terms it is a computer system for managing data, analyzing it statistically, and writing reports. A computer system is a group of computer programs that work together in data analyses. Because SAS is a system, you don't have to prepare one computer job to plot data values, another job to perform a regression, or another job to print a special report. SAS does it all within one job. Most common statistical procedures are available within SAS. Moreover, SAS is one of the most advanced proprietary packages in the area of linear statistical models (Showen, 1978). SAS can provide data management functions such as sorting, merging, copying, modifying, and condensing sets of data. SAS also functions as a report writer, allowing users to print their results in custom-made reports.

Data that comes from punched cards, disk, or tape are analyzed by SAS. SAS checks for errors, provides excellent error diagnostics and syntax checking, performs statistical tests, and prints results. Users can learn SAS in a tutorial approach, by first attempting simple SAS jobs and then following instructions issued by the SAS programs, should errors occur. Basic terminology pertaining to data that are analyzed by SAS are as follows:

Data Values--single measurements, such as rainfall amounts;
Observations--a set of data values for the same event, like rainfall amount, discharge, and total evaporation.

SAS is used to establish the necessary data files for this system and for manipulating data between files. An examination of necessary steps in designing a system will help in understanding the reasons behind the selection of SAS. These steps include the following.

(1) Design the files for the data base. Decide whether file organization will be sequential, indexed sequential, direct access, etc., and then compute the size of the records and blocksizes that contain the records.
(2) Write computer programs to create the data files. All the necessary file information would be included in the computer programs.
(3) Create the necessary Job Control Language (JCL) to establish the files.
(4) Create computer programs and associated JCL to update files.
(5) Create all the data analysis programs necessary to manage and monitor the system.
(6) Create a backup system to safeguard the data files.

With SAS, steps 1 and 2 are available for creating any file that is needed. Most, if not all, of steps 4-6 are available, too. SAS uses English-like commands which can be entered in any position on an input card or cards.

The most important feature, however, is the ability that SAS has to modify files. In what would be referred to as a "static system," one created by other computer programs, a major effort is required to change or reorganize data files and analysis programs. SAS addresses data values within observations by names and all positioning within the records to locate the data values is done by SAS. The relative ease with which one can create and manage data sets with SAS resulted in its selection as the data management system for the Urban Hydrology Program.

CHAPTER 2. RETRIEVING FROM WATSTORE

Operation F in figure 1.1 shows a data transfer from the USGS WATSTORE data files to the User File listed under operation G. The three WATSTORE files that data are to be retrieved from are:

(1) The Daily-Values File;
(2) The Unit-Values File; and
(3) The Water-Quality File.

The transfer procedure involves using standard USGS data retrieval programs and JCL cataloged procedures to retrieve from the three WATSTORE files. (See WATSTORE User's Guide, Hutchison, 1975). These data are then transformed into SAS data sets and with SAS commands are merged into similar file components in the User File.

2.1 Daily-Values Data

The standard WATSTORE retrieval cataloged procedure DVRETR is used to retrieve daily data such as rainfall and evaporation. Retrieval options, input data formats, and other operations are explained in the WATSTORE User's Guide and can be consulted for usage. A "MACRO" which is a collection of SAS commands takes the DVRETR output and transforms it into a SAS data set called DV2. The six variables generated as a part of DV2 are:

(1) STATION--station identification number.
(2) PARMCODE--5-digit WATSTORE parameter code.
(3) VALUE--daily value of parameter.
(4) DATE--date of collection or measurement for sample value.
(5) STATCODE--a statistical code for the respective parameter.
(6) DATETIME--single value of date and time in seconds computed from January 1, 1960.

The data set DV2 is then merged into the daily-values data set that is a part of the User File. JCL and SAS commands necessary to accomplish the entire process are documented in chapter 3 of this report.

2.2 Unit-Values Data

The standard WATSTORE retrieval cataloged procedure UNRETR is used to retrieve unit data from the WATSTORE unit-values file. These data including unit rainfall, unit discharge, and other data are transformed into a SAS data set called UV. A SAS "MACRO" creates 7 output parameters in the data set.

(1) STATION--station identification number.
(2) PARMCODE--5-digit WATSTORE parameter code.
(3) VALUE--unit value of parameter.
(4) DATE--date of collection or measurement for sample value.
(5) DATETIME--single value of date and time in seconds computed from January 1, 1960.

(6) STATCODE--a statistical code for the respective parameter.
(7) TIME--unit time expressed in 24-hour military format.

The data set UV is then merged into the User File unit-values data set. Chapter 3 of this report contains instructions for this operation.

2.3 Water-Quality Data

The standard WATSTORE retrieval cataloged procedure QWRETR is used for retrieving WATSTORE water-quality data. Output from QWRETR is passed into a PL/I program that has been loaded as a SAS PROC. This procedure called QWSAS transforms the retrieved data into a SAS data set named DATA1.

The standard default parameters that make up DATA1 are STATION, the station identification number, and one variable for each parameter code listed on the QWRETR output parameter list cards. The parameter values are stored in variables named Pnnnnn, where nnnnn is the parameter code on the output list. Section R of Chapter IV, Volume 3, WATSTORE User's Guide fully describes the computational process and corresponding SAS data set output.

In addition to the default variables, the user may request that certain other variables be included in the SAS data set. These optional variables described in Section R of Chapter IV, Volume 3, WATSTORE User's Guide may include data for time, date, state code, and district code. Chapter 3 in this report explains JCL and SAS commands for this procedure.

CHAPTER 3. USER DATA FILE

Operation G in figure 1.1 pertains to the User File. Chapters 1 and 2 discussed the structure of the User File and how it is related to the WATSTORE data files. In section 1.2 of this report the general requirements of a user file system were described. Chapter 3 discusses specifics associated with actually working with the User File.

3.1 Organization of File

The User File has three major components:

(1) A daily-values file component;
(2) A unit-values file component; and
(3) A water-quality file component.

These three components parallel those in WATSTORE and are created and updated by retrieving new or updated data from WATSTORE and passing the data into the User File.

3.2 Daily-Values File Component

The daily-values file component of the User File has the capacity to store as many as ten long-term daily time series per site. An example is that one long-term daily time series is for 5 years of daily rainfall data and another is for 5 years of daily evaporation data. An observation at a particular site includes these six variables:

(1) STATION--station identification number.
(2) PARMCODE--5-digit WATSTORE parameter code.
(3) VALUE--daily value of parameter.
(4) DATE--date of collection or measurement for sample value.
(5) STATCODE--a statistical code for the respective parameter.
(6) DATETIME--single value of date and time in seconds computed from January 1, 1960 (computed by SAS system).

The capacity of the file is such that as many as 10 long-term daily time series (10 different PARMCODE's) for as many sites or STATION's necessary can be stored.

3.21 Naming Data Sets

The Operating System data set name (DSN) for User File daily-values data sets is AG4yyyz.STATEXX.URBAN.DAILY.VALUES. The first part of the DSN is AG4yyyz which is a TSO/ONLINE identification Userid that is assigned to the user by the Computer Center Division (CCD). Chapter 5, section 2, of the CCD User's Manual explains how to obtain a Userid. The Userid as the first part of the DSN is necessary and required by CCD for cataloging on-line data sets. The AG4 characters will apply to most WRD terminal users (districts). A user registration code is represented by yyy and the last character z is a code assigned by CCD. XX in STATEXX is a two-digit state identification code as listed in the WATSTORE User's Guide, Appendix B. As many as 40 SAS data sets can be a part of any one operating system (OS) daily-values file component. Therefore, the SAS data-set member name is simply DVMASTER. This allows the user an area that might be used to store as many as 39 related or unrelated SAS data sets.

The JCL statement

```
//DVFILE DD DSN=AG4yyyz.STATEXX.URBAN.DAILY.VALUES,...
```

references the OS data set AG4yyyz.STATEXX.URBAN.DAILY.VALUES. The SAS data set reference

```
DVFILE.DVMASTER
```

refers to the SAS data set that is a member of the OS data set identified by the DDNAME DVFILE. The link between the SAS data set reference and the JCL OS data set reference is the word DVFILE that appears in both references.

3.22 Creating Data Sets

There are two sets of commands necessary for establishing a new Daily-Values File (DV File) for a state. The first set are JCL commands that define the data set name to the Operating System. The second set are SAS instructions that are used to define the organization of the DV File.

3.221 JCL Commands

The necessary JCL cards are as follows:

```
        COL.1      COL.12
          ●          ●
Card 1..//           JOB
     2..//PROCLIB   DD DSN=WRD.PROCLIB,DISP=SHR
     3..// EXEC DVRETR,AGENCY=USGS
     4..//HDR.SYSIN DD *

         Retrieval cards for DVRETR

     5../*
     6..// EXEC WRDSAS,DSN='&&BKREC',MACRO=DV2,DSN1=NULLFILE,DSN2=NULLFILE
     7..//DVFILE DD DSN=AG4yyyz.STATEXX.URBAN.DAILY.VALUES,
     8..// DISP=(NEW,CATLG),DCB=DSORG=DA,
     9..// SPACE=(TRK,(N1,N2),RLSE),UNIT=3330-1,VOL=SER=CCD810
    10..//SYSIN DD *
    11..  DVINPUT

Other SAS commands

    12../*
    13..//
```

The JCL cards above do the following:

Card 1..Job control card.
2..Invokes the WRD cataloged procedure library.
3..Invokes the procedure DVRETR with AGENCY=USGS being the agency code.
4..Establishes that incoming data cards for DVRETR follow.
5..Delimiter or JCL step separator card.
6..Invokes the procedure WRDSAS to call the WRD loaded version of SAS.
7-9..Defines data set to be created for state XX to be placed on WRD disk CCD810, an on-line disk of which 3000 tracks are dedicated to the data-management system of the USGS/USEPA Urban Hydrology Studies Program. Space to be reserved for data set = N1 + 15(N2) tracks (explained in Appendix A of this report).
10..Establishes that incoming SAS data cards follow.
11..Causes DVINPUT macro to be expanded and executed.
12..Delimiter.
13..End of job card.

3.222 SAS Commands

Between cards 10 and 12 in section 3.221 reference was made to two sets of SAS instructions. The macro consists of the following statements.

```
MACRO DVINPUT
DATA DV;
  INFILE USERFILE;
  ARRAY MODA(MONTH) MODA1-MODA12;
    RETAIN MODA1 31 MODA3 31 MODA4 30 MODA5 31 MODA6 30 MODA7 31 MODA8 31
    MODA9 30 MODA10 31 MODA11 30 MODA12 31 STATION MONTH DAY
          PARMCODE STATCODE NOVALUE LASTMO DATETIME;
  KEEP STATION PARMCODE STATCODE DATE DATETIME VALUE;
  INPUT       @10 STATION $CHAR15.
              @33 PARMCODE IB4.
              @37 YEAR     IB2.
              @39 STATCODE IB2.
              @41 NOVALUE  RB4. @@;
  YEAR=YEAR-1;
  FIRSTMO=10;
  LASTMO=12;
  LINK MONTHLY;
  YEAR=YEAR+1;
  IF MOD(YEAR,4) = 0
     THEN IF MOD(YEAR,100) = 0
          THEN MODA2 = 28;
          ELSE MODA2 = 29;
     ELSE MODA2 = 28;
  FIRSTMO=1;
  LASTMO=9;
  LINK MONTHLY;
  INPUT @37 YEAR IB2.;
  RETURN;
MONTHLY:
  DO MONTH = FIRSTMO TO LASTMO;
   DO DAY = 1 TO MODA;
    P = 45 + (MONTH-1)*124 + (DAY-1)*4;
    INPUT @P VALUE RB4. @@;
     IF VALUE = NOVALUE
       THEN;
       ELSE DO;
         DATE = MDY(MONTH, DAY, YEAR);
         DATETIME = DHMS(DATE,0,0,0);
         OUTPUT
        END;
     END;
   END;
   RETURN;
FORMAT DATE YYMMDD8. DATETIME DATETIME13.;
LENGTH PARMCODE 4 STATCODE 4 VALUE 4;
%
```

The name of the above macro procedure is DVINPUT. It is not necessary to input the macro instruction cards because they are automatically brought in as part of the program whenever the macro name DVINPUT is used.

The following SAS instructions would follow card 11.

```
Card 1..PROC SORT OUT=DVFILE.DVMASTER;
     2..     BY STATION PARMCODE DATETIME;
     3..     FORMAT DATE YYMMDD8.;
     4..PROC PRINT;
```

DVINPUT establishes a SAS data set; then the above SAS instruction cards 1-4 will cause the following to happen:

(1) A sort of the data set created by DVINPUT is performed. The data is sorted by STATION (the major sort key) and PARMCODE (the minor sort key). The results are placed in DVFILE.DVMASTER which is the Daily-Values data set for state XX.
(2) Instruction 3 specifies the format to be used when DATE is output by PROC PRINT.
(3) The newly established SAS data set is printed by the instruction given on card 4

```
PROC PRINT;
```

The following pages present JCL commands, SAS instructions, and sample output resulting from creating a Daily-Values File for urban data collected at a multifamily residential site near Miami, Fla. The order of the output corresponds to the sequential processing of JCL and SAS commands as referenced on the preceding pages.

```
  1     //AG4254J1 JOB (**********,J001,5,5),'LORENS',CLASS=B,MSGLEVEL=(2,0)      JOB 9249
  2     //PROCLIB DD DSN=WRD.PROCLIB,DISP=SHR
        ***SETUP    118538/H                                                      P
  3     // EXEC DVRETR,AGENCY=USGS,VOL1=118538
 18     //HDR.SYSIN DD *
 73     // EXEC WRDSAS,DSN='&&BKREC',MACRO=DV2,DSN1=NULLFILE,DSN2=NULLFILE
112     //DVFILE DD DSN=AG4254J.STATEXX.URBAN.DAILY.VALUES,
        // DISP=(NEW,CATLG),DCB=DSORG=DA,
        // SPACE=(TRK,(4,1),RLSE),UNIT=3330-1,VOL=SER=CCD810
113     //SYSIN DD *
        //
```

```
CCD000I  JOB /A84254J1/ BASIC STEP CHARGE          CPU      DISK-IO    TAPE-IO    KBYTE-HR     TOTAL
                                                    .00          .00        .00         .00       .00
IEF142I A84254J1 SAS - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 82070.0918
IEF374I STEP /SAS      / STOP  82070.0919 CPU     0MIN 01.35SEC SRB     0MIN 00.13SEC VIRT   360K SYS   308K
```

KOMAND DATA ACQUISITION SYSTEM

EXCP STATISTICS

UNIT	EXCP COUNT	UNIT	EXCP COUNT	UNIT	EXCP COUNT	UNIT	EXCP COUNT	UNIT	EXCP COUNT	UNIT	EXCP COUNT
E40	0	E43	0	E42	0	781	0	E40	0	631	17
318	21	48D	0	E41	86	E41	0	781	0	E41	0
E40	0	E41	0	315	0	486	0	316	0	E41	0
E41	0	E41	2	488	0	488	5	488	2	488	2
488	20	480	0								

EXCP TOTAL 155 VIO PAGE INS 0 VIO PAGE OUTS 0 PAGES SWAPPED IN 0

```
CCD000I  JOB /A84254J1/ BASIC STEP CHARGE          CPU      DISK-IO    TAPE-IO    KBYTE-HR     TOTAL
                                                   1.12          .46        .00         .64      2.22
IEF376I  JOB /A84254J1/ START 82070.0917
IEF377I  JOB /A84254J1/ STOP  82070.0919 CPU     0MIN 02.17SEC SRB     0MIN 00.36SEC
```

KOMAND DATA ACQUISITION SYSTEM

JOB LOG NUMBER - A84254J1 82070 00.00.00.00	CPU TIME 00.00.02.17	SRB TIME	00.00.00.35
PROGRAMMER LORENS	INIT DATE 03/11/82 82.070	INITIATION TIME	09.17.50.04
ACCTG DATA $SSSSSSSS,J001,5%5	TERM DATE 03/11/82 82.070	TERMINATION TIME	09.19.22.01
OS-VS2 REL 03.8	PGN/SERVICE 1/ 11.645	ELAPSED TIME	00.00.00.00
SYSTEM ID VSV7	CLASS B	COMPLETION STATUS	C0000

```
CCD002I JOB/A84254J1/ TOTAL BASIC JOB CHARGE      1.24  (FIXED) +       3.89  (STEPS) =      5.13
THIS CHARGE DOES NOT INCLUDE CHARGES FOR TAPE OR DISK MOUNTS, IF APPLICABLE, OR UNIT RECORD CHARGES
```

```
PROGRAM G745 HAD THE FOLLOWING PROGRAM DATES OF LAST REVISION:
     G745           20 AUG 81 07.43.09
     WDRIRTV        14 JAN 81 11.01.24
     WDRLIST         8 APR 81 12.57.31


AGENCY CODE USGS  WAS SUBMITTED THROUGH THE AGENCY SYMBOLIC JCL PARAMETER ON THE EXEC CARD.
            -----

CODES SUBMITTED THROUGH SYMBOLIC JCL PARAMETERS ON THE EXEC CARDS WILL BE TEMPORARILY OVERRIDDEN
IF A 7 CARD WITH VALID ENTRIES. IS PLACED PRECEDING A STATION SELECTION CARD.




********************************************  RETRIEVAL NO.  1   MAR 11, 1982   ********************************************


STATION HEADER DATA HAS BEEN REQUESTED TO BE WRITTEN INTO AN OUTPUT FILE IN THE FORMAT LISTED BELOW.

STATION HEADER RECORD LIST

PROGRAM G745 IS FUNCTIONING AS A PREPROCESSOR FOR RETRIEVING DAILY VALUES  DATA RECORDS.

                                                  <- SORT OPTNS ->                  M CARD  ***

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
M2  197801  197805                                                          01

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
R00049

 <-STATION ID.->                                                                  D CARD  ***
D254031080191103



BASED ONLY ON INFORMATION AVAILABLE FROM THE STATION HEADER FILE.      1 SITES WERE SELECTED FOR RETRIEVAL NO.  1

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


STATION HEADER RETRIEVAL PROCESSING ENDED
```

WATSTORE DAILY VALUES FILE RETRIEVAL PROGRAM.
(PGM. NO. G490) - DATE OF LAST REVISION: 09/20/80.
M2 197801 197805

01

RETRIEVAL SPECIFICATIONS FOR REQUEST NUMBER 1 ARE AS FOLLOWS:

PARAMETER LIST IS AS FOLLOWS:P_CODE
00045

ALL STATISTIC CODES RETRIEVED

CONTROL VALUES NOT CONSIDERED

ALL CROSS SECTIONS RETRIEVED.

ALL SAMPLING DEPTHS RETRIEVED

18

1 RECORDS HAVE BEEN RETRIEVED FOR RETRIEVAL NO. 1
1 STATION(S) HAVE RECORDS

NOTE: THE JOB AG4254J1 HAS BEEN RUN UNDER RELEASE 79.5 OF SAS AT U. S. GEOLOGICAL SURVEY (00592).

NOTE: SAS OPTIONS SPECIFIED ARE:
SYSIN=INPUT S=80

```
1          MACRO DVINPUT
2          DATA DV;
3            INFILE USERFILE;
4            ARRAY MODA(MONTH) MODA1-MODA12;
5              RETAIN MODA1 31 MODA3 31 MODA4 30 MODA5 31 MODA6 30 MODA7 31 MODA8 31
6              MODA9 30 MODA10 31 MODA11 30 MODA12 31 STATION MONTH DAY
7                    PARMCODE STATCODE NOVALUE LASTMO DATETIME;
8            DROP MODA1-MODA12 NOVALUE LASTMO YEAR FIRSTMO MONTH DAY P;
9            INPUT       @10 STATION $CHAR15.
10                       @33 PARMCODE IB4.
11                       @37 YEAR     IB2.
12                       @39 STATCODE IB2.
13                       @41 NOVALUE  RB4. @@;
14           LINK USERCODE;
15           YEAR=YEAR-1;
16           FIRSTMO=10;
17           LASTMO=12;
18           LINK MONTHLY;
19           YEAR=YEAR+1;
20           IF MOD(YEAR,4) = 0
21             THEN IF MOD(YEAR,100) = 0
22                  THEN MODA2 = 28;
23                  ELSE MODA2 = 29;
24             ELSE MODA2 = 28;
25           FIRSTMO=1;
26           LASTMO=9;
27           LINK MONTHLY;
28           INPUT @37 YEAR IB2.;
29           RETURN;
30         MONTHLY:
31           DO MONTH = FIRSTMO TO LASTMO;
32            DO DAY = 1 TO MODA;
33             P = 45 + (MONTH-1)*124 + (DAY-1)*4;
34             INPUT @P VALUE RB4. @@;
35              IF VALUE = NOVALUE
36                THEN;
37                ELSE DO;
38                  DATE = MDY(MONTH, DAY, YEAR);
39                  DATETIME = DHMS(DATE,0,0,0);
40                  OUTPUT;
41                 END;
42              END;
43            END;
44            RETURN;
45         FORMAT DATE YYMMDD8. DATETIME DATETIME13.;
46         LENGTH PARMCODE 4 STATCODE 4 VALUE 4;
47         USERCODE: * USER-SUPPLIED CODE FOLLOWING THE MACRO IS LINKED HERE;
48         %
49         MACRO LSNAME   INPUT @1541 SNAME $48. @@; RETAIN SNAME;
50                        LABEL SNAME=STATION NAME; %
51         MACRO @STATE   INPUT @3    STATE $2.  @@; RETAIN STATE; %
```

```
52          MACRO _AGENCY  INPUT @5    AGENCY $5. @9; RETAIN AGENCY; %
53          MACRO _XSEC    INPUT @25   XSEC  R84. @9; RETAIN XSEC;
54                         LABEL XSEC=LOCATION IN CROSS SECTION; %
55          MACRO _SDEPTH  INPUT @29  SDEPTH R84. @9; RETAIN SDEPTH;
56                         LABEL SDEPTH=SAMPLING DEPTH;
57                         IF SDEPTH=999999 THEN SDEPTH=.; %
58          MACRO _STATCOD INPUT @39 STATCODE I82. @9; RETAIN STATCODE;
59                         LENGTH STATCODE 4; FORMAT STATCODE Z5.; %
60          MACRO _DISTRIC INPUT @1536 DISTRICT $2. @9; RETAIN DISTRICT; %
61          MACRO _COUNTY  INPUT @1538 COUNTY $3. @9; RETAIN COUNTY; %
62          MACRO _DA      INPUT @1589 DA R84. @9; RETAIN DA; IF DA=0 THEN DA=.;
63                         LABEL DA=DRAINAGE AREA; %
64          MACRO _CDA     INPUT @1593 CDA R84. @9; RETAIN CDA; IF CDA=0 THEN CDA=.;
65                         LABEL CDA=CONTRIBUTING DRAINAGE AREA; %
66          MACRO _DEPTH   INPUT @1597 DEPTH R84. @9; RETAIN DEPTH; LABEL DEPTH=WELL
67                         IF DEPTH=-99999 THEN DEPTH=.; %
68          MACRO _DATUM   INPUT @1601 DATUM PD7.2 @9; RETAIN DATUM; %
69          MACRO _HUNIT   INPUT @1605 HUNIT I84. @9; RETAIN HUNIT; FORMAT HUNIT Z8.
70                         IF HUNIT=0 THEN HUNIT=.;
71                         LENGTH HUNIT 5; LABEL HUNIT=HYDROLOGIC UNIT CODE; %
72          MACRO _SITETYP INPUT @1613 SITETYPE $2. @9; RETAIN SITETYPE; %
73          MACRO _LAT     INPUT @1615 LAT 6. @9; RETAIN LAT; FORMAT LAT Z6.; %
74          MACRO _LONG    INPUT @1621 LONG 7. @9; RETAIN LONG; FORMAT LONG Z7.; %
75          MACRO _GUNIT   INPUT @1630 GUNIT $8. @9; RETAIN GUNIT;
76                         LABEL GUNIT=GEOLOGIC UNIT CODE; %
77          MACRO _AQUIFER INPUT @1639 AQUIFER $1. @9; RETAIN AQUIFER; %
78
79
80                  DVINPUT
```

NOTE: INFILE USERFILE IS:
DSNAME=SYS02070.T091749.RA000.AB4254J1.BKREC,
UNIT=SYSDA,VOL=SER=SYS501,DISP=OLD,
DCB=(BLKSIZE=11592,LRECL=1656,RECFM=FB)

NOTE: 1 LINE WAS READ FROM INFILE USERFILE.
NOTE: DATA SET WORK.DV HAS 259 OBSERVATIONS AND 5 VARIABLES. 405 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.27 SECONDS AND 194K.

```
81                  PROC SORT OUT=DVFILE.DVMASTER ;
82                       BY STATION PARMCODE DATETIME;
83                       FORMAT DATE YYMMDD8. ;
84
```

NOTE: DATA SET DVFILE.DVMASTER HAS 259 OBSERVATIONS AND 6 VARIABLES. 277 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.34 SECONDS AND 194K.

```
84                  PROC PRINT ;
```

NOTE: THE PROCEDURE PRINT USED 0.35 SECONDS AND 176K AND PRINTED PAGES 1 TO 5.

NOTE: SAS USED 184K MEMORY.

NOTE: SAS INSTITUTE INC.
SAS CIRCLE
BOX 8000
CARY, N.C. 27511

OBS	STATION	PARMCODE	STATCODE	DATETIME	VALUE	DATE
1	254031080191103	45	6	01OCT77:00:00	0.00	77-10-01
2	254031080191103	45	6	02OCT77:00:00	0.00	77-10-02
3	254031080191103	45	6	03OCT77:00:00	0.00	77-10-03
4	254031080191103	45	6	04OCT77:00:00	0.00	77-10-04
5	254031080191103	45	6	05OCT77:00:00	0.00	77-10-05
6	254031080191103	45	6	06OCT77:00:00	0.54	77-10-06
7	254031080191103	45	6	07OCT77:00:00	0.00	77-10-07
8	254031080191103	45	6	08OCT77:00:00	0.00	77-10-08
9	254031080191103	45	6	09OCT77:00:00	0.00	77-10-09
10	254031080191103	45	6	10OCT77:00:00	0.00	77-10-10
11	254031080191103	45	6	11OCT77:00:00	0.00	77-10-11
12	254031080191103	45	6	12OCT77:00:00	0.00	77-10-12
13	254031080191103	45	6	13OCT77:00:00	0.00	77-10-13
14	254031080191103	45	6	14OCT77:00:00	0.00	77-10-14
15	254031080191103	45	6	15OCT77:00:00	0.00	77-10-15
16	254031080191103	45	6	16OCT77:00:00	0.00	77-10-16
17	254031080191103	45	6	17OCT77:00:00	0.00	77-10-17
18	254031080191103	45	6	18OCT77:00:00	0.00	77-10-18
19	254031080191103	45	6	19OCT77:00:00	0.00	77-10-19
20	254031080191103	45	6	20OCT77:00:00	0.00	77-10-20
21	254031080191103	45	6	21OCT77:00:00	0.00	77-10-21
22	254031080191103	45	6	22OCT77:00:00	1.12	77-10-22
23	254031080191103	45	6	23OCT77:00:00	0.04	77-10-23
24	254031080191103	45	6	24OCT77:00:00	0.00	77-10-24
25	254031080191103	45	6	25OCT77:00:00	0.00	77-10-25
26	254031080191103	45	6	26OCT77:00:00	0.00	77-10-26
27	254031080191103	45	6	27OCT77:00:00	0.00	77-10-27
28	254031080191103	45	6	28OCT77:00:00	0.00	77-10-28
29	254031080191103	45	6	29OCT77:00:00	0.00	77-10-29
30	254031080191103	45	6	30OCT77:00:00	0.00	77-10-30
31	254031080191103	45	6	31OCT77:00:00	0.00	77-10-31
32	254031080191103	45	6	01NOV77:00:00	0.00	77-11-01
33	254031080191103	45	6	02NOV77:00:00	0.00	77-11-02
34	254031080191103	45	6	03NOV77:00:00	0.00	77-11-03
35	254031080191103	45	6	04NOV77:00:00	0.05	77-11-04
36	254031080191103	45	6	05NOV77:00:00	0.12	77-11-05
37	254031080191103	45	6	06NOV77:00:00	0.00	77-11-06
38	254031080191103	45	6	07NOV77:00:00	0.00	77-11-07
39	254031080191103	45	6	08NOV77:00:00	0.00	77-11-08
40	254031080191103	45	6	09NOV77:00:00	0.10	77-11-09
41	254031080191103	45	6	10NOV77:00:00	0.00	77-11-10
42	254031080191103	45	6	11NOV77:00:00	0.00	77-11-11
43	254031080191103	45	6	12NOV77:00:00	0.00	77-11-12
44	254031080191103	45	6	13NOV77:00:00	0.00	77-11-13
45	254031080191103	45	6	14NOV77:00:00	0.00	77-11-14
46	254031080191103	45	6	15NOV77:00:00	0.00	77-11-15
47	254031080191103	45	6	16NOV77:00:00	0.00	77-11-16
48	254031080191103	45	6	17NOV77:00:00	0.00	77-11-17
49	254031080191103	45	6	18NOV77:00:00	0.07	77-11-18
50	254031080191103	45	6	19NOV77:00:00	0.24	77-11-19
51	254031080191103	45	6	20NOV77:00:00	0.00	77-11-20
52	254031080191103	45	6	21NOV77:00:00	0.13	77-11-21
53	254031080191103	45	6	22NOV77:00:00	0.08	77-11-22
54	254031080191103	45	6	23NOV77:00:00	0.13	77-11-23
55	254031080191103	45	6	24NOV77:00:00	4.47	77-11-24
56	254031080191103	45	6	25NOV77:00:00	0.00	77-11-25

OBS	STATION	PARMCODE	STATCODE	DATETIME	VALUE	DATE
57	254031080191103	45	6	26NOV77:00:00	0.000	77-11-26
58	254031080191103	45	6	27NOV77:00:00	0.000	77-11-27
59	254031080191103	45	6	28NOV77:00:00	0.000	77-11-28
60	254031080191103	45	6	29NOV77:00:00	0.000	77-11-29
61	254031080191103	45	6	30NOV77:00:00	0.000	77-11-30
62	254031080191103	45	6	01DEC77:00:00	0.000	77-12-01
63	254031080191103	45	6	02DEC77:00:00	0.000	77-12-02
64	254031080191103	45	6	03DEC77:00:00	0.000	77-12-03
65	254031080191103	45	6	04DEC77:00:00	0.000	77-12-04
66	254031080191103	45	6	05DEC77:00:00	0.000	77-12-05
67	254031080191103	45	6	06DEC77:00:00	1.020	77-12-06
68	254031080191103	45	6	07DEC77:00:00	0.000	77-12-07
69	254031080191103	45	6	08DEC77:00:00	0.000	77-12-08
70	254031080191103	45	6	09DEC77:00:00	0.250	77-12-09
71	254031080191103	45	6	10DEC77:00:00	0.000	77-12-10
72	254031080191103	45	6	11DEC77:00:00	0.000	77-12-11
73	254031080191103	45	6	12DEC77:00:00	0.000	77-12-12
74	254031080191103	45	6	13DEC77:00:00	0.080	77-12-13
75	254031080191103	45	6	14DEC77:00:00	0.000	77-12-14
76	254031080191103	45	6	15DEC77:00:00	0.000	77-12-15
77	254031080191103	45	6	16DEC77:00:00	0.000	77-12-16
78	254031080191103	45	6	17DEC77:00:00	0.000	77-12-17
79	254031080191103	45	6	18DEC77:00:00	0.000	77-12-18
80	254031080191103	45	6	19DEC77:00:00	0.430	77-12-19
81	254031080191103	45	6	20DEC77:00:00	0.000	77-12-20
82	254031080191103	45	6	21DEC77:00:00	0.000	77-12-21
83	254031080191103	45	6	22DEC77:00:00	0.000	77-12-22
84	254031080191103	45	6	23DEC77:00:00	0.000	77-12-23
85	254031080191103	45	6	24DEC77:00:00	0.000	77-12-24
86	254031080191103	45	6	25DEC77:00:00	0.000	77-12-25
87	254031080191103	45	6	26DEC77:00:00	0.020	77-12-26
88	254031080191103	45	6	27DEC77:00:00	0.000	77-12-27
89	254031080191103	45	6	28DEC77:00:00	0.000	77-12-28
90	254031080191103	45	6	29DEC77:00:00	0.000	77-12-29
91	254031080191103	45	6	30DEC77:00:00	0.000	77-12-30
92	254031080191103	45	6	31DEC77:00:00	0.250	77-12-31
93	254031080191103	45	6	01JAN78:00:00	0.000	78-01-01
94	254031080191103	45	6	02JAN78:00:00	0.015	78-01-02
95	254031080191103	45	6	03JAN78:00:00	0.300	78-01-03
96	254031080191103	45	6	04JAN78:00:00	0.250	78-01-04
97	254031080191103	45	6	05JAN78:00:00	0.015	78-01-05
98	254031080191103	45	6	06JAN78:00:00	0.030	78-01-06

INTERMEDIATE COMPUTER PRINTOUT CONTINUES AS ABOVE

OBS	STATION	PARMCODE	STATCODE	DATETIME	VALUE	DATE
225	254031080191103	45	6	13MAY78:00:00	0.000	78-05-13
226	254031080191103	45	6	14MAY78:00:00	0.010	78-05-14
227	254031080191103	45	6	15MAY78:00:00	0.000	78-05-15
228	254031080191103	45	6	16MAY78:00:00	0.000	78-05-16
229	254031080191103	45	6	17MAY78:00:00	0.000	78-05-17
230	254031080191103	45	6	18MAY78:00:00	0.825	78-05-18
231	254031080191103	45	6	19MAY78:00:00	0.150	78-05-19
232	254031080191103	45	6	20MAY78:00:00	0.000	78-05-20
233	254031080191103	45	6	21MAY78:00:00	0.000	78-05-21
234	254031080191103	45	6	22MAY78:00:00	0.000	78-05-22
235	254031080191103	45	6	23MAY78:00:00	0.000	78-05-23
236	254031080191103	45	6	24MAY78:00:00	0.000	78-05-24
237	254031080191103	45	6	25MAY78:00:00	0.200	78-05-25
238	254031080191103	45	6	26MAY78:00:00	0.630	78-05-26
239	254031080191103	45	6	27MAY78:00:00	0.050	78-05-27
240	254031080191103	45	6	28MAY78:00:00	2.740	78-05-28
241	254031080191103	45	6	29MAY78:00:00	0.025	78-05-29
242	254031080191103	45	6	30MAY78:00:00	0.000	78-05-30
243	254031080191103	45	6	31MAY78:00:00	0.000	78-05-31
244	254031080191103	45	6	01JUN78:00:00	0.000	78-06-01
245	254031080191103	45	6	02JUN78:00:00	0.000	78-06-02
246	254031080191103	45	6	03JUN78:00:00	0.155	78-06-03
247	254031080191103	45	6	04JUN78:00:00	0.000	78-06-04
248	254031080191103	45	6	05JUN78:00:00	0.000	78-06-05
249	254031080191103	45	6	06JUN78:00:00	0.015	78-06-06
250	254031080191103	45	6	07JUN78:00:00	0.000	78-06-07
251	254031080191103	45	6	08JUN78:00:00	0.000	78-06-08
252	254031080191103	45	6	09JUN78:00:00	0.000	78-06-09
253	254031080191103	45	6	10JUN78:00:00	0.000	78-06-10
254	254031080191103	45	6	11JUN78:00:00	0.000	78-06-11
255	254031080191103	45	6	12JUN78:00:00	1.030	78-06-12
256	254031080191103	45	6	13JUN78:00:00	0.000	78-06-13
257	254031080191103	45	6	14JUN78:00:00	0.000	78-06-14
258	254031080191103	45	6	15JUN78:00:00	0.000	78-06-15
259	254031080191103	45	6	16JUN78:00:00	0.000	78-06-16

3.23 Updating Data Sets

After the original creation of a state's User File DV component, all further operations are actually updates (corrections and additions) to the file. Therefore, JCL and SAS commands change to reflect an update operation.

3.231 JCL Commands

In section 3.221 cards 7, 8, and 9* are replaced by these two cards:

```
Card 7..//DVFILE DD DSN=AG4yyyz.STATEXX.URBAN.DAILY.VALUES,
     8..// DISP=OLD
```

*Note: There is no card 9 for this operation.

This change reflects the status of OS data set DVFILE as already existing.

3.232 SAS Commands

The "MACRO" Procedure SAS instruction cards remain the same as in section 3.222. The other SAS instruction cards that follow do change and are as follows:

DVINPUT SAS "MACRO" Procedure - (another retrieval from WATSTORE daily values file)

```
Card 1..PROC SORT OUT=TEMP;
     2..    BY STATION PARMCODE DATETIME;
     3..    FORMAT DATE YYMMDD8.;
     4..DATA DVFILE.DVMASTER;
     5..UPDATE DVFILE.DVMASTER TEMP;
     6..    BY STATION PARMCODE DATETIME;
     7..PROC PRINT DATA=DVFILE.DVMASTER;
```

The above procedure, cards 1-7, is for merging additional data into the DVMASTER file. If data to be entered is an update of previously entered data then new values will replace the old. Also, if the DVMASTER file is large, then card 7 above should probably be omitted or possibly placed after card 3 with only the command PROC PRINT to print out a listing of the new data that are being entered into the DVMASTER file.

An example of updating the Daily-Values File for the Miami, Fla., multifamily residential site is presented on the following pages. The JCL commands, SAS instructions and sample output are all illustrated.

```
  1     //AG4254J2 JOB (**********,J001,5,5),'LORENS',CLASS=B,MSGLEVEL=(2,0)      JOB 9281
  2     //PROCLIB DD DSN=WRD.PROCLIB,DISP=SHR
        ***SETUP    118538/H                                                      P
  3     // EXEC DVRETR,AGENCY=USGS,VOL1=118538
 18     //HDR.SYSIN DD *
 73     // EXEC WRDSAS,DSN='&&BKREC',MACRD=DV2,DSN1=NULLFILE,DSN2=NULLFILE
112     //DVFILE DD DSN=AG4254J.STATEXX.URBAN.DAILY.VALUES,
        // DISP=OLD
113     //SYSIN DD *
        //
```

```
IEF142I A64254J2 HDR - STEP WAS EXECUTED - COND CODE 0002
IEF373I STEP /HDR     / START 82070.0927
IEF374I STEP /HDR     / STOP  82070.0927 CPU    0MIN 00.33SEC SRB    0MIN 00.04SEC VIRT   260K SYS   244K
*********************************************************************************************************************************
*                                                                                                                               *
*                                                KOMAND DATA ACQUISITION SYSTEM                                                 *
*                                                                                                                               *
*                                                                                                                               *
*********************************************************************************************************************************
*                                                                                                                               *
*                                                      EXCP STATISTICS                                                          *
*                                                                                                                               *
* UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT  *
*                                                                                                                               *
*  318           0      E42           0      48D           C      488           0      486           0      486           2  *
*  E41           0      E40           1      498           0      E41           1      E41           2                       *
* EXCP TOTAL          6       VIO PAGE INS          0       VIO PAGE OUTS         0       PAGES SWAPPED IN          0         *
*********************************************************************************************************************************
CCD088I  JOB /A64254J2/ BASIC STEP CHARGE          CPU     DISK-IO   TAPE-IO   KBYTE-HR     TOTAL
                                                    .28        .01       .00        .12        .41
IEF202I A64254J2 HSRT - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I A64254J2 HSRT - STEP WAS NOT EXECUTED.
IEF373I STEP /HSRT    / START 82070.0927
IEF374I STEP /HSRT    / STOP  82070.0927 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT     0K SYS     0K
*********************************************************************************************************************************
*                                                                                                                               *
*                                                KOMAND DATA ACQUISITION SYSTEM                                                 *
*                                                                                                                               *
* EXCP TOTAL          0       VIO PAGE INS          0       VIO PAGE OUTS         0       PAGES SWAPPED IN          0         *
*********************************************************************************************************************************
CCD009I  JOB /A64254J2/ BASIC STEP CHARGE          CPU     DISK-IO   TAPE-IO   KBYTE-HR     TOTAL
                                                    .00        .00       .00        .00        .00
IEF142I A64254J2 DVR - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /DVR     / START 82070.0927
IEF374I STEP /DVR     / STOP  82070.0928 CPU    0MIN 00.37SEC SRB    0MIN 00.04SEC VIRT   424K SYS   256K
*********************************************************************************************************************************
*                                                                                                                               *
*                                                KOMAND DATA ACQUISITION SYSTEM                                                 *
*                                                                                                                               *
*                                                                                                                               *
*********************************************************************************************************************************
*                                                                                                                               *
*                                                      EXCP STATISTICS                                                          *
*                                                                                                                               *
* UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT  *
*                                                                                                                               *
*  318           0      E42           0      491           0      48D           0      310           6      993           0  *
*  486           0      E40           2      315           5      E40           0      E40           1      E41           1  *
*  E40           0      E40           0      491           0      E41           0      E41           0      E41           0  *
*  E41           2                                                                                                            *
* EXCP TOTAL         17       VIO PAGE INS          0       VIO PAGE OUTS         0       PAGES SWAPPED IN          0         *
*********************************************************************************************************************************
CCD088I  JOB /A64254J2/ BASIC STEP CHARGE          CPU     DISK-IO   TAPE-IO   KBYTE-HR     TOTAL
                                                    .31        .05       .00        .18        .54
IEF202I A64254J2 DSRT - STEP WAS NOT RUN BECAUSE OF CONDITION CODES
IEF272I A64254J2 DSRT - STEP WAS NOT EXECUTED.
IEF373I STEP /DSRT    / START 82070.0928
IEF374I STEP /DSRT    / STOP  82070.0928 CPU    0MIN 00.00SEC SRB    0MIN 00.00SEC VIRT     0K SYS     0K
*********************************************************************************************************************************
*                                                                                                                               *
*                                                KOMAND DATA ACQUISITION SYSTEM                                                 *
*                                                                                                                               *
* EXCP TOTAL          0       VIO PAGE INS          0       VIO PAGE OUTS         0       PAGES SWAPPED IN          0         *
*********************************************************************************************************************************
```

```
CCD007  JOB /AG4254J2/ BASIC STEP CHARGE          CPU      DISK-IO    TAPE-IO    KBYTE-HR     TOTAL
                                                   .00          .00        .00         .00          .00
IEF142I AG4254J2 SAS - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 82070.0928
IEF374I STEP /SAS      / STOP  82070.0928 CPU     0MIN 01.70SEC SRB     0MIN 00.16SEC VIRT   360K SYS   292K
```

```
*                                                
```

```
PROGRAM G745 HAD THE FOLLOWING PROGRAM DATES OF LAST REVISION:
     G745           20 AUG 81 07.43.09
     WDRIRTV        14 JAN 81 11.01.24
     WDRLEST         8 APR 81 12.57.31


AGENCY CODE USGS  WAS SUBMITTED THROUGH THE AGENCY SYMBOLIC JCL PARAMETER ON THE EXEC CARD.
           -----

CODES SUBMITTED THROUGH SYMBOLIC JCL PARAMETERS ON THE EXEC CARDS WILL BE TEMPORARILY OVERRIDDEN
IF A Z CARD WITH VALID ENTRIES, IS PLACED PRECEDING A STATION SELECTION CARD.




**********************************************  RETRIEVAL NO.  1   MAR 11, 1982  **********************************************


STATION HEADER DATA HAS BEEN REQUESTED TO BE WRITTEN INTO AN OUTPUT FILE IN THE FORMAT LISTED BELOW.

STATION HEADER RECORD LIST

PROGRAM G745 IS FUNCTIONING AS A PREPROCESSOR FOR RETRIEVING DAILY VALUES  DATA RECORDS.

                                                  <- SORT OPTNS ->                  M CARD  ***

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
MI  197705  197709                                                          01

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
R00045

 <-STATION ID.->                                                          D CARD  ***
D2540310501911O3


BASED ONLY ON INFORMATION AVAILABLE FROM THE STATION HEADER FILE.     1 SITES WERE SELECTED FOR RETRIEVAL NO.  1


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


STATION HEADER RETRIEVAL PROCESSING ENDED
```

WATSTORE DAILY VALUES FILE RETRIEVAL PROGRAM.
(PGM. NO. G490) - DATE OF LAST REVISION: 09/20/80.
M1 197705 197709

01

RETRIEVAL SPECIFICATIONS FOR REQUEST NUMBER 1 ARE AS FOLLOWS:

PARAMETER LIST IS AS FOLLOWS:P_CODE
00045

ALL STATISTIC CODES RETRIEVED

CONTROL VALUES NOT CONSIDERED

ALL CROSS SECTIONS RETRIEVED.

ALL SAMPLING DEPTHS RETRIEVED

1 RECORDS HAVE BEEN RETRIEVED FOR RETRIEVAL NO. 1
1 STATION(S) HAVE RECORDS

NOTE: THE JOB AG4254J2 HAS BEEN RUN UNDER RELEASE 79.5 OF SAS AT U. S. GEOLOGICAL SURVEY (00592).

NOTE: SAS OPTIONS SPECIFIED ARE:
SYSIN=INPUT S=80

```
1          MACRO DVINPUT
2          DATA DV;
3            INFILE USERFILE;
4            ARRAY MODA(MONTH) MODA1-MODA12;
5              RETAIN MODA1 31 MODA3 31 MODA4 30 MODA5 31 MODA6 30 MODA7 31 MODA8 31
6              MODA9 30 MODA10 31 MODA11 30 MODA12 31 STATION MONTH DAY
7                    PARMCODE STATCODE NOVALUE LASTMO DATETIME;
8            DROP MODA1-MODA12 NOVALUE LASTMO YEAR FIRSTMO MONTH DAY P;
9            INPUT       @10 STATION $CHAR15.
10                       @33 PARMCODE I84.
11                       @37 YEAR      I82.
12                       @39 STATCODE I82.
13                       @41 NOVALUE   R84. @@;
14           LINK USERCODE;
15           YEAR=YEAR-1;
16           FIRSTMO=10;
17           LASTMO=12;
18           LINK MONTHLY;
19           YEAR=YEAR+1;
20           IF MOD(YEAR,4) = 0
21             THEN IF MOD(YEAR,100) = 0
22                  THEN MODA2 = 28;
23                  ELSE MODA2 = 29;
24             ELSE MODA2 = 28;
25           FIRSTMO=1;
26           LASTMO=9;
27           LINK MONTHLY;
28           INPUT @37 YEAR I82.;
29           RETURN;
30         MONTHLY:
31           DO MONTH = FIRSTMO TO LASTMO;
32            DO DAY = 1 TO MODA;
33             P = 45 + (MONTH-1)*124 + (DAY-1)*64;
34             INPUT @P VALUE R84. @@;
35              IF VALUE = NOVALUE
36                THEN;
37                ELSE DO;
38                  DATE = MDY(MONTH, DAY, YEAR);
39                  DATETIME = DHMS(DATE,0,0,0);
40                  OUTPUT;
41                END;
42              END;
43            END;
44            RETURN;
45         FORMAT DATE YYMMDD8. DATETIME DATETIME13.;
46         LENGTH PARMCODE 4 STATCODE 4 VALUE 4;
47         USERCODE; * USER-SUPPLIED CODE FOLLOWING THE MACRO IS LINKED HERE;
48         %
49         MACRO &SNAME    INPUT @154 SNAME $40. @@; RETAIN SNAME;
50                         LABEL SNAME=STATION NAME; %
51         MACRO &STATE    INPUT @3    STATE $2.  @@; RETAIN STATE; %
```

```
52          MACRO @AGENCY  INPUT @5    AGENCY $5. @@; RETAIN AGENCY; %
53          MACRO @XSEC    INPUT @25   XSEC  RB4. @@; RETAIN XSEC;
54                         LABEL XSEC=LOCATION IN CROSS SECTION; %
55          MACRO @SDEPTH  INPUT @29  SDEPTH RB4. @@; RETAIN SDEPTH;
56                         LABEL SDEPTH=SAMPLING DEPTH;
57                         IF SDEPTH=999999 THEN SDEPTH=.; %
58          MACRO @STATCOD INPUT @39 STATCODE IB2. @@; RETAIN STATCODE;
59                         LENGTH STATCODE 4; FORMAT STATCODE Z5.; %
60          MACRO @DISTRIC INPUT @1536 DISTRICT $2. @@; RETAIN DISTRICT; %
61          MACRO @COUNTY  INPUT @1538 COUNTY $3. @@; RETAIN COUNTY; %
62          MACRO @DA      INPUT @1589 DA RB4. @@; RETAIN DA; IF DA=0 THEN DA=.;
63                         LABEL DA=DRAINAGE AREA; %
64          MACRO @CDA     INPUT @1593 CDA RB4. @@; RETAIN CDA; IF CDA=0 THEN CDA=.;
65                         LABEL CDA=CONTRIBUTING DRAINAGE AREA; %
66          MACRO @DEPTH   INPUT @1597 DEPTH RB4. @@; RETAIN DEPTH; LABEL DEPTH=WELL
67                         IF DEPTH=-99999 THEN DEPTH=.; %
68          MACRO @DATUM   INPUT @1601 DATUM PD7.2 @@; RETAIN DATUM; %
69          MACRO @HUNIT   INPUT @1605 HUNIT IB4. @@; RETAIN HUNIT; FORMAT HUNIT Z8.
70                         IF HUNIT=0 THEN HUNIT=.;
71                         LENGTH HUNIT 5; LABEL HUNIT=HYDROLOGIC UNIT CODE; %
72          MACRO @SITETYP INPUT @1613 SITETYPE $2. @@; RETAIN SITETYPE; %
73          MACRO @LAT     INPUT @1615 LAT 6. @@; RETAIN LAT; FORMAT LAT Z6.; %
74          MACRO @LONG    INPUT @1621 LONG 7. @@; RETAIN LONG; FORMAT LONG Z7.; %
75          MACRO @GUNIT   INPUT @1630 GUNIT $8. @@; RETAIN GUNIT;
76                         LABEL GUNIT=GEOLOGIC UNIT CODE; %
77          MACRO @AQUIFER INPUT @1639 AQUIFER $1. @@; RETAIN AQUIFER; %
78
79
80                DVINPUT

NOTE: INFILE USERFILE IS:
      DSNAME=SYS82070.T092750.RA000.AG4254J2.BKREC,
      UNIT=SYSDA,VOL=SER=SYS500,DISP=OLD,
      DCB=(BLKSIZE=11592,LRECL=1656,RECFM=FB)

NOTE: 1 LINE WAS READ FROM INFILE USERFILE.
NOTE: DATA SET WORK.DV HAS 153 OBSERVATIONS AND 5 VARIABLES. 405 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.26 SECONDS AND 194K.

81                PROC SORT OUT=TEMP;
82                     BY STATION PARMCODE DATETIME ;
83                     FORMAT DATE YYMMDD8. ;
84

NOTE: DATA SET WORK.TEMP HAS 153 OBSERVATIONS AND 6 VARIABLES. 405 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.30 SECONDS AND 194K.

84                DATA DVFILE.DVMASTER;
85                UPDATE DVFILE.DVMASTER TEMP ;
86                     BY STATION PARMCODE DATETIME;
87

NOTE: DATA SET DVFILE.DVMASTER HAS 412 OBSERVATIONS AND 6 VARIABLES. 277 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.22 SECONDS AND 194K.

87                PROC PRINT DATA=DVFILE.DVMASTER;
```

OBS	STATION	PARMCODE	STATCODE	DATETIME	VALUE	DATE
1	254031080191103	45	6	01MAY77:00:00	0.00000	77-05-01
2	254031080191103	45	6	02MAY77:00:00	0.00000	77-05-02
3	254031080191103	45	6	03MAY77:00:00	0.00000	77-05-03
4	254031080191103	45	6	04MAY77:00:00	6.70001	77-05-04
5	254031080191103	45	6	05MAY77:00:00	0.04000	77-05-05
6	254031080191103	45	6	06MAY77:00:00	0.06000	77-05-06
7	254031080191103	45	6	07MAY77:00:00	0.00000	77-05-07
8	254031080191103	45	6	08MAY77:00:00	0.01000	77-05-08
9	254031080191103	45	6	09MAY77:00:00	0.18000	77-05-09
10	254031080191103	45	6	10MAY77:00:00	0.45000	77-05-10
11	254031080191103	45	6	11MAY77:00:00	3.31000	77-05-11
12	254031080191103	45	6	12MAY77:00:00	0.02000	77-05-12
13	254031080191103	45	6	13MAY77:00:00	0.21000	77-05-13
14	254031080191103	45	6	14MAY77:00:00	0.00000	77-05-14
15	254031080191103	45	6	15MAY77:00:00	0.00000	77-05-15
16	254031080191103	45	6	16MAY77:00:00	0.00000	77-05-16
17	254031080191103	45	6	17MAY77:00:00	0.00000	77-05-17
18	254031080191103	45	6	18MAY77:00:00	0.00000	77-05-18
19	254031080191103	45	6	19MAY77:00:00	0.00000	77-05-19
20	254031080191103	45	6	20MAY77:00:00	0.00000	77-05-20
21	254031080191103	45	6	21MAY77:00:00	0.00000	77-05-21
22	254031080191103	45	6	22MAY77:00:00	0.00000	77-05-22
23	254031080191103	45	6	23MAY77:00:00	0.00000	77-05-23
24	254031080191103	45	6	24MAY77:00:00	0.00000	77-05-24
25	254031080191103	45	6	25MAY77:00:00	0.43000	77-05-25
26	254031080191103	45	6	26MAY77:00:00	0.07000	77-05-26
27	254031080191103	45	6	27MAY77:00:00	0.23000	77-05-27
28	254031080191103	45	6	28MAY77:00:00	0.28000	77-05-28
29	254031080191103	45	6	29MAY77:00:00	0.00000	77-05-29
30	254031080191103	45	6	30MAY77:00:00	0.00000	77-05-30
31	254031080191103	45	6	31MAY77:00:00	0.00000	77-05-31
32	254031080191103	45	6	01JUN77:00:00	2.25000	77-06-01
33	254031080191103	45	6	02JUN77:00:00	2.33000	77-06-02
34	254031080191103	45	6	03JUN77:00:00	0.41000	77-06-03
35	254031080191103	45	6	04JUN77:00:00	0.42000	77-06-04
36	254031080191103	45	6	05JUN77:00:00	0.08000	77-06-05
37	254031080191103	45	6	06JUN77:00:00	0.03000	77-06-06
38	254031080191103	45	6	07JUN77:00:00	0.00000	77-06-07
39	254031080191103	45	6	08JUN77:00:00	0.00000	77-06-08
40	254031080191103	45	6	09JUN77:00:00	0.22000	77-06-09
41	254031080191103	45	6	10JUN77:00:00	0.00000	77-06-10
42	254031080191103	45	6	11JUN77:00:00	0.00000	77-06-11
43	254031080191103	45	6	12JUN77:00:00	0.00000	77-06-12
44	254031080191103	45	6	13JUN77:00:00	0.00000	77-06-13
45	254031080191103	45	6	14JUN77:00:00	0.00000	77-06-14
46	254031080191103	45	6	15JUN77:00:00	0.00000	77-06-15
47	254031080191103	45	6	16JUN77:00:00	0.00000	77-06-16
48	254031080191103	45	6	17JUN77:00:00	0.00000	77-06-17
49	254031080191103	45	6	18JUN77:00:00	0.00000	77-06-18
50	254031080191103	45	6	19JUN77:00:00	0.00000	77-06-19
51	254031080191103	45	6	20JUN77:00:00	1.16000	77-06-20
52	254031080191103	45	6	21JUN77:00:00	0.00000	77-06-21
53	254031080191103	45	6	22JUN77:00:00	0.00000	77-06-22
54	254031080191103	45	6	23JUN77:00:00	0.00000	77-06-23
55	254031080191103	45	6	24JUN77:00:00	0.00000	77-06-24
56	254031080191103	45	6	25JUN77:00:00	0.00000	77-06-25

OBS	STATION	PARMCODE	STATCODE	DATETIME	VALUE	DATE
57	254031080191103	45	6	26JUN77:00:00	0.00	77-06-26
58	254031080191103	45	6	27JUN77:00:00	0.00	77-06-27
59	254031080191103	45	6	28JUN77:00:00	0.00	77-06-28
60	254031080191103	45	6	29JUN77:00:00	0.00	77-06-29
61	254031080191103	45	6	30JUN77:00:00	0.00	77-06-30
62	254031080191103	45	6	01JUL77:00:00	0.00	77-07-01
63	254031080191103	45	6	02JUL77:00:00	0.00	77-07-02
64	254031080191103	45	6	03JUL77:00:00	0.00	77-07-03
65	254031080191103	45	6	04JUL77:00:00	0.09	77-07-04
66	254031080191103	45	6	05JUL77:00:00	0.00	77-07-05
67	254031080191103	45	6	06JUL77:00:00	0.05	77-07-06
68	254031080191103	45	6	07JUL77:00:00	0.00	77-07-07
69	254031080191103	45	6	08JUL77:00:00	0.00	77-07-08
70	254031080191103	45	6	09JUL77:00:00	0.00	77-07-09
71	254031080191103	45	6	10JUL77:00:00	0.00	77-07-10
72	254031080191103	45	6	11JUL77:00:00	0.00	77-07-11
73	254031080191103	45	6	12JUL77:00:00	0.01	77-07-12
74	254031080191103	45	6	13JUL77:00:00	0.11	77-07-13
75	254031080191103	45	6	14JUL77:00:00	0.09	77-07-14
76	254031080191103	45	6	15JUL77:00:00	1.62	77-07-15
77	254031080191103	45	6	16JUL77:00:00	2.12	77-07-16
78	254031080191103	45	6	17JUL77:00:00	0.02	77-07-17
79	254031080191103	45	6	18JUL77:00:00	0.01	77-07-18
80	254031080191103	45	6	19JUL77:00:00	0.01	77-07-19
81	254031080191103	45	6	20JUL77:00:00	0.00	77-07-20
82	254031080191103	45	6	21JUL77:00:00	0.13	77-07-21
83	254031080191103	45	6	22JUL77:00:00	0.00	77-07-22
84	254031080191103	45	6	23JUL77:00:00	1.25	77-07-23
85	254031080191103	45	6	24JUL77:00:00	0.15	77-07-24
86	254031080191103	45	6	25JUL77:00:00	0.19	77-07-25
87	254031080191103	45	6	26JUL77:00:00	0.12	77-07-26
88	254031080191103	45	6	27JUL77:00:00	0.00	77-07-27
89	254031080191103	45	6	28JUL77:00:00	0.00	77-07-28
90	254031080191103	45	6	29JUL77:00:00	0.02	77-07-29
91	254031080191103	45	6	30JUL77:00:00	0.00	77-07-30
92	254031080191103	45	6	31JUL77:00:00	0.00	77-07-31
93	254031080191103	45	6	01AUG77:00:00	0.00	77-08-01
94	254031080191103	45	6	02AUG77:00:00	0.01	77-08-02
95	254031080191103	45	6	03AUG77:00:00	0.00	77-08-03
96	254031080191103	45	6	04AUG77:00:00	0.29	77-08-04
97	254031080191103	45	6	05AUG77:00:00	0.00	77-08-05
98	254031080191103	45	6	06AUG77:00:00	1.12	77-08-06

INTERMEDIATE COMPUTER PRINTOUT CONTINUES AS ABOVE

OBS	STATION	PARMCODE	STATCODE	DATETIME	VALUE	DATE
393	254031080191103	45	6	28MAY78:00:00	2.740	78-05-28
394	254031080191103	45	6	29MAY78:00:00	0.025	78-05-29
395	254031080191103	45	6	30MAY78:00:00	0.000	78-05-30
396	254031080191103	45	6	31MAY78:00:00	0.000	78-05-31
397	254031080191103	45	6	01JUN78:00:00	0.000	78-06-01
398	254031080191103	45	6	02JUN78:00:00	0.000	78-06-02
399	254031080191103	45	6	03JUN78:00:00	0.155	78-06-03
400	254031080191103	45	6	04JUN78:00:00	0.000	78-06-04
401	254031080191103	45	6	05JUN78:00:00	0.000	78-06-05
402	254031080191103	45	6	06JUN78:00:00	0.015	78-06-06
403	254031080191103	45	6	07JUN78:00:00	0.000	78-06-07
404	254031080191103	45	6	08JUN78:00:00	0.000	78-06-08
405	254031080191103	45	6	09JUN78:00:00	0.000	78-06-09
406	254031080191103	45	6	10JUN78:00:00	0.000	78-06-10
407	254031080191103	45	6	11JUN78:00:00	0.000	78-06-11
408	254031080191103	45	6	12JUN78:00:00	1.030	78-06-12
409	254031080191103	45	6	13JUN78:00:00	0.000	78-06-13
410	254031080191103	45	6	14JUN78:00:00	0.000	78-06-14
411	254031080191103	45	6	15JUN78:00:00	0.000	78-06-15
412	254031080191103	45	6	16JUN78:00:00	0.000	78-06-16

3.3 Unit-Values File Component

The unit-values file component of the User File has the capacity to store data collected at uniform time intervals for as many as 2,880 observations per day per parameter (30 second data), such as rainfall and runoff collected during a storm event. An observation at a particular site will include these seven variables.

(1) STATION--station identification number.
(2) PARMCODE--5-digit WATSTORE parameter code.
(3) VALUE--unit value of parameter.
(4) DATE--date of collection or measurement for sample value.
(5) DATETIME--single value of date and time in seconds computed from January 1, 1960 (computed by the SAS system).
(6) STATCODE--a statistical code for the respective parameter.
(7) TIME--unit time expressed in 24-hour military format.

As many as eight unit-values time series (30 seconds to hourly time interval) per site can be stored in the Unit-Values File. Also, storage for as many as 100 events for each unit-value time series for all sites in a state program is available.

3.31 Naming Data Sets

The Operating System DSN for User File unit-values data sets is AG4yyyz.STATEXX.URBAN.UNIT.VALUES. Section 3.21 describes the naming nomenclature for DSN and should be referenced here. The SAS data set member name is UVMASTER. This provides the user an additional 39 SAS data set member names for related or unrelated unit-values data. A suggestion for a related data set is that the user put all of one station's unit-values data in one data set. This, however, creates the necessity of a SAS transfer program from the SAS data set UVMASTER to the newly created data set. Instructions for manipulating data sets in this manner will not be elaborated on in this report. If the need for this procedure develops, the user can probably obtain the necessary SAS commands from this report. If not, the SAS reference manuals will provide any needed information. The JCL statement

```
//UVFILE DD DSN=AG4yyyz.STATEXX.URBAN.UNIT.VALUES,..etc.
```

references the OS data set AG4yyyz.STATEXX.URBAN.UNIT.VALUES. The corresponding SAS data set reference is UVFILE.UVMASTER which refers to the SAS data set that is a member of the OS data set.

3.32 Creating Data Sets

There are two sets of commands necessary for establishing a new Unit-Value File (UV File) for a state. The first set are JCL commands that define the data set name to the Operating System. The second set are SAS instructions that are used to define the organization of the UV File.

3.321 JCL Commands

The necessary JCL cards are as follows

```
        COL.1       COL.12
          ●           ●
Card 1..//           JOB
     2..//PROCLIB DD DSN=WRD.PROCLIB,DISP=SHR
     3..//     EXEC  UNRETR,AGENCY=USGS
     4..//HDR.SYSIN DD *

          Retrieval cards for UNRETR

     5../*
     6..// EXEC WRDSAS,DSN3='&&UNREC',MACRO=UV,DSN1=NULLFILE,DSN2=NULLFILE
     7..//UVFILE DD DSN=AG4yyyz.STATEXX.URBAN.UNIT.VALUES,
     8..// DISP=(NEW,CATLG),DCB=DSORG=DA,
     9..// SPACE=(TRK,(N1,N2),RLSE),UNIT=3330-1,VOL=SER=CCD810
    10..//SYSIN DD *
    11..  UVINPUT

Other SAS commands

    12../*
    13..//
```

The above JCL cards do the following:

Card 1..Job control card.
2..Invokes the WRD cataloged procedure library.
3..Invokes the cataloged procedure UNRETR.
4..Establishes that incoming data cards for UNRETR follow.
5..Delimiter or JCL step separator card.
6..Invokes the procedure WRDSAS to call the WRD loaded version of SAS.
7-9..Defines data set to be created for state XX to be placed on WRD disk CCD810. Space to be reserved for data set = N1 + 15(N2) tracks (explained in Appendix A of this report).
10..Establishes that incoming SAS data cards follow.
11..Causes the UVINPUT macro to be expanded and executed.
12..Delimiter.
13..End of Job card.

3.322 SAS Commands

Between cards 10 and 12 given in section 3.321, reference was made to two sets of SAS instructions. The first set is a macro called UVINPUT and these statements are listed below.

```
MACRO UVINPUT
*********************************************************************;
* THE UVINPUT MACRO CREATES A SAS DATA SET FROM UNIT VALUES DATA     ;
* VARIABLES CREATED ARE:  STATION PARMCODE STATCODE                  ;
*                         DATE DATETIME VALUE TIME                  ;
*********************************************************************;
DATA UV;
   INFILE USERFIL2;
   RETAIN STATION PARMCODE STATCODE DATE NOVALUE SREAD INTERVAL READINGS;
   KEEP STATION PARMCODE STATCODE DATE DATETIME VALUE TIME;
   INPUT      @10  STATION   $CHAR15.
              @33  PARMCODE  IB4.
              @37  YEAR      IB2.
              @39  MONTH     IB2.
              @41  DAY       IB2.
              @43  STATCODE  IB2.
              @45  INT       IB2.
              @47  SREAD     IB2.
              @49  READINGS  IB2.
              @77  NOVALUE   RB4. @@;
   COUNT=0;
   DATE=MDY(MONTH,DAY,YEAR);
   INTERVAL=86400/INT;
   LINK UNIT;
   INPUT @37 YEAR IB2.;
RETURN;
UNIT:
   COUNT+1;
   IF COUNT > READINGS THEN RETURN;
   P=77+COUNT*4;
   INPUT @P VALUE RB4. @@;
   IF VALUE=NOVALUE THEN GO TO UNIT;
   TIME=(SREAD+COUNT-1)*INTERVAL;
   DATETIME=DATE*86400+TIME;
   OUTPUT;
   GO TO UNIT;
FORMAT DATE YYMMDD8. DATETIME DATETIME16. PARMCODE Z5. TIME TIME8.;
LABEL TIME = TIME OF DAY(HH:MM:SS);
LENGTH  PARMCODE 4 VALUE 4 STATCODE 3 DATE 4 TIME 4;
%
```

The above procedure is brought in automatically by the calling program when card 11 is included and MACRO=UV is specified on card 6. The UVINPUT macro establishes a SAS data set from the unit values data.

The following SAS instructions would follow the "MACRO" Procedure (card 11).

```
Card 1..PROC SORT OUT=UVFILE.UVMASTER;
     2..     BY STATION PARMCODE DATETIME;
     3..     FORMAT DATE YYMMDD8.;
     4..PROC PRINT;
```

The above SAS instruction cards 1-4 will cause the following to happen:

(1) A sort by station and parameter code is performed on the data set created by UVINPUT. The new SAS data set is called UVMASTER which is the Unit-Values data set for state XX.
(2) Instruction 3 specifies the format to be used when DATE is output by PROC PRINT.
(3) The newly established SAS data set is printed by the instruction given on card 4

```
PROC PRINT;
```

The following pages present JCL commands, SAS instructions and sample output resulting from creating a Unit-Values File for urban data collected at a multifamily residential site near Miami, Fla. The order of the output corresponds to the sequential processing of JCL and SAS commands as referenced on the preceding pages.

```
//AG4254J8 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)          J4969
***PROCLIB  WRD.PROCLIB
***SETUP    118943/H
// EXEC UNRETR,AGENCY=USGS,VOL1=118943
//HDR.SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0002
IEF373I STEP /HDR      / START 81154.0850
IEF374I STEP /HDR      / STOP  81154.0851 CPU    0MIN 00.33SEC MAIN 252K LCS    0K
CCD006I STEP /HDR      / I/O IN DD SEQ: 215:0        314:0        743:0
CCD006I STEP /HDR      / I/O IN DD SEQ: 4A5:2        000:0        743:0
CCD006I STEP /HDR      / I/O IN DD SEQ: 486:2        486:3        155:0
CCD006I STEP /HDR      / I/O IN DD SEQ: 563:1        155:1        563:3
CCD006I STEP /HDR      / I/O IN DD SEQ: 4D2:1
CCD001I STEP /HDR      / MEMORY RESERVED  260K: ACCESSES: DISK       13/ TAPE        0
IEF202I - STEP - HSRT    . WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /HSRT     / START 81154.0851
IEF374I STEP /HSRT     / STOP  81154.0851 CPU    0MIN 00.00SEC MAIN   0K LCS    0K
CCD001I STEP /HSRT     / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /UNR      / START 81154.0851
IEF374I STEP /UNR      / STOP  81154.0853 CPU    0MIN 01.64SEC MAIN 334K LCS    0K
CCD006I STEP /UNR      / I/O IN DD SEQ: 215:0        314:0        4A2:1
CCD006I STEP /UNR      / I/O IN DD SEQ: 4A3:15       486:10       194:1070
CCD006I STEP /UNR      / I/O IN DD SEQ: 000:0        000:0        000:0
CCD006I STEP /UNR      / I/O IN DD SEQ: 000:0        000:0        563:3
CCD006I STEP /UNR      / I/O IN DD SEQ: 155:3        563:0        480:0
CCD006I STEP /UNR      / I/O IN DD SEQ: 563:1        486:0        481:0
CCD006I STEP /UNR      / I/O IN DD SEQ: 000:0
CCD001I STEP /UNR      / MEMORY RESERVED  350K: ACCESSES: DISK       33/ TAPE     1070
IEF202I - STEP - UNSRT   . WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /UNSRT    / START 81154.0853
IEF374I STEP /UNSRT    / STOP  81154.0853 CPU    0MIN 00.00SEC MAIN   0K LCS    0K
CCD001I STEP /UNSRT    / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
// EXEC WRDSAS,DSN3='&&UNREC',MACRO=JV,DSN1=NULLFILE,DSN2=NULLFILE
//JVFILE DD DSN=AG4254J.STATEXX.URBAN.UNIT.VALUES,
// DISP=(NEW,CATLG),DCB=DSORG=DA,
// SPACE=(TRK,(4,1),RLSE),UNIT=3330,VOL=SER=CCD810
//SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81154.0853
IEF374I STEP /SAS      / STOP  81154.0854 CPU    0MIN 01.97SEC MAIN 276K LCS    0K
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        481:0        155:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 631:0        215:0        314:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:53       4A2:3        4A3:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 4F1:69       480:0        563:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 314:0        4F2:0        155:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 563:0        563:0        000:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 000:0        743:0        486:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 216:0        155:0        155:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 000:0        563:4        000:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 000:0        743:4        743:3
CCD006I STEP /SAS      / I/O IN DD SEQ: 743:3        4D1:1        744:22
CCD001I STEP /SAS      / MEMORY RESERVED  276K: ACCESSES: DISK      162/ TAPE        0
IEF375I  JOB /AG4254J8/ START 81154.0850
IEF376I  JOB /AG4254J8/ STOP  81154.0854 CPU    0MIN 03.94SEC
CCD007A  JOB /AG4254J8/ BASIC CHRG: FIXED    CPU    DSK-ID  TPE-IO KBYTE-HR   TOTAL
                                    1.24     2.99      .63    1.62      .62    7.11
CCD007C  JOB /AG4254J8/ OTHER CHRGS: TP-MTS DK-MTS                            TOTAL
                                     1.00                                     1.00
CCD002I  JOB /AG4254J8/ TOTAL CHARGE RECORDED =       $8.11
CCD003I  JOB /AG4254J8/ US GEOLOGICAL SURVEY REI OS REL 21B TIME = 08.54.48 DATE = 06/03/81
```

```
PROGRAM G745 HAD THE FOLLOWING PROGRAM DATES OF LAST REVISION:
     G745             9 APR 81 08.24.18
     HDRIRTV         14 JAN 81 11.01.24
     HDRLIST          8 APR 81 12.57.31


AGENCY CODE USGS  WAS SUBMITTED THROUGH THE AGENCY SYMBOLIC JCL PARAMETER ON THE EXEC CARD.
            -----

CODES SUBMITTED THROUGH SYMBOLIC JCL PARAMETERS ON THE EXEC CARDS WILL BE TEMPORARILY OVERRIDDEN
IF A Z CARD WITH VALID ENTRIES, IS PLACED PRECEDING A STATION SELECTION CARD.




**********************************************  RETRIEVAL NO.  1   JUN 03, 1981   **********************************************

STATION HEADER DATA HAS BEEN REQUESTED TO BE WRITTEN INTO AN OUTPUT FILE IN THE FORMAT LISTED BELOW.

STATION HEADER RECORD LIST

PROGRAM G745 IS FUNCTIONING AS A PREPROCESSOR FOR RETRIEVING  UNIT VALUES  DATA RECORDS.

                                                  <- SORT OPTNS ->                  M CARD  ***

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
M3  1977050419770504                          X                              01

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
R00045

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
F00006

 <-STATION ID.->                                                          D CARD  ***
D2540310801911O3



BASED ONLY ON INFORMATION AVAILABLE FROM THE STATION HEADER FILE.      1 SITES WERE SELECTED FOR RETRIEVAL NO.  1


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


STATION HEADER RETRIEVAL PROCESSING ENDED
```

81/06/03 UNIT DATA RETRIEVAL PROGRAM
ERRORS AND MESSAGES - PGM M572
DATE OF LAST REVISION = 26 JAN 81 07.53.30

RETRIEVAL # 1

41 *** UR051 - RECORD SPECIFIED BY STATE CODE = 12, AGENCY CODE = USGS , AND STATION ID = 254031090191103 IS NOT IN CURRENT FILE
RETV # = 1

*** UR030 - 1 RECORDS HAVE BEEN ACCEPTED FOR RETRIEVAL NUMBER 1 - 1 STATION(S) HAVE RECORDS
0 RECORDS RETRIEVED FROM CURRENT FILE
1 RECORDS RETRIEVED FROM BACKFILE
0 RECORDS FOUND WITH RECORD DISP = D

*** UR031 - 1 CARDS PUNCHED OR WRITTEN ON A MAGNETIC DEVICE FOR RETRIEVAL REQUEST NUMBER 1

*** UR032 - DATA LEVEL RETRIEVAL SPECIFICATIONS FOR RETRIEVAL REQUEST NUMBER 1 ARE AS FOLLOWS:
M3 19770504 19770504 X 01
R00045
F00006

81/06/03 UNIT DATA RETRIEVAL PROGRAM H572
DATE OF LAST REVISION = 26 JAN 81 07.53.30

RETRIEVAL # 1

AGENCY CODE	STATION IDENTIFICATION	LATITUDE	LONGITUDE	SEQ NUM	STATE CODE	DIST CODE	COUNTY CODE	SITE CODES #1	#2	#3	HYDROLOGIC UNIT CODE	DRAINAGE AREA	CONTRIB. DRAIN. AREA	BASE DISCHARGE
USGS	254031080191103	254031	0801911	03	12	12	025	SW			03090202			

STATION NAME OR LOCAL NUMBER	GEOLOGIC UNIT CODE	WELL DEPTH	AQ. TYPE	DATUM	PASSWORDS UPD	PASSWORDS RTV	INTERNAL TOOPUMLER	REALTIME DATA
UNIT RAIN. DAILY RAIN & EVAP. SITE 4					NULL	NULL	210011101	

STATION ID =254031080191103 PARAMETER CODE = 00045 STATISTIC CODE = 00006

DEPTH =999999.00 CREATE DATE OF REC = 791203 STATE CODE = 12 RCD RET DATE = 0
X-SECTION =999999.00 ACCOUNT NUMBER =********* AGENCY CODE = USGS PROCESS CODE = B

DATE: MAY 4, 1977 READINGS PER DAY = 1440 NO VALUE INDICATOR=999999.00 RCD DISP =

HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE
07.34.00	0.00	07.35.00	0.00	07.36.00	0.00	07.37.00	0.00	07.38.00	0.00	07.39.00	0.00
07.40.00	0.00	07.41.00	0.00	07.42.00	0.00	07.43.00	0.00	07.44.00	0.00	07.45.00	0.00
07.46.00	0.00	07.47.00	0.00	07.48.00	0.00	07.49.00	0.00	07.50.00	0.00	07.51.00	0.00
07.52.00	0.00	07.53.00	0.00	07.54.00	0.00	07.55.00	0.00	07.56.00	0.00	07.57.00	0.00
07.58.00	0.00	07.59.00	0.00	08.00.00	0.01	08.01.00	0.00	08.02.00	0.00	08.03.00	0.00
08.04.00	0.00	08.05.00	0.00	08.06.00	0.00	08.07.00	0.00	08.08.00	0.00	08.09.00	0.00
08.10.00	0.00	08.11.00	0.00	08.12.00	0.00	08.13.00	0.00	08.14.00	0.00	08.15.00	0.00
08.16.00	0.00	08.17.00	0.00	08.18.00	0.00	08.19.00	0.01	08.20.00	0.00	08.21.00	0.00
08.22.00	0.00	08.23.00	0.00	08.24.00	0.00	08.25.00	0.00	08.26.00	0.00	08.27.00	0.00
08.28.00	0.00	08.29.00	0.00	08.30.00	0.00	08.31.00	0.00	08.32.00	0.00	08.33.00	0.00
08.34.00	0.00	08.35.00	0.00	08.36.00	0.00	08.37.00	0.00	08.38.00	0.00	08.39.00	0.01
08.40.00	0.00	08.41.00	0.00	08.42.00	0.00	08.43.00	0.00	08.44.00	0.00	08.45.00	0.00
08.46.00	0.01	08.47.00	0.00	08.48.00	0.01	08.49.00	0.00	08.50.00	0.00	08.51.00	0.01
08.52.00	0.00	08.53.00	0.01	08.54.00	0.00	08.55.00	0.01	08.56.00	0.01	08.57.00	0.00
08.58.00	0.01	08.59.00	0.00	09.00.00	0.01	09.01.00	0.01	09.02.00	0.01	09.03.00	0.02
09.04.00	0.02	09.05.00	0.01	09.06.00	0.02	09.07.00	0.02	09.08.00	0.03	09.09.00	0.01
09.10.00	0.01	09.11.00	0.02	09.12.00	0.03	09.13.00	0.01	09.14.00	0.02	09.15.00	0.01
09.16.00	0.02	09.17.00	0.01	09.18.00	0.00	09.19.00	0.01	09.20.00	0.00	09.21.00	0.01
09.22.00	0.01	09.23.00	0.01	09.24.00	0.00	09.25.00	0.01	09.26.00	0.01	09.27.00	0.01
09.28.00	0.01	09.29.00	0.01	09.30.00	0.01	09.31.00	0.01	09.32.00	0.01	09.33.00	0.01
09.34.00	0.01	09.35.00	0.01	09.36.00	0.01	09.37.00	0.02	09.38.00	0.01	09.39.00	0.02
09.40.00	0.01	09.41.00	0.01	09.42.00	0.01	09.43.00	0.01	09.44.00	0.01	09.45.00	0.01
09.46.00	0.00	09.47.00	0.01	09.48.00	0.01	09.49.00	0.01	09.50.00	0.00	09.51.00	0.01
09.52.00	0.00	09.53.00	0.01	09.54.00	0.00	09.55.00	0.01	09.56.00	0.00	09.57.00	0.01
09.58.00	0.00	09.59.00	0.01	10.00.00	0.01	10.01.00	0.01	10.02.00	0.01	10.03.00	0.01
10.04.00	0.01	10.05.00	0.01	10.06.00	0.00	10.07.00	0.01	10.08.00	0.01	10.09.00	0.00
10.10.00	0.01	10.11.00	0.01	10.12.00	0.00	10.13.00	0.00	10.14.00	0.01	10.15.00	0.00
10.16.00	0.00	10.17.00	0.01	10.18.00	0.00	10.19.00	0.01	10.20.00	0.00	10.21.00	0.01
10.22.00	0.00	10.23.00	0.01	10.24.00	0.03	10.25.00	0.09	10.26.00	0.01	10.27.00	0.03
10.28.00	0.02	10.29.00	0.01	10.30.00	0.01	10.31.00	0.01	10.32.00	0.03	10.33.00	0.02
10.34.00	0.02	10.35.00	0.03	10.36.00	0.01	10.37.00	0.03	10.38.00	0.02	10.39.00	0.02
10.40.00	0.02	10.41.00	0.03	10.42.00	0.03	10.43.00	0.03	10.44.00	0.03	10.45.00	0.03
10.46.00	0.03	10.47.00	0.03	10.48.00	0.03	10.49.00	0.06	10.50.00	0.04	10.51.00	0.03
10.52.00	0.07	10.53.00	0.05	10.54.00	0.02	10.55.00	0.02	10.56.00	0.02	10.57.00	0.02
10.58.00	0.01	10.59.00	0.02	11.00.00	0.00	11.01.00	0.01	11.02.00	0.00	11.03.00	0.00
11.04.00	0.00	11.05.00	0.00	11.06.00	0.00	11.07.00	0.00	11.08.00	0.01	11.09.00	0.00
11.10.00	0.00	11.11.00	0.00	11.12.00	0.00	11.13.00	0.00	11.14.00	0.00	11.15.00	0.00
11.16.00	0.00	11.17.00	0.00	11.18.00	0.00	11.19.00	0.00	11.20.00	0.00	11.21.00	0.01
11.22.00	0.00	11.23.00	0.00	11.24.00	0.00	11.25.00	0.01	11.26.00	0.01	11.27.00	0.01
11.28.00	0.01	11.29.00	0.01	11.30.00	0.01	11.31.00	0.01	11.32.00	0.01	11.33.00	0.00
11.34.00	0.00	11.35.00	0.01	11.36.00	0.01	11.37.00	0.01	11.38.00	0.01	11.39.00	0.01
11.40.00	0.01	11.41.00	0.01	11.42.00	0.00	11.43.00	0.01	11.44.00	0.00	11.45.00	0.00
11.46.00	0.01	11.47.00	0.00	11.48.00	0.01	11.49.00	0.01	11.50.00	0.00	11.51.00	0.01
11.52.00	0.00	11.53.00	0.01	11.54.00	0.01	11.55.00	0.01	11.56.00	0.01	11.57.00	0.01
11.58.00	0.01	11.59.00	0.01	12.00.00	0.01	12.01.00	0.01	12.02.00	0.01	12.03.00	0.01
12.04.00	0.02	12.05.00	0.02	12.06.00	0.03	12.07.00	0.03	12.08.00	0.01	12.09.00	0.02
12.10.00	0.01	12.11.00	0.01	12.12.00	0.00	12.13.00	0.01	12.14.00	0.01	12.15.00	0.00
12.16.00	0.00	12.17.00	0.01	12.18.00	0.01	12.19.00	0.02	12.20.00	0.03	12.21.00	0.01
12.22.00	0.01	12.23.00	0.01	12.24.00	0.01	12.25.00	0.00	12.26.00	0.00	12.27.00	0.01
12.28.00	0.00	12.29.00	0.01	12.30.00	0.00	12.31.00	0.02	12.32.00	0.02	12.33.00	0.00
12.34.00	0.01	12.35.00	0.00	12.36.00	0.00	12.37.00	0.01	12.38.00	0.00	12.39.00	0.01

(page 45 follows)

81/06/03 UNIT DATA RETRIEVAL PROGRAM H572
DATE OF LAST REVISION = 26 JAN 81 07.53.30

17.58.00	0.01	17.59.00	0.00	18.00.00	0.01	18.01.00	0.00	18.02.00	0.00	18.03.00	0.01
18.04.00	0.00	18.05.00	0.01	18.06.00	0.00	18.07.00	0.01	18.08.00	0.01	18.09.00	0.00
18.10.00	0.00	18.11.00	0.01	18.12.00	0.00	18.13.00	0.00	18.14.00	0.01	18.15.00	0.00
18.16.00	0.01	18.17.00	0.00	18.18.00	0.00	18.19.00	0.01	18.20.00	0.00	18.21.00	0.00
18.22.00	0.00	18.23.00	0.01	18.24.00	0.00	18.25.00	0.01	18.26.00	0.01	18.27.00	0.01
18.28.00	0.00	18.29.00	0.01	18.30.00	0.01	18.31.00	0.01	18.32.00	0.00	18.33.00	0.01
18.34.00	0.00	18.35.00	0.01	18.36.00	0.00	18.37.00	0.01	18.38.00	0.01	18.39.00	0.01
18.40.00	0.00	18.41.00	0.01	18.42.00	0.00	18.43.00	0.01	18.44.00	0.01	18.45.00	0.00
18.46.00	0.01	18.47.00	0.00	18.48.00	0.00	18.49.00	0.00	18.50.00	0.01	18.51.00	0.00
18.52.00	0.00	18.53.00	0.01	18.54.00	0.00	18.55.00	0.01	18.56.00	0.00	18.57.00	0.00
18.58.00	0.00	18.59.00	0.00	19.00.00	0.00	19.01.00	0.00	19.02.00	0.00	19.03.00	0.00
19.04.00	0.00	19.05.00	0.01	19.06.00	0.00	19.07.00	0.00	19.08.00	0.00	19.09.00	0.00
19.10.00	0.00	19.11.00	0.00	19.12.00	0.00	19.13.00	0.00	19.14.00	0.00	19.15.00	0.01
19.16.00	0.00	19.17.00	0.00	19.18.00	0.00	19.19.00	0.00	19.20.00	0.00	19.21.00	0.00
19.22.00	0.01	19.23.00	0.00	19.24.00	0.00	19.25.00	0.01	19.26.00	0.00	19.27.00	0.01
19.28.00	0.00	19.29.00	0.01	19.30.00	0.00	19.31.00	0.00	19.32.00	0.00	19.33.00	0.01
19.34.00	0.00	19.35.00	0.00	19.36.00	0.01	19.37.00	0.00	19.38.00	0.00	19.39.00	0.00
19.40.00	0.00	19.41.00	0.00	19.42.00	0.01	19.43.00	0.00	19.44.00	0.00	19.45.00	0.00
19.46.00	0.00	19.47.00	0.00	19.48.00	0.01	19.49.00	0.00	19.50.00	0.00	19.51.00	0.00
19.52.00	0.01	19.53.00	0.00	19.54.00	0.00	19.55.00	0.00	19.56.00	0.00	19.57.00	0.00
19.58.00	0.00	19.59.00	0.00	20.00.00	0.00	20.01.00	0.01	20.02.00	0.00	20.03.00	0.00
20.04.00	0.00	20.05.00	0.00	20.06.00	0.00	20.07.00	0.01	20.08.00	0.00	20.09.00	0.00
20.10.00	0.00	20.11.00	0.01	20.12.00	0.00	20.13.00	0.00	20.14.00	0.00	20.15.00	0.00
20.16.00	0.00	20.17.00	0.01	20.18.00	0.00	20.19.00	0.00	20.20.00	0.00	20.21.00	0.00
20.22.00	0.00	20.23.00	0.00	20.24.00	0.00	20.25.00	0.00	20.26.00	0.00	20.27.00	0.00
20.28.00	0.01	20.29.00	0.00	20.30.00	0.00	20.31.00	0.00	20.32.00	0.00	20.33.00	0.00
20.34.00	0.00	20.35.00	0.00	20.36.00	0.00	20.37.00	0.00	20.38.00	0.00	20.39.00	0.00
20.40.00	0.00	20.41.00	0.00								

NORMAL END PROGRAM H572

NOTE: THE JOB AG4254J8 HAS BEEN RUN UNDER RELEASE 79.33 OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1          MACRO UVINPUT
2          ************************************************************;
3          * THE UVINPUT MACRO CREATES A SAS DATA SET FROM UNIT VALUES DATA  ;
4          * VARIABLES CREATED ARE: STATION PARMCODE STATCODE                ;
5          *                        DATE DATETIME VALUE TIME                ;
6          ************************************************************;
7          DATA UV;
8             INFILE USERFIL2;
9             RETAIN STATION PARMCODE STATCODE DATE NOVALUE SREAD INTERVAL READINGS;
10            KEEP STATION PARMCODE STATCODE DATE DATETIME VALUE TIME;
11            INPUT      @10  STATION   $CHAR15.
12                       @33  PARMCODE  IB4.
13                       @37  YEAR      IB2.
14                       @39  MONTH     IB2.
15                       @41  DAY       IB2.
16                       @43  STATCODE  IB2.
17                       @45  INT       IB2.
18                       @47  SREAD     IB2.
19                       @49  READINGS  IB2.
20                       @77  NOVALUE   RB4. @@;
21            COUNT=0;
22            DATE=MDY(MONTH,DAY,YEAR);
23            INTERVAL=86400/INT;
24            LINK UNIT;
25            INPUT @37 YEAR IB2.;
26         RETURN;
27         UNIT:
28            COUNT+1;
29            IF COUNT > READINGS THEN RETURN;
30            P=77+COUNT*4;
31            INPUT @P VALUE RB4. @@;
32            IF VALUE=NOVALUE THEN GO TO UNIT;
33            TIME=(SREAD+COUNT-1)*INTERVAL;
34            DATETIME=DATE*86400+TIME;
35            OUTPUT;
36            GO TO UNIT;
37         FORMAT DATE YYMMDD8. DATETIME DATETIME16. PARMCODE Z5. TIME TIME8.;
38         LABEL TIME = TIME OF DAY(HH:MM:SS);
39         LENGTH  PARMCODE 4 VALUE 4 STATCODE 3 DATE 4 TIME 4;
40         %
41
42
43                 UVINPUT
44
```

NOTE: INFILE USERFIL2 IS:
DSNAME=SYS81154.T082858.RV000.AG4254J8.UNREC,
UNIT=SYSDK,VOL=SER=REIWK2,DISP=OLD,
DCB=(BLKSIZE=12932,LRECL=11604,RECFM=VB)

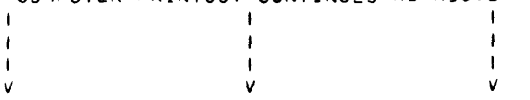
NOTE: 1 LINE WAS READ FROM INFILE USERFIL2.
THE MINIMUM LINE LENGTH IS 3232.
THE MAXIMUM LINE LENGTH IS 3232.
NOTE: DATA SET WORK.UV HAS 788 OBSERVATIONS AND 7 VARIABLES. 283 OBS/TRK.

```
NOTE: THE DATA STATEMENT USED 0.41 SECONDS AND 142K.

44                  PROC SORT OUT=UVFILE.JVMASTER ;
45                       BY STATION PARMCODE DATETIME;
46                       FORMAT DATE YYMMDD8.;
47

NOTE: DATA SET UVFILE.JVMASTER HAS 788 OBSERVATIONS AND 7 VARIABLES. 283 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.38 SECONDS AND 272K.

47                  PROC PRINT;

NOTE: THE PROCEDURE PRINT USED 1.05 SECONDS AND 132K AND PRINTED PAGES 1 TO 15.


NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

OBS	STATION	PARMCODE	STATCODE	DATE	VALUE	TIME	DATETIME
1	254031080191103	00045	6	77-05-04	0.00	7:34:00	04MAY77:07:34:00
2	254031080191103	00045	6	77-05-04	0.00	7:35:00	04MAY77:07:35:00
3	254031080191103	00045	6	77-05-04	0.00	7:36:00	04MAY77:07:36:00
4	254031080191103	00045	6	77-05-04	0.00	7:37:00	04MAY77:07:37:00
5	254031080191103	00045	6	77-05-04	0.00	7:38:00	04MAY77:07:38:00
6	254031080191103	00045	6	77-05-04	0.00	7:39:00	04MAY77:07:39:00
7	254031080191103	00045	6	77-05-04	0.00	7:40:00	04MAY77:07:40:00
8	254031080191103	00045	6	77-05-04	0.00	7:41:00	04MAY77:07:41:00
9	254031080191103	00045	6	77-05-04	0.00	7:42:00	04MAY77:07:42:00
10	254031080191103	00045	6	77-05-04	0.00	7:43:00	04MAY77:07:43:00
11	254031080191103	00045	6	77-05-04	0.00	7:44:00	04MAY77:07:44:00
12	254031080191103	00045	6	77-05-04	0.00	7:45:00	04MAY77:07:45:00
13	254031080191103	00045	6	77-05-04	0.00	7:46:00	04MAY77:07:46:00
14	254031080191103	00045	6	77-05-04	0.00	7:47:00	04MAY77:07:47:00
15	254031080191103	00045	6	77-05-04	0.00	7:48:00	04MAY77:07:48:00
16	254031080191103	00045	6	77-05-04	0.00	7:49:00	04MAY77:07:49:00
17	254031080191103	00045	6	77-05-04	0.00	7:50:00	04MAY77:07:50:00
18	254031080191103	00045	6	77-05-04	0.00	7:51:00	04MAY77:07:51:00
19	254031080191103	00045	6	77-05-04	0.00	7:52:00	04MAY77:07:52:00
20	254031080191103	00045	6	77-05-04	0.00	7:53:00	04MAY77:07:53:00
21	254031080191103	00045	6	77-05-04	0.00	7:54:00	04MAY77:07:54:00
22	254031080191103	00045	6	77-05-04	0.00	7:55:00	04MAY77:07:55:00
23	254031080191103	00045	6	77-05-04	0.00	7:56:00	04MAY77:07:56:00
24	254031080191103	00045	6	77-05-04	0.00	7:57:00	04MAY77:07:57:00
25	254031080191103	00045	6	77-05-04	0.00	7:58:00	04MAY77:07:58:00
26	254031080191103	00045	6	77-05-04	0.00	7:59:00	04MAY77:07:59:00
27	254031080191103	00045	6	77-05-04	0.01	8:00:00	04MAY77:08:00:00
28	254031080191103	00045	6	77-05-04	0.00	8:01:00	04MAY77:08:01:00
29	254031080191103	00045	6	77-05-04	0.00	8:02:00	04MAY77:08:02:00
30	254031080191103	00045	6	77-05-04	0.00	8:03:00	04MAY77:08:03:00
31	254031080191103	00045	6	77-05-04	0.00	8:04:00	04MAY77:08:04:00
32	254031080191103	00045	6	77-05-04	0.00	8:05:00	04MAY77:08:05:00
33	254031080191103	00045	6	77-05-04	0.00	8:06:00	04MAY77:08:06:00
34	254031080191103	00045	6	77-05-04	0.00	8:07:00	04MAY77:08:07:00
35	254031080191103	00045	6	77-05-04	0.00	8:08:00	04MAY77:08:08:00
36	254031080191103	00045	6	77-05-04	0.00	8:09:00	04MAY77:08:09:00
37	254031080191103	00045	6	77-05-04	0.00	8:10:00	04MAY77:08:10:00
38	254031080191103	00045	6	77-05-04	0.00	8:11:00	04MAY77:08:11:00
39	254031080191103	00045	6	77-05-04	0.00	8:12:00	04MAY77:08:12:00
40	254031080191103	00045	6	77-05-04	0.00	8:13:00	04MAY77:08:13:00
41	254031080191103	00045	6	77-05-04	0.00	8:14:00	04MAY77:08:14:00
42	254031080191103	00045	6	77-05-04	0.00	8:15:00	04MAY77:08:15:00
43	254031080191103	00045	6	77-05-04	0.00	8:16:00	04MAY77:08:16:00
44	254031080191103	00045	6	77-05-04	0.00	8:17:00	04MAY77:08:17:00
45	254031080191103	00045	6	77-05-04	0.00	8:18:00	04MAY77:08:18:00
46	254031080191103	00045	6	77-05-04	0.01	8:19:00	04MAY77:08:19:00
47	254031080191103	00045	6	77-05-04	0.00	8:20:00	04MAY77:08:20:00
48	254031080191103	00045	6	77-05-04	0.00	8:21:00	04MAY77:08:21:00
49	254031080191103	00045	6	77-05-04	0.00	8:22:00	04MAY77:08:22:00
50	254031080191103	00045	6	77-05-04	0.00	8:23:00	04MAY77:08:23:00
51	254031080191103	00045	6	77-05-04	0.00	8:24:00	04MAY77:08:24:00
52	254031080191103	00045	6	77-05-04	0.00	8:25:00	04MAY77:08:25:00
53	254031080191103	00045	6	77-05-04	0.00	8:26:00	04MAY77:08:26:00
54	254031080191103	00045	6	77-05-04	0.00	8:27:00	04MAY77:08:27:00
55	254031080191103	00045	6	77-05-04	0.00	8:28:00	04MAY77:08:28:00
56	254031080191103	00045	6	77-05-04	0.00	8:29:00	04MAY77:08:29:00

OBS	STATION	PARMCODE	STATCODE	DATE	VALUE	TIME	DATETIME
57	254031080191103	00045	6	77-05-04	0.00	8:30:00	04MAY77:08:30:00
58	254031080191103	00045	6	77-05-04	0.00	8:31:00	04MAY77:08:31:00
59	254031080191103	00045	6	77-05-04	0.00	8:32:00	04MAY77:08:32:00
60	254031080191103	00045	6	77-05-04	0.00	8:33:00	04MAY77:08:33:00
61	254031080191103	00045	6	77-05-04	0.00	8:34:00	04MAY77:08:34:00
62	254031080191103	00045	6	77-05-04	0.00	8:35:00	04MAY77:08:35:00
63	254031080191103	00045	6	77-05-04	0.00	8:36:00	04MAY77:08:36:00
64	254031080191103	00045	6	77-05-04	0.00	8:37:00	04MAY77:08:37:00
65	254031080191103	00045	6	77-05-04	0.00	8:38:00	04MAY77:08:38:00
66	254031080191103	00045	6	77-05-04	0.01	8:39:00	04MAY77:08:39:00
67	254031080191103	00045	6	77-05-04	0.00	8:40:00	04MAY77:08:40:00
68	254031080191103	00045	6	77-05-04	0.00	8:41:00	04MAY77:08:41:00
69	254031080191103	00045	6	77-05-04	0.00	8:42:00	04MAY77:08:42:00
70	254031080191103	00045	6	77-05-04	0.00	8:43:00	04MAY77:08:43:00
71	254031080191103	00045	6	77-05-04	0.00	8:44:00	04MAY77:08:44:00
72	254031080191103	00045	6	77-05-04	0.00	8:45:00	04MAY77:08:45:00
73	254031080191103	00045	6	77-05-04	0.01	8:46:00	04MAY77:08:46:00
74	254031080191103	00045	6	77-05-04	0.00	8:47:00	04MAY77:08:47:00
75	254031080191103	00045	6	77-05-04	0.01	8:48:00	04MAY77:08:48:00
76	254031080191103	00045	6	77-05-04	0.00	8:49:00	04MAY77:08:49:00
77	254031080191103	00045	6	77-05-04	0.00	8:50:00	04MAY77:08:50:00
78	254031080191103	00045	6	77-05-04	0.01	8:51:00	04MAY77:08:51:00
79	254031080191103	00045	6	77-05-04	0.00	8:52:00	04MAY77:08:52:00
80	254031080191103	00045	6	77-05-04	0.01	8:53:00	04MAY77:08:53:00
81	254031080191103	00045	6	77-05-04	0.00	8:54:00	04MAY77:08:54:00
82	254031080191103	00045	6	77-05-04	0.01	8:55:00	04MAY77:08:55:00
83	254031080191103	00045	6	77-05-04	0.01	8:56:00	04MAY77:08:56:00
84	254031080191103	00045	6	77-05-04	0.00	8:57:00	04MAY77:08:57:00
85	254031080191103	00045	6	77-05-04	0.01	8:58:00	04MAY77:08:58:00
86	254031080191103	00045	6	77-05-04	0.00	8:59:00	04MAY77:08:59:00
87	254031080191103	00045	6	77-05-04	0.01	9:00:00	04MAY77:09:00:00
88	254031080191103	00045	6	77-05-04	0.01	9:01:00	04MAY77:09:01:00
89	254031080191103	00045	6	77-05-04	0.01	9:02:00	04MAY77:09:02:00
90	254031080191103	00045	6	77-05-04	0.02	9:03:00	04MAY77:09:03:00
91	254031080191103	00045	6	77-05-04	0.02	9:04:00	04MAY77:09:04:00
92	254031080191103	00045	6	77-05-04	0.01	9:05:00	04MAY77:09:05:00
93	254031080191103	00045	6	77-05-04	0.02	9:06:00	04MAY77:09:06:00
94	254031080191103	00045	6	77-05-04	0.02	9:07:00	04MAY77:09:07:00
95	254031080191103	00045	6	77-05-04	0.03	9:08:00	04MAY77:09:08:00
96	254031080191103	00045	6	77-05-04	0.01	9:09:00	04MAY77:09:09:00
97	254031080191103	00045	6	77-05-04	0.01	9:10:00	04MAY77:09:10:00
98	254031080191103	00045	6	77-05-04	0.02	9:11:00	04MAY77:09:11:00

INTERMEDIATE COMPUTER PRINTOUT CONTINUES AS ABOVE



OBS	STATION	PARMCODE	STATCODE	DATE	VALUE	TIME	DATETIME
785	254031080191103	00045	6	77-05-04	0	20:38:00	04MAY77:20:38:00
786	254031080191103	00045	6	77-05-04	0	20:39:00	04MAY77:20:39:00
787	254031080191103	00045	6	77-05-04	0	20:40:00	04MAY77:20:40:00
788	254031080191103	00045	6	77-05-04	0	20:41:00	04MAY77:20:41:00

3.33 Updating Data Sets

After the original creation of a state's User File UV component, all further operations are actually updates (corrections and additions) to the file. Therefore, JCL and SAS commands change to reflect an update operation.

3.331 JCL Commands

In section 3.321, cards 7, 8, and 9* are replaced by these two cards:

```
Card 7..//UVFILE DD DSN=AG4yyyz.STATEXX.URBAN.UNIT.VALUES,
     8..// DISP=OLD
```

*Note: There is no card 9 for this operation.

This change reflects the status of OS data set UVFILE as already existing.

3.332 SAS Commands

The UVINPUT "MACRO" Procedure SAS instruction cards remain the same as in section 3.322. The other SAS instruction cards that follow do change and are listed below.

UVINPUT SAS "MACRO" Procedure - (another retrieval from WATSTORE unit-values file)

```
Card 1..PROC SORT OUT=TEMP;
     2..     BY STATION PARMCODE DATETIME;
     3..     FORMAT DATE YYMMDD8.;
     4..DATA UVFILE.UVMASTER;
     5..UPDATE UVFILE.UVMASTER TEMP;
     6..     BY STATION PARMCODE DATETIME;
     7..PROC PRINT;
```

The above procedure, cards 1-7, is for merging additional data into the UVMASTER file. If the data to be entered is an update of previously entered data, then the new data will replace the old. If the UVMASTER file is large, then probably card 7 should be removed or placed behind card 3 to print out a listing of the new data that are being entered into the UVMASTER file.

An example of updating the Unit-Values File for the Miami, Fla., multifamily residential site is presented on the following pages. The JCL commands, SAS instructions and sample output are all illustrated.

```
//AG4254J8 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)          J5102
***PROCLIB  WRD.PROCLIB
***SETUP    118943/H
// EXEC UNRETR,AGENCY=USGS,VOL1=118943
//HDR.SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0002
IEF373I STEP /HDR      / START 81154.0948
IEF374I STEP /HDR      / STOP  81154.0949 CPU    0MIN 00.37SEC MAIN 252K LCS    0K
CCD0006I STEP /HDR      / I/O IN DD SEQ: 215:0        314:0        743:0
CCD0006I STEP /HDR      / I/O IN DD SEQ: 4A9:2        000:0        743:0
CCD0006I STEP /HDR      / I/O IN DD SEQ: 486:2        486:3        155:0
CCD0006I STEP /HDR      / I/O IN DD SEQ: 155:1        563:1        155:3
CCD0006I STEP /HDR      / I/O IN DD SEQ: 402:1
CCD0001I STEP /HDR      / MEMORY RESERVED  260K: ACCESSES: DISK       13/ TAPE        0
IEF202I - STEP - HSRT     , WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /HSRT     / START 81154.0949
IEF374I STEP /HSRT     / STOP  81154.0949 CPU    0MIN 00.00SEC MAIN    0K LCS    0K
CCD0001I STEP /HSRT     / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /UNR      / START 81154.0949
IEF374I STEP /UNR      / STOP  81154.0950 CPU    0MIN 01.64SEC MAIN 334K LCS    0K
CCD0006I STEP /UNR      / I/O IN DD SEQ: 215:0        314:0        4AA:1
CCD0006I STEP /UNR      / I/O IN DD SEQ: 4F2:16       486:10       293:1070
CCD0006I STEP /UNR      / I/O IN DD SEQ: 000:0        000:0        000:0
CCD0006I STEP /UNR      / I/O IN DD SEQ: 000:0        000:0        155:3
CCD0006I STEP /UNR      / I/O IN DD SEQ: 563:3        155:0        481:0
CCD0006I STEP /UNR      / I/O IN DD SEQ: 155:1        486:0        433:0
CCD0006I STEP /UNR      / I/O IN DD SEQ: 000:0
CCD0001I STEP /UNR      / MEMORY RESERVED  350K: ACCESSES: DISK       34/ TAPE     1070
IEF202I - STEP - UNSRT    , WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /UNSRT    / START 81154.0950
IEF374I STEP /UNSRT    / STOP  81154.0950 CPU    0MIN 00.00SEC MAIN    0K LCS    0K
CCD0001I STEP /UNSRT    / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
// EXEC MROSAS,DSN3='&&UNREC',MACRO=UV,DSN1=NULLFILE,DSN2=NULLFILE
//UVFILE DD DSN=AG4254J.STATEXX.URBAN.UNIT.VALUES,
// DISP=OLD
//SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81154.0950
IEF374I STEP /SAS      / STOP  81154.0951 CPU    0MIN 02.68SEC MAIN 276K LCS    0K
CCD0006I STEP /SAS      / I/O IN DD SEQ: 155:0        481:0        155:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 631:0        215:0        314:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 155:77       4AA:3        4F2:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 4F6:95       480:0        155:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 314:0        4F7:0        155:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 563:0        563:0        000:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 000:0        743:0        486:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 216:0        155:0        155:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 000:0        155:4        000:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 000:0        743:4        743:3
CCD0006I STEP /SAS      / I/O IN DD SEQ: 743:3        5E0:1        744:46
CCD0001I STEP /SAS      / MEMORY RESERVED  276K: ACCESSES: DISK      236/ TAPE        0
IEF375I  JOB /AG4254J8/ START 81154.0948
IEF376I  JOB /AG4254J8/ STOP  81154.0951 CPU    0MIN 04.69SEC
CCD0007A  JOB /AG4254J8/ BASIC CHRG: FIXED    CPU    DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                     1.24     3.56      .86     1.62      .93     8.22
CCD0007C  JOB /AG4254J8/ OTHER CHRGS: TP-MTS DK-MTS                            TOTAL
                                        1.00                                    1.00
CCD0002I  JOB /AG4254J8/ TOTAL CHARGE RECORDED =      $9.22
CCD0003I  JOB /AG4254J8/ US GEOLOGICAL SURVEY REL 05 REL 218 TIME = 09.51.58 DATE = 06/03/81
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PROGRAM G745 HAD THE FOLLOWING PROGRAM DATES OF LAST REVISION:
     G745             9 APR 81 08.24.18
     HDRIRTV         14 JAN 81 11.01.24
     HDRLIST          8 APR 81 12.57.31


AGENCY CODE USGS  WAS SUBMITTED THROUGH THE AGENCY SYMBOLIC JCL PARAMETER ON THE EXEC CARD.
            -----

CODES SUBMITTED THROUGH SYMBOLIC JCL PARAMETERS ON THE EXEC CARDS WILL BE TEMPORARILY OVERRIDDEN
IF A Z CARD WITH VALID ENTRIES, IS PLACED PRECEDING A STATION SELECTION CARD.




**********************************  RETRIEVAL NO.  1   JUN 03, 1981   ****************************************


STATION HEADER DATA HAS BEEN REQUESTED TO BE WRITTEN INTO AN OUTPUT FILE IN THE FORMAT LISTED BELOW.

STATION HEADER RECORD LIST

PROGRAM G745 IS FUNCTIONING AS A PREPROCESSOR FOR RETRIEVING  UNIT VALUES  DATA RECORDS.

                                              <- SORT OPTNS ->                  M CARD  ***

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
M3  1977051119770511                          X                                 01

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
R00045

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
F00006

 <-STATION ID.->                                                          D CARD  ***
D254031080191103



BASED ONLY ON INFORMATION AVAILABLE FROM THE STATION HEADER FILE,      1 SITES WERE SELECTED FOR RETRIEVAL NO.  1

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


STATION HEADER RETRIEVAL PROCESSING ENDED
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81/06/03 JNIT DATA RETRIEVAL PROGRAM
ERRORS AND MESSAGES - PGM H572
DATE OF LAST REVISION = 26 JAN 81 07.53.30

RETRIEVAL # 1

*** UR051 - RECORD SPECIFIED BY STATE CODE = 12, AGENCY CODE = USGS , AND STATION ID = 254031080191103 IS NOT IN CURRENT FILE
RETV # = 1

*** UR030 - 1 RECORDS HAVE BEEN ACCEPTED FOR RETRIEVAL NUMBER 1 - 1 STATION(S) HAVE RECORDS
0 RECORDS RETRIEVED FROM CURRENT FILE
1 RECORDS RETRIEVED FROM BACKFILE
0 RECORDS FOUND WITH RECORD DISP = D

*** UR031 - 1 CARDS PUNCHED OR WRITTEN ON A MAGNETIC DEVICE FOR RETRIEVAL REQUEST NUMBER 1

*** UR032 - DATA LEVEL RETRIEVAL SPECIFICATIONS FOR RETRIEVAL REQUEST NUMBER 1 ARE AS FOLLOWS:
M3 1977051119770511 X 01
R00045
F00006

81/05/03 UNIT DATA RETRIEVAL PROGRAM 4572
DATE OF LAST REVISION = 26 JAN 81 07.53.30

RETRIEVAL # 1

AGENCY CODE	STATION IDENTIFICATION	LATITUDE	LONGITUDE	SEQ NUM	STATE CODE	DIST CODE	COUNTY CODE	SITE CODES #1	#2	#3	HYDROLOGIC UNIT CODE	DRAINAGE AREA	CONTRIB. DRAIN. AREA	BASE DISCHARGE
USGS	254031080191103	254031	0801911	03	12	12	025	SW			03090202			

STATION NAME OR LOCAL NUMBER	GEOLOGIC UNIT CODE	WELL DEPTH	AQ. TYPE	DATUM	PASSWORDS UPD	PASSWORDS RIV	INTERNAL TOQPUMBER	REALTIME DATA
UNIT RAIN. DAILY RAIN & EVAP. SITE 4					NULL	NULL	210011101	

STATION ID =254031080191103 PARAMETER CODE = 00045 STATISTIC CODE = 00006

DEPTH =999999.00 CREATE DATE OF REC = 791203 STATE CODE = 12 RCD RET DATE = 0
X-SECTION =999999.00 ACCOUNT NUMBER =********** AGENCY CODE = USGS PROCESS CODE = B

DATE: MAY 11, 1977 READINGS PER DAY = 1440 NO VALUE INDICATOR=999999.00 RCD DISP =

HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE	HR.MIN.SEC	VALUE
04.40.00	0.00	04.41.00	0.01	04.42.00	0.06	04.43.00	0.05	04.44.00	0.08	04.45.00	0.03
04.46.00	0.03	04.47.00	0.06	04.48.00	0.14	04.49.00	0.06	04.50.00	0.14	04.51.00	0.07
04.52.00	0.06	04.53.00	0.07	04.54.00	0.05	04.55.00	0.03	04.56.00	0.05	04.57.00	0.06
04.58.00	0.03	04.59.00	0.03	05.00.00	0.03	05.01.00	0.00	05.02.00	0.00	05.03.00	0.00
05.04.00	0.01	05.05.00	0.00	05.06.00	0.00	05.07.00	0.00	05.08.00	0.00	05.09.00	0.00
05.10.00	0.00	05.11.00	0.01	05.12.00	0.00	05.13.00	0.00	05.14.00	0.00	05.15.00	0.00
05.16.00	0.00	05.17.00	0.00	05.18.00	0.00	05.19.00	0.00	05.20.00	0.00	05.21.00	0.00
05.22.00	0.00	05.23.00	0.00	05.24.00	0.00	05.25.00	0.00	05.26.00	0.00	05.27.00	0.00
05.28.00	0.00	05.29.00	0.00	05.30.00	0.01	05.31.00	0.00	05.32.00	0.00	05.33.00	0.00
05.34.00	0.00	05.35.00	0.00	05.36.00	0.00	05.37.00	0.00	05.38.00	0.00	05.39.00	0.00
05.40.00	0.00	05.41.00	0.00	05.42.00	0.00	05.43.00	0.00	05.44.00	0.00	05.45.00	0.00
05.46.00	0.00	05.47.00	0.00	05.48.00	0.00	05.49.00	0.00	05.50.00	0.00	05.51.00	0.00
05.52.00	0.00	05.53.00	0.00	05.54.00	0.00	05.55.00	0.00	05.56.00	0.00	05.57.00	0.00
05.58.00	0.00	05.59.00	0.00	06.00.00	0.00	06.01.00	0.00	06.02.00	0.00	06.03.00	0.00
06.04.00	0.00	06.05.00	0.00	06.06.00	0.00	06.07.00	0.00	06.08.00	0.00	06.09.00	0.00
06.10.00	0.00	06.11.00	0.00	06.12.00	0.00	06.13.00	0.00	06.14.00	0.00	06.15.00	0.00
06.16.00	0.00	06.17.00	0.00	06.18.00	0.00	06.19.00	0.00	06.20.00	0.00	06.21.00	0.00
06.22.00	0.00	06.23.00	0.00	06.24.00	0.01	06.25.00	0.00	06.26.00	0.00	06.27.00	0.00
06.28.00	0.00	06.29.00	0.00	06.30.00	0.00	06.31.00	0.00	06.32.00	0.00	06.33.00	0.00
06.34.00	0.00	06.35.00	0.00	06.36.00	0.00	06.37.00	0.00	06.38.00	0.00	06.39.00	0.00
06.40.00	0.00	06.41.00	0.00	06.42.00	0.00	06.43.00	0.00	06.44.00	0.00	06.45.00	0.00
06.46.00	0.00	06.47.00	0.00	06.48.00	0.00	06.49.00	0.00	06.50.00	0.00	06.51.00	0.00
06.52.00	0.00	06.53.00	0.00	06.54.00	0.00	06.55.00	0.00	06.56.00	0.00	06.57.00	0.00
06.58.00	0.00	06.59.00	0.00	07.00.00	0.00	07.01.00	0.00	07.02.00	0.00	07.03.00	0.00
07.04.00	999999.00	07.05.00	999999.00	07.06.00	999999.00	07.07.00	999999.00	07.08.00	999999.00	07.09.00	999999.00
07.10.00	999999.00	07.11.00	999999.00	07.12.00	999999.00	07.13.00	999999.00	07.14.00	999999.00	07.15.00	999999.00
07.16.00	999999.00	07.17.00	999999.00	07.18.00	999999.00	07.19.00	999999.00	07.20.00	999999.00	07.21.00	999999.00
07.22.00	999999.00	07.23.00	999999.00	07.24.00	999999.00	07.25.00	999999.00	07.26.00	999999.00	07.27.00	999999.00
07.28.00	999999.00	07.29.00	999999.00	07.30.00	999999.00	07.31.00	999999.00	07.32.00	999999.00	07.33.00	999999.00
07.34.00	999999.00	07.35.00	999999.00	07.36.00	999999.00	07.37.00	999999.00	07.38.00	999999.00	07.39.00	999999.00
07.40.00	999999.00	07.41.00	999999.00	07.42.00	999999.00	07.43.00	999999.00	07.44.00	999999.00	07.45.00	999999.00
07.46.00	999999.00	07.47.00	999999.00	07.48.00	999999.00	07.49.00	999999.00	07.50.00	999999.00	07.51.00	999999.00
07.52.00	999999.00	07.53.00	999999.00	07.54.00	999999.00	07.55.00	999999.00	07.56.00	999999.00	07.57.00	999999.00
07.58.00	999999.00	07.59.00	999999.00	08.00.00	999999.00	08.01.00	999999.00	08.02.00	999999.00	08.03.00	999999.00
08.04.00	999999.00	08.05.00	999999.00	08.06.00	999999.00	08.07.00	999999.00	08.08.00	999999.00	08.09.00	999999.00
08.10.00	999999.00	08.11.00	999999.00	08.12.00	999999.00	08.13.00	999999.00	08.14.00	999999.00	08.15.00	999999.00
08.16.00	999999.00	08.17.00	999999.00	08.18.00	999999.00	08.19.00	999999.00	08.20.00	999999.00	08.21.00	999999.00
08.22.00	999999.00	08.23.00	999999.00	08.24.00	999999.00	08.25.00	999999.00	08.26.00	999999.00	08.27.00	999999.00
08.28.00	999999.00	08.29.00	999999.00	08.30.00	999999.00	08.31.00	999999.00	08.32.00	999999.00	08.33.00	999999.00
08.34.00	999999.00	08.35.00	999999.00	08.36.00	999999.00	08.37.00	999999.00	08.38.00	999999.00	08.39.00	999999.00
08.40.00	999999.00	08.41.00	999999.00	08.42.00	999999.00	08.43.00	999999.00	08.44.00	999999.00	08.45.00	999999.00
08.46.00	999999.00	08.47.00	999999.00	08.48.00	999999.00	08.49.00	999999.00	08.50.00	999999.00	08.51.00	999999.00
08.52.00	999999.00	08.53.00	999999.00	08.54.00	999999.00	08.55.00	999999.00	08.56.00	999999.00	08.57.00	999999.00
08.58.00	999999.00	08.59.00	999999.00	09.00.00	999999.00	09.01.00	999999.00	09.02.00	999999.00	09.03.00	999999.00
09.04.00	999999.00	09.05.00	999999.00	09.06.00	999999.00	09.07.00	999999.00	09.08.00	999999.00	09.09.00	999999.00
09.10.00	999999.00	09.11.00	999999.00	09.12.00	999999.00	09.13.00	999999.00	09.14.00	999999.00	09.15.00	999999.00
09.16.00	999999.00	09.17.00	999999.00	09.18.00	999999.00	09.19.00	999999.00	09.20.00	999999.00	09.21.00	999999.00
09.22.00	999999.00	09.23.00	999999.00	09.24.00	999999.00	09.25.00	999999.00	09.26.00	999999.00	09.27.00	999999.00
09.28.00	999999.00	09.29.00	999999.00	09.30.00	999999.00	09.31.00	999999.00	09.32.00	999999.00	09.33.00	999999.00
09.34.00	999999.00	09.35.00	999999.00	09.36.00	999999.00	09.37.00	999999.00	09.38.00	999999.00	09.39.00	999999.00
09.40.00	999999.00	09.41.00	999999.00	09.42.00	999999.00	09.43.00	999999.00	09.44.00	999999.00	09.45.00	999999.00

81/06/03 JNIT DATA RETRIEVAL PROGRAM H572
DATE OF LAST REVISION = 26 JAN 81 07.53.30

09.46.00 999999.00	09.47.00 999999.00	09.48.00 999999.00	09.49.00 999999.00	09.50.00 999999.00	09.51.00 999999.00
09.52.00 999999.00	09.53.00 999999.00	09.54.00 999999.00	09.55.00 999999.00	09.56.00 999999.00	09.57.00 999999.00
09.58.00 999999.00	09.59.00 999999.00	10.00.00 999999.00	10.01.00 999999.00	10.02.00 999999.00	10.03.00 999999.00
10.04.00 999999.00	10.05.00 999999.00	10.06.00 999999.00	10.07.00 999999.00	10.08.00 999999.00	10.09.00 999999.00
10.10.00 999999.00	10.11.00 999999.00	10.12.00 999999.00	10.13.00 999999.00	10.14.00 999999.00	10.15.00 999999.00
10.16.00 999999.00	10.17.00 999999.00	10.18.00 999999.00	10.19.00 999999.00	10.20.00 999999.00	10.21.00 999999.00
10.22.00 999999.00	10.23.00 999999.00	10.24.00 999999.00	10.25.00 999999.00	10.26.00 999999.00	10.27.00 999999.00
10.28.00 999999.00	10.29.00 999999.00	10.30.00 999999.00	10.31.00 999999.00	10.32.00 999999.00	10.33.00 999999.00
10.34.00 999999.00	10.35.00 999999.00	10.36.00 999999.00	10.37.00 999999.00	10.38.00 999999.00	10.39.00 999999.00
10.40.00 999999.00	10.41.00 999999.00	10.42.00 999999.00	10.43.00 999999.00	10.44.00 999999.00	10.45.00 999999.00
10.46.00 999999.00	10.47.00 999999.00	10.48.00 999999.00	10.49.00 999999.00	10.50.00 999999.00	10.51.00 999999.00
10.52.00 999999.00	10.53.00 999999.00	10.54.00 999999.00	10.55.00 999999.00	10.56.00 999999.00	10.57.00 999999.00
10.58.00 999999.00	10.59.00 999999.00	11.00.00 999999.00	11.01.00 999999.00	11.02.00 999999.00	11.03.00 999999.00
11.04.00 999999.00	11.05.00 999999.00	11.06.00 999999.00	11.07.00 999999.00	11.08.00 999999.00	11.09.00 999999.00
11.10.00 999999.00	11.11.00 999999.00	11.12.00 999999.00	11.13.00 999999.00	11.14.00 999999.00	11.15.00 999999.00
11.16.00 999999.00	11.17.00 999999.00	11.18.00 999999.00	11.19.00 999999.00	11.20.00 999999.00	11.21.00 999999.00
11.22.00 999999.00	11.23.00 999999.00	11.24.00 999999.00	11.25.00 999999.00	11.26.00 999999.00	11.27.00 999999.00
11.28.00 999999.00	11.29.00 999999.00	11.30.00 999999.00	11.31.00 999999.00	11.32.00 999999.00	11.33.00 999999.00
11.34.00 999999.00	11.35.00 999999.00	11.36.00 999999.00	11.37.00 999999.00	11.38.00 999999.00	11.39.00 999999.00
11.40.00 999999.00	11.41.00 999999.00	11.42.00 999999.00	11.43.00 999999.00	11.44.00 999999.00	11.45.00 999999.00
11.46.00 999999.00	11.47.00 999999.00	11.48.00 999999.00	11.49.00 999999.00	11.50.00 999999.00	11.51.00 999999.00
11.52.00 999999.00	11.53.00 999999.00	11.54.00 999999.00	11.55.00 999999.00	11.56.00 999999.00	11.57.00 999999.00
11.58.00 999999.00	11.59.00 999999.00	12.00.00 999999.00	12.01.00 999999.00	12.02.00 999999.00	12.03.00 999999.00
12.04.00 999999.00	12.05.00 999999.00	12.06.00 999999.00	12.07.00 999999.00	12.08.00 999999.00	12.09.00 999999.00
12.10.00 999999.00	12.11.00 999999.00	12.12.00 999999.00	12.13.00 999999.00	12.14.00 999999.00	12.15.00 999999.00
12.16.00 999999.00	12.17.00 999999.00	12.18.00 999999.00	12.19.00 999999.00	12.20.00 999999.00	12.21.00 999999.00
12.22.00 999999.00	12.23.00 999999.00	12.24.00 999999.00	12.25.00 999999.00	12.26.00 999999.00	12.27.00 999999.00
12.28.00 999999.00	12.29.00 999999.00	12.30.00 999999.00	12.31.00 999999.00	12.32.00 999999.00	12.33.00 999999.00
12.34.00 999999.00	12.35.00 999999.00	12.36.00 999999.00	12.37.00 999999.00	12.38.00 999999.00	12.39.00 999999.00
12.40.00 999999.00	12.41.00 999999.00	12.42.00 999999.00	12.43.00 999999.00	12.44.00 999999.00	12.45.00 999999.00
12.46.00 999999.00	12.47.00 999999.00	12.48.00 999999.00	12.49.00 999999.00	12.50.00 999999.00	12.51.00 999999.00
12.52.00 999999.00	12.53.00 999999.00	12.54.00 999999.00	12.55.00 999999.00	12.56.00 999999.00	12.57.00 999999.00
12.58.00 999999.00	12.59.00 999999.00	13.00.00 999999.00	13.01.00 999999.00	13.02.00 999999.00	13.03.00 999999.00
13.04.00 999999.00	13.05.00 999999.00	13.06.00 999999.00	13.07.00 999999.00	13.08.00 999999.00	13.09.00 999999.00
13.10.00 999999.00	13.11.00 999999.00	13.12.00 999999.00	13.13.00 999999.00	13.14.00 999999.00	13.15.00 999999.00
13.16.00 999999.00	13.17.00 999999.00	13.18.00 999999.00	13.19.00 999999.00	13.20.00 999999.00	13.21.00 999999.00
13.22.00 999999.00	13.23.00 999999.00	13.24.00 999999.00	13.25.00 999999.00	13.26.00 999999.00	13.27.00 999999.00
13.28.00 999999.00	13.29.00 999999.00	13.30.00 999999.00	13.31.00 999999.00	13.32.00 999999.00	13.33.00 999999.00
13.34.00 999999.00	13.35.00 999999.00	13.36.00 999999.00	13.37.00 999999.00	13.38.00 999999.00	13.39.00 999999.00
13.40.00 999999.00	13.41.00 999999.00	13.42.00 999999.00	13.43.00 999999.00	13.44.00 999999.00	13.45.00 999999.00
13.46.00 999999.00	13.47.00 999999.00	13.48.00 999999.00	13.49.00 999999.00	13.50.00 999999.00	13.51.00 999999.00
13.52.00 999999.00	13.53.00 999999.00	13.54.00 999999.00	13.55.00 999999.00	13.56.00 999999.00	13.57.00 999999.00
13.58.00 999999.00	13.59.00 999999.00	14.00.00 999999.00	14.01.00 999999.00	14.02.00 999999.00	14.03.00 999999.00
14.04.00 999999.00	14.05.00 999999.00	14.06.00 999999.00	14.07.00 999999.00	14.08.00 999999.00	14.09.00 999999.00
14.10.00 999999.00	14.11.00 999999.00	14.12.00 999999.00	14.13.00 999999.00	14.14.00 999999.00	14.15.00 999999.00
14.16.00 999999.00	14.17.00 999999.00	14.18.00 999999.00	14.19.00 999999.00	14.20.00 999999.00	14.21.00 999999.00
14.22.00 999999.00	14.23.00 999999.00	14.24.00 999999.00	14.25.00 999999.00	14.26.00 999999.00	14.27.00 999999.00
14.28.00 999999.00	14.29.00 999999.00	14.30.00 999999.00	14.31.00 999999.00	14.32.00 999999.00	14.33.00 999999.00
14.34.00 999999.00	14.35.00 999999.00	14.36.00 999999.00	14.37.00 999999.00	14.38.00 999999.00	14.39.00 999999.00
14.40.00 999999.00	14.41.00 999999.00	14.42.00 999999.00	14.43.00 999999.00	14.44.00 999999.00	14.45.00 999999.00
14.46.00 999999.00	14.47.00 999999.00	14.48.00 999999.00	14.49.00 999999.00	14.50.00 999999.00	14.51.00 999999.00
14.52.00 999999.00	14.53.00 999999.00	14.54.00 999999.00	14.55.00 999999.00	14.56.00 999999.00	14.57.00 999999.00
14.58.00 999999.00	14.59.00 999999.00	15.00.00 999999.00	15.01.00 999999.00	15.02.00 999999.00	15.03.00 999999.00

81/05/03 UNIT DATA RETRIEVAL PROGRAM M572
DATE OF LAST REVISION = 26 JAN 81 07.53.30

15.04.00	999999.00	15.05.00	999999.00	15.06.00	999999.00	15.07.00	999999.00	15.08.00	999999.00	15.09.00	999999.00
15.10.00	999999.00	15.11.00	999999.00	15.12.00	999999.00	15.13.00	999999.00	15.14.00	999999.00	15.15.00	999999.00
15.16.00	999999.00	15.17.00	999999.00	15.18.00	999999.00	15.19.00	999999.00	15.20.00	999999.00	15.21.00	999999.00
15.22.00	999999.00	15.23.00	999999.00	15.24.00	999999.00	15.25.00	999999.00	15.26.00	999999.00	15.27.00	999999.00
15.28.00	999999.00	15.29.00	999999.00	15.30.00	999999.00	15.31.00	999999.00	15.32.00	999999.00	15.33.00	999999.00
15.34.00	999999.00	15.35.00	999999.00	15.36.00	999999.00	15.37.00	999999.00	15.38.00	999999.00	15.39.00	999999.00
15.40.00	999999.00	15.41.00	0.01	15.42.00	0.01	15.43.00	0.01	15.44.00	0.01	15.45.00	0.01
15.46.00	0.01	15.47.00	0.02	15.48.00	0.01	15.49.00	0.01	15.50.00	0.01	15.51.00	0.01
15.52.00	0.01	15.53.00	0.02	15.54.00	0.02	15.55.00	0.01	15.56.00	0.01	15.57.00	0.02
15.58.00	0.01	15.59.00	0.02	16.00.00	0.02	16.01.00	0.02	16.02.00	0.02	16.03.00	0.02
16.04.00	0.02	16.05.00	0.03	16.06.00	0.02	16.07.00	0.02	16.08.00	0.02	16.09.00	0.05
16.10.00	0.04	16.11.00	0.03	16.12.00	0.02	16.13.00	0.02	16.14.00	0.02	16.15.00	0.02
16.16.00	0.03	16.17.00	0.01	16.18.00	0.02	16.19.00	0.02	16.20.00	0.02	16.21.00	0.01
16.22.00	0.01	16.23.00	0.01	16.24.00	0.01	16.25.00	0.01	16.26.00	0.01	16.27.00	0.01
16.28.00	0.01	16.29.00	0.01	16.30.00	0.01	16.31.00	0.01	16.32.00	0.01	16.33.00	0.01
16.34.00	0.01	16.35.00	0.01	16.36.00	0.01	16.37.00	0.01	16.38.00	0.01	16.39.00	0.01
16.40.00	0.01	16.41.00	0.01	16.42.00	0.04	16.43.00	0.04	16.44.00	0.05	16.45.00	0.05
16.46.00	0.04	16.47.00	0.05	16.48.00	0.05	16.49.00	0.05	16.50.00	0.05	16.51.00	0.03
16.52.00	0.02	16.53.00	0.02	16.54.00	0.02	16.55.00	0.02	16.56.00	0.02	16.57.00	0.02
16.58.00	0.03	16.59.00	0.02	17.00.00	0.02	17.01.00	0.02	17.02.00	0.02	17.03.00	0.02
17.04.00	0.02	17.05.00	0.02	17.06.00	0.02	17.07.00	0.02	17.08.00	0.02	17.09.00	0.02
17.10.00	0.02	17.11.00	0.02	17.12.00	0.03	17.13.00	0.03	17.14.00	0.03	17.15.00	0.02
17.16.00	0.02	17.17.00	0.02	17.18.00	0.02	17.19.00	0.02	17.20.00	0.02	17.21.00	0.02
17.22.00	0.02	17.23.00	0.00	17.24.00	0.00	17.25.00	0.00	17.26.00	0.00	17.27.00	0.01
17.28.00	0.00	17.29.00	0.00	17.30.00	0.00	17.31.00	0.00	17.32.00	0.00	17.33.00	0.00
17.34.00	0.01	17.35.00	0.00	17.36.00	0.00	17.37.00	0.00	17.38.00	0.00	17.39.00	0.00
17.40.00	0.00	17.41.00	0.00	17.42.00	0.00	17.43.00	0.00	17.44.00	0.00	17.45.00	0.00
17.46.00	0.01	17.47.00	0.00	17.48.00	0.00	17.49.00	0.00	17.50.00	0.00	17.51.00	0.00
17.52.00	0.00	17.53.00	0.00	17.54.00	0.00	17.55.00	0.00	17.56.00	0.00	17.57.00	0.00
17.58.00	0.00	17.59.00	0.00	18.00.00	0.00	18.01.00	0.00	18.02.00	0.00	18.03.00	0.00
18.04.00	0.00	18.05.00	0.00	18.06.00	0.00	18.07.00	0.00	18.08.00	0.00	18.09.00	0.00
18.10.00	0.00	18.11.00	0.00	18.12.00	0.00	18.13.00	0.00	18.14.00	0.00	18.15.00	0.00
18.16.00	0.00	18.17.00	0.00	18.18.00	0.00	18.19.00	0.01	18.20.00	0.00	18.21.00	0.00
18.22.00	0.00	18.23.00	0.00	18.24.00	0.00	18.25.00	0.00	18.26.00	0.00	18.27.00	0.00
18.28.00	0.00										

NOTE: THE JOB AG4254J8 HAS BEEN RUN UNDER RELEASE 79.38 OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1          MACRO UVINPUT
2          ************************************************************;
3          * THE UVINPUT MACRO CREATES A SAS DATA SET FROM UNIT VALUES DATA  ;
4          * VARIABLES CREATED ARE: STATION PARMCODE STATCODE                ;
5          *                        DATE DATETIME VALUE TIME                ;
6          ************************************************************;
7          DATA UV;
8             INFILE USERFIL2;
9             RETAIN STATION PARMCODE STATCODE DATE NOVALUE SREAD INTERVAL READINGS;
10            KEEP STATION PARMCODE STATCODE DATE DATETIME VALUE TIME;
11            INPUT      @10  STATION   $CHAR15.
12                       @33  PARMCODE  I94.
13                       @37  YEAR      I82.
14                       @39  MONTH     I82.
15                       @41  DAY       I82.
16                       @43  STATCODE  I82.
17                       @45  INT       I82.
18                       @47  SREAD     I82.
19                       @49  READINGS  I82.
20                       @77  NOVALUE   RB4. @@;
21            COUNT=0;
22            DATE=MDY(MONTH,DAY,YEAR);
23            INTERVAL=86400/INT;
24            LINK UNIT;
25            INPUT @37 YEAR I82.;
26         RETURN;
27         UNIT:
28            COUNT+1;
29            IF COUNT > READINGS THEN RETURN;
30            P=77+COUNT*4;
31            INPUT @P VALUE RB4. @@;
32            IF VALUE=NOVALUE THEN GO TO UNIT;
33            TIME=(SREAD+COUNT-1)*INTERVAL;
34            DATETIME=DATE*86400+TIME;
35            OUTPUT;
36            GO TO UNIT;
37         FORMAT DATE YYMMDD8. DATETIME DATETIME16. PARMCODE Z5. TIME TIME8.;
38         LABEL TIME = TIME OF DAY(HH:MM:SS);
39         LENGTH  PARMCODE 4 VALUE 4 STATCODE 3 DATE 4 TIME 4;
40         %
41
42
43                UVINPUT
44
```

NOTE: INFILE USERFIL2 IS:
DSNAME=SYS81154.T082858.RV000.AG4254J8.UNREC,
UNIT=SYSDK,VOL=SER=RE1WK1,DISP=OLD,
DCB=(BLKSIZE=12932,LRECL=11604,RECFM=VB)

NOTE: 1 LINE WAS READ FROM INFILE USERFIL2.
THE MINIMUM LINE LENGTH IS 3396.
THE MAXIMUM LINE LENGTH IS 3396.
NOTE: DATA SET WORK.UV HAS 312 OBSERVATIONS AND 7 VARIABLES. 283 OBS/TRK.

```
NOTE: THE DATA STATEMENT USED 0.42 SECONDS AND 142K.

44                  PROC SORT OUT=TEMP;
45                       BY STATION PARMCODE DATETIME ;
46                       FORMAT DATE YYMMDD8.;
47

NOTE: DATA SET WORK.TEMP HAS 312 OBSERVATIONS AND 7 VARIABLES. 293 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.28 SECONDS AND 272K.

47                  DATA UVFILE.UVMASTER;
48                  UPDATE UVFILE.UVMASTER TEMP ;
49                       BY STATION PARMCODE DATETIME;
50

NOTE: DATA SET UVFILE.UVMASTER HAS 1100 OBSERVATIONS AND 7 VARIABLES. 283 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.52 SECONDS AND 132K.

50                  PROC PRINT;

NOTE: THE PROCEDURE PRINT USED 1.31 SECONDS AND 132K AND PRINTED PAGES 1 TO 20.


NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

OBS	STATION	PARMCODE	STATCODE	DATE	VALUE	TIME	DATETIME
1	254031080191103	00045	6	77-05-04	0.00	7:34:00	04MAY77:07:34:00
2	254031080191103	00045	6	77-05-04	0.00	7:35:00	04MAY77:07:35:00
3	254031080191103	00045	6	77-05-04	0.00	7:36:00	04MAY77:07:36:00
4	254031080191103	00045	6	77-05-04	0.00	7:37:00	04MAY77:07:37:00
5	254031080191103	00045	6	77-05-04	0.00	7:38:00	04MAY77:07:38:00
6	254031080191103	00045	6	77-05-04	0.00	7:39:00	04MAY77:07:39:00
7	254031080191103	00045	6	77-05-04	0.00	7:40:00	04MAY77:07:40:00
8	254031080191103	00045	6	77-05-04	0.00	7:41:00	04MAY77:07:41:00
9	254031080191103	00045	6	77-05-04	0.00	7:42:00	04MAY77:07:42:00
10	254031080191103	00045	6	77-05-04	0.00	7:43:00	04MAY77:07:43:00
11	254031080191103	00045	6	77-05-04	0.00	7:44:00	04MAY77:07:44:00
12	254031080191103	00045	6	77-05-04	0.00	7:45:00	04MAY77:07:45:00
13	254031080191103	00045	6	77-05-04	0.00	7:46:00	04MAY77:07:46:00
14	254031080191103	00045	6	77-05-04	0.00	7:47:00	04MAY77:07:47:00
15	254031080191103	00045	6	77-05-04	0.00	7:48:00	04MAY77:07:48:00
16	254031080191103	00045	6	77-05-04	0.00	7:49:00	04MAY77:07:49:00
17	254031080191103	00045	6	77-05-04	0.00	7:50:00	04MAY77:07:50:00
18	254031080191103	00045	6	77-05-04	0.00	7:51:00	04MAY77:07:51:00
19	254031080191103	00045	6	77-05-04	0.00	7:52:00	04MAY77:07:52:00
20	254031080191103	00045	6	77-05-04	0.00	7:53:00	04MAY77:07:53:00
21	254031080191103	00045	6	77-05-04	0.00	7:54:00	04MAY77:07:54:00
22	254031080191103	00045	6	77-05-04	0.00	7:55:00	04MAY77:07:55:00
23	254031080191103	00045	6	77-05-04	0.00	7:56:00	04MAY77:07:56:00
24	254031080191103	00045	6	77-05-04	0.00	7:57:00	04MAY77:07:57:00
25	254031080191103	00045	6	77-05-04	0.00	7:58:00	04MAY77:07:58:00
26	254031080191103	00045	6	77-05-04	0.00	7:59:00	04MAY77:07:59:00
27	254031080191103	00045	6	77-05-04	0.01	8:00:00	04MAY77:08:00:00
28	254031080191103	00045	6	77-05-04	0.00	8:01:00	04MAY77:08:01:00
29	254031080191103	00045	6	77-05-04	0.00	8:02:00	04MAY77:08:02:00
30	254031080191103	00045	6	77-05-04	0.00	8:03:00	04MAY77:08:03:00
31	254031080191103	00045	6	77-05-04	0.00	8:04:00	04MAY77:08:04:00
32	254031080191103	00045	6	77-05-04	0.00	8:05:00	04MAY77:08:05:00
33	254031080191103	00045	6	77-05-04	0.00	8:06:00	04MAY77:08:06:00
34	254031080191103	00045	6	77-05-04	0.00	8:07:00	04MAY77:08:07:00
35	254031080191103	00045	6	77-05-04	0.00	8:08:00	04MAY77:08:08:00
36	254031080191103	00045	6	77-05-04	0.00	8:09:00	04MAY77:08:09:00
37	254031080191103	00045	6	77-05-04	0.00	8:10:00	04MAY77:08:10:00
38	254031080191103	00045	6	77-05-04	0.00	8:11:00	04MAY77:08:11:00
39	254031080191103	00045	6	77-05-04	0.00	8:12:00	04MAY77:08:12:00
40	254031080191103	00045	6	77-05-04	0.00	8:13:00	04MAY77:08:13:00
41	254031080191103	00045	6	77-05-04	0.00	8:14:00	04MAY77:08:14:00
42	254031080191103	00045	6	77-05-04	0.00	8:15:00	04MAY77:08:15:00
43	254031080191103	00045	6	77-05-04	0.00	8:16:00	04MAY77:08:16:00
44	254031080191103	00045	6	77-05-04	0.00	8:17:00	04MAY77:08:17:00
45	254031080191103	00045	6	77-05-04	0.00	8:18:00	04MAY77:08:18:00
46	254031080191103	00045	6	77-05-04	0.01	8:19:00	04MAY77:08:19:00
47	254031080191103	00045	6	77-05-04	0.00	8:20:00	04MAY77:08:20:00
48	254031080191103	00045	6	77-05-04	0.00	8:21:00	04MAY77:08:21:00
49	254031080191103	00045	6	77-05-04	0.00	8:22:00	04MAY77:08:22:00
50	254031080191103	00045	6	77-05-04	0.00	8:23:00	04MAY77:08:23:00
51	254031080191103	00045	6	77-05-04	0.00	8:24:00	04MAY77:08:24:00
52	254031080191103	00045	6	77-05-04	0.00	8:25:00	04MAY77:08:25:00
53	254031080191103	00045	6	77-05-04	0.00	8:26:00	04MAY77:08:26:00
54	254031080191103	00045	6	77-05-04	0.00	8:27:00	04MAY77:08:27:00
55	254031080191103	00045	6	77-05-04	0.00	8:28:00	04MAY77:08:28:00
56	254031080191103	00045	6	77-05-04	0.00	8:29:00	04MAY77:08:29:00

OBS	STATION	PARMCODE	STATCODE	DATE	VALUE	TIME	DATETIME
57	254031080191103	00045	6	77-05-04	0.00	8:30:00	04MAY77:08:30:00
58	254031080191103	00045	6	77-05-04	0.00	8:31:00	04MAY77:08:31:00
59	254031080191103	00045	6	77-05-04	0.00	8:32:00	04MAY77:08:32:00
60	254031080191103	00045	6	77-05-04	0.00	8:33:00	04MAY77:08:33:00
61	254031080191103	00045	6	77-05-04	0.00	8:34:00	04MAY77:08:34:00
62	254031080191103	00045	6	77-05-04	0.00	8:35:00	04MAY77:08:35:00
63	254031080191103	00045	6	77-05-04	0.00	8:36:00	04MAY77:08:36:00
64	254031080191103	00045	6	77-05-04	0.00	8:37:00	04MAY77:08:37:00
65	254031080191103	00045	6	77-05-04	0.00	8:38:00	04MAY77:08:38:00
66	254031080191103	00045	6	77-05-04	0.01	8:39:00	04MAY77:08:39:00
67	254031080191103	00045	6	77-05-04	0.00	8:40:00	04MAY77:08:40:00
68	254031080191103	00045	6	77-05-04	0.00	8:41:00	04MAY77:08:41:00
69	254031080191103	00045	6	77-05-04	0.00	8:42:00	04MAY77:08:42:00
70	254031080191103	00045	6	77-05-04	0.00	8:43:00	04MAY77:08:43:00
71	254031080191103	00045	6	77-05-04	0.00	8:44:00	04MAY77:08:44:00
72	254031080191103	00045	6	77-05-04	0.00	8:45:00	04MAY77:08:45:00
73	254031080191103	00045	6	77-05-04	0.01	8:46:00	04MAY77:08:46:00
74	254031080191103	00045	6	77-05-04	0.00	8:47:00	04MAY77:08:47:00
75	254031080191103	00045	6	77-05-04	0.01	8:48:00	04MAY77:08:48:00
76	254031080191103	00045	6	77-05-04	0.00	8:49:00	04MAY77:08:49:00
77	254031080191103	00045	6	77-05-04	0.00	8:50:00	04MAY77:08:50:00
78	254031080191103	00045	6	77-05-04	0.01	8:51:00	04MAY77:08:51:00
79	254031080191103	00045	6	77-05-04	0.00	8:52:00	04MAY77:08:52:00
80	254031080191103	00045	6	77-05-04	0.01	8:53:00	04MAY77:08:53:00
81	254031080191103	00045	6	77-05-04	0.00	8:54:00	04MAY77:08:54:00
82	254031080191103	00045	6	77-05-04	0.01	8:55:00	04MAY77:08:55:00
83	254031080191103	00045	6	77-05-04	0.01	8:56:00	04MAY77:08:56:00
84	254031080191103	00045	6	77-05-04	0.00	8:57:00	04MAY77:08:57:00
85	254031080191103	00045	6	77-05-04	0.01	8:58:00	04MAY77:08:58:00
86	254031080191103	00045	6	77-05-04	0.00	8:59:00	04MAY77:08:59:00
87	254031080191103	00045	6	77-05-04	0.01	9:00:00	04MAY77:09:00:00
88	254031080191103	00045	6	77-05-04	0.01	9:01:00	04MAY77:09:01:00
89	254031080191103	00045	6	77-05-04	0.01	9:02:00	04MAY77:09:02:00
90	254031080191103	00045	6	77-05-04	0.02	9:03:00	04MAY77:09:03:00
91	254031080191103	00045	6	77-05-04	0.02	9:04:00	04MAY77:09:04:00
92	254031080191103	00045	6	77-05-04	0.01	9:05:00	04MAY77:09:05:00
93	254031080191103	00045	6	77-05-04	0.02	9:06:00	04MAY77:09:06:00
94	254031080191103	00045	6	77-05-04	0.02	9:07:00	04MAY77:09:07:00
95	254031080191103	00045	6	77-05-04	0.03	9:08:00	04MAY77:09:08:00
96	254031080191103	00045	6	77-05-04	0.01	9:09:00	04MAY77:09:09:00
97	254031080191103	00045	6	77-05-04	0.01	9:10:00	04MAY77:09:10:00
98	254031080191103	00045	6	77-05-04	0.02	9:11:00	04MAY77:09:11:00

INTERMEDIATE COMPUTER PRINTOUT CONTINUES AS ABOVE

OBS	STATION	PARMCODE	STATCODE	DATE	VALUE	TIME	DATETIME
1065	254031080191103	00045	6	77-05-11	0.00	17:53:00	11MAY77:17:53:00
1066	254031080191103	00045	6	77-05-11	0.00	17:54:00	11MAY77:17:54:00
1067	254031080191103	00045	6	77-05-11	0.00	17:55:00	11MAY77:17:55:00
1068	254031080191103	00045	6	77-05-11	0.00	17:56:00	11MAY77:17:56:00
1069	254031080191103	00045	6	77-05-11	0.00	17:57:00	11MAY77:17:57:00
1070	254031080191103	00045	6	77-05-11	0.00	17:58:00	11MAY77:17:58:00
1071	254031080191103	00045	6	77-05-11	0.00	17:59:00	11MAY77:17:59:00
1072	254031080191103	00045	6	77-05-11	0.00	18:00:00	11MAY77:18:00:00
1073	254031080191103	00045	6	77-05-11	0.00	18:01:00	11MAY77:18:01:00
1074	254031080191103	00045	6	77-05-11	0.00	18:02:00	11MAY77:18:02:00
1075	254031080191103	00045	6	77-05-11	0.00	18:03:00	11MAY77:18:03:00
1076	254031080191103	00045	6	77-05-11	0.00	18:04:00	11MAY77:18:04:00
1077	254031080191103	00045	6	77-05-11	0.00	18:05:00	11MAY77:18:05:00
1078	254031080191103	00045	6	77-05-11	0.00	18:06:00	11MAY77:18:06:00
1079	254031080191103	00045	6	77-05-11	0.00	18:07:00	11MAY77:18:07:00
1080	254031080191103	00045	6	77-05-11	0.00	18:08:00	11MAY77:18:08:00
1081	254031080191103	00045	6	77-05-11	0.00	18:09:00	11MAY77:18:09:00
1082	254031080191103	00045	6	77-05-11	0.00	18:10:00	11MAY77:18:10:00
1083	254031080191103	00045	6	77-05-11	0.00	18:11:00	11MAY77:18:11:00
1084	254031080191103	00045	6	77-05-11	0.00	18:12:00	11MAY77:18:12:00
1085	254031080191103	00045	6	77-05-11	0.00	18:13:00	11MAY77:18:13:00
1086	254031080191103	00045	6	77-05-11	0.00	18:14:00	11MAY77:18:14:00
1087	254031080191103	00045	6	77-05-11	0.00	18:15:00	11MAY77:18:15:00
1088	254031080191103	00045	6	77-05-11	0.00	18:16:00	11MAY77:18:16:00
1089	254031080191103	00045	6	77-05-11	0.00	18:17:00	11MAY77:18:17:00
1090	254031080191103	00045	6	77-05-11	0.00	18:18:00	11MAY77:18:18:00
1091	254031080191103	00045	6	77-05-11	0.01	18:19:00	11MAY77:18:19:00
1092	254031080191103	00045	6	77-05-11	0.00	18:20:00	11MAY77:18:20:00
1093	254031080191103	00045	6	77-05-11	0.00	18:21:00	11MAY77:18:21:00
1094	254031080191103	00045	6	77-05-11	0.00	18:22:00	11MAY77:18:22:00
1095	254031080191103	00045	6	77-05-11	0.00	18:23:00	11MAY77:18:23:00
1096	254031080191103	00045	6	77-05-11	0.00	18:24:00	11MAY77:18:24:00
1097	254031080191103	00045	6	77-05-11	0.00	18:25:00	11MAY77:18:25:00
1098	254031080191103	00045	6	77-05-11	0.00	18:26:00	11MAY77:18:26:00
1099	254031080191103	00045	6	77-05-11	0.00	18:27:00	11MAY77:18:27:00
1100	254031080191103	00045	6	77-05-11	0.00	18:28:00	11MAY77:18:28:00

3.4 Water-Quality File Component

The water-quality file component of the User File has the capacity to store as many water-quality parameters per water sample as necessary and as prudent use of storage facilities allows. A variable number of samples per storm and parameters per sample can be stored so the approximate total capacity of this file is:

$$M \cdot N \cdot O \cdot P$$

where

M = number of sites;
N = number of storms;
O = number of samples; and
P = number of parameters for a given sample.

Data that are put into the file are generated from the standard WATSTORE retrieval program QWRETR. QWRETR takes data from the Water-Quality File in WATSTORE and passes it to a PL/I program called QWSAS that has been loaded as a SAS PROC. QWSAS transforms the data into a SAS data set named DATA1. The standard default parameters that make up DATA1 are STATION, the station identification number, and one variable for each parameter code listed on the QWRETR output parameter list cards. The parameter values are stored in variables named Pnnnnn, where nnnnn is the parameter code on the output list. Section R of Chapter IV, Volume 3, WATSTORE User's Guide fully describes the computational process and corresponding SAS data set output.

3.41 Naming Data Sets

The Operating System DSN for User File water-quality data sets is AG4yyyz.STATEXX.URBAN.QW.VALUES. XX and yyyz are determined as defined in Section 3.21. The SAS data set member name is QWMASTER. Again as stated in other sections of this report, the 39 possible SAS data sets that could be a part of the OS data set are for creating user work data sets and so forth. The JCL statement

```
//QWFILE DD DSN=AG4yyyz.STATEXX.URBAN.QW.VALUES,...
```

references the OS data set. The corresponding SAS data set reference is

```
QWFILE.QWMASTER
```

which refers to the SAS data set that is a member of the OS data set.

3.42 Creating Data Sets

There are two sets of commands necessary for establishing a new QW File for a State. JCL commands that define the data set name to the operating system is the first set. The second set are SAS instructions that are used to define organization of the QW File.

3.421 JCL Commands

The necessary JCL cards are as follows:

```
        COL.1       COL.12
          ●           ●
Card 1..//          JOB
     2..//PROCLIB DD DSN=WRD.PROCLIB,DISP=SHR
     3..//  EXEC QWRETR,AGENCY=USGS
     4..//HDR.SYSIN DD *

          Retrieval cards for QWRETR

     5..XQWSAS
     6..//*
     7..//  EXEC WRDSAS
     8..//QWFILE DD DSN=AG4yyyz.STATEXX.URBAN.QW.VALUES,
     9..// DISP=(NEW,CATLG),DCB=DSORG=DA,
    10..// SPACE=(TRK,(N1,N2),RLSE),UNIT=3330-1,VOL=SER=CCD810
    11..//SYSIN DD *
    12..PROC QWSAS DATE TIME REMARKS;

Other SAS commands

    13..//*
    14..//
```

The above JCL cards do the following:

Card 1..Job control card.
2..Invokes the WRD cataloged procedure library.
3..Invokes the cataloged procedure QWRETR.
4..Establishes that incoming data cards for QWRETR follow.
5..Signals to QWRETR that a QWSAS execution will follow.
6..Delimiter or JCL step separator card.
7..Invokes the procedure WRDSAS to call the WRD loaded version of SAS.
8-10..Defines data set to be created for state XX to be placed on WRD disk CCD810. Space to be reserved for data set = N1 + 15(N2) tracks (explained in Appendix A of this report).
11..Establishes that incoming SAS data cards follow.
12..Activates SAS PROC QWSAS.
13..Delimiter.
14..End of job card.

3.422 SAS Commands

Between cards 11 and 13 given in section 3.421, reference was made to an instruction card PROC QWSAS and other SAS commands. The PROC QWSAS command will generate a SAS data set with a variable named STATION and one variable for each parameter code listed on the QWRETR output parameter list cards. Additionally, users will probably want other variables included. To do this, card 12 in section 3.421 is coded as illustrated to include the other variables.

```
Card 12..PROC QWSAS DATE TIME REMARKS;
```

The other SAS commands are listed below.

```
Card 1..PROC SORT OUT=QWFILE.QWMASTER;
     2..    BY STATION DATE TIME;
     3..    FORMAT DATE YYMMDD8.;
     4..PROC PRINT;
```

The above SAS commands will perform the following functions on the SAS data set DATA1 that was created by PROC QWSAS.

(1) QWFILE.QWMASTER is sorted by STATION and PARMCODE.
(2) The newly established data set QWFILE.QWMASTER is printed by the instruction card 4. The variable DATE is printed using the format specified on card 3.

In sections 3.222 and 3.322 the SAS commands made reference to two macro procedures, DVINPUT and UVINPUT. Similarly, the macro for the water-quality file component is QWINPUT. The statements listed on the next page make up the macro QWINPUT.

```
MACRO QWINPUT

********THIS MACRO CREATES A SAS DATASET FROM RETRIEVED WATER QUALITY DATA
        VARIABLES CREATED ARE STATION, PARMCODE, DATETIME, VALUE, REMARK *****
DATA QW; RETAIN STATION N DATETIME;
INFILE BKFILE;
INPUT @2 STATION $15. @19 DATE YYMMDD6.  @33 HH 2.
      @35 MM 2. @133 N IB4. @@;
IF MM=. THEN MM=0; IF HH=. THEN HH=0.;
      DATETIME=DHMS(DATE,HH,MM,O);
PUTOUT:
     N=N-1
     P=137 + 12*N;
     IF N=0 THEN GO TO LAST;
     INPUT @P PARMCODE IB4. VALUE RB4. REMARK $1. @@;
     OUTPUT;
     GO TO PUTOUT;
LAST:
     INPUT @P PARMCODE IB4. VALUE RB4. REMARK $1.;
     OUTPUT;
DROP N P DATE HH MM;
FORMAT DATETIME DATETIME18.;
LENGTH PARMCODE 4 VALUE 4;
%
```

The variables that would be generated as a result of the macro QWINPUT would be:

(1) STATION--Station identification number.
(2) PARMCODE--5-digit WATSTORE parameter code.
(3) VALUE--Unit value of parameter.
(4) DATE--Date of collection or measurement of sample value.
(5) REMARK--Remark code corresponding to retrieval parameter.

If the user wants to use QWINPUT, then necessary JCL information for card 8 in section 3.421 would have to be supplied. It is recommended that the PROC QWSAS be used and retain instructions for QWINPUT as a reference.

The following pages illustrate JCL commands, SAS instructions, and sample output resulting from creating a Water-Quality File for urban data collected at a multifamily residential site near Miami, Fla. The order of the output corresponds to the sequential processing of JCL and SAS commands as referenced on the preceding pages.

```
//AG4254J9 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=8,MSGLEVEL=(2,0)        J4973
***PROCLIB  WRD.PROCLIB
***SETUP    110289/M
// EXEC QWRETR,AGENCY=USGS,VOL1=110289
//MDR.SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0002
IEF373I STEP /MDR      / START 81154.0851
IEF374I STEP /MDR      / STOP  81154.0852 CPU   0MIN 00.35SEC MAIN 252K LCS   0K
CCD006I STEP /MDR      / I/O IN DD SEQ: 215:0       314:0       4A9:2
CCD006I STEP /MDR      / I/O IN DD SEQ: 4AB:0       000:0       743:0
CCD006I STEP /MDR      / I/O IN DD SEQ: 486:2       486:3       563:0
CCD006I STEP /MDR      / I/O IN DD SEQ: 155:1       743:0       563:1
CCD006I STEP /MDR      / I/O IN DD SEQ: 155:2       4D2:1
CCD001I STEP /MDR      / MEMORY RESERVED  260K: ACCESSES: DISK       12/ TAPE        0
IEF202I - STEP - MSRT    . WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /MSRT     / START 81154.0852
IEF374I STEP /MSRT     / STOP  81154.0852 CPU   0MIN 00.00SEC MAIN   0K LCS   0K
CCD001I STEP /MSRT     / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /QWR      / START 81154.0852
IEF374I STEP /QWR      / STOP  81154.0856 CPU   0MIN 02.89SEC MAIN 472K LCS   0K
CCD006I STEP /QWR      / I/O IN DD SEQ: 743:0       314:0       215:0
CCD006I STEP /QWR      / I/O IN DD SEQ: 314:0       4A9:1       4AA:10
CCD006I STEP /QWR      / I/O IN DD SEQ: 4AB:1       4AC:1       743:0
CCD006I STEP /QWR      / I/O IN DD SEQ: 215:0       215:0       155:3
CCD006I STEP /QWR      / I/O IN DD SEQ: 486:0       485:0       196:4215
CCD006I STEP /QWR      / I/O IN DD SEQ: 000:0       000:0       000:0
CCD006I STEP /QWR      / I/O IN DD SEQ: 000:0       000:0       000:0
CCD006I STEP /QWR      / I/O IN DD SEQ: 000:0       155:1       155:1
CCD006I STEP /QWR      / I/O IN DD SEQ: 432:0       4F0:0       000:0
CCD006I STEP /QWR      / I/O IN DD SEQ: 000:0       000:0       563:3
CCD001I STEP /QWR      / MEMORY RESERVED  492K: ACCESSES: DISK       21/ TAPE     4215
IEF202I - STEP - QSORT   . WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /QSORT    / START 81154.0856
IEF374I STEP /QSORT    / STOP  81154.0856 CPU   0MIN 00.00SEC MAIN   0K LCS   0K
CCD001I STEP /QSORT    / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
// EXEC #ROSAS
//QWFILE DD DSN=AG4254J.STATEXX.JRBAN.QW.VALUES,
// DISP=(NEW,CATLG),DCB=DSORG=DA,
// SPACE=(TRK,(4,1),RLSE),UNIT=3330,VOL=SER=CCD010
//SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81154.0856
IEF374I STEP /SAS      / STOP  81154.0858 CPU   0MIN 01.18SEC MAIN 276K LCS   0K
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0       481:0       155:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 631:0       215:0       314:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 563:50      4A9:1       4AA:3
CCD006I STEP /SAS      / I/O IN DD SEQ: 4AB:4       481:0       155:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 314:0       4AC:0       563:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0       155:0       155:2
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:3       743:41      486:5
CCD006I STEP /SAS      / I/O IN DD SEQ: 216:0       563:0       563:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 000:0       000:0       000:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 000:0       743:3       743:3
CCD006I STEP /SAS      / I/O IN DD SEQ: 743:3       4D3:1       744:20
CCD001I STEP /SAS      / MEMORY RESERVED  276K: ACCESSES: DISK      139/ TAPE        0
IEF375I  JOB /AG4254J9/ START 81154.0851
IEF376I  JOB /AG4254J9/ STOP  81154.0858 CPU   0MIN 04.42SEC
CCD007A  JOB /AG4254J9/ BASIC CHRG: FIXED    CPU    DSK-IO   TPE-IO KBYTE-HR  TOTAL
                                    1.24     3.36      .52     6.40     1.24   12.76
CCD007C  JOB /AG4254J9/ OTHER CHRGS: TP-MTS DK-MTS                             TOTAL
```

```
PROGRAM G745 HAD THE FOLLOWING PROGRAM DATES OF LAST REVISION:
     G745             9 APR 81 08.24.18
     HDRIRTV         14 JAN 81 11.01.24
     HDRLIST          8 APR 81 12.57.31


AGENCY CODE USGS  WAS SUBMITTED THROUGH THE AGENCY SYMBOLIC JCL PARAMETER ON THE EXEC CARD.
            -----

CODES SUBMITTED THROUGH SYMBOLIC JCL PARAMETERS ON THE EXEC CARDS WILL BE TEMPORARILY OVERRIDDEN
IF A 7 CARD WITH VALID ENTRIES. IS PLACED PRECEDING A STATION SELECTION CARD.




**********************************  RETRIEVAL NO.  1   JUN 03, 1981   ****************************************


STATION HEADER DATA HAS BEEN REQUESTED TO BE WRITTEN INTO AN OUTPUT FILE IN THE FORMAT LISTED BELOW.

STATION HEADER RECORD LIST

PROGRAM G745 IS FUNCTIONING AS A PREPROCESSOR FOR RETRIEVING WATER QUALITY DATA RECORDS.

                                                 <- SORT OPTNS ->                  M CARD  ***

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
M2  1977050419770504                          X                              01

 <-STATION ID.->                                                                   D CARD  ***
D2540310801911OO

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
XQWSAS



BASED ONLY ON INFORMATION AVAILABLE FROM THE STATION HEADER FILE.     1 SITES WERE SELECTED FOR RETRIEVAL NO.  1


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


STATION HEADER RETRIEVAL PROCESSING ENDED
```

PROGRAM E771 AND SUBROUTINES DATES OF LAST REVISION

E771 + COMDATX	13 MAY 81 21.20.51
QWRTVB	14 JUL 80 12.49.01
QWRTVC	14 JUL 80 12.49.14
QWCONTL	25 APR 80 02.46.23
QWPUNCH	25 APR 80 02.47.03
QWRLIST	9 AUG 80 09.01.08
QWXLIST	9 AUG 80 09.01.33
PARMAPW	
PARMRET	
HDRIRTV	
ENDATE	

PARAMETERS PASSED VIA JOB CONTROL
AGENCY = USGS
PASSWORD =

```
******************************************************  RETRIEVAL NO:  1  ******************************************************

M2  19770504 19770504                    X                                01

XQWSAS


RETRIEVAL SPECIFICATIONS FOR REQUEST NUMBER  1 ARE AS FOLLOWS:
          ALL PARAMETERS RETRIEVED
          FOR EACH SELECTED ANALYSIS ALL PARAMETERS WILL BE WRITTEN
          A DUMP OF ALL PARAMETERS IS REQUESTED - THE RETRIEVAL MAY USE AN EXCESSIVE AMOUNT OF TIME
          SELECTED ANALYSIS WILL BE PRINTED AS REQUESTED
```

SELECTED ANALYSIS FOR RETRIEVAL NO: 1

STATION ID. NO.	LAT-LONG-SQ.NO.	SITE CODE	STATE CODE	DIST CODE	CNTY CODE	STATION NAME OR LOCAL WELL NO.
254031080191100	254031080191100	SS	12	12	025	STORM WATER RUNOFF AT KINGS CREEK APTS MIAMI FLA

DATES: 77/05/04		TIME: 927		TYPE: 2		GEOLOGIC UNIT:		70	84.9999
80	69.9999	340	109.9998			500	646.9990	515	131.9998
600	1.5700	605	1.4000			610	0.0100	615	0.0100
620	0.1500	625	1.4100			630	0.1600	665	0.2100
680	12.0000	685	13.0000			690	25.0000	937	1.5000
1027	0.0000	1034	10.0000	1		1042	25.0000	1045	820.0000
1051	610.0000	1092	240.0000			70299	514.9993	70507	0.0400
71887	6.9000	72005	43.0000						
DATES: 77/05/04		TIME: 933		TYPE: 2		GEOLOGIC UNIT:		70	64.9999
80	49.9999	95	115.9998			340	109.9998	500	321.9995
515	87.9999	600	1.2700			605	1.1000	610	0.0100
615	0.0100	620	0.1500			625	1.1100	630	0.1600
665	0.1900	680	12.0000			685	6.0000	690	18.0000
937	1.5000	1027	0.0000			1034	10.0000	1042	21.0000
1045	720.0000	1051	450.0000			1092	170.0000	70299	233.9997
70507	0.0600	71887	5.6000			72005	42.9999		
DATES: 77/05/04		TIME: 942		TYPE: 2		GEOLOGIC UNIT:		70	40.0000
80	30.0000	95	121.9998			340	44.9999	500	188.9997
515	81.9999	600	0.9400			605	0.8100	610	0.0200
615	0.0100	620	0.1000			625	0.8300	630	0.1100
665	0.1400	680	7.0000			685	8.0000	690	15.0000
937	1.5000	1027	0.0000			1034	10.0000	1042	14.0000
1045	470.0000	1051	230.0000			1092	100.0000	70299	106.9999
70507	0.0600	71887	4.2000			72005	42.9999		
DATES: 77/05/04		TIME: 954		TYPE: 2		GEOLOGIC UNIT:		70	25.0000
80	30.0000	95	119.9998			340	48.9999	500	126.9998
515	67.9999	600	0.9000			605	0.7800	610	0.0100
615	0.0100	620	0.1000			625	0.7900	630	0.1100
665	0.1500	680	10.0000			685	7.0000	690	17.0000
937	1.8000	1027	0.0000			1034	10.0000	1042	7.0000
1045	240.0000	1051	240.0000			1092	70.0000	70299	58.9999
70507	0.0800	71887	4.0000			72005	42.9999		
DATES: 77/05/04		TIME: 1006		TYPE: 2		GEOLOGIC UNIT:		70	35.0000
80	30.0000	95	81.9999			340	11.0000	500	148.9998
515	69.9999	600	0.8000			605	0.7100	610	0.0200
615	0.0100	620	0.0600			625	0.7300	630	0.0700
665	0.1600	680	5.0000			685	5.0000	690	11.0000
937	1.6000	1027	0.0000			1034	10.0000	1042	9.0000
1045	280.0000	1051	220.0000			1092	90.0000	70299	78.9999
70507	0.1000	71887	3.5000			72005	42.9999		
DATES: 77/05/04		TIME: 1013		TYPE: 2		GEOLOGIC UNIT:		70	20.0000
80	20.0000	95	74.9999			340	26.0000	500	91.9999
515	51.9999	600	0.5900			605	0.5100	610	0.0200
615	0.0100	620	0.0500			625	0.5300	630	0.0600
665	0.1500	680	4.0000			685	6.0000	690	10.0000
937	1.6000	1027	0.0000			1034	10.0000	1042	7.0000
1045	250.0000	1051	230.0000			1092	60.0000	70299	40.0000
70507	0.1000	71887	2.6000			72005	42.9999		

DATES:	77/05/04		TIME: 1030		TYPE: 2		GEOLOGIC UNIT:			70	159.9998
80	40.0000		95		81.9999		340	240.9997		500	628.9990
515	119.9998		600		2.6700		605	2.6000		610	0.0200
615	0.0100		620		0.0400		625	2.6200		630	0.0500
665	0.5000		680		4.0000		685	6.0000		690	10.0000
937	1.4000		1027		0.0000		1034	10.0000	1	1042	45.0000
1045	2600.0000		1051		1100.0000		1092	790.0000		70299	508.9993
70507	0.1000		71887		12.0000		72005	42.9999			
DATES:	77/05/04		TIME: 1042		TYPE: 2		GEOLOGIC UNIT:			70	99.9998
80	30.0000		340		233.9997		500	705.9990		515	71.9999
500	2.2800		605		2.2000		610	0.0200		615	0.0100
620	0.0500		625		2.2200		630	0.0600		665	0.4300
680	2.0000		685		5.0000		690	8.0000		937	1.7000
1027	0.0000		1034		10.0000	1	1042	39.0000		1045	1800.0000
1051	860.0000		1092		660.0000		70299	633.9990		70507	0.1100
71887	10.0000		72005		43.0000						
DATES:	77/05/04		TIME: 1054		TYPE: 2		GEOLOGIC UNIT:			70	30.0000
80	30.0000		95		139.9998		340	24.0000		500	134.9998
515	85.9999		600		0.8700		605	0.7600		610	0.0200
615	0.0100		620		0.0800		625	0.7800		630	0.0900
665	0.1700		680		3.0000		685	7.0000		690	15.0000
937	2.2000		1027		0.0000		1034	10.0000	1	1042	7.0000
1045	230.0000		1051		60.0000		1092	30.0000		70299	48.9999
70507	0.1300		71887		3.9000		72005	42.9999			
DATES:	77/05/04		TIME: 1109		TYPE: 2		GEOLOGIC UNIT:			70	15.0000
80	30.0000		95		81.9999		340	10.0000		500	52.9999
515	43.9999		600		0.6800		605	0.5800		610	0.0100
615	0.0100		620		0.0800		625	0.5900		630	0.0900
665	0.2100		680		4.0000		685	6.0000		690	10.0000
937	2.2000		1027		0.0000		1034	10.0000	1	1042	7.0000
1045	220.0000		1051		70.0000		1092	70.0000		70299	9.0000
70507	0.1700		71887		3.0000		72005	42.9999			
DATES:	77/05/04		TIME: 1127		TYPE: 2		GEOLOGIC UNIT:			70	30.0000
80	20.0000		95		95.9999		340	55.9999		500	147.9998
515	71.9999		600		0.9600		605	0.8400		610	0.0100
615	0.0100		620		0.1000		625	0.8500		630	0.1100
665	0.3100		680		4.0000		685	6.0000		690	10.0000
937	2.8000		1027		0.0000		1034	10.0000	1	1042	10.0000
1045	490.0000		1051		110.0000		1092	120.0000		70299	75.9999
70507	0.2300		71887		4.2000		72005	42.9999			
DATES:	77/05/04		TIME: 1153		TYPE: 2		GEOLOGIC UNIT:			70	15.0000
80	40.0000		95		110.9998		340	37.0000		500	111.9998
515	79.9999		600		0.8900		605	0.7800		610	0.0100
615	0.0100		620		0.0900		625	0.7900		630	0.1000
665	0.2900		680		3.0000		685	5.0000		690	14.0000
937	2.9000		1027		0.0000		1034	10.0000	1	1042	4.0000
1045	200.0000		1051		150.0000		1092	70.0000		70299	32.0000
70507	0.2200		71887		3.9000		72005	42.9999			

12 ANALYSIS HAVE BEEN WRITTEN IN THE BACKFILE FORMAT FOR RETRIEVAL NO: 1

***** NOTE *****

```
* VALUES OF DISSOLVED AND TOTAL *
* SELENIUM EXCEEDING 5 UG/L IN  *
* SAMPLES COLLECTED BEFORE 1975 *
* SHOULD BE USED WITH CAUTION.  *
* PLEASE REFER TO QUALITY OF    *
* WATER BRANCH TECHNICAL MEMO   *
*         NO. 81.12.            *
*********************************
```

WATER QUALITY RETRIEVAL PROCESSING ENDED

```
1                                  S T A T I S T I C A L   A N A L Y S I S   S Y S T E M          8:56 WEDNESDAY, JUNE 3, 1981

NOTE: THE JOB AG4254J9 HAS BEEN RUN UNDER RELEASE 79.38 OF SAS AT U.S. GEOLOGICAL SURVEY.


1
2
3
4                  PROC QWSAS DATE TIME REMARKS;
5

NOTE: DATA SET WORK.DATA1 HAS 12 OBSERVATIONS AND 59 VARIABLES. 46 OBS/TRK.
NOTE: THE PROCEDURE QWSAS USED 0.57 SECONDS AND 276K.

5                  PROC SORT OUT=QWFILE.QWMASTER ;
6                       BY STATION DATE TIME;
7                       FORMAT DATE YYMMDD8.;
8

NOTE: DATA SET QWFILE.QWMASTER HAS 12 OBSERVATIONS AND 59 VARIABLES. 46 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.27 SECONDS AND 272K.

8                  PROC PRINT;

NOTE: THE PROCEDURE PRINT USED 0.21 SECONDS AND 168K AND PRINTED PAGE 1.


NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

QWSAS PROCEDURE: CONVERSION OF USGS DATASETS TO SAS DATASETS
LATEST REVISION: 27 SEP 78 03.06.47
THE FOLLOWING VARIABLES WERE CREATED ON THE SAS DATASET NAMED DATA1:

VARIABLE	NAME
STATION	STATION IDENTIFICATION NUMBER
DATE	DATE SAMPLE WAS COLLECTED
TIME	TIME OF DAY (24 HR CLOCK)
P00070	TURBIDITY (JTU)
R00070	REMARK CODE CORRESPONDING TO P00070
P00080	COLOR (PLATINUM COBALT UNITS)
R00080	REMARK CODE CORRESPONDING TO P00080
P00095	SPECIFIC CONDUCTANCE (MICROMHOS)
R00095	REMARK CODE CORRESPONDING TO P00095
P00340	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)
R00340	REMARK CODE CORRESPONDING TO P00340
P00500	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L)
R00500	REMARK CODE CORRESPONDING TO P00500
P00515	SOLIDS, RESIDUE AT 105 DEG. C, DISSOLVED (MG/L)
R00515	REMARK CODE CORRESPONDING TO P00515
P00600	NITROGEN, TOTAL (MG/L AS N)
R00600	REMARK CODE CORRESPONDING TO P00600
P00605	NITROGEN, ORGANIC TOTAL (MG/L AS N)
R00605	REMARK CODE CORRESPONDING TO P00605
P00610	NITROGEN, AMMONIA TOTAL (MG/L AS N)
R00610	REMARK CODE CORRESPONDING TO P00610
P00615	NITROGEN, NITRITE TOTAL (MG/L AS N)
R00615	REMARK CODE CORRESPONDING TO P00615
P00620	NITROGEN, NITRATE TOTAL (MG/L AS N)
R00620	REMARK CODE CORRESPONDING TO P00620
P00625	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)
R00625	REMARK CODE CORRESPONDING TO P00625
P00630	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)
R00630	REMARK CODE CORRESPONDING TO P00630
P00665	PHOSPHORUS, TOTAL (MG/L AS P)
R00665	REMARK CODE CORRESPONDING TO P00665
P00680	CARBON, ORGANIC TOTAL (MG/L AS C)
R00680	REMARK CODE CORRESPONDING TO P00680
P00685	CARBON, INORGANIC, TOTAL (MG/L AS C)
R00685	REMARK CODE CORRESPONDING TO P00685
P00690	CARBON, TOTAL (MG/L AS C)
R00690	REMARK CODE CORRESPONDING TO P00690
P00937	POTASSIUM, TOTAL RECOVERABLE (MG/L AS K)
R00937	REMARK CODE CORRESPONDING TO P00937
P01027	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)
R01027	REMARK CODE CORRESPONDING TO P01027
P01034	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)
R01034	REMARK CODE CORRESPONDING TO P01034
P01042	COPPER, TOTAL RECOVERABLE (UG/L AS CU)
R01042	REMARK CODE CORRESPONDING TO P01042
P01045	IRON, TOTAL RECOVERABLE (UG/L AS FE)
R01045	REMARK CODE CORRESPONDING TO P01045
P01051	LEAD, TOTAL RECOVERABLE (UG/L AS PB)
R01051	REMARK CODE CORRESPONDING TO P01051
P01092	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)
R01092	REMARK CODE CORRESPONDING TO P01092
P70299	SOLIDS, SUSP. TOTAL, RESIDUE AT 110 DEG. C (MG/L)
R70299	REMARK CODE CORRESPONDING TO P70299
P70507	PHOSPHORUS, ORTHOPH OSPHATE TOTAL (MG/L AS P)

```
R70507    REMARK CODE CORRESPONDING TO P70507
P71887    NITROGEN, TOTAL (MG/L AS NO3)
R71887    REMARK CODE CORRESPONDING TO P71887
P72005    SAMPLE SOURCE
R72005    REMARK CODE CORRESPONDING TO P72005

EXIT QWSAS
```

OBS	STATION	DATE	TIME	P00	R00	P00	R00	P00	R00	P03	R34	P50	R50	P51	R51	P60	R60	P60	R60	P60	R60	P60	R60	P60	R60
1	254031080191100	77-05-04	0927	85		69.9999		.		110		646.999		132		1.57		1.40		0.01		0.01		0.15	
2	254031080191100	77-05-04	0933	65		49.9999		117		110		322.000		88		1.27		1.10		0.01		0.01		0.15	
3	254031080191100	77-05-04	0942	40		30.0000		122		45		189.000		82		0.94		0.81		0.02		0.01		0.10	
4	254031080191100	77-05-04	0954	25		30.0000		120		49		127.000		68		0.90		0.78		0.01		0.01		0.10	
5	254031080191100	77-05-04	1006	35		30.0000		82		11		149.000		70		0.80		0.71		0.02		0.01		0.06	
6	254031080191100	77-05-04	1013	20		20.0000		75		26		92.000		52		0.59		0.51		0.02		0.01		0.05	
7	254031080191100	77-05-04	1030	160		40.0000		82		241		628.999		120		2.67		2.60		0.02		0.01		0.04	
8	254031080191100	77-05-04	1042	100		30.0000		.		234		705.999		72		2.28		2.20		0.02		0.01		0.05	
9	254031080191100	77-05-04	1054	30		30.0000		140		24		135.000		86		0.87		0.76		0.02		0.01		0.08	
10	254031080191100	77-05-04	1109	15		30.0000		82		10		53.000		44		0.68		0.58		0.01		0.01		0.08	
11	254031080191100	77-05-04	1127	30		20.0000		97		56		168.000		72		0.96		0.84		0.01		0.01		0.10	
12	254031080191100	77-05-04	1153	15		40.0000		111		37		112.000		80		0.89		0.78		0.01		0.01		0.09	

OBS	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00
1	1.41		0.16		0.21		12		13		25		1.5		0		10	1	25		820		610		240		514.999		0.04		6.9		43.0000	
2	1.11		0.16		0.19		12		6		18		1.5		0		10	1	21		720		450		170		234.000		0.06		5.6		42.9999	
3	0.83		0.11		0.14		7		8		15		1.5		0		10	1	14		470		230		100		107.000		0.06		4.2		42.9999	
4	0.79		0.11		0.15		10		7		17		1.8		0		10	1	7		240		240		70		59.000		0.08		4.0		42.9999	
5	0.73		0.07		0.15		6		5		11		1.6		0		10	1	8		280		220		90		79.000		0.10		3.5		42.9999	
6	0.53		0.06		0.15		4		6		10		1.6		0		10	1	7		250		230		60		40.000		0.10		2.6		42.9999	
7	2.62		0.05		0.50		4		5		10		1.4		0		10	1	45		2600		1100		790		508.999		0.10		12.0		42.9999	
8	2.22		0.06		0.43		2		5		8		1.7		0		10	1	39		1800		860		660		633.999		0.11		10.0		43.0000	
9	0.78		0.09		0.17		8		7		15		2.2		0		10	1	7		230		60		30		49.000		0.13		3.9		42.9999	
10	0.59		0.09		0.21		4		6		10		2.2		0		10	1	7		220		70		70		9.000		0.17		3.0		42.9999	
11	0.85		0.11		0.31		4		5		10		2.8		0		10	1	10		490		110		120		76.000		0.23		4.2		42.9999	
12	0.79		0.10		0.29		9		5		14		2.9		0		10	1	4		200		150		70		32.000		0.22		3.9		42.9999	

3.43 Updating Data Sets

After the original creation of a state's User File QW component, all further operations are actually updates (additions or corrections) to the file. The JCL and SAS commands change to reflect an update operation.

3.431 JCL Commands

In section 3.421 cards 8, 9, and 10* are replaced by these two cards:

```
Card 8..//QWFILE DD DSN=AG4yyyz.STATEXX.URBAN.QW.VALUES,
     9..// DISP=OLD
```

*Note: There is no card 10 for this operation.

The above statement references the OS data set as alreadv existing.

3.432 SAS Commands

When updating, the PROC QWSAS is still activated but the other SAS instruction cards change and are listed below.

```
Card 1..PROC QWSAS DATE TIME REMARKS;
     2..PROC SORT OUT=TEMP;
     3..     BY STATION DATE TIME;
     4..     FORMAT DATE YYMMDD8.;
     5..DATA QWFILE.QWMASTER;
     6..UPDATE QWFILE.QWMASTER TEMP;
     7..     BY STATION DATE TIME;
     8..PROC PRINT:
```

The above procedure, cards 1-8, is for merging data into the QWMASTER file that has not been previously entered. Card 8 should probably be placed behind card 4 if the data set is very large. This will list the new data that is being entered into the QWMASTER file.

An example of updating the Water-Quality File for the Miami, Fla., multifamily residential site is presented on the following pages. The JCL commands, SAS instructions and sample output are all illustrated.

```
//AG4254J9 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)          J5103
***PROCLIB  WRD.PROCLIB
***SETUP    110289/M
// EXEC QWRETR,AGENCY=USGS,VOL1=110289
//WDR.SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0002
IEF373I STEP /WDR      / START 91154.0948
IEF374I STEP /WDR      / STOP  91154.0949 CPU    0MIN 00.38SEC MAIN 252K LCS    0K
CCD0006I STEP /WDR      / I/O IN DD SEQ: 215:0        314:0        4A1:2
CCD0006I STEP /WDR      / I/O IN DD SEQ: 4A2:0        000:0        743:0
CCD0006I STEP /WDR      / I/O IN DD SEQ: 486:2        486:3        563:0
CCD0006I STEP /WDR      / I/O IN DD SEQ: 563:1        743:0        563:1
CCD0006I STEP /WDR      / I/O IN DD SEQ: 155:2        5E2:1
CCD0001I STEP /WDR      / MEMORY RESERVED  260K: ACCESSES: DISK       12/ TAPE        0
IEF202I - STEP - WSRT    , WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /WSRT     / START 91154.0949
IEF374I STEP /WSRT     / STOP  91154.0949 CPU    0MIN 00.00SEC MAIN    0K LCS    0K
CCD0001I STEP /WSRT     / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /QWR      / START 91154.0949
IEF374I STEP /QWR      / STOP  91154.0955 CPU    0MIN 02.98SEC MAIN 476K LCS    0K
CCD0006I STEP /QWR      / I/O IN DD SEQ: 743:0        314:0        215:0
CCD0006I STEP /QWR      / I/O IN DD SEQ: 314:0        4A1:1        4A2:12
CCD0006I STEP /QWR      / I/O IN DD SEQ: 4F3:1        4F4:1        743:0
CCD0006I STEP /QWR      / I/O IN DD SEQ: 215:0        215:0        563:3
CCD0006I STEP /QWR      / I/O IN DD SEQ: 486:0        485:0        19C:4215
CCD0006I STEP /QWR      / I/O IN DD SEQ: 000:0        000:0        000:0
CCD0006I STEP /QWR      / I/O IN DD SEQ: 000:0        000:0        000:0
CCD0006I STEP /QWR      / I/O IN DD SEQ: 000:0        155:2        155:1
CCD0006I STEP /QWR      / I/O IN DD SEQ: 434:0        4F5:0        000:0
CCD0006I STEP /QWR      / I/O IN DD SEQ: 000:0        000:0        563:3
CCD0001I STEP /QWR      / MEMORY RESERVED  492K: ACCESSES: DISK       24/ TAPE     4215
IEF202I - STEP - QSORT   , WAS NOT RUN BECAUSE OF CONDITION CODES.
IEF373I STEP /QSORT    / START 91154.0955
IEF374I STEP /QSORT    / STOP  91154.0955 CPU    0MIN 00.00SEC MAIN    0K LCS    0K
CCD0001I STEP /QSORT    / MEMORY RESERVED    0K: ACCESSES: DISK        0/ TAPE        0
// EXEC WRDSAS
//QWFILE DD DSN=AG4254J.STATEXX.JRBAN.QW.VALUES,
// DISP=OLD
//SYSIN DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 91154.0955
IEF374I STEP /SAS      / STOP  91154.0958 CPU    0MIN 01.55SEC MAIN 276K LCS    0K
CCD0006I STEP /SAS      / I/O IN DD SEQ: 563:0        491:0        563:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 631:0        215:0        314:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 155:82       4A4:1        4A5:3
CCD0006I STEP /SAS      / I/O IN DD SEQ: 4A6:8        4B1:0        563:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 314:0        4A7:0        155:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 563:0        563:0        155:2
CCD0006I STEP /SAS      / I/O IN DD SEQ: 155:4        743:41       486:5
CCD0006I STEP /SAS      / I/O IN DD SEQ: 216:0        155:0        155:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 000:0        000:0        000:0
CCD0006I STEP /SAS      / I/O IN DD SEQ: 000:0        743:3        743:3
CCD0006I STEP /SAS      / I/O IN DD SEQ: 743:3        4D1:1        744:33
CCD0001I STEP /SAS      / MEMORY RESERVED  276K: ACCESSES: DISK      189/ TAPE        0
IEF375I  JOB /AG4254J9/ START 91154.0948
IEF376I  JOB /AG4254J9/ STOP  91154.0958 CPU    0MIN 04.91SEC
CCD007A  JOB /AG4254J9/ BASIC CHRG: FIXED    CPU    DSK-IO  TPE-IO KBYTE-HR   TOTAL
                                    1.24     3.73      .58     6.40     1.24    13.30
CCD007C  JOB /AG4254J9/ OTHER CHRGS: TP-MTS DK-MTS                             TOTAL
                                     1.00                                       1.00
```

```
PROGRAM G745 HAD THE FOLLOWING PROGRAM DATES OF LAST REVISION:
     G745              9 APR 81 08.24.18
     HDRIRTV          14 JAN 81 11.01.24
     HDRLIST           8 APR 81 12.57.31


AGENCY CODE USGS  WAS SUBMITTED THROUGH THE AGENCY SYMBOLIC JCL PARAMETER ON THE EXEC CARD.
            -----

CODES SUBMITTED THROUGH SYMBOLIC VOL PARAMETERS ON THE EXEC CARDS WILL BE TEMPORARILY OVERRIDDEN
IF A 7 CARD WITH VALID ENTRIES IS PLACED PRECEDING A STATION SELECTION CARD.




**********************************************  RETRIEVAL NO.  1   JUN 03, 1981   **********************************************

STATION HEADER DATA HAS BEEN REQUESTED TO BE WRITTEN INTO AN OUTPUT FILE IN THE FORMAT LISTED BELOW.

STATION HEADER RECORD LIST

PROGRAM G745 IS FUNCTIONING AS A PREPROCESSOR FOR RETRIEVING WATER QUALITY DATA RECORDS.

                                                  <- SORT OPTNS ->                  M CARD  ***

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
M2  19770511197705110                          X                                01

 <-STATION ID.->                                                                   D CARD  ***
D25403108019110 0

         1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
XQWSAS


BASED ONLY ON INFORMATION AVAILABLE FROM THE STATION HEADER FILE.      1 SITES WERE SELECTED FOR RETRIEVAL NO.  1

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


STATION HEADER RETRIEVAL PROCESSING ENDED.
```

PROGRAM E771 AND SUBROUTINES DATES OF LAST REVISION

E771 * COMDATX	13 MAY 81 21.20.51
QWRTVB	14 JUL 80 12.49.01
QWRTVC	14 JUL 80 12.49.14
QWCONTL	25 APR 80 02.46.23
QWPUNCH	25 APR 80 02.47.03
QWRLIST	9 AUG 80 09.01.08
QWXLIST	9 AUG 80 09.01.33
PARMAPW	
PARMRET	
HDRIRTV	
ENDATE	

PARAMETERS PASSED VIA JOB CONTROL
AGENCY = USGS
PASSWORD =

```
**********************************************************  RETRIEVAL NO:  1  **********************************************************

M2  1977051119770511                        X                                01

XQWSAS


RETRIEVAL SPECIFICATIONS FOR REQUEST NUMBER  1 ARE AS FOLLOWS:
          ALL PARAMETERS RETRIEVED
          FOR EACH SELECTED ANALYSIS ALL PARAMETERS WILL BE WRITTEN
          A DUMP OF ALL PARAMETERS IS REQUESTED - THE RETRIEVAL MAY USE AN EXCESSIVE AMOUNT OF TIME
          SELECTED ANALYSIS WILL BE PRINTED AS REQUESTED
```

SELECTED ANALYSIS FOR RETRIEVAL NO: 1

STATION ID. NO.	LAT-LONG-SQ.NO.	SITE CODE	STATE CODE	DIST CODE	CNTY CODE	STATION NAME OR LOCAL WELL NO.
254031080191100	254031080191100	SS	12	12	025	STORM WATER RUNOFF AT KINGS CREEK APTS MIAMI FLA

DATES: 77/05/11 TIME: 456 TYPE: 2

80	10.0000	95	149.9998	GEOLOGIC UNIT:		70	139.9998
515	99.9998	600	1.9500	340	149.9998	500	528.9993
615	0.0100	620	0.1000	605	1.8000	610	0.0400
665	0.2700	680	3.0000	625	1.8400	630	0.1100
937	1.0000	1027	0.0000	685	10.0000	690	13.0000
1045	1500.0000	1051	630.0000	1034	20.0000	1042	32.0000
70507	0.0300	71887	8.6000	1092	480.0000	70299	428.9993
				72005	43.0000		

DATES: 77/05/11 TIME: 458 TYPE: 2

80	10.0000	95	95.9999	GEOLOGIC UNIT:		70	139.9998
515	63.9999	600	1.8700	340	139.9999	500	505.9993
615	0.0100	620	0.0900	605	1.7000	610	0.0700
665	0.2500	680	1.0000	625	1.7700	630	0.1000
937	0.7000	1027	0.0000	685	5.0000	690	6.0000
1045	1200.0000	1051	620.0000	1034	20.0000	1042	21.0000
70507	0.0300	71887	8.3000	1092	420.0000	70299	441.9993
				72005	43.0000		

DATES: 77/05/11 TIME: 500 TYPE: 2

80	5.0000	95	91.9999	GEOLOGIC UNIT:		70	119.9998
515	59.9999	600	1.3400	340	86.9999	500	368.9993
615	0.0100	620	0.0800	605	1.2000	610	0.0500
665	0.2000	680	2.0000	625	1.2500	630	0.0900
937	0.6000	1027	0.0000	685	5.0000	690	7.0000
1045	1100.0000	1051	500.0000	1034	10.0000	1042	19.0000
70507	0.0400	71887	5.9000	1092	390.0000	70299	388.9995
				72005	43.0000		

DATES: 77/05/11 TIME: 502 TYPE: 2

80	5.0000	95	93.9999	GEOLOGIC UNIT:		70	89.9999
515	61.9999	600	0.9800	340	5.6000	500	238.9997
615	0.0100	620	0.0700	605	0.8600	610	0.0400
665	0.1500	680	2.0000	625	0.9000	630	0.0800
937	0.7000	1027	0.0000	685	4.0000	690	5.0000
1045	700.0000	1051	430.0000	1034	10.0000 1	1042	13.0000
70507	0.0400	71887	4.3000	1092	230.0000	70299	176.9998
				72005	43.0000		

DATES: 77/05/11 TIME: 504 TYPE: 2

80	5.0000	95	94.9999	GEOLOGIC UNIT:		70	64.9999
515	61.9999	600	0.8600	340	51.9999	500	192.9997
615	0.0100	620	0.0700	605	0.7600	610	0.0200
665	0.1400	680	3.0000	625	0.7800	630	0.0800
937	0.9000	1027	0.0000	685	5.0000	690	8.0000
1045	450.0000	1051	370.0000	1034	10.0000 1	1042	8.0000
70507	0.0600	71887	3.8000	1092	140.0000	70299	130.9998
				72005	43.0000		

DATES: 77/05/11 TIME: 506 TYPE: 2

80	5.0000	95	91.9999	GEOLOGIC UNIT:		70	44.9999
515	67.9999	600	0.7600	340	30.0000	500	133.9998
615	0.0100	620	0.0700	605	0.6500	610	0.0300
665	0.1300	680	3.0000	625	0.6800	630	0.0800
937	1.0000	1027	0.0000	685	6.0000	690	9.0000
1045	380.0000	1051	120.0000	1034	10.0000 1	1042	6.0000
70507	0.0700	71887	3.4000	1092	80.0000	70299	65.9999
				72005	43.0000		

DATES: 77/05/11		TIME: 508		TYPE: 2	GEOLOGIC UNIT:			70	30.0000
80	5.0000	95	89.9999		340	46.9999		500	132.9998
515	49.9999	600	0.7100		605	0.6000		610	0.0300
615	0.0100	620	0.0700		625	0.6300		630	0.0800
665	0.1200	680	4.0000		685	4.0000		690	8.0000
937	1.1000	1027	0.0000		1034	10.0000	1	1042	2.0000
1045	320.0000	1051	70.0000		1092	50.0000		70299	82.9999
70507	0.0800	71887	3.1000		72005	43.0000			
DATES: 77/05/11		TIME: 510		TYPE: 2	GEOLOGIC UNIT:			70	30.0000
80	10.0000	95	87.9999		340	23.0000		500	124.9998
515	49.9999	600	0.6400		605	0.5300		610	0.0300
615	0.0100	620	0.0700		625	0.5600		630	0.0800
665	0.1200	680	2.0000		685	5.0000		690	7.0000
937	1.1000	1027	0.0000		1034	10.0000	1	1042	0.0000
1045	220.0000	1051	100.0000		1092	40.0000		70299	74.9999
70507	0.0800	71887	2.8000		72005	43.0000			
DATES: 77/05/11		TIME: 1551		TYPE: 2	GEOLOGIC UNIT:			70	64.9999
80	20.0000	95	67.9999		340	36.0000		500	217.9997
515	57.9999	600	0.6900		605	0.6200		610	0.0500
615	0.0000	620	0.0200		625	0.6700		630	0.0200
665	0.1800	680	1.0000		685	5.0000		690	6.0000
937	0.1000	1027	0.0000		1034	20.0000		1042	8.0000
1045	380.0000	1051	190.0000		1092	100.0000		70299	159.9998
70507	0.0700	71887	3.1000		72005	43.0000			
DATES: 77/05/11		TIME: 1658		TYPE: 2	GEOLOGIC UNIT:			70	89.9999
80	20.0000	95	69.9999		340	47.9999		500	236.9997
515	47.9999	600	0.7100		605	0.6500		610	0.0400
615	0.0000	620	0.0200		625	0.6900		630	0.0200
665	0.2000	680	1.0000		685	5.0000		690	6.0000
937	1.1000	1027	0.0000		1034	10.0000	1	1042	9.0000
1045	500.0000	1051	210.0000		1092	110.0000		70299	188.9997
70507	0.0700	71887	3.1000		72005	43.0000			
DATES: 77/05/11		TIME: 1703		TYPE: 2	GEOLOGIC UNIT:			70	44.9999
80	20.0000	95	69.9999		340	33.0000		500	137.9998
515	57.9999	600	0.6100		605	0.5500		610	0.0400
615	0.0000	620	0.0200		625	0.5900		630	0.0200
665	0.1400	680	1.0000		685	5.0000		690	6.0000
937	1.5000	1027	0.0000		1034	10.0000	1	1042	5.0000
1045	270.0000	1051	140.0000		1092	50.0000		70299	79.9999
70507	0.0700	71887	2.7000		72005	43.0000			
DATES: 77/05/11		TIME: 1712		TYPE: 2	GEOLOGIC UNIT:			70	20.0000
80	20.0000	95	67.9999		340	20.0000		500	67.9999
515	45.9999	600	0.4900		605	0.4300		610	0.0500
615	0.0100	620	0.0000		625	0.4800		630	0.0100
665	0.1500	680	1.0000		685	5.0000		690	5.0000
937	0.9000	1027	0.0000		1034	10.0000	1	1042	4.0000
1045	120.0000	1051	88.0000		1092	30.0000		70299	22.0000
70507	0.1100	71887	2.2000		72005	43.0000			
DATES: 77/05/11		TIME: 1721		TYPE: 2	GEOLOGIC UNIT:			70	20.0000
80	30.0000	95	71.9999		340	15.0000		500	67.9999
515	47.9999	600	0.4600		605	0.3700		610	0.0500
615	0.0100	620	0.0200		625	0.4300		630	0.0300
665	0.1600	680	1.0000		685	6.0000		690	7.0000
937	1.4000	1027	0.0000		1034	10.0000		1042	4.0000

1045	140.0000	1051	50.0000	1092	30.0000	70299	20.0000
70507	0.1100	71887	2.0000	72005	43.0000		

DATES: 77/05/11		TIME: 1732	TYPE: 2	GEOLOGIC UNIT:		70	25.0000
80	30.0000	95	75.9999	340	18.0000	500	87.9999
515	59.9999	600	0.4900	605	0.4000	610	0.0500
615	0.0100	620	0.0300	625	0.4500	630	0.0400
665	0.1600	680	2.0000	685	5.0000	690	7.0000
937	0.0000	1027	0.0000	1034	10.0000	1042	4.0000
1045	120.0000	1051	69.0000	1092	30.0000	70299	28.0000
70507	0.1300	71887	2.2000	72005	43.0000		

DATES: 77/05/11		TIME: 1743	TYPE: 2	GEOLOGIC UNIT:		70	35.0000
80	30.0000	95	75.9999	340	20.0000	500	97.9999
515	65.9999	600	0.5900	605	0.4500	610	0.0700
615	0.0100	620	0.0600	625	0.5200	630	0.0700
665	0.2100	680	2.0000	685	6.0000	690	8.0000
937	2.7000	1027	0.0000	1034	10.0000	1042	4.0000
1045	139.9998	1051	62.9999	1092	20.0000	70299	32.0000
70507	0.1600	71887	2.6000	72005	43.0000		

15 ANALYSIS HAVE BEEN WRITTEN IN THE BACKFILE FORMAT FOR RETRIEVAL NO: 1

```
*****          NOTE          *****
* VALUES OF DISSOLVED AND TOTAL *
* SELENIUM EXCEEDING 5 UG/L IN  *
* SAMPLES COLLECTED BEFORE 1975 *
* SHOULD BE USED WITH CAUTION.  *
* PLEASE REFER TO QUALITY OF    *
* WATER BRANCH TECHNICAL MEMO   *
*         NO. 81.12.            *
*********************************
```

WATER QUALITY RETRIEVAL PROCESSING ENDED

```
1                                   S T A T I S T I C A L   A N A L Y S I S   S Y S T E M          9:56 WEDNESDAY, JUNE 3, 1981

NOTE: THE JOB AG4254J9 HAS BEEN RUN UNDER RELEASE 79.38 OF SAS AT U.S. GEOLOGICAL SURVEY.


1
2
3
4                   PROC QWSAS DATE TIME REMARKS;
5

NOTE: DATA SET WORK.DATA1 HAS 15 OBSERVATIONS AND 59 VARIABLES. 46 OBS/TRK.
NOTE: THE PROCEDURE QWSAS USED 0.70 SECONDS AND 276K.

5                   PROC SORT OUT=TEMP;
6                        BY STATION DATE TIME ;
7                        FORMAT DATE YYMMDD8.;
8

NOTE: DATA SET WORK.TEMP HAS 15 OBSERVATIONS AND 59 VARIABLES. 46 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.22 SECONDS AND 272K.

8                   DATA QWFILE.QWMASTER;
9                   UPDATE QWFILE.QWMASTER TEMP ;
10                       BY STATION DATE TIME;
11

NOTE: DATA SET QWFILE.QWMASTER HAS 27 OBSERVATIONS AND 59 VARIABLES. 46 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.19 SECONDS AND 144K.

11                  PROC PRINT;

NOTE: THE PROCEDURE PRINT USED 0.31 SECONDS AND 168K AND PRINTED PAGES 1 TO 2.


NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

QWSAS PROCEDURE: CONVERSION OF USGS DATASETS TO SAS DATASETS
LATEST REVISION: 27 SEP 78 03.06.47
THE FOLLOWING VARIABLES WERE CREATED ON THE SAS DATASET NAMED DATA1:

VARIABLE NAME	
STATION	STATION IDENTIFICATION NUMBER
DATE	DATE SAMPLE WAS COLLECTED
TIME	TIME OF DAY (24 HR CLOCK)
P00070	TURBIDITY (JTU)
R00070	REMARK CODE CORRESPONDING TO P00070
P00080	COLOR (PLATINUM COBALT UNITS)
R00080	REMARK CODE CORRESPONDING TO P00080
P00095	SPECIFIC CONDUCTANCE (MICROMHOS)
R00095	REMARK CODE CORRESPONDING TO P00095
P00340	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)
R00340	REMARK CODE CORRESPONDING TO P00340
P00500	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L)
R00500	REMARK CODE CORRESPONDING TO P00500
P00515	SOLIDS, RESIDUE AT 105 DEG. C, DISSOLVED (MG/L)
R00515	REMARK CODE CORRESPONDING TO P00515
P00600	NITROGEN, TOTAL (MG/L AS N)
R00600	REMARK CODE CORRESPONDING TO P00600
P00605	NITROGEN, ORGANIC TOTAL (MG/L AS N)
R00605	REMARK CODE CORRESPONDING TO P00605
P00610	NITROGEN, AMMONIA TOTAL (MG/L AS N)
R00610	REMARK CODE CORRESPONDING TO P00610
P00615	NITROGEN, NITRITE TOTAL (MG/L AS N)
R00615	REMARK CODE CORRESPONDING TO P00615
P00620	NITROGEN, NITRATE TOTAL (MG/L AS N)
R00620	REMARK CODE CORRESPONDING TO P00620
P00625	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)
R00625	REMARK CODE CORRESPONDING TO P00625
P00630	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)
R00630	REMARK CODE CORRESPONDING TO P00630
P00665	PHOSPHORUS, TOTAL (MG/L AS P)
R00665	REMARK CODE CORRESPONDING TO P00665
P00680	CARBON, ORGANIC TOTAL (MG/L AS C)
R00680	REMARK CODE CORRESPONDING TO P00680
P00685	CARBON, INORGANIC, TOTAL (MG/L AS C)
R00685	REMARK CODE CORRESPONDING TO P00685
P00690	CARBON, TOTAL (MG/L AS C)
R00690	REMARK CODE CORRESPONDING TO P00690
P00937	POTASSIUM, TOTAL RECOVERABLE (MG/L AS K)
R00937	REMARK CODE CORRESPONDING TO P00937
P01027	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)
R01027	REMARK CODE CORRESPONDING TO P01027
P01034	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)
R01034	REMARK CODE CORRESPONDING TO P01034
P01042	COPPER, TOTAL RECOVERABLE (UG/L AS CU)
R01042	REMARK CODE CORRESPONDING TO P01042
P01045	IRON, TOTAL RECOVERABLE (UG/L AS FE)
R01045	REMARK CODE CORRESPONDING TO P01045
P01051	LEAD, TOTAL RECOVERABLE (UG/L AS PB)
R01051	REMARK CODE CORRESPONDING TO P01051
P01092	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)
R01092	REMARK CODE CORRESPONDING TO P01092
P70299	SOLIDS, SUSP, TOTAL, RESIDUE AT 110 DEG. C (MG/L)
R70299	REMARK CODE CORRESPONDING TO P70299
P70507	PHOSPHORUS, ORTHOPHOSPHATE TOTAL (MG/L AS P)

```
R70507    REMARK CODE CORRESPONDING TO P70507
P71887    NITROGEN, TOTAL (MG/L AS NO3)
R71887    REMARK CODE CORRESPONDING TO P71887
P72005    SAMPLE SOURCE
R72005    REMARK CODE CORRESPONDING TO P72005

EXIT QWSAS
```

OBS	STATION	DATE	TIME	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00	P00	R00
1	254031080191100	77-05-04	0927	85		69.9999		.		110.0		646.999		132		1.57		1.40		0.0100000		0.01		0.15			
2	254031080191100	77-05-04	0933	65		49.9999		117		110.0		322.000		88		1.27		1.10		0.0100000		0.01		0.15			
3	254031080191100	77-05-04	0942	40		30.0000		122		45.0		189.000		82		0.94		0.81		0.0200000		0.01		0.10			
4	254031080191100	77-05-04	0954	25		30.0000		120		49.0		127.000		68		0.90		0.78		0.0100000		0.01		0.10			
5	254031080191100	77-05-04	1006	35		30.0000		82		11.0		149.000		70		0.80		0.71		0.0200000		0.01		0.06			
6	254031080191100	77-05-04	1013	20		20.0000		75		26.0		92.000		52		0.59		0.51		0.0200000		0.01		0.05			
7	254031080191100	77-05-04	1030	160		40.0000		82		241.0		628.999		120		2.67		2.60		0.0200000		0.01		0.04			
8	254031080191100	77-05-04	1042	100		30.0000		.		234.0		705.999		72		2.28		2.20		0.0200000		0.01		0.05			
9	254031080191100	77-05-04	1054	30		30.0000		140		24.0		135.000		86		0.87		0.76		0.0200000		0.01		0.08			
10	254031080191100	77-05-04	1109	15		30.0000		92		10.0		53.000		44		0.68		0.58		0.0100000		0.01		0.08			
11	254031080191100	77-05-04	1127	30		20.0000		97		56.0		148.000		72		0.96		0.84		0.0100000		0.01		0.10			
12	254031080191100	77-05-04	1153	15		40.0000		111		37.0		112.000		80		0.89		0.78		0.0100000		0.01		0.09			
13	254031080191100	77-05-11	0456	140		10.0000		150		150.0		528.999		100		1.95		1.80		0.0400000		0.01		0.10			
14	254031080191100	77-05-11	0458	140		10.0000		96		140.0		505.999		64		1.87		1.70		0.0699999		0.01		0.09			
15	254031080191100	77-05-11	0500	120		5.0000		92		87.0		368.999		60		1.34		1.20		0.0500000		0.01		0.08			
16	254031080191100	77-05-11	0502	90		5.0000		91		5.6		239.000		52		0.98		0.86		0.0400000		0.01		0.07			
17	254031080191100	77-05-11	0504	55		5.0000		95		52.0		193.000		62		0.86		0.76		0.0200000		0.01		0.07			
18	254031080191100	77-05-11	0506	45		5.0000		92		30.0		134.000		68		0.75		0.65		0.0300000		0.01		0.07			
19	254031080191100	77-05-11	0508	30		5.0000		89		47.0		133.000		50		0.71		0.60		0.0300000		0.01		0.07			
20	254031080191100	77-05-11	0510	30		10.0000		88		23.0		125.000		50		0.64		0.53		0.0300000		0.01		0.07			

| OBS | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00 | R00 | P00

OBS	STATION	DATE	TIME	P0	R0	P0	R0	P0	R0	P0	R0	P0	R0	P0	R0	P0	R0	P0	R0	P0	R0	P0	R0	P0	R0
21	254031080191100	77-05-11	1551	64.9999	20	67.9999	36.0000	218	57.9999	0.689999	0.619999	0.0500000	0.00												
22	254031080191100	77-05-11	1558	89.9999	20	59.9999	47.9999	237	47.9999	0.709999	0.649999	0.0400000	0.00												
23	254031080191100	77-05-11	1703	44.9999	20	69.9999	33.0000	138	57.9999	0.610000	0.549999	0.0400000	0.00												
24	254031080191100	77-05-11	1712	20.0000	20	57.9999	20.0000	68	45.9999	0.489999	0.430000	0.0500000	0.01												
25	254031080191100	77-05-11	1721	20.0000	30	71.9999	15.0000	68	47.9999	0.460000	0.370000	0.0599999	0.01												
26	254031080191100	77-05-11	1732	25.0000	30	75.9999	18.0000	88	59.9999	0.489999	0.400000	0.0500000	0.01												
27	254031080191100	77-05-11	1743	35.0000	30	76.9999	20.0000	98	65.9999	0.589999	0.450000	0.0699999	0.01												

| OBS | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0 | P0 | R0

3.5 Backup of User File

If the user is making many retrievals or just wishes to maintain a backup for security, the SAS Procedure COPY may be used. This procedure will back up entire OS data sets which contain SAS data sets or selected SAS data sets. To back up a data set containing daily values the following JCL and SAS instructions would be used.

```
       COL.1      COL.12
         ●           ●
Card 1..//          JOB
     2../*SETUP     xxxxxx/HR
     3..//PROCLIB DD DSN=WRD.PROCLIB,DISP=SHR
     4..// EXEC SAS
     5..//DVFILE DD DSN=AG4yyyz.STATEXX.URBAN.DAILY.VALUES,
     6..//    DISP=OLD
     7..//BACKUP  DD  DSN=YOUR.BACKUP.TAPE,
     8..//    UNIT=TAPE62,VOL=SER=xxxxxx,DCB=DEN=4,
     9..//    DISP=(NEW,CATLG)
    10..//SYSIN DD *
    11..      PROC COPY IN=DVFILE OUT=BACKUP;
    12../*
    13..//
```

This program will copy the data set AG4yyyz.STATEXX.URBAN.DAILY.VALUES onto the user specified backup tape xxxxxx. The data may be retrieved at any time and copied back to the disk with PROC COPY.

If the master files are used by more than one user, care should be taken when restoring data. The backup should only be used in the case of destruction of a data set and should only be applied after consulting the urban studies data base coordinator. The above procedure can be applied to backup any user file and is highly recommended.

CHAPTER 4. BASIN CHARACTERISTICS FILE

Previous studies by the USGS in Portland, Oreg., and Miami, Fla., have indicated that storm loading of selected water-quality constituents can be related statistically to characteristics of storms and to watershed characteristics describing the generalized physiography and land use using multiple regression techniques. For the purpose of regional and national transferability, a consistent set of basin characteristics will be compiled for each basin included in the USGS/USEPA Urban Hydrology Studies Program. The physiographic and land-use characteristics that can be used in statistical analyses are listed in table 4.1. Changes in characteristics during the study period must be documented. Other basin characteristics that are expected to explain or relate to water quantity or quality in each study area should be compiled and tested for statistical significance and should be included along with table 4.1 characteristics if found to be significant. These other types of characteristics are explained later.

Distributed runoff/water-quality models require specific physical characteristics and model parameters for subcatchments of each watershed. Selection of characteristics and the degree of subdivision is dependent on the model selected and the level of detail intended for each model application. Table 4.1 information is not intended to support detailed watershed model development.

The methods used to compile data for table 4.1 should be consistent, to the degree possible, for all studies. However, source materials vary significantly and the size of the watershed may dictate the method and source used. It is suggested that the best available topographic and soils map be used for the physiographic characteristics. The drainage areas or subareas of a watershed should be determined with an accuracy of five percent or better. Planimetering is preferred, however, the grid-point method is an efficient means of determining drainage areas. This method entails overlaying a grid of equi-spaced points over the source map and counting points falling in each area. Areas are determined from the known grid scale relative to the map scale. Generally, a scale allowing 100 or more points over an entire watershed will provide the needed accuracy.

The size of the watershed should be considered when selecting methods. For example, impervious area and street density should be measured directly from a map or areal photo in conjunction with field verification for small watersheds. For large areas, however, estimates may be made from average values using zoning maps. Also, population density may be estimated by counting houses in a small watershed, whereas a zoning map can be used for larger areas.

Table 4.1--Physiographic, land use, and water-quality characteristics in the Basin Characteristics File.

Variable Name	Numeric Values	Variable Identification
SITE	1.	Site identification number which is an 8 or 15 digit station ID.
TCAREA	2.	Total drainage area, in square miles (exclude non-contributing areas).
IAREA	3.	Impervious area in percentage of drainage area.
EAREA	4.	Effective impervious area in percentage of drainage area. Include only impervious surfaces connected directly to a sewer pipe or principal conveyance.
BSLOPE	5.	Average basin slope, in feet per mile, determined from an average of terrain slopes at 50 or more equispaced points using best available topographic map.
CSLOPE	6.	Main conveyance slope, in feet per mile, measured at points 10 and 85 percent of the distance from the gaging station to the divide.
PAHOR	7.	Permeability of the A horizon of the soil profile, in inches per hour.
AWAABC	8.	Available water capacity as an average of the A, B, and C soil horizons, in inches of water per inch of soil.
SWPHA	9.	Soil-water pH of the "A" horizon (in H_2O).
HYSGR	10.	Hydrologic soil group (A, B, C, or D) according to SCS methodology. Use numeric codes, A=1, B=2, C=3, D=4.
POPDEN	11.	Population density in persons per square mile.
STDEN	12.	Street density, in lane miles per square mile (approximately 12 ft. lanes).
	13.	Land use of the basins as a percentage of drainage area including:
LURUPA		a. Rural and pasture.
LUAGRI		b. Agricultural.
LULOWD		c. Low density residential (1/2 to 2 acres/dwelling).
LUMEDD		d. Medium density residential (3 to 8 dwellings/acre).
LUHIGD		e. High density residential (9 or more dwellings/acre).
LUCOMM		f. Commercial.
LUINDU		g. Industrial.
LUCONB		h. Under construction (bare surface).
LUIDLE		i. Idle or vacant land.
LUWETL		j. Wetland.
LUPARK		k. Parkland.
DETSTO	14.	Detention storage in acre-feet of storage.
PERWUD	15.	Percent of watershed upstream from detention storage.
PERSEW	16.	Percent of area drained by a storm-sewer system.
PERCAG	17.	Percent of streets with curb and gutter drainage.
PERDAS	18.	Percent of streets with ditch and swale drainage.
MANRNT	19.	Mean annual rainfall in inches. (long term)
TENYRR	20.	Ten year 1-hour rainfall intensity in inches per hour. (long term)
MRLxxxxx	21.	Mean annual loads of water-quality constituents in runoff, in pounds/acre. xxxxx is the 5-digit WATSTORE parameter code.
MWLxxxxx	22.	Mean annual loads of constituents in wetfall, in pounds/acre. xxxxx is as defined in item 21.
MDLxxxxx	23.	Mean annual loads of constituents in dryfall, in pounds/acre.

The soil characteristics (items 7-10) should be weighted areally for each watershed based on SCS soil-series maps and the generalized characteristics for each soil series. Land use should be based on a land-use map if available or a set of areal photographs. Generally, USGS topographic maps are not adequate for determining land use. City planning agencies often have land-use source maps available.

Some cross checking is necessary for quality control. For example, land uses should add up to 100 percent. Also, items 17 and 18 should add up to 100 percent. Some field checking may be required for quality control.

The annual rainfall characteristics (items 19 and 20) should be determined from National Weather Service maps or from nearby weather records provided the data are transferable to the watershed. In an area of high rainfall variability, a weather service map is the preferable source.

The annual loads of constituents in runoff, wetfall, and dryfall (items 21, 22, and 23) are to be computed from data collected for the study. The constituents to be included should correspond to chemical parameters required by the program. Definition of individual parameters will be stored as a part of the variable name with xxxxx being the 5-digit WATSTORE parameter codes. Only parameters that have adequate sample definition are computed by summing the computed storm loads and estimates for unsampled storm events and base-flow loads.

4.1 Organization of the File

The Basin Characteristics File (Operation H, figure 1.1), referred to as the BC File, contains specific-site information such as the data listed in table 4.1. These data are all numeric entries.

Urban study areas may have environmental practices which impact water quantity and quality. These practices should be identified and documented to support both modeling and statistical techniques of analysis to establish cause and effect relationships between management techniques and water-quality processes. Therefore, environmental practices data are included in the BC File. A list of environmental-practice data for each urban study is listed in table 4.2. These data are also stored in the BC File in the same data set as table 4.1 data. The first group of six characteristics must be defined numerically. Because these data are difficult to collect, some means of estimating must be devised depending on available information sources. Street sweeping, sewer flushing, and catch basin cleaning frequencies (items 1, 4, and 5) may be obtained from city records. Because each record may not be adequate, it may be wise to arrange for more adequate recordkeeping for specific areas during the study period. Annual fertilizer applications

Table 4.2--Environmental practices inventory characteristics in the Basin Characteristics File.

Variable Name		Variable Identification
		Numeric Values
AVFRSS	1.	Average frequency of street sweeping, in days.
EAFENI	2.	Estimated annual fertilizer applied to watershed, in pounds per acre of nitrogen.
EAFEPR	3.	Estimated annual fertilizer applied to watershed, in pounds per acre of phosphorous.
AVSEFF	4.	Average sewer flushing frequency, in days.
AVBCFR	5.	Average catch basin cleaning frequency, in days.
EADVTR	6.	Estimated average daily vehicle traffic, in vehicle miles per day.
		Descriptive, as many as 80 characters per variable
MEFQSC	1.	Method or type of street sweeping equipment.
GAOINE	2.	Grading and agricultural ordinances in effect.
RECOLP	3.	Refuse collection practice.
SWASDP	4.	Solid-waste-disposal areas in watershed.
FLREFE	5.	Flood retarding features such as gravel filter strips.
LEAFDP	6.	Leaf disposal practice in watershed.
SEDSOU	7.	Identify major sediment source(s).
STPTCO	8.	Street pavement and condition.
DEICCH	9.	Deicing chemicals.

(items 2 and 3) can be estimated from generalized zoning or land-use maps and estimates of application rates from county extension agents. A more accurate method may be to poll a representative portion of homes in a residential area. Average daily traffic can be estimated from available traffic count records and from generalized estimates for each specific street category (i.e., residential, commercial, etc.). Vehicle traffic, in miles per day (item 6), can be computed by multiplying the traffic counts by the lengths of street in each category and summing the results for each basin. Local traffic engineers can be very helpful in making these estimates.

The second group of practices (items 1-9) are intended to provide background information to the data user. Each descriptor will be stored in the data management system as 80 alphanumeric characters.

Climatological or hydrologic factors which affect stormwater runoff quality include rainfall depth, rainfall intensity, runoff, and antecedent conditions. Constituent accumulations and washoff processes can be explained by combinations of these hydrologic variables, physiographic characteristics, existing drainage patterns, and environmental practices. Table 4.3 contains a list of storm characteristics, many of which have been found to be significant in previous statistical analyses or model applications. These data are stored in a separate SAS data set just for storm characteristic data in the BC File. Other storm characteristics that are expected to explain or relate to water-quantity or quality processes should also be compiled and tested for statistical significance.

The characteristics related to storm events (table 4.3) are compiled from data collected for each watershed. Most of these are self explanatory and can be extracted directly from rainfall or flow records. The remaining part of Chapter 4 explains one mode of entering the data and that is by direct input. Chapter 5 also documents user programs (section 5.4) that can be used to retrieve storm data and compute some of the data in table 4.3.

For the purpose of consistency, the duration of a storm event will be defined by the interval beginning when the flow reaches a point 25 percent above base flow and ending when the flow recedes to this same level. For storm sewers or channels that were previously dry, the duration of runoff begins when runoff begins and ends when the flow recedes to 10 percent of the peak flow. The duration of the rainfall event (item 18) begins at the start of rainfall and ends when the last rainfall is followed by 6 or more hours without rainfall. It should be recognized that use of this definition may mean that on large basins, more than one storm event may contribute to a single runoff event. The runoff, dryfall, and wetfall loads are computed for those constituents which have adequate data to define the load over the hydrograph. Space for as many load computation results as needed is reserved for items 21, 22, and 23. There is no limit to the number of different constituent loads that can be included as a part of the observation record.

Table 4.3--Characteristics related to storm events in the national urban studies program.

Variable Name	Numeric Values	Variable Identification
SITE	1.	Site identification number which is an 8 or 15 digit station ID.
BDATE	2.	Storm begin date; year, month, day, - for example, 800601.
BTIME	3.	Storm begin time expressed in military format, 0001-2400.
EDATE	4.	Storm end date; year, month, day, - for example, 800602.
ETIME	5.	Storm end time expressed in military format, 0001-2400.
TRAINA	6.	Total rainfall, average for the basin in inches.
MAXR5	7.	Maximum 5-minute rainfall rate in inches per hour.
MAXR15	8.	Maximum 15-minute rainfall rate in inches per hour.
MAX1H	9.	Maximum 1-hour rainfall rate in inches per hour.
NDRDO2	10.	Number of dry hours prior to storm, counting backwards to storm event with rainfall greater than 0.2 inches.
DERNPD	11.	Depth of rainfall accumulated during previous 24 hours, in inches.
DERNP3	12.	Depth of rainfall accumulated during previous 72 hours, in inches.
DERNP7	13.	Depth of rainfall accumulated during previous 168 hours, in inches.
TOTRUN	14.	Total runoff, in inches, over the basin.
PEAKQ	15.	Peak discharge, in cubic feet per second.
BFLOW	16.	Base flow prior to storm, in cubic feet per second.
DURSTO	17.	Duration of storm runoff used to calculate load, in minutes.
DURRNF	18.	Duration of rainfall, in minutes.
TIMBPK	19.	Time from beginning of rainfall to hydrograph peak, in minutes.
TILASC	20.	Time since last street cleaning, in days.
RLxxxxx	21.	Storm-runoff loads of individual constituents, in pounds per acre. WATSTORE parameter codes are to be used in place of xxxxx, for example, RL01051 is the variable name for storm-runoff load for total lead.
WLxxxxx	22.	Wetfall loads of individual constituents since previous storm sampled, in pounds per acre. xxxxx is as defined in no. 21.
DLxxxxx	23.	Dryfall loads of individual constituents since previous storm in pounds per acre (interpolated from monthly dryfall rate, based on number of dry hours, i.e., no. 10 above).

4.2 Naming Data Sets

The OS data set name (DSN) for BC File basin and storm characteristics data sets is AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA where the first two parts AG4yyyz and STATEXX are as defined in section 3.21 of chapter 3. There will be at least two SAS data set members in each OS data set. One, designated as BCMASTER, will contain all the site descriptive data for a state urban study (information in tables 4.1 and 4.2). Information in BCMASTER is not limited only to tables 4.1 and 4.2 data. New data variables only need to be defined and the corresponding data values entered. The other SAS data set member is SCMASTER and contains individual storm characteristics data for each site (table 4.3).

The JCL statement

```
//BCFILE DD DSN=AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA,...
```

references the OS data set AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA. The SAS reference statements BCFILE.BCMASTER and BCFILE.SCMASTER refer to the two SAS data sets described above that are members of the OS data set AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA. The link between the two SAS data sets and the OS data set is the BCFILE reference that appears in each statement.

4.3 Creating and Updating Basin Characteristics Data Sets

The following pages illustrate JCL commands, SAS instructions and sample output that result when a Basin Characteristics file (BCMASTER) is created and updated.

4.31 Creating Basin Characteristics Data Sets

The Basin Characteristics file (BCMASTER) creation macros are stored as SAS code in the partitioned data set AG4254J.URBAN.SOURCE as member name BCFILE. Figure 4.31.1 is a listing of the job to create the BCMASTER file. Two macros are referenced in this job. The macro XINPUT reads the complete data deck describing the basin. The input formats may be read directly from the XINPUT macro listing included in the job listing at the end of this section. They define all the data names of the various data values that are a part of BCMASTER. Also, the respective card positions for each data variable are documented. For example, SITE is on the first card in columns 1-15. If a $ sign appears before the column numbers, this defines the incoming data as alphanumeric. A new data card is designated by a slash (/) symbol that appears before the first variable on the card.

A second macro, XLIST, is called which creates an output listing of the data for verification and future reference. Several computations are made on the incoming data by XLIST. The percentage of total land use and total street drainage are accumulated for cross checking the data.

```
       COL.1     COL.12
         ●         ●
Card  1..//           JOB
      2..// EXEC SAS,TIME=(,5)
      3..//BCFILE DD DSN=AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA,
      4..// DISP=OLD
      5..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(BCFILE),DISP=SHR
      6..//      DD *
      7..         DATA BCFILE.BCMASTER ;
      8..         XINPUT
      9..       12345678            20            .60            .40
     10..           .001           .002
     11..            .75             .5            7.2              1
     12..           1000             20
     13..    .10    .10    .10    .10    .04    .10    .10    .10    .06    .10    .10
     14..            200            .30            .70            .35            .75
     15..             65            7.2
     16..00095     40.2654
     17..00310
     18..00340     27.0574
     19..00500     36.4165
     20..00600     0.4760
     21..00665     0.0326
     22..00690     11.8254
     23..01051
     24..01092
     25..             30            100            100
     26..             30             60           1000
     27..MEFGSC - METHOD OR TYPE OF STREET SWEEPING EQUIPMENT
     28..GADINE - GRADING AND AGRICULTURAL ORDINANCES IN EFFECT
     29..RECOLP - REFUSE COLLECTION PRACTICE
     30..SWASDP - SOLID WASTE DISPOSAL AREAS IN WATERSHED
     31..FLREFE - FLOOD RETARDING FEATURES SUCH AS GRAVEL FILTER STRIPS
     32..LEAFDP - LEAF DISPOSAL PRACTICE IN WATERSHED
     33..SEDSOU - IDENTIFY MAJOR SEDIMENT SOURCES
     34..STPTCO - STREET PAVEMENT AND CONDITION
     35..DEICCH - DEICING CHEMICALS
     36..;
     37..         XLIST
     38../*
     39..//
```

Figure 4.31.1.--SAS and JCL commands for executing a Basin Characteristics file creation.

The run deck consists of job control language (JCL), SAS statements and input data cards. The following is a card by card description of the sample run deck listed in figure 4.31.1. For further discussion of the JCL see the CCD User's Manual.

The JCL must be entered in certain card columns as shown (figure 4.31.1). The SAS statements may be entered in any columns.

Card 1..Job card.
2..Execute a SAS program using a maximum of 5 seconds.
3-4..JCL specifying the name of the OS data set which contains the SAS data set BCMASTER.
5-6..Input to SAS will come from the partitioned data set AG4254J.URBAN.SOURCE. Member BCFILE is specified. The cards following the '*' are to be concatenated to the source statements from BCFILE and executed.
7..A SAS statement describing BCMASTER as the output data set.
8..Calls the macro XINPUT which reads the following data cards.
9-35..Input data cards describing the basin.
36..SAS end of data indicator.
37..Calls the macro XLIST to create a listing of all input data.
38-39..End of step and job.

The following pages illustrate a complete sample run. The listing includes JCL commands, SAS instructions, and corresponding output.

```
//AG4254J6 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)          J5146
// EXEC SAS,TIME=(,5)
//BCFILE DD DSN=AG4254J.STATEYY.URBAN.BASIN.STORM.DATA,
// DISP=OLD
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(BCFILE),DISP=SHR
//       DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81154.1003
IEF374I STEP /SAS      / STOP  81154.1004 CPU    0MIN 00.66SEC MAIN 240K LCS    0K
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        481:0        314:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 314:0        155:0        155:88
CCD006I STEP /SAS      / I/O IN DD SEQ: 4AB:7        4AD:3        431:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 563:0        314:0        4AE:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        563:0        563:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 744:32       744:5        5E1:2
CCD001I STEP /SAS      / MEMORY RESERVED  240K; ACCESSES: DISK     137/ TAPE        0
IEF375I  JOB /AG4254J6/ START 81154.1003
IEF376I  JOB /AG4254J6/ STOP  81154.1004 CPU    0MIN 00.66SEC
CCD007A  JOB /AG4254J6/ BASIC CHRG: FIXED    CPU    DSK-IO   TPE-IO KBYTE-HR   TOTAL
                                    1.24      .50      .41                      2.15
CCD002I  JOB /AG4254J6/ TOTAL CHARGE RECORDED =      $2.15
CCD003I  JOB /AG4254J6/ US GEOLOGICAL SURVEY REL 05 REL 218 TIME = 10.04.18 DATE = 06/03/81

                        EFFECTIVE JUNE 1, 1981, CCD WILL NO LONGER SUPPORT 2314 DISK STORAGE
                        DUE TO THE EQUIPMENTS OBSOLESCENCE AND PHYSICAL SPACE REQUIREMENT.
                        FOR CONVERSION ASSISTANCE CALL DAN MCGLOTHIN 860-7119 OR FTS 928-7119.
```

NOTE: THE JOB AG4254J6 HAS BEEN RUN UNDER RELEASE 79.38 OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1                MACRO XINPUT
2          *
3          *--PROGRAM TO INPUT BASIN CHARACTERISTICS
4          ;
5          *
6          *  --INPUT DATA WILL BE READ FROM CARDS
7          ;
8             INFILE  CARDS  MISSOVER ;
9          *
10         *  --INPUT BASIN CHARACTERISTICS DATA
11         ;
12            INPUT  SITE $ 1-15  TCAREA 16-30   IAREA 31-45   EAREA 46-60
13                / BSLOPE  1-15  CSLOPE 16-30
14                /  PAMOR  1-15  AWAABC 16-30   SWPHA 31-45   HYSGR 46-60
15                / POPDEN  1-15   STDEN 16-30
16                / LURUPA  1-7   LUAGRI  8-14  LJLOWD 15-21  LUMEDD 22-28
17                  LUMIGD 29-35  LUCOMM 36-42  LJENDU 43-49  LUCONB 50-56
18                  LUIDLE 57-63  LUWETL 64-70  LJPARK 71-77
19                / DETSTO  1-15  PERWUD 16-30  PERSEW 31-45  PERCAG 46-60  PERDAS 61-75
20                / MANRNT  1-15  TENYRR 16-30 ;
21         *
22         *    --ANNUAL LOADS FOR WATER QUALITY CONSTITUENTS
23         ;
24            INPUT
25                  MRL00095 11-20 MWL00095 21-30 MDL00095 31-40
26                / MRL00310 11-20 MWL00310 21-30 MDL00310 31-40
27                / MRL00340 11-20 MWL00340 21-30 MDL00340 31-40
28                / MRL00500 11-20 MWL00500 21-30 MDL00500 31-40
29                / MRL00600 11-20 MWL00600 21-30 MDL00500 31-40
30                / MRL00665 11-20 MWL00665 21-30 MDL00665 31-40
31                / MRL00690 11-20 MWL00690 21-30 MDL00690 31-40
32                / MRL01051 11-20 MWL01051 21-30 MDL01051 31-40
33                / MRL01092 11-20 MWL01092 21-30 MDL01092 31-40
34         ;
35            INPUT
36                  AVFRSS  1-15  EAFENI 16-30  EAFEPR 31-45
37                / AVSEFF  1-15  AVBCFR 16-30  EADVTR 31-45
38                / MEFQSC $ 1-80    / GADINE $ 1-80    / RECOLP $ 1-80    / SWASDP $ 1-80
39                / FLREFE $ 1-80    / LEAFDP $ 1-80    / SEDSOU $ 1-80    / STPTCO $ 1-80
40                / DEICCH $ 1-80;
41            CARDS ;
42                  %
43                  MACRO XLIST
44          DATA ;
45         *
46         *--PRINT OUT BASIN CHARACTERISTICS
47         ;
48            SET ;
49         *
50         *  --OUTPUT TO PRINTER, NO SAS HEADINGS
51         ;
52            FILE PRINT NOTITLES ;
53         *
54         *  --TODAYS DATE
55         ;
```

```
56          DAY = TODAY( ) ;
57          LAND = LURUPA + LUAGRI + LULOWD + LUMEDD + LUHIGD + LUCOMM
58               + LUINDU + LUCONB + LUIDLE + LUWETL + LUPARK ;
59          STREET = PERCAG + PERDAS ;
60        *
61        *  -PRINT OUT DATA
62        ;
63          PUT _PAGE_ ;
64          PUT @5 'SITE' @10 SITE @30 'FILE CREATED ' @43 DAY DATE7. / ;
65          PUT TCAREA 5-15 2 @17 'CONTRIBUTING DRAINAGE AREA, SQUARE MILES' /
66              IAREA  5-15 2 @17 'IMPERVIOUS AREA, PERCENTAGE OF DRAINAGE AREA' /
67              EAREA  5-15 2 @17 'EFFECTIVE IMPERVIOUS AREA'
68                            @42', PERCENTAGE OF DRAINAGE AREA' / ;
69          PUT BSLOPE 5-15 4 @17 'AVERAGE BASIN SLOPE, FEET/MILE ' /
70              CSLOPE 5-15 4 @17 'MAIN CONVEYANCE SLOPE, FEET/MILE' / ;
71          PUT PAMOR  5-15 2 @17 'PERMEABILITY OF A HORIZON OF SOIL '
72                            @51 'PROFILE, INCHES/HOUR' /
73              AWAABC 5-15 2 @17 'WATER CAPACITY, INCHES OF WATER/INCH OF SOIL ' /
74              SWPHA  5-15 2 @17 'SOIL-WATER PH OF THE A HORIZON' /
75              HYSGR  5-15   @17 'HYDROLOGIC SOIL GROUP, SCS METHODOLOGY' /
76                            @17 'A=1, B=2, C=3, D=4' / ;
77          PUT POPDEN 5-15   @17 'POPULATION DENSITY, PERSON/SQUARE MILE' /
78              STDEN  5-15   @17 'STREET DENSITY, LANES/SQUARE MILE' / ;
79          PUT                @17 'LAND USE, PERCENTAGE OF DRAINAGE AREA' /
80              LURUPA 5-15 2 @17 'RURAL AND PASTURE' /
81              LUAGRI 5-15 2 @17 'AGRICULTURAL' /
82              LULOWD 5-15 2 @17 'LOW DENSITY RESIDENTIAL' /
83              LUMEDD 5-15 2 @17 'MEDIUM DENSITY' /
84              LUHIGD 5-15 2 @17 'HIGH DENSITY RESIDENTIAL' /
85              LUCOMM 5-15 2 @17 'COMMERCIAL' /
86              LUINDU 5-15 2 @17 'INDUSTRIAL' /
87              LUCONB 5-15 2 @17 'UNDER CONSTRUCTION, BARE SURFACE' /
88              LUIDLE 5-15 2 @17 'IDLE OR VACANT' /
89              LUWETL 5-15 2 @17 'WETLAND' /
90              LUPARK 5-15 2 @17 'PARK' / ;
91          PUT @90 '***TOTAL LAND USE =' LAND 110-114 2 ;
92          PUT DETSTO 5-15 2 @17 'DETENTION STORAGE, ACRE FEET OF STORAGE' /
93              PERWUD 5-15 2 @17 '% WATERSHED UPSTREAM OF DETENTION STORAGE' /
94              PERSEW 5-15 2 @17 '% AREA DRAINED BY A STORM SEWER SYSTEM' /
95              PERCAG 5-15 2 @17 '% STREETS WITH CURB AND GUTTER DRAINAGE' /
96              PERDAS 5-15 2 @17 '% STREETS WITH DITCH AND SWALE DRAINAGE' / ;
97          PUT @90 '***TOTAL STREET DRAINAGE =' STREET 117-121 2 ;
98          PUT MANRNT 5-15 2 @17 'MEAN ANNUAL RAINFALL, INCHES' /
99              TENYRR 5-15 2 @17 'TEN-YEAR 1-HOUR RAINFALL INTENSITY, INCHES/HOUR' / ;
100         PUT AVFRSS 5-15   @17 'AVERAGE FREQUENCY OF STREET SWEEPING, DAYS' /
101             EAFENI 5-15   @17 'ESTIMATED FERTILIZER, POUNDS / ACRE OF NITROGEN' /
102             EAFEPR 5-15   @17 'ESTIMATED FERTILIZER, POUNDS / ACRE OF PHOSPHORUS' /
103             AVSEFF 5-15   @17 'AVERAGE SEWER FLUSHING FREQUENCY, DAYS' /
104             AVBCFR 5-15   @17 'AVERAGE CATCH BASIN CLEANING FREQUENCY, DAYS' /
105             EADVTR 5-15   @17 'ESTIMATED AVERAGE DAILY VEHICLE TRAFFIC'
106                           @56 ', VEHICLE MILES / DAY' / ;
107         PUT @5 'MEFQSC -' @14 MEFQSC /   @5 'GADINE -' @14 GADINE /
108             @5 'RECOLP -' @14 RECOLP /   @5 'SWASDP -' @14 SWASDP /
109             @5 'FLREFE -' @14 FLREFE /   @5 'LEAFDP -' @14 LEAFDP /
110             @5 'SEDSOU -' @14 SEDSOU /   @5 'STPTCO -' @14 STPTCO /
111             @5 'DEICCH -' @14 DEICCH / ;
112       *
113       *  --PRINT OUT BASIN WATER QUALITY CONSTITUENTS
```

```
114       ;
115          PUT _PAGE_ ;
116          PUT @4 '*************** ANNUAL STORM LOADS OF WATER QUALITY '
117                 'CONSTITUENTS ***************' /
118              @5 'RUNOFF' @20 'RUNOFF' @32 'WETFALL' @48 'WETFALL'
119             @61 'DRYFALL' @77 'DRYFALL' /
120              @6 'CODE' @21 'LOAD' @33 'CODE' @49 'LOAD' @62 'CODE' @78 'LOAD'/;
121          PUT @4 'MRL00095' MRL00095 12-26 & @32 'MWL00095' MWL00095 41-55 &
122             @61 'MDL00095' MDL00095 70-84 &;
123          PUT @4 'MRL00310' MRL00310 12-26 & @32 'MWL00310' MWL00310 41-55 &
124             @61 'MDL00310' MDL00310 70-84 &;
125          PUT @4 'MRL00340' MRL00340 12-26 & @32 'MWL00340' MWL00340 41-55 &
126             @61 'MDL00340' MDL00340 70-84 &;
127          PUT @4 'MRL00500' MRL00500 12-26 & @32 'MWL00500' MWL00500 41-55 &
128             @61 'MDL00500' MDL00500 70-84 &;
129          PUT @4 'MRL00600' MRL00600 12-26 & @32 'MWL00600' MWL00600 41-55 &
130             @61 'MDL00600' MDL00600 70-84 &;
131          PUT @4 'MRL00665' MRL00665 12-26 & @32 'MWL00665' MWL00665 41-55 &
132             @61 'MDL00665' MDL00665 70-84 &;
133          PUT @4 'MRL01051' MRL01051 12-26 & @32 'MWL01051' MWL01051 41-55 &
134             @61 'MDL01051' MDL01051 70-84 &;
135          PUT @4 'MRL01092' MRL01092 12-26 & @32 'MWL01092' MWL01092 41-55 &
136             @61 'MDL01092' MDL01092 70-84 &;
137                %
138                MACRO XUPDATE
139       *
140       *--SORT NEWBASIN BY SITE CODE
141       ;
142        PROC SORT DATA=NEWBASIN ;
143          BY SITE ;
144       *
145       *--SORT OLD BCMASTER BY SITE CODE
146       ;
147        PROC SORT DATA=BCFILE.BCMASTER ;
148          BY SITE ;
149       *
150       *--UPDATE BCMASTER BY SITE CODE
151       ;
152        DATA BCFILE.BCMASTER ;
153          UPDATE BCFILE.BCMASTER NEWBASIN ;
154          BY SITE ;
155                %
156                DATA BCFILE.BCMASTER ;

NOTE: DATA SET BCFILE.BCMASTER HAS 1 OBSERVATIONS AND 72 VARIABLES. 10 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.30 SECONDS AND 140K.

185       ;
186                XLIST

NOTE: 62 LINES WERE WRITTEN TO FILE PRINT.
NOTE: DATA SET WORK.DATA1 HAS 1 OBSERVATIONS AND 75 VARIABLES. 10 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.28 SECONDS AND 140K.

NOTE: SAS USED 140K MEMORY.
```

```
SITE 12345678            FILE CREATED 03JUN81

      20.00 CONTRIBUTING DRAINAGE AREA, SQUARE MILES
       0.60 IMPERVIOUS AREA, PERCENTAGE OF DRAINAGE AREA
       0.40 EFFECTIVE IMPERVIOUS AREA, PERCENTAGE OF DRAINAGE AREA

     0.0010 AVERAGE BASIN SLOPE, FEET/MILE
     0.0020 MAIN CONVEYANCE SLOPE, FEET/MILE

       0.75 PERMEABILITY OF A HORIZON OF SOIL PROFILE, INCHES/HOUR
       0.50 WATER CAPACITY, INCHES OF WATER/INCH OF SOIL
       7.20 SOIL-WATER PH OF THE A HORIZON
          1 HYDROLOGIC SOIL GROUP, SCS METHODOLOGY
            A=1, B=2, C=3, D=4

       1000 POPULATION DENSITY, PERSON/SQUARE MILE
         20 STREET DENSITY, LANES/SQUARE MILE

            LAND USE, PERCENTAGE OF DRAINAGE AREA
       0.10 RURAL AND PASTURE
       0.10 AGRICULTURAL
       0.10 LOW DENSITY RESIDENTIAL
       0.10 MEDIUM DENSITY
       0.04 HIGH DENSITY RESIDENTIAL
       0.10 COMMERCIAL
       0.10 INDUSTRIAL
       0.10 UNDER CONSTRUCTION, BARE SURFACE
       0.06 IDLE OR VACANT
       0.10 WETLAND
       0.10 PARK

                                                          ***TOTAL LAND USE =  1.00

     200.00 DETENTION STORAGE, ACRE FEET OF STORAGE
       0.30 % WATERSHED UPSTREAM OF DETENTION STORAGE
       0.70 % AREA DRAINED BY A STORM SEWER SYSTEM
       0.35 % STREETS WITH CURB AND GUTTER DRAINAGE
       0.75 % STREETS WITH DITCH AND SWALE DRAINAGE

                                                          ***TOTAL STREET DRAINAGE =  1.10

      65.00 MEAN ANNUAL RAINFALL, INCHES
       7.20 TEN-YEAR 1-HOUR RAINFALL INTENSITY, INCHES/HOUR

         30 AVERAGE FREQUENCY OF STREET SWEEPING, DAYS
        100 ESTIMATED FERTILIZER, POUNDS / ACRE OF NITROGEN
        100 ESTIMATED FERTILIZER, POUNDS / ACRE OF PHOSPHOROUS
         30 AVERAGE SEWER FLUSHING FREQUENCY, DAYS
         60 AVERAGE CATCH BASIN CLEANING FREQUENCY, DAYS
       1000 ESTIMATED AVERAGE DAILY VEHICLE TRAFFIC, VEHICLE MILES / DAY

MEFWSC - MEFSSC - METHOD OR TYE OF STREET SWEEPING EQUIPMENT
GADINE - GADINE - GRADING AND AGRICULTURAL ORDINANCES IN EFFECT
RECOLP - RECOLP - REFUSE COLLECTION PRACTICE
SWASDP - SWASDP - SOLID WASTE DISPOSAL AREAS IN WATERSHED
FLREFE - FLREFE - FLOOD RETARDING FEATURES SUCH AS GRAVEL FILTER STRIPS
LEAFDP - LEAFDP - LEAF DISPOSAL PRACTICE IN WATERSHED
SEDSOU - SEDSOU - IDENTIFY MAJOR SEDIMENT SOURCES
STPTCO - STPTCO - STREET PAVEMENT AND CONDITION
DEICCH - DEICCH - DEICING CHEMICALS
```

********** ANNUAL STORM LOADS OF WATER QUALITY CONSTITUENTS **********

RUNOFF CODE	RUNOFF LOAD	WETFALL CODE	WETFALL LOAD	DRYFALL CODE	DRYFALL LOAD
MRL00095	40.2654	MWL00095	.	MDL00095	.
MRL00310	.	MWL00310	.	MDL00310	.
MRL00340	27.0574	MWL00340	.	MDL00340	.
MRL00500	36.4165	MWL00500	.	MDL00500	.
MRL00600	0.4760	MWL00600	.	MDL00600	.
MRL00665	0.0326	MWL00665	.	MDL00665	.
MRL01051	.	MWL01051	.	MDL01051	.
MRL01092	.	MWL01092	.	MDL01092	.

4.32 Updating Basin Characteristics Data Sets

This section covers updating information which is already in BCMASTER and adding data for additional basins to the data set. The macros XINPUT and XLIST are also used in an update run. In addition the macro XUPDATE which supplies the SAS update code is used. These macros are located in member BCFILE of the partitioned data set AG4254J.URBAN.SOURCE. Figure 4.32.1 is a listing of the job deck to update or add to the BCMASTER file. The only cards which differ (assuming the OS data set exists in the creation run) are card 7 which allows SAS to create an intermediate temporary data set containing all the new inputs and card 38 which calls the update macro. All data cards for a site should be entered when making updates so that a complete new listing can be generated and filed. Several computations are made on the incoming data as seen on the output listing. The percentage of total land use and total street drainage are accumulated for cross checking the data.

The pages following figure 4.32.1 illustrate JCL commands, SAS instructions, and sample output that result when a BCMASTER data set in the BC File is updated. The output order corresponds to the sequential processing of JCL and SAS commands in an update operation.

```
Card 1..//         JOB
     2..// EXEC SAS,TIME=(,5)
     3..//BCFILE DD DSN=AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA,
     4..// DISP=OLD
     5..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(BCFILE),DISP=SHR
     6..//      DD *
     7..          DATA NEWBASIN ;
     8..          XINPUT
     9..        12345601              20             .60             .40
    10..            .001            .002
    11..             .75              .5             7.2               1
    12..            1000              20
    13..    .10     .10     .10     .10     .04     .10     .10     .10     .06     .10     .10
    14..             200             .30             .70             .35             .75
    15..              65             7.2
    16..00095      24.3040
    17..00310
    18..00340      15.8987
    19..00500      24.4288
    20..00600      0.4614
    21..00665      0.0160
    22..00690      8.4905
    23..01051      0.0430
    24..01092      0.0291
    25..              30             100             100
    26..              30              60            1000
    27..MEFGSC - METHOD OR TYPE OF STREET SWEEPING EQUIPMENT
    28..GADINE - GRADING AND AGRICULTURAL ORDINANCES IN EFFECT
    29..RECOLP - REFUSE COLLECTION PRACTICE
    30..SWASDP - SOLID WASTE DISPOSAL AREAS IN WATERSHED
    31..FLREFE - FLOOD RETARDING FEATURES SUCH AS GRAVEL FILTER STRIPS
    32..LEAFDP - LEAF DISPOSAL PRACTICE IN WATERSHED
    33..SEDSOU - IDENTIFY MAJOR SEDIMENT SOURCES
    34..STPTCO - STREET PAVEMENT AND CONDITION
    35..DEICCH - DEICING CHEMICALS
    36..;
    37..          XLIST
    38..          XUPDATE
    39../*
    40..//
```

Figure 4.32.1.--SAS and JCL commands for executing a Basin Characteristics file update.

```
//AG4254J6 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)        J5184
// EXEC SAS,TIME=(,5)
//BCFILE DD DSN=AG4254J.STATEYY.URBAN.BASIN.STORM.DATA,
// DISP=OLD
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(BCFILE),DISP=SHR
//       DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81154.1023
IEF374I STEP /SAS      / STOP  81154.1025 CPU    0MIN 01.26SEC MAIN 240K LCS    0K
CCD006I STEP /SAS      / I/O IN DD SEQ; 155:0       481:0       314:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 314:0       155:0       155:210
CCD006I STEP /SAS      / I/O IN DD SEQ; 442:8       447:3       431:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 155:0       314:0       449:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 563:0       155:0       155:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 744:83      744:5       401:2
CCD001I STEP /SAS      / MEMORY RESERVED  240K; ACCESSES: DISK      311/ TAPE        0
IEF375I  JOB /AG4254J6/ START 81154.1023
IEF376I  JOB /AG4254J6/ STOP  81154.1025 CPU    0MIN 01.26SEC
CCD007A  JOB /AG4254J6/ BASIC CHRG: FIXED    CPU    DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                    1.24     .95      .94              .31    3.45
CCD002I  JOB /AG4254J6/ TOTAL CHARGE RECORDED =      $3.45
CCD003I  JOB /AG4254J6/ US GEOLOGICAL SURVEY REL 05 REL 218 TIME = 10.25.23 DATE = 06/03/81

                        EFFECTIVE JUNE 1, 1981, CCD WILL NO LONGER SUPPORT 2314 DISK STORAGE
                        DUE TO THE EQUIPMENTS OBSOLESCENCE AND PHYSICAL SPACE REQUIREMENT.
                        FOR CONVERSION ASSISTANCE CALL DAN MCGLOTHIN 860-7119 OR FTS 928-7119.
```

NOTE: THE JOB AG4254J6 HAS BEEN RUN UNDER RELEASE 79.38 OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1                MACRO XINPUT
2          *
3          *--PROGRAM TO INPUT BASIN CHARACTERISTICS
4          ;
5          *
6          *  --INPUT DATA WILL BE READ FROM CARDS
7          ;
8             INFILE  CARDS  MISSOVER ;
9          *
10         *  --INPUT BASIN CHARACTERISTICS DATA
11         ;
12            INPUT  SITE $ 1-15  TCAREA 16-30   IAREA 31-45   EAREA 46-60
13                / BSLOPE  1-15  CSLOPE 16-30
14                /  PAMOR  1-15  AWAABC 16-30   SWPMA 31-45   MYSGR 46-60
15                / POPDEN  1-15   STDEN 16-30
16                / LURJPA  1-7   LUAGRI  8-14  LULOWD 15-21  LUMEDD 22-28
17                  LUHIGD 29-35  LUCOMM 36-42  LUINDU 43-49  LUCONB 50-56
18                  LUIDLE 57-63  LUWETL 64-70  LUPARK 71-77
19                / DETSTO  1-15  PERWUD 16-30  PERSEW 31-45  PERCAG 46-60  PERDAS 61-75
20                / MANRNT  1-15  TENYRR 16-30 ;
21         *
22         *    --ANNUAL LOADS FOR WATER QUALITY CONSTITUENTS
23         ;
24            INPUT
25                 MRL00095 11-20 MWL00095 21-30 MDL00095 31-40
26                / MRL00310 11-20 MWL00310 21-30 MDL00310 31-40
27                / MRL00340 11-20 MWL00340 21-30 MDL00340 31-40
28                / MRL00500 11-20 MWL00500 21-30 MDL00500 31-40
29                / MRL00600 11-20 MWL00600 21-30 MDL00500 31-40
30                / MRL00665 11-20 MWL00665 21-30 MDL00565 31-40
31                / MRL00690 11-20 MWL00690 21-30 MDL00590 31-40
32                / MRL01051 11-20 MWL01051 21-30 MDL01051 31-40
33                / MRL01092 11-20 MWL01092 21-30 MDL01092 31-40
34         ;
35            INPUT
36                 AVFRSS  1-15  EAFENI 16-30  EAFEPR 31-45
37                / AVSEFF  1-15  AVBCFR 16-30  EADVTR 31-45
38                / MEFQSC $ 1-80    / GAJINE $ 1-80    / RECOLP $ 1-80    / SWASDP $ 1-80
39                / FLNEFE $ 1-80    / LEAFOP $ 1-80    / SEDSOU $ 1-80    / STPTCO $ 1-80
40                / DEICCH $ 1-80;
41            CARDS ;
42                 %
43                 MACRO XLIST
44          DATA ;
45         *
46         *--PRINT OUT BASIN CHARACTERISTICS
47         ;
48            SET ;
49         *
50         *  --OUTPUT TO PRINTER, NO SAS HEADINGS
51         ;
52            FILE PRINT NOTITLES ;
53         *
54         *  --TODAYS DATE
55         ;
```

```
56          DAY = TODAY( ) ;
57          LAND = LURUPA + LJAGNI + LULOWD + LJMEDD + LUHIGD + LJCOMM
58               + LUINDU + LJCONB + LUIDLE + LJWETL + LUPARK ;
59          STREET = PERCAG + PERDAS ;
60       *
61       *  -PRINT OUT DATA
62       ;
63          PUT _PAGE_ ;
64          PUT @5 'SITE' @10 SITE @30 'FILE CREATED ' @43 DAY DATE7. / ;
65          PUT TCAREA 5-15 2 @17 'CONTRIBUTING DRAINAGE AREA, SQUARE MILES' /
66              IAREA  5-15 2 @17 'IMPERVIOUS AREA, PERCENTAGE OF DRAINAGE AREA' /
67              EAREA  5-15 2 @17 'EFFECTIVE IMPERVIOUS AREA'
68                            @42', PERCENTAGE OF DRAINAGE AREA' / ;
69          PUT BSLOPE 5-15 4 @17 'AVERAGE BASIN SLOPE, FEET/MILE ' /
70              CSLOPE 5-15 4 @17 'MAIN CONVEYANCE SLOPE, FEET/MILE' / ;
71          PUT PAHOR  5-15 2 @17 'PERMEABILITY OF A HORIZON OF SOIL '
72                            @51 'PROFILE, INCHES/HOUR' /
73              AWAABC 5-15 2 @17 'WATER CAPACITY, INCHES OF WATER/INCH OF SOIL ' /
74              SWPHA  5-15 2 @17 'SOIL-WATER PH OF THE A HORIZON' /
75              HYSGR  5-15   @17 'HYDROLOGIC SOIL GROUP, SCS METHODOLOGY' /
76                            @17 'A=1, B=2, C=3, D=4' / ;
77          PUT POPDEN 5-15   @17 'POPULATION DENSITY, PERSON/SQUARE MILE' /
78              STDEN  5-15   @17 'STREET DENSITY, LANES/SQUARE MILE' / ;
79          PUT                @17 'LAND USE, PERCENTAGE OF DRAINAGE AREA' /
80              LURUPA 5-15 2 @17 'RURAL AND PASTURE' /
81              LJAGNI 5-15 2 @17 'AGRICULTURAL' /
82              LULOWD 5-15 2 @17 'LOW DENSITY RESIDENTIAL' /
83              LJMEDD 5-15 2 @17 'MEDIUM DENSITY' /
84              LUHIGD 5-15 2 @17 'HIGH DENSITY RESIDENTIAL' /
85              LJCOMM 5-15 2 @17 'COMMERCIAL' /
86              LUINDU 5-15 2 @17 'INDUSTRIAL' /
87              LUCONB 5-15 2 @17 'UNDER CONSTRUCTION, BARE SURFACE' /
88              LUIDLE 5-15 2 @17 'IDLE OR VACANT' /
89              LJWETL 5-15 2 @17 'WETLAND' /
90              LJPARK 5-15 2 @17 'PARK' / ;
91          PUT @90 '***TOTAL LAND USE =' LAND 110-114 2 ;
92          PUT DETSTO 5-15 2 @17 'DETENTION STORAGE, ACRE FEET OF STORAGE' /
93              PERWUD 5-15 2 @17 '% WATERSHED UPSTREAM OF DETENTION STORAGE' /
94              PERSEW 5-15 2 @17 '% AREA DRAINED BY A STORM SEWER SYSTEM' /
95              PERCAG 5-15 2 @17 '% STREETS WITH CURB AND GUTTER DRAINAGE' /
96              PERDAS 5-15 2 @17 '% STREETS WITH DITCH AND SWALE DRAINAGE' / ;
97          PUT @90 '***TOTAL STREET DRAINAGE =' STREET 117-121 2 ;
98          PUT MANRNT 5-15 2 @17 'MEAN ANNUAL RAINFALL, INCHES' /
99              TENYRR 5-15 2 @17 'TEN-YEAR 1-HOUR RAINFALL INTENSITY, INCHES/HOUR' / ;
100         PUT AVFRSS 5-15   @17 'AVERAGE FREQUENCY OF STREET SWEEPING, DAYS' /
101             EAFENI 5-15   @17 'ESTIMATED FERTILIZER, POUNDS / ACRE OF NITROGEN' /
102             EAFEPR 5-15   @17 'ESTIMATED FERTILIZER, POUNDS / ACRE OF PHOSPHOROUS' /
103             AVSEFF 5-15   @17 'AVERAGE SEWER FLUSHING FREQUENCY, DAYS' /
104             AVBCFR 5-15   @17 'AVERAGE CATCH BASIN CLEANING FREQUENCY, DAYS' /
105             EADVTR 5-15   @17 'ESTIMATED AVERAGE DAILY VEHICLE TRAFFIC'
106                           @56 ', VEHICLE MILES / DAY' / ;
107         PUT @5 'MEFQSC -' @14 MEFQSC /   @5 'GAOINE -' @14 GAOINE /
108             @5 'RECOLP -' @14 RECOLP /   @5 'SWASDP -' @14 SWASDP /
109             @5 'FLREFE -' @14 FLREFE /   @5 'LEAFDP -' @14 LEAFDP /
110             @5 'SEDSOU -' @14 SEDSOU /   @5 'STPTCO -' @14 STPTCO /
111             @5 'DEICCH -' @14 DEICCH / ;
112      *
113      *  --PRINT OUT BASIN WATER QUALITY CONSTITUENTS
```

```
114       ;
115          PUT _PAGE_ ;
116          PUT @4 '**************** ANNJAL STORM LOADS OF #ATER QUALITY '
117                 'CONSTITUENTS ****************' /
118              @5 'RJNOFF' @20 'RUNOFF' @32 'WETFALL' @48 'WETFALL'
119             @61 'DRYFALL' @77 'DRYFALL' /
120              @6 'CODE' @21 'LOAD' @33 'CODE' @49 'LOAD' @62 'CODE' @78 'LOAD'/;
121          PUT @4 'MRL00095' MRL00095 12-26 & @32 'M#L00095' M#L00095 41-55 &
122             @61 'MDL00095' MDL00095 70-84 &;
123          PUT @4 'MRL00310' MRL00310 12-26 & @32 'M#L00310' M#L00310 41-55 &
124             @61 'MDL00310' MDL00310 70-84 &;
125          PUT @4 'MRL00340' MRL00340 12-26 & @32 'M#L00340' M#L00340 41-55 &
126             @61 'MDL00340' MDL00340 70-84 &;
127          PUT @4 'MRL00500' MRL00500 12-26 & @32 'M#L00500' M#L00500 41-55 &
128             @61 'MDL00500' MDL00500 70-84 &;
129          PUT @4 'MRL00600' MRL00600 12-26 & @32 'M#L00600' M#L00600 41-55 &
130             @61 'MDL00600' MDL00600 70-84 &;
131          PUT @4 'MRL00665' MRL00665 12-26 & @32 'M#L00665' M#L00665 41-55 &
132             @61 'MDL00665' MDL00665 70-84 &;
133          PUT @4 'MRL01051' MRL01051 12-26 & @32 'M#L01051' M#L01051 41-55 &
134             @61 'MDL01051' MDL01051 70-84 &;
135          PUT @4 'MRL01092' M#L01092 12-26 & @32 'M#L01092' M#L01092 41-55 &
136             @61 'MDL01092' MDL01092 70-84 &;
137                *
138                MACRO XUPDATE
139       *
140       *--SORT NE#BASIN BY SITE CODE
141       ;
142        PROC SORT DATA=NE#BASIN ;
143          BY SITE ;
144       *
145       *--SORT OLD BCMASTER BY SITE CODE
146       ;
147        PROC SORT DATA=BCFI_E.BCMASTER ;
148          BY SITE ;
149       *
150       *--UPDATE BCMASTER BY SITE CODE
151       ;
152        DATA BCFILE.BCMASTER ;
153          UPDATE BCFILE.BCMASTER NE#BASIN ;
154          BY SITE ;
155                *
156                DATA NE#BASIN ;

NOTE: DATA SET #ORK.NE#BASIN HAS 1 OBSERVATIONS AND 72 VARIABLES. 10 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.31 SECONDS AND 139K.

185       ;
186                XLIST

NOTE: 62 LINES #ERE #RITTEN TO FILE PRINT.
NOTE: DATA SET WORK.DATA1 HAS 1 OBSERVATIONS AND 75 VARIABLES. 10 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.28 SECONDS AND 140K.


NOTE: DATA SET WORK.NE#BASIN HAS 1 OBSERVATIONS AND 72 VARIABLES. 10 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 235K.
```

```
NOTE: DATA SET BCFILE.BCMASTER HAS 1 OBSERVATIONS AND 72 VARIABLES. 10 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.21 SECONDS AND 236K.

187                XUPDATE

NOTE: DATA SET BCFILE.BCMASTER HAS 2 OBSERVATIONS AND 72 VARIABLES. 10 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.16 SECONDS AND 140K.


NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

```
SITE 12345601            FILE CREATED 03JUN81

      20.00 CONTRIBUTING DRAINAGE AREA, SQUARE MILES
       0.60 IMPERVIOUS AREA, PERCENTAGE OF DRAINAGE AREA
       0.40 EFFECTIVE IMPERVIOUS AREA, PERCENTAGE OF DRAINAGE AREA

     0.0010 AVERAGE BASIN SLOPE, FEET/MILE
     0.0020 MAIN CONVEYANCE SLOPE, FEET/MILE

       0.75 PERMEABILITY OF A HORIZON OF SOIL PROFILE, INCHES/HOUR
       0.50 WATER CAPACITY, INCHES OF WATER/INCH OF SOIL
       7.20 SOIL-WATER PH OF THE A HORIZON
          1 HYDROLOGIC SOIL GROUP, SCS METHODOLOGY
            A=1, B=2, C=3, D=4

       1000 POPULATION DENSITY, PERSON/SQUARE MILE
         20 STREET DENSITY, LANES/SQUARE MILE

            LAND USE, PERCENTAGE OF DRAINAGE AREA
       0.10 RURAL AND PASTURE
       0.10 AGRICULTURAL
       0.10 LOW DENSITY RESIDENTIAL
       0.10 MEDIUM DENSITY
       0.04 HIGH DENSITY RESIDENTIAL
       0.10 COMMERCIAL
       0.10 INDUSTRIAL
       0.10 UNDER CONSTRUCTION, BARE SURFACE
       0.06 IDLE OR VACANT
       0.10 WETLAND
       0.10 PARK

                                                                    ***TOTAL LAND USE =  1.00

     200.00 DETENTION STORAGE, ACRE FEET OF STORAGE
       0.30 % WATERSHED UPSTREAM OF DETENTION STORAGE
       0.70 % AREA DRAINED BY A STORM SEWER SYSTEM
       0.35 % STREETS WITH CURB AND GUTTER DRAINAGE
       0.75 % STREETS WITH DITCH AND SWALE DRAINAGE

                                                                    ***TOTAL STREET DRAINAGE =  1.10
      65.00 MEAN ANNUAL RAINFALL, INCHES
       7.20 TEN-YEAR 1-HOUR RAINFALL INTENSITY, INCHES/HOUR

         30 AVERAGE FREQUENCY OF STREET SWEEPING, DAYS
        100 ESTIMATED FERTILIZER, POUNDS / ACRE OF NITROGEN
        100 ESTIMATED FERTILIZER, POUNDS / ACRE OF PHOSPHOROUS
         30 AVERAGE SEWER FLUSHING FREQUENCY, DAYS
         60 AVERAGE CATCH BASIN CLEANING FREQUENCY, DAYS
       1000 ESTIMATED AVERAGE DAILY VEHICLE TRAFFIC, VEHICLE MILES / DAY

MEFGSC - MEFGSC - METHOD OR TYE OF STREET SWEEPING EQUIPMENT
GADINE - GADINE - GRADING AND AGRICULTURAL ORDINANCES IN EFFECT
RECOLP - RECOLP - REFUSE COLLECTION PRACTICE
SWASDP - SWASDP - SOLID WASTE DISPOSAL AREAS IN WATERSHED
FLREFE - FLREFE - FLOOD RETARDING FEATURES SUCH AS GRAVEL FILTER STRIPS
LEAFDP - LEAFDP - LEAF DISPOSAL PRACTICE IN WATERSHED
SEDSOU - SEDSOU - IDENTIFY MAJOR SEDIMENT SOURCES
STPTCO - STPTCO - STREET PAVEMENT AND CONDITION
DEICCH - DEICCH - DEICING CHEMICALS
```

********** ANNUAL STORM LOADS OF WATER QUALITY CONSTITUENTS **********

RUNOFF CODE	RUNOFF LOAD	WETFALL CODE	WETFALL LOAD	DRYFALL CODE	DRYFALL LOAD
MRL00095	24.3040	MWL00095	.	MDL00095	.
MRL00310	.	MWL00310	.	MDL00310	.
MRL00340	15.8987	MWL00340	.	MDL00340	.
MRL00500	24.4288	MWL00500	.	MDL00500	.
MRL00600	0.4614	MWL00600	.	MDL00600	.
MRL00665	0.0160	MWL00665	.	MDL00665	.
MRL01051	0.0430	MWL01051	.	MDL01051	.
MRL01092	0.0291	MWL01092	.	MDL01092	.

4 4 Creating and Updating Storm Characteristics Data Sets

The following pages illustrate JCL commands, SAS instructions and sample output that result when a Storm Characteristics file (SCMASTER) is created and updated.

4.41 Creating Storm Characteristics Data Sets

The Storm Characteristics file (SCMASTER) creation macros are stored as SAS instructions in the partitioned data set AG4254J.URBAN.SOURCE with a member name of SCFILE. Figure 4.41.1 is a listing of the job to create the SCMASTER file. Two macros are referenced in this job. The macro XINPUT reads the complete data deck describing the storm. All the data names of the various data values that are a part of SCMASTER are defined in table 4.3. The input formats may be read directly from the XINPUT macro listing included in the job listing at the end of this section. The respective card positions for each data variable are documented. For example, SITE is on the first card in columns 1-15. If a $ sign appears before the column numbers, this defines the incoming data as alphanumeric. A new data card is designated by a slash (/) symbol that appears before the first variable on the card.

A second macro, XLIST, is called which creates an output listing of the data for verification and future reference.

The run deck consists of job control language (JCL), SAS statements and input data cards. The following is a card by card description of the sample run deck listed in figure 4.41.1. For further discussion of the JCL see the CCD User's Manual.

The JCL must be entered in certain card columns as shown (figure 4.41.1). The SAS statements may be entered in any columns.

Card 1..Job card.
2..Execute a SAS program using a maximum of 5 seconds.
3-4..JCL specifying the name of the OS data set which contains the SAS data set SCMASTER.
5-6..Input to SAS will come from the partitioned data set AG4254J.URBAN.SOURCE. Member SCFILE is specified. The cards following the '*' are to be concatenated to the source.
7-9..SAS comment statements.
10..SAS statement describing SCMASTER as the output data set.
11..Calls the macro XINPUT which reads the following data cards.
12-23..Input cards describing the storm.
24..SAS end of data indicator.
25..Calls macro XLIST to create a listing of all input data.
26-27..End of step and job.

The pages following figure 4.41.1 illustrate a complete sample run. The listing includes JCL commands, SAS instructions, and corresponding output.

```
       COL.1      COL.12
        ●           ●
Card 1..//          JOB
     2..// EXEC SAS,TIME=(,5)
     3..//BCFILE DD DSN=AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA,
     4..// DISP=OLD
     5..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(SCFILE),DISP=SHR
     6..//       DD *
     7..*
     8..*--PROGRAM TO CREATE NEW STORM CHARACTERISTICS FILE
     9..;
    10..          DATA BCFILE.SCMASTER ;
    11..          XINPUT
    12..FL.HWY.STE S001     750415     1417       750415     1630
    13..0.07       0.53       0.18       0.05       50         0.00      0.09      0.09
    14..0.01       0.47       0.00       130        131        17
    15..00095      40.2654
    16..00310
    17..00340      27.0574
    18..00500      36.4165
    19..00600      0.4760
    20..00665      0.0326
    21..00690      11.8254
    22..01051
    23..01092
    24..          ;
    25..          XLIST
    26../*
    27..//
```

Figure 4.41.1.--SAS and JCL commands for executing a Storm Characteristics file creation.

```
//AG4254J5 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)        J5126
// EXEC SAS,TIME=(,5)
//SCFILE DD DSN=AG4254J.STATEYY.URBAN.BASIN.STORM.DATA,
// DISP=OLD
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(SCFILE),DISP=SHR
//       DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81154.0955
IEF374I STEP /SAS      / STOP  81154.0956 CPU    0MIN 00.62SEC MAIN 240K LCS    0K
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        481:0        314:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 314:0        155:0        155:65
CCD006I STEP /SAS      / I/O IN DD SEQ: 44A:6        4AC:2        4B3:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        314:0        4AD:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 563:0        155:0        155:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 744:24       744:5        5E1:2
CCD001I STEP /SAS      / MEMORY RESERVED  240K: ACCESSES: DISK      104/ TAPE        0
IEF375I  JOB /AG4254J5/ START 81154.0955
IEF376I  JOB /AG4254J5/ STOP  81154.0956 CPU    0MIN 00.62SEC
CCD007A  JOB /AG4254J5/ BASIC CHRG: FIXED    CPU    DSK-IO   TPE-IO KBYTE-HR   TOTAL
                                    1.24      .47      .31                      2.02
CCD002I  JOB /AG4254J5/ TOTAL CHARGE RECORDED =       $2.02
CCD003I  JOB /AG4254J5/ US GEOLOGICAL SURVEY REL OS REL 218 TIME = 09.56.28 DATE = 06/03/81

                        EFFECTIVE JUNE 1, 1981, CCD WILL NO LONGER SUPPORT 2314 DISK STORAGE
                        DUE TO THE EQUIPMENTS OBSOLESCENCE AND PHYSICAL SPACE REQUIREMENT.
                        FOR CONVERSION ASSISTANCE CALL DAN MCGLOTHIN 860-7119 OR FTS 928-7119.
```

NOTE: THE JOB AG4254J5 HAS BEEN RUN UNDER RELEASE 79.38 OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1                MACRO XINPUT
2          *
3          *  --INPUT DATA WILL BE READ FROM CARDS
4          ;
5             INFILE  CARDS  MISSOVER ;
6          *
7          *
8          *  --INPUT RAINFALL AMOUNTS, TIMES, AND DURATIONS
9                   AND STORM WATER QUALITY CONSTITUENTS
10         ;
11            INPUT  SITE $ 1-15   BDATE 20-25   BTIME 30-33   EDATE 40-45   ETIME 50-53
12                / TRAINA  1-10   MAXR5 11-20  MAXR15 21-30   MAX1H 31-40  NDRD02 41-50
13                  DERNPD 51-60  DERNP3 61-70  DERNP7 71-80
14                / TOTRUN  1-10   PEAKQ 11-20   BFLOW 21-30  DURSTQ 31-40  DURRNF 41-50
15                  TIMBPK 51-60  TILASC 61-70
16                / RL00095 11-20 WL00095 21-30 D_00095 31-40
17                / RL00310 11-20 WL00310 21-30 D_00310 31-40
18                / RL00340 11-20 WL00340 21-30 D_00340 31-40
19                / RL00500 11-20 WL00500 21-30 D_00500 31-40
20                / RL00600 11-20 WL00600 21-30 D_00600 31-40
21                / RL00665 11-20 WL00665 21-30 D_00665 31-40
22                / RL00690 11-20 WL00690 21-30 D_00690 31-40
23                / RL01051 11-20 WL01051 21-30 D_01051 31-40
24                / RL01092 11-20 WL01092 21-30 D_01092 31-40
25         ;
26            CARDS ;
27                  %
28                  MACRO XLIST
29          DATA ;
30         *
31         *--PRINT OUT STORM CHARACTERISTICS
32         ;
33            SET ;
34         *
35         *  --OUTPUT TO PRINTER, NO SAS HEADINGS
36         ;
37            FILE PRINT NOTITLES ;
38         *
39         *  --TODAYS DATA
40         ;
41            DAY = TODAY( ) ;
42         *
43         *  --PRINT RAINFALL AMOUNTS, TIMES, AND DURATIONS
44         ;
45            PUT _PAGE_ ;
46            PUT @5 'SITE' @10 SITE  @40'FILE CREATED' @53 DAY DATE7. / ;
47            PUT @5 'STORM BEGIN DATE (YR, MON, DAY) ' @40 BDATE /
48                @5 'STORM BEGIN TIME (MILITARY)'      @42 BTIME /
49                @5 'STORM END DATE (YR, MON, DAY) '   @40 EDATE /
50                @5 'STORM END TIME (MILITARY) '       @42 ETIME / ;
51            PUT TRAINA 5-15 2 @17 'TOTAL RAINFALL, AVERAGE FOR THE BASIN, INCHES' /
52                MAXR5  5-15 2 @17 'MAXIMUM 5-MINUTE RAINFALL RATE, INCHES/HOUR ' /
53                MAXR15 5-15 2 @17 'MAXIMUM 15-MINUTE RAINFALL RATE, INCHES/HOUR ' /
54                MAX1H  5-15 2 @17 'MAXIMUM 1-HOUR RAINFALL RATE, INCHES/HOUR ' / ;
55            PUT NDRD02 5-15   @17 'NUMBER OF DRY HOURS PRIOR TO '
```

```
56                          'STORM COUNTING BACKWARDS TO' /
57                      @17 'STORM EVENT WITH RAINFALL '
58                          'GREATER THAN 0.2 INCHES' /
59          DERNP2 5-15 2 @17 'DEPTH OF RAINFALL ACCUMULATED PREVIOUS '
60                          '24 HOURS, INCHES' /
61          DERNP3 5-15 2 @17 'DEPTH OF RAINFALL ACCUMULATED PREVIOUS '
62                          '72 HOURS, INCHES' /
63          DERNP7 5-15 2 @17 'DEPTH OF RAINFALL ACCUMULATED PREVIOUS '
64                          '168 HOURS, INCHES' /
65          TOTRUN 5-15 2 @17 'TOTAL RUNOFF OVER THE BASIN, INCHES ' /
66          PEAKQ  5-15 2 @17 'PEAK DISCHARGE, CUBIC FEET / SECOND' /
67          BFLOW  5-15 2 @17 'BASE FLOW PRIOR TO STORM, CUBIC FEET / SECOND '/ ;
68      PUT DURSTO 5-15   @17 'DURATION OF STORM RUNOFF USED TO CALCULATE LOAD, '
69                          'MINUTES' /
70          DURRNF 5-15   @17 'DURATION OF RAINFALL, MINUTES ' /
71          TIMBPK 5-15   @17 'TIME FROM BEGINNING OF RAINFALL TO '
72                          'HYDROGRAPH PEAK, MINUTES' /
73          TILASC 5-15   @17 'TIME SINCE LAST STREET CLEANING, DAYS ' ;
74      *
75      *  --PRINT STORM WATER QUALITY CONSTITUENTS, STARTING ON A NEW PAGE
76      ;
77         PUT _PAGE_ ;
78         PUT @4 '******************** STORM LOADS OF WATER QUALITY '
79                'CONSTITUENTS ********************' /
80            @5 'RUNOFF' @20 'RUNOFF' @32 'WETFALL' @48 'WETFALL'
81           @61 'DRYFALL' @77 'DRYFALL' /
82            @6 'CODE' @21 'LOAD' @33 'CODE' @49 'LOAD' @62 'CODE' @78 'LOAD'/;
83         PUT @4 'RL00095' RL00095 12-26 & @32 'WL00095' WL00095 41-55 5
84            @61 'DL00095' DL00095 70-84 ;
85         PUT @4 'RL00310' RL00310 12-26 & @32 'WL00310' WL00310 41-55 5
86            @61 'DL00310' DL00310 70-84 ;
87         PUT @4 'RL00340' RL00340 12-26 & @32 'WL00340' WL00340 41-55 5
88            @61 'DL00340' DL00340 70-84 ;
89         PUT @4 'RL00500' RL00500 12-26 & @32 'WL00500' WL00500 41-55 5
90            @61 'DL00500' DL00500 70-84 ;
91         PUT @4 'RL00600' RL00600 12-26 & @32 'WL00600' WL00600 41-55 5
92            @61 'DL00600' DL00600 70-84 ;
93         PUT @4 'RL00665' RL00665 12-26 & @32 'WL00665' WL00665 41-55 5
94            @61 'DL00665' DL00665 70-84 ;
95         PUT @4 'RL01051' RL01051 12-26 & @32 'WL01051' WL01051 41-55 5
96            @61 'DL01051' DL01051 70-84 ;
97         PUT @4 'RL01092' RL01092 12-26 & @32 'WL01092' WL01092 41-55 5
98            @61 'DL01092' DL01092 70-84 ;
99               %
100              MACRO XUPDATE
101     *
102     *--SORT NEWSTORM BY SITE CODE
103     ;
104      PROC SORT DATA=NEWSTORM ;
105        BY SITE ;
106     *
107     *--SORT OLD SCMASTER BY SITE CODE
108     ;
109      PROC SORT DATA=BCFILE.SCMASTER ;
110        BY SITE ;
111     *
112     *--UPDATE SCMASTER BY SITE CODE
113     ;
```

```
114         DATA BCFILE.SCMASTER ;
115           UPDATE BCFILE.SCMASTER NEWSTORM ;
116           BY SITE ;
117                 %
118       *
119       *--PROGRAM TO CREATE NEW STORM CHARACTERISTICS FILE
120       ;
121                 DATA BCFILE.SCMASTER ;

NOTE: DATA SET BCFILE.SCMASTER HAS 1 OBSERVATIONS AND 67 VARIABLES. 33 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.32 SECONDS AND 140K.

135                 ;
136                 XLIST

NOTE: 34 LINES WERE WRITTEN TO FILE PRINT.
NOTE: DATA SET WORK.DATA1 HAS 1 OBSERVATIONS AND 68 VARIABLES. 32 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.21 SECONDS AND 140K.

NOTE: SAS USED 140K MEMORY.

NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

SITE FL.HWY.STE S001 FILE CREATED 03JUN81

STORM BEGIN DATE (YR, MON, DAY)	750415
STORM BEGIN TIME (MILITARY)	1417
STORM END DATE (YR, MON, DAY)	750415
STORM END TIME (MILITARY)	1630

0.07	TOTAL RAINFALL, AVERAGE FOR THE BASIN, INCHES
0.53	MAXIMUM 5-MINUTE RAINFALL RATE, INCHES/HOUR
0.18	MAXIMUM 15-MINUTE RAINFALL RATE, INCHES/HOUR
0.05	MAXIMUM 1-HOUR RAINFALL RATE, INCHES/HOUR
50	NUMBER OF DRY HOURS PRIOR TO STORM COUNTING BACKWARDS TO STORM EVENT WITH RAINFALL GREATER THAN 0.2 INCHES
0.00	DEPTH OF RAINFALL ACCUMULATED PREVIOUS 24 HOURS, INCHES
0.09	DEPTH OF RAINFALL ACCUMULATED PREVIOUS 72 HOURS, INCHES
0.09	DEPTH OF RAINFALL ACCUMULATED PREVIOUS 168 HOURS, INCHES
0.01	TOTAL RUNOFF OVER THE BASIN, INCHES
0.47	PEAK DISCHARGE, CUBIC FEET / SECOND
0.00	BASE FLOW PRIOR TO STORM, CUBIC FEET / SECOND
130	DURATION OF STORM RUNOFF USED TO CALCULATE LOAD, MINUTES
131	DURATION OF RAINFALL, MINUTES
17	TIME FROM BEGINNING OF RAINFALL TO HYDROGRAPH PEAK, MINUTES
.	TIME SINCE LAST STREET CLEANING, DAYS

********** STORM LOADS OF WATER QUALITY CONSTITUENTS **********

RUNOFF CODE	RUNOFF LOAD	WETFALL CODE	WETFALL LOAD	DRYFALL CODE	DRYFALL LOAD
RL00095	40.2654	WL00095	.	DL00095	.
RL00310	.	WL00310	.	DL00310	.
RL00340	27.0574	WL00340	.	DL00340	.
RL00500	36.4165	WL00500	.	DL00500	.
RL00600	0.4760	WL00600	.	DL00600	.
RL00665	0.0326	WL00665	.	DL00665	.
RL01051	.	WL01051	.	DL01051	.
RL01092	.	WL01092	.	DL01092	.

4.42 Updating Storm Characteristics Data Sets

This section covers updating information which is already in SCMASTER and adding data for additional storms to the data set. The macros XINPUT and XLIST are also used in an update run. In addition, the macro XUPDATE which supplies the SAS update code is used. These macros are located in member SCFILE of the partitioned data set AG4254J.URBAN.SOURCE. Figure 4.42.1 is a listing of the job deck to update or add to the SCMASTER file. The only cards which differ (assuming the OS data set exists in the creation run) are card 10 which allows SAS to create an intermediate temporary data set containing all the new inputs and card 26 which calls the update macro. All data cards for a site should be entered when making updates so that a complete new listing can be generated and filed.

The pages following figure 4.42.1 illustrate JCL commands, SAS instructions, and sample output that result when a SCMASTER data set in the SC File is updated. The output order corresponds to the sequential processing of JCL and SAS commands in an update operation.

4.5 Backup of Basin Characteristics File

Section 3.5 can be referenced for JCL commands that activate a SAS Procedure COPY that can be used to backup entire OS data sets or selected SAS data sets.

```
Card 1..//          JOB
     2..// EXEC SAS,TIME=(,5)
     3..//BCFILE DD DSN=AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA,
     4..// DISP=OLD
     5..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(SCFILE),DISP=SHR
     6..//       DD *
     7..*
     8..*--PROGRAM TO ADD NEW OR UPDATED STORM CHARACTERISTICS
     9..;
    10..          DATA NEWSTORM ;
    11..          XINPUT
    12..FL.HWY.STE S002     750505     1930       750505     2300
    13..0.23       1.34      0.69       0.23       70         0.00       0.00       0.00
    14..0.01       0.32      0.00       26         42         7
    15..00095      24.3040
    16..00310
    17..00340      15.8987
    18..00500      24.4288
    19..00600      0.4614
    20..00665      0.0160
    21..00690      8.4905
    22..01051      0.0430
    23..01092      0.0291
    24..          ;
    25..          XLIST
    26..          XUPDATE
    27../*
    28..//
```

Figure 4.42.1.--SAS and JCL commands for executing a Storm Characteristics file update.

```
//AG4254J5 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)          J5182
// EXEC SAS,TIME=(,5)
//BCFILE DD DSN=AG4254J.STATEYY.URBAN.BASIN.STORM.DATA,
// DISP=OLD
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(SCFILE),DISP=SHR
//       DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81154.1011
IEF374I STEP /SAS      / STOP  81154.1014 CPU    0MIN 01.19SEC MAIN 240K LCS    0K
CCD006I STEP /SAS      / I/O IN DD SEQ; 563:0        481:0        314:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 314:0        563:0        563:159
CCD006I STEP /SAS      / I/O IN DD SEQ; 440:6        441:2        431:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 155:0        314:0        442:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 563:0        155:0        155:0
CCD006I STEP /SAS      / I/O IN DD SEQ; 744:62       744:5        5E0:2
CCD001I STEP /SAS      / MEMORY RESERVED  240K; ACCESSES: DISK     236/ TAPE        0
IEF375I  JOB /AG4254J5/ START 81154.1011
IEF376I  JOB /AG4254J5/ STOP  81154.1014 CPU    0MIN 01.19SEC
CCD007A  JOB /AG4254J5/ BASIC CHRG: FIXED    CPU    DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                    1.24     .90      .71              .31    3.17
CCD002I  JOB /AG4254J5/ TOTAL CHARGE RECORDED =      $3.17
CCD003I  JOB /AG4254J5/ US GEOLOGICAL SURVEY REL 05 REL 218 TIME = 10.14.34 DATE = 06/03/81

                        EFFECTIVE JUNE 1, 1981, CCD WILL NO LONGER SUPPORT 2314 DISK STORAGE
                        DUE TO THE EQUIPMENTS OBSOLESCENCE AND PHYSICAL SPACE REQUIREMENT.
                        FOR CONVERSION ASSISTANCE CALL DAN MCGLOTHIN 860-7119 OR FTS 928-7119.
```

NOTE: THE JOB AG4254J5 HAS BEEN RUN UNDER RELEASE 79.33 OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1                MACRO XINPUT
2          *
3          *  --INPUT DATA WILL BE READ FROM CARDS
4          ;
5             INFILE  CARDS  MISSOVER ;
6          *
7          *
8          *  --INPUT RAINFALL AMOUNTS, TIMES, AND DURATIONS
9                   AND STORM WATER QUALITY CONSTITUENTS
10         ;
11            INPUT  SITE $ 1-15   BDATE 20-25   BTIME 30-33   EDATE 40-45   ETIME 50-53
12                / TRAINA  1-10   MAXM5 11-20  MAXR15 21-30   MAXIM 31-40  NDRD02 41-50
13                  DERNPD 51-60  DERNP3 51-70  DERNP7 71-80
14                / TOTRUN  1-10   PEAKQ 11-20   BFLOW 21-30  DURSTO 31-40  DURRNF 41-50
15                  TIMBPK 51-60  TILASC 51-70
16                / RL00095 11-20 WL00095 21-30 D_00095 31-40
17                / RL00310 11-20 WL00310 21-30 D_00310 31-40
18                / RL00340 11-20 WL00340 21-30 D_00340 31-40
19                / RL00500 11-20 WL00500 21-30 D_00500 31-40
20                / RL00600 11-20 WL00600 21-30 D_00600 31-40
21                / RL00665 11-20 WL00665 21-30 D_00665 31-40
22                / RL00690 11-20 WL00690 21-30 D_00690 31-40
23                / RL01051 11-20 WL01051 21-30 D_01051 31-40
24                / RL01092 11-20 WL01092 21-30 D_01092 31-40
25         ;
26            CARDS ;
27                  %
28                  MACRO XLIST
29          DATA ;
30         *
31         *--PRINT OUT STORM CHARACTERISTICS
32         ;
33            SET ;
34         *
35         *  --OUTPUT TO PRINTER, NO SAS HEADINGS
36         ;
37            FILE PRINT NOTITLES ;
38         *
39         *  --TODAYS DATA
40         ;
41            DAY = TODAY( ) ;
42         *
43         *  --PRINT RAINFALL AMOUNTS, TIMES, AND DURATIONS
44         ;
45            PUT _PAGE_ ;
46            PUT @5 'SITE' @10 SITE  @40'FILE CREATED' @53 DAY DATE7. / ;
47            PUT @5 'STORM BEGIN DATE (YR, MON, DAY) ' @40 BDATE /
48                @5 'STORM BEGIN TIME (MILITARY)'      @42 BTIME /
49                @5 'STORM END DATE (YR, MON, DAY) '   @40 EDATE /
50                @5 'STORM END TIME (MILITARY) '       @42 ETIME / ;
51            PUT TRAINA 5-15 2 @17 'TOTAL RAINFALL, AVERAGE FOR THE BASIN, INCHES' /
52                MAXR5  5-15 2 @17 'MAXIMUM 5-MINUTE RAINFALL RATE, INCHES/HOUR ' /
53                MAXR15 5-15 2 @17 'MAXIMUM 15-MINUTE RAINFALL RATE, INCHES/HOUR ' /
54                MAXIM  5-15 2 @17 'MAXIMUM 1-HOUR RAINFALL RATE, INCHES/HOUR ' / ;
55            PUT NDRD02 5-15   @17 'NUMBER OF DRY HOURS PRIOR TO '
```

```
56                              'STORM COUNTING BACKWARDS TO' /
57                          @17 'STORM EVENT WITH RAINFALL '
58                              'GREATER THAN 0.2 INCHES' /
59              DERNP2 5-15 2 @17 'DEPTH OF RAINFALL ACCUMULATED PREVIOUS '
60                              '24 HOURS, INCHES' /
61              DERNP3 5-15 2 @17 'DEPTH OF RAINFALL ACCUMULATED PREVIOUS '
62                              '72 HOURS, INCHES' /
63              DERNP7 5-15 2 @17 'DEPTH OF RAINFALL ACCUMULATED PREVIOUS '
64                              '168 HOURS, INCHES' /
65              TOTRUN 5-15 2 @17 'TOTAL RUNOFF OVER THE BASIN, INCHES ' /
66              PEAKQ  5-15 2 @17 'PEAK DISCHARGE, CUBIC FEET / SECOND' /
67              BFLOW  5-15 2 @17 'BASE FLOW PRIOR TO STORM, CUBIC FEET / SECOND '/ ;
68          PUT DURSTO 5-15   @17 'DURATION OF STORM RUNOFF USED TO CALCULATE LOAD, '
69                              'MINUTES' /
70              DURRNF 5-15   @17 'DURATION OF RAINFALL, MINUTES ' /
71              TIMBPK 5-15   @17 'TIME FROM BEGINNING OF RAINFALL TO '
72                              'HYDROGRAPH PEAK, MINUTES' /
73              TILASC 5-15   @17 'TIME SINCE LAST STREET CLEANING, DAYS ' ;
74          *
75          *  --PRINT STORM WATER QUALITY CONSTITUENTS, STARTING ON A NEW PAGE
76          ;
77             PUT _PAGE_ ;
78             PUT @4 '********************* STORM LOADS OF WATER QUALITY '
79                    'CONSTITUENTS **********************' /
80                 @5 'RUNOFF' @20 'RUNOFF' @32 'WETFALL' @48 'WETFALL'
81                @61 'DRYFALL' @77 'DRYFALL' /
82                 @6 'CODE' @21 'LOAD' @33 'CODE' @49 'LOAD' @62 'CODE' @78 'LOAD'/;
83             PUT @4 'RL00095' RL00095 12-26 & @32 'WL00095' WL00095 41-55 5
84                @61 'DL00095' DL00095 70-84 4;
85             PUT @4 'RL00310' RL00310 12-26 & @32 'WL00310' WL00310 41-55 5
86                @61 'DL00310' DL00310 70-84 4;
87             PUT @4 'RL00340' RL00340 12-26 & @32 'WL00340' WL00340 41-55 5
88                @61 'DL00340' DL00340 70-84 4;
89             PUT @4 'RL00500' RL00500 12-26 & @32 'WL00500' WL00500 41-55 5
90                @61 'DL00500' DL00500 70-84 4;
91             PUT @4 'RL00600' RL00600 12-26 & @32 'WL00600' WL00600 41-55 5
92                @61 'DL00600' DL00600 70-84 4;
93             PUT @4 'RL00665' RL00665 12-26 & @32 'WL00665' WL00565 41-55 5
94                @61 'DL00665' DL00665 70-84 4;
95             PUT @4 'RL01051' RL01051 12-26 & @32 'WL01051' WL01051 41-55 5
96                @61 'DL01051' DL01051 70-84 4;
97             PUT @4 'RL01092' RL01092 12-26 & @32 'WL01092' WL01092 41-55 5
98                @61 'DL01092' DL01092 70-84 4;
99                   %
100                  MACRO XUPDATE
101         *
102         *--SORT NEWSTORM BY SITE CODE
103         ;
104          PROC SORT DATA=NEWSTORM ;
105            BY SITE ;
106         *
107         *--SORT OLD SCMASTER BY SITE CODE
108         ;
109          PROC SORT DATA=BCFILE.SCMASTER ;
110            BY SITE ;
111         *
112         *--UPDATE SCMASTER BY SITE CODE
113         ;
```

```
114        DATA BCFILE.SCMASTER ;
115          UPDATE BCFILE.SCMASTER NEWSTORM ;
116          BY SITE ;
117                %
118       *
119       *--PROGRAM TO ADD NEW OR UPDATED STORM CHARACTERISTICS
120       ;
121                DATA NEWSTORM ;

NOTE: DATA SET WORK.NEWSTORM HAS 1 OBSERVATIONS AND 67 VARIABLES. 33 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.30 SECONDS AND 139K.

135                ;
136                XLIST

NOTE: 34 LINES WERE WRITTEN TO FILE PRINT.
NOTE: DATA SET WORK.DATA1 HAS 1 OBSERVATIONS AND 68 VARIABLES. 32 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.19 SECONDS AND 140K.


NOTE: DATA SET WORK.NEWSTORM HAS 1 OBSERVATIONS AND 67 VARIABLES. 33 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.20 SECONDS AND 235K.


NOTE: DATA SET BCFILE.SCMASTER HAS 1 OBSERVATIONS AND 67 VARIABLES. 33 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.22 SECONDS AND 235K.

137                XUPDATE

NOTE: DATA SET BCFILE.SCMASTER HAS 2 OBSERVATIONS AND 67 VARIABLES. 33 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.13 SECONDS AND 140K.


NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

SITE FL.HWY.STE S002 FILE CREATED 03JUN81

STORM BEGIN DATE (YR, MON, DAY)	750505
STORM BEGIN TIME (MILITARY)	1930
STORM END DATE (YR, MON, DAY)	750505
STORM END TIME (MILITARY)	2300

0.23	TOTAL RAINFALL, AVERAGE FOR THE BASIN, INCHES
1.34	MAXIMUM 5-MINUTE RAINFALL RATE, INCHES/HOUR
0.69	MAXIMUM 15-MINUTE RAINFALL RATE, INCHES/HOUR
0.23	MAXIMUM 1-HOUR RAINFALL RATE, INCHES/HOUR
70	NUMBER OF DRY HOURS PRIOR TO STORM COUNTING BACKWARDS TO STORM EVENT WITH RAINFALL GREATER THAN 0.2 INCHES
0.00	DEPTH OF RAINFALL ACCUMULATED PREVIOUS 24 HOURS, INCHES
0.00	DEPTH OF RAINFALL ACCUMULATED PREVIOUS 72 HOURS, INCHES
0.00	DEPTH OF RAINFALL ACCUMULATED PREVIOUS 168 HOURS, INCHES
0.01	TOTAL RUNOFF OVER THE BASIN, INCHES
0.32	PEAK DISCHARGE, CUBIC FEET / SECOND
0.00	BASE FLOW PRIOR TO STORM, CUBIC FEET / SECOND
26	DURATION OF STORM RUNOFF USED TO CALCULATE LOAD, MINUTES
42	DURATION OF RAINFALL, MINUTES
7	TIME FROM BEGINNING OF RAINFALL TO HYDROGRAPH PEAK, MINUTES
.	TIME SINCE LAST STREET CLEANING, DAYS

********** STORM LOADS OF WATER QUALITY CONSTITUENTS **********

RUNOFF CODE	RUNOFF LOAD	WETFALL CODE	WETFALL LOAD	DRYFALL CODE	DRYFALL LOAD
RL00095	24.3040	WL00095	.	DL00095	.
RL00310	.	WL00310	.	DL00310	.
RL00340	15.8987	WL00340	.	DL00340	.
RL00500	24.4288	WL00500	.	DL00500	.
RL00600	0.4614	WL00600	.	DL00600	.
RL00665	0.0160	WL00665	.	DL00665	.
RL01051	0.0430	WL01051	.	DL01051	.
RL01092	0.0291	WL01092	.	DL01092	.

CHAPTER 5. USER PROGRAMS FILE

In any data management system, routinely used computer programs need to be stored. These programs process the data from the data base for use in storm-water models, statistical, and other types of analyses. In essence, the file contains all programs that the user might need. This is the concept of the User Programs File.

5.1 Organization of File

The User Programs File (Operation I, figure 1.1), hereafter referred to as the UP File, contains user programs, urban stormwater models, utility programs to perform chemical load calculations, report listings, and other data operations. The programs are loaded as executable load modules either in the WRD program library or individual user libraries. Some of the utility programs are written as SAS instructions that perform the required data functions.

Users are encouraged to inform the data base coordinator about any programs they have developed or ones that they may have in their program libraries which are not available to other users. Updates of chapter 5 can be used to relay information about individual programs to other users. The data coordinator will specify what program documentation is needed.

5.2 Data Set Information

There are two categories of programs or data sets in the UP File; one loaded for use by all users, and the other being loaded for individual users. Programs in the latter category can be documented and included in this chapter if they can be used by others. The rest of Chapter 5 documents general-use programs. A brief description of program purpose, required input formats, listing (if not available in some other publication), and program outputs are included. Information about program JCL is also documented.

5.3 Urban Stormwater Models

This section includes necessary information about the urban stormwater models and transformation programs that can be used to retrieve data from the data base for input to the models. This report is not intended to document the models, but to provide general information as related to the models and for interfacing with the data base.

5.31 Urban Rainfall-Runoff Model DR_3M

A computer program for routing urban flood discharges through a branched system of pipes or natural channels using rainfall as input is documented in Alley and Smith (1982a). The model combines soil-moisture-accounting and rainfall-excess components developed by Dawdy and others (1972); and surface runoff is routed using kinematic-wave theory.

Data from the daily-values and unit-values file components of the User File (Operation G) are required model input data. Daily rainfall and evaporation totals are required as are also unit rainfall data. Unit discharge data can also be input to the model. The four types of data in the User File

(1) Unit-rainfall data;
(2) Unit-discharge data;
(3) Daily-rainfall data; and
(4) Daily-evaporation data

are preceded and followed by required model data that will not come from the User File.

Section 5.321 describes the SAS instructions that can be used to retrieve User File data and transform the data for model input. A second step or program (section 5.322) will combine these data with required model data that precede and follow the User File data. The next step in program execution order would be to activate the model, program DR_3M, with the output from the second step.

5.32 Rainfall-Runoff Model DR_3M Interface Program

The DR_3M Rainfall-Runoff model interface consists of two programs. The set of SAS macros called RRCARD will retrieve data from the data sets UVMASTER and DVMASTER and create card groups 8, 9, 10, and 11 in the proper format to be used as input in the Rainfall-Runoff DR_3M model. The FORTRAN program RRCOMB will combine the user-created input cards and RRCARD-created cards to form the run ready deck for DR_3M. RRCOMB also uses dates from the unit-rainfall cards (card group 8) to mark storm days on the daily-rainfall cards (card group 10). The following is a brief description of RRCARD and RRCOMB and sample run decks.

5.321 RRCARD

RRCARD is a set of SAS macros which will create input data cards for the model from data stored in DVMASTER and UVMASTER. Specifically, the program will create unit-rainfall data cards (card group 8), unit-discharge data cards (card group 9), daily-rainfall data cards (card group 10), and daily-evaporation data cards (card group 11).

The RRCARD macro source code is stored in the partitioned data set AG4254J.URBAN.SOURCE which resides on the urban hydrology studies program disk (VOL=SER=CCD810) as the member RRCARD.

During the run the macros XDTIME and RID are executed to select data from UVMASTER and DVMASTER data sets. A description of these macros can be found in the RRLIST program description (section 5.41). In addition, there are two main macros which create the card images, one which creates the unit values data cards called Macro CGROUP12 and Macro CGROUP34 which creates the daily values cards. These macros take the data selected by the storm interval cards and create the appropriately formatted input cards for the model. All the card images created by RRCARD are stored consecutively in the data set specified by the data definition card named CARDX (figure 5.321.1, card 7). In the example card deck given here (figure 5.321.1), all four card groups are requested. Any combination of card groups can be requested, except if the daily rainfall cards are requested, unit rainfall is also requested so that the storm days on the daily cards may be marked.

After running RRCARD, the program RRCOMB is run to create the final Rainfall-Runoff input data set.

The run deck consists of job control language (JCL), SAS statements and input data cards. The following is a card by card description of a sample run deck (figure 5.321.1). For further discussion of the JCL see the CCD User's Guide.

The JCL must be entered in certain card columns as shown in figure 5.321.1. The SAS statements may be entered in any columns on the cards with spaces separating the values except where noted. For a more complete description of the Storm Interval Cards see the discussion on XDTIME Macro and figure 5.41.2.

Card	1..	Job card
	2..	Execute a SAS program for a maximum of three minutes
	3-4..	Data definition card specifying daily values data set for state XX. Specify disposition SHR since this data set will not be written on.
	5-6..	Data definition card specifying unit values data set for state XX. Specify disposition SHR.
	7-8..	Data definition card for data set where card images will be stored. Specify disposition old.
	9..	Data definition card specifying macro source data set and member RRCARD
	10..	Indicates rest of SAS input follows in card deck
	11-13..	Optional SAS comment cards to separate the deck

```
 COL.1       COL.12
   ●           ●
1..//          JOB
2..// EXEC SAS,TIME=3
3..//DVFILE DD DSN=AG4yyyz.STATEXX.URBAN.DAILY.VALUES,
4..// DISP=SHR
5..//UVFILE DD DSN=AG4yyyz.STATEXX.URBAN.UNIT.VALUES,
6..// DISP=SHR
7..//CARDX DD DSN=AG4yyyz.STATEXX.DATA,
8..// DISP=OLD
9..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(RRCARD),DISP=SHR
10..//      DD *
11..* ;
12..* ;
13..* ;
14..          MACRO PC 00045 %
15..          XDTIME
16..254031080191103 770808 17 45 770808 23 01 STORM 17
17..254031080191103 780518 11 30 780518 15 21 STORM 48
18..254031080191103 780612 15 33 780612 16 41 STORM 52
19..* ;
20..          DATA RAINFALL ;
21..          SET TEMP UVFILE.UVMASTER ;
22..          BY STATION PARMCODE DATETIME ;
23..* ;
24..          DATA TEMP1 (RENAME=(TAG1=TAG)) ;
25..          SET RAINFALL ;
26..          RID
27..          MACRO INTERVAL 1 %
28..          MACRO DATATYPE 1 %
29..          MACRO OPT 0 %
30..          MACRO XPUTFILE CARDX OLD %
31..          CGROUP12
32..          MACRO PC 00060 %
33..          XDTIME
34..254031080191100 770808 17 45 770808 23 01 STORM 17
35..254031080191100 780518 11 30 780518 15 21 STORM 48
36..254031080191100 780612 15 33 780612 16 41 STORM 52
37..* ;
```

Figure 5.321.1.--SAS and JCL commands for executing RRCARD.

```
38..          DATA DISCH ;
39..          SET TEMP UVFILE.UVMASTER ;
40..          BY STATION PARMCODE DATETIME ;
41..* ;
42..          DATA TEMP1 (RENAME=(TAG1=TAG)) ;
43..          SET DISCH ;
44..          RID
45..          MACRO OPT 1 %
46..          MACRO INTERVAL 1 %
47..          MACRO DATATYPE 2 %
48..          MACRO XPUTFILE CARDX MOD %
49..          CGROUP12
50..          MACRO DATATYPE 3%
51..          MACRO PC 00045 %
52..          XDTIME
53..254031080191103 770601 00 00 780617 00 00 RAINFALL
54..          DATA RAINFALL ;
55..          SET TEMP DVFILE.DVMASTER ;
56..          BY STATION PARMCODE DATETIME ;
57..          DATA TEMP1 (RENAME=(TAG1=TAG)) ;
58..          SET RAINFALL ;
59..          RID
60..  PROC SORT DATA=TEMP1 ;
61..       BY DATETIME ;
62..          MACRO DEBUG 0 %
63..          CGROUP34
64..          MACRO DATATYPE 4%
65..          MACRO PC 00050 %
66..          XDTIME
67..254031080191103 770601 00 00 780617 00 00 EVAPORATION
68..          DATA EVAP ;
69..          SET TEMP DVFILE.DVMASTER ;
70..          BY STATION PARMCODE DATETIME ;
71..          DATA TEMP1 (RENAME=(TAG1=TAG)) ;
72..          SET EVAP ;
73..          RID
74..  PROC SORT DATA=TEMP1 ;
75..       BY DATETIME ;
76..          CGROUP34
77..DATA _NULL_ ;
78..INFILE CARDX ;
79..INPUT LINE $80. ;
80..PUT _INFILE_ ;
81../*
82..//
```

Figure 5.321.1.--SAS and JCL commands for executing RRCARD--Continued.

Card 14-31..	Pertain to unit rainfall
14..	Defines the macro PC, the parameter code of the data to be selected; in this example, rainfall data
15..	Calls the macro XDTIME which reads the Storm input cards
16-18..	Storm input cards define the data sequences to be selected from UVMASTER, (see Section 5.41 and figure 5.41.2). For additional rain gage data, add on by ascending station number
19..	SAS comment card, indicates end of data
20-23..	Merges the TEMP data set created by XDTIME with UVMASTER to create data set RAINFALL
24-26..	Calls the macro RID which deletes all the unit value observations except those selected. The data set TEMP1 contains the selected observations.
27..	Defines the macro INTERVAL, the data interval
28..	Defines the macro DATATYPE, the data type code put in column 80 of the card images created by CGROUP12; in this case, 1 for card group 8
29..	Defines the macro OPT; if OPT=1 then a card with a 9 in column 80 is punched after this group of cards. If OPT=0, CGROUP12 does not punch a nine card.
30..	Defines the macro XPUTFILE, which specifies the DD name of the JCL card which describes the output data set and specifies a disposition of OLD so that this output will write over any previous RRCARD output
31..	Calls the macro CGROUP12, which takes the unit rainfall data selected by cards 14-26 and creates card group 8 cards (a 1 in column 80)
32-49..	These cards parallel cards 14-31; these cards request unit discharge data (parameter code 60 specified on card 32) and request that card group 9 cards (a 2 in column 80) be created. Note that DATATYPE 2 is specified on card 47. Also macro OPT is 1 in order that a nine card is punched after card group 9.
50-63..	Pertain to daily rainfall
50..	Defines macro DATATYPE, specifies data type 3 to be put in column 80 of the card
51..	Defines macro PC, which requests data with parameter code 45 or rainfall data
52..	Calls the macro XDTIME to read the following storm interval cards
53..	Storm interval input card. In this particular case, daily data is to be requested so the hour and minute inputs are entered as zero. The end date is incremented by one day from (780616 to 780617) so that all data will be retrieved from the DVMASTER data set including 780616.
54-59..	Merges the date observations into the DVMASTER data set and then calls the macro RID to select only the requested data for the input cards to be created.

Card 60-61..	Sorts the data by time so that CGROUP34 receives the data in proper order
62..	Defines the macro DEBUG. If DEBUG=1 then output useful in debugging the macro CGROUP34 will be printed. If DEBUG=0 it will not.
63..	Calls the macro CGROUP34 to create the daily rainfall cards (card group 10)
64-76..	These cards parallel cards 50-63 except daily evaporation cards (card group 11) are created
77-80..	A complete listing of the cards created by this run are listed on the output
81-82..	End of step and job

The following pages illustrate an example execution of RRCARD.

```
//AG4254J9 JOB ($$$$$$$$$,J001,$,5),'LORENS',CLASS=B                    J5784
// EXEC SAS,TIME=3
XXSAS    PROC  OPTIONS=,SORT=4,ENTRY=SAS                               00000010
*****************************************************************    00000020
***  STATISTICAL ANALYSIS SYSTEM,  VERSION 79.3                 ***    00000030
***  DOCUMENTATION:  SAS USER'S GUIDE 79 EDITION                ***    00000040
***  FROM THE SAS INSTITUTE, BOX 8000, CARY, NC 27511           ***    00000050
***  R. SLOSSBERG    MARCH 1980                                 ***    00000060
*****************************************************************    00000070
XXSAS    EXEC  PGM=&ENTRY,PARM='&OPTIONS',REGION=240K                  00000080
IEF653I SUBSTITUTION JCL - PGM=SAS,PARM='',REGION=240K
XXLIBRARY  DD  DSN=&&LIBRARY,UNIT=SYSDK,SPACE=(TRK,(20,,20))           00000090
XXSTEPLIB  DD  DSNAME=SYS1.SAS.LIBRARY,DISP=SHR                        00000100
XX         DD  DSN=SYSI.PPLNKSRT,DISP=SHR                              00000110
XX         DD  DSN=SYS1.PPLNKOPT,DISP=SHR                              00000120
XX   DD   DSN=*.LIBRARY,DISP=(OLD,PASS),VOL=REF=*.LIBRARY              00000130
XXWORK     DD  UNIT=SYSDK,SPACE=(TRK,(240,80)) TEMPORARY DATA SETS     00000140
XXFT11F001 DD  SYSOUT=A,DCB=(BLKSIZE=141,LRECL=137,RECFM=VA) LOG       00000150
XXFT12F001 DD  SYSOUT=A,DCB=(BLKSIZE=141,LRECL=137,RECFM=VA) PRINT     00000160
XXFT13F001 DD  SYSOUT=B PUNCH                                          00000170
XXFT15F001 DD  UNIT=SYSDK,SPACE=(TRK,(10,10)), PARMCARDS               00000180
XX             DCB=(RECFM=FB,LRECL=80,BLKSIZE=400)                     00000190
XXSORTLIB DD DSN=SYS1.SM01SORT,DISP=SHR                                00000200
XXSORTMSG  DD  SYSOUT=A                                                00000210
XXSORTWK01 DD  SPACE=(CYL,(&SORT)),UNIT=SYSDK                          00000220
IEF653I SUBSTITUTION JCL - SPACE=(CYL,(4)),UNIT=SYSDK
XXSORTWK02 DD  SPACE=(CYL,(&SORT)),UNIT=(SYSDK,,SEP=(SORTWK01))        00000230
IEF653I SUBSTITUTION JCL - SPACE=(CYL,(4)),UNIT=(SYSDK,,SEP=(SORTWK01))
XXSORTWK03 DD  SPACE=(CYL,(&SORT)),UNIT=(SYSDK,,SEP=(SORTWK01,         00000240
IEF653I SUBSTITUTION JCL - SPACE=(CYL,(4)),UNIT=(SYSDK,,SEP=(SORTWK01,
XX             SORTWK02))                                              00000250
//UVFILE DD DSN=AG4254J.STATE12.URBAN.DAILY.VALUES,
// DISP=SHR
//UVFILE DD DSN=AG4254J.STATE12.URBAN.UNIT.VALUES,
// DISP=SHR
//CARDX DD DSN=AG4254J.DSARH.DATA,
// DISP=OLD
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(RHCARD),DISP=SHR
//       DD *
//
IEF236I ALLOC. FOR AG4254J9 SAS
IEF237I 155   ALLOCATED TO LIBRARY
IEF237I 481   ALLOCATED TO STEPLIB
IEF237I 314   ALLOCATED TO
IEF237I 314   ALLOCATED TO
IEF237I 155   ALLOCATED TO
IEF237I 155   ALLOCATED TO WORK
IEF237I 4A0   ALLOCATED TO FT11F001
IEF237I 4A9   ALLOCATED TO FT12F001
IEF237I 482   ALLOCATED TO FT13F001
IEF237I 155   ALLOCATED TO FT15F001
IEF237I 314   ALLOCATED TO SORTLIB
IEF237I 4AA   ALLOCATED TO SORTMSG
IEF237I 155   ALLOCATED TO SORTWK01
IEF237I 563   ALLOCATED TO SORTWK02
IEF237I 563   ALLOCATED TO SORTWK03
IEF237I 744   ALLOCATED TO UVFILE
IEF237I 744   ALLOCATED TO UVFILE
IEF237I 480   ALLOCATED TO CARDX
IEF237I 744   ALLOCATED TO SYSIN
IEF237I 4D1   ALLOCATED TO
```

```
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS81188.T080248.RV000.AG4254J9.LIBRARY       DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS1.SAS.LIBRARY                              KEPT
IEF285I   VOL SER NOS= SYS801.
IEF285I   SYS1.PPLWKSRT                                 KEPT
IEF285I   VOL SER NOS= SYS008.
IEF285I   SYS1.PPLWKOPT                                 KEPT
IEF285I   VOL SER NOS= SYS008.
IEF285I   SYS81188.T080248.RV000.AG4254J9.LIBRARY       PASSED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS81188.T080248.RV000.AG4254J9.R0001097      DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS81188.T080248.RV000.AG4254J9.R0001101      DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS1.S401SORT                                 KEPT
IEF285I   VOL SER NOS= SYS008.
IEF285I   SYS81188.T080248.RV000.AG4254J9.R0001103      DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS81188.T080248.RV000.AG4254J9.R0001104      DELETED
IEF285I   VOL SER NOS= RE1WK2.
IEF285I   SYS81188.T080248.RV000.AG4254J9.R0001105      DELETED
IEF285I   VOL SER NOS= RE1WK2.
IEF285I   AG4254J.STATE12.URBAN.DAILY.VALUES            KEPT
IEF285I   VOL SER NOS= CCD810.
IEF285I   AG4254J.STATE12.URBAN.UNIT.VALUES             KEPT
IEF285I   VOL SER NOS= CCD810.
IEF285I   AG4254J.DSARR.DATA                            KEPT
IEF285I   VOL SER NOS= SYS302.
IEF285I   AG4254J.URBAN.SOURCE                          KEPT
IEF285I   VOL SER NOS= CCD810.
IEF373I STEP /SAS      / START 81188.0918
IEF374I STEP /SAS      / STOP  81188.0947 CPU    0MIN 14.15SEC MAIN 240K LCS    0K
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        481:0        314:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 314:0        155:0        155:1109
CCD006I STEP /SAS      / I/O IN DD SEQ: 4A0:31       4A9:0        482:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        314:0        4AA:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0        563:0        563:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 744:30       744:154      480:17
CCD006I STEP /SAS      / I/O IN DD SEQ: 744:12       401:4
CCD001I STEP /SAS      / MEMORY RESERVED  240K; ACCESSES: DISK     1357/ TAPE        0
IEF285I   SYS81188.T080248.RV000.AG4254J9.LIBRARY       KEPT
IEF285I   VOL SER NOS= RE1WK1.
IEF375I  JOB /AG4254J9/ START 81188.0918
IEF376I  JOB /AG4254J9/ STOP  81188.0947 CPU    0MIN 14.15SEC
CCD007A  JOB /AG4254J9/ BASIC CHRG: FIXED    CPU    DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                    1.24   10.75     4.12             2.17   18.29
CCD002I  JOB /AG4254J9/ TOTAL CHARGE RECORDED =      $18.29
CCD003I  JOB /AG4254J9/ US GEOLOGICAL SURVEY RE1 OS REL 21B TIME = 09.47.29 DATE = 07/07/81
```

NOTE: THE JOB AG4254J9 HAS BEEN RUN UNDER RELEASE 79.38 OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1          ********************************************************************************
2          *                                                                              *
3          *         THIS PROGRAM UPDATED JULY 7, 1981                                    *
4          *              CGROUP34 MACRO MODIFIED                                         *
5          *                                                                              *
6          ********************************************************************************;
7                   OPTIONS MISSING=' ' ;
8                   MACRO CGROUP12
9          * ;
10         * ;
11         * ;
12                  DATA _NULL_ ;
13                  SET TEMP1 END=EOF ;
14                  BY STATION ;
15                  ARRAY P(I) P1-P12 ;
16                  FORMAT CURDATE YYMMDD6. P1-P12 5.2 ;
17                  FORMAT DATEX YYMMDD6. ;
18                  RETAIN I 0 CN CURDATE CURTIME 0 ;
19                  RETAIN P1-P12 ;
20                  RETAIN SAVEID ;
21                  RETAIN INTER INTERVAL CODE DATATYPE ;
22                  RETAIN IND 0 ;
23                  DATEX=DATEPART(DATETIME) ;
24                  TIMEX=TIMEPART(DATETIME) ;
25                  IF IND EQ 1 OR _N_ EQ 1 THEN DO ;
26                       LINK CNPOS ;
27                       IND=0 ;
28                       END ;
29                  ELSE I=I+1 ;
30                  IF FIRST.STATION THEN DO ;
31                       SAVEID2=STATION ;
32                       STATION=SAVEID ;
33                       DO OVER P ;
34                            IF P NE . THEN DO ;
35                                 LINK CARD ;
36                                 GO TO SKIP ;
37                                 END ;
38                            END ;
39         SKIP :
40                       LINK CNPOS ;
41                       LINK NEWPAGE ;
42                       STATION=SAVEID2 ;
43                       END ;
44                  ELSE DO ;
45         * IS THIS THE LAST INTERVAL OF THE DAY  ;
46                  IF DATEX EQ CURDATE AND
47                     TIMEX EQ CURTIME+INTER*60 OR
48                     DATEX EQ CURDATE+1 AND
49                     TIMEX EQ 0 THEN GO TO OK ;
50                  ELSE DO ;
51                       IF DATEX EQ CURDATE THEN DO ;
52         * THIS NEXT STORM MAY START ON THE SAME CARD ;
53                            CNN=CN ;                    * SAVE THIS CARD NO ;
54                            LINK CARDNO ;               * GET NEW CARDNO ;
55                            IF CNN NE CN THEN DO ;
```

```
56                      * THEY ARE NOT ON THE SAME CARD ;
57                      * GO PUNCH PREVIOUS CARD SO WE CAN START NEW ONE ;
58                          CN=CNN ;                * GET OLD CARDNO BACK ;
59                          J=I ;
60                          DO OVER P ;
61                              IF P NE . THEN DO ;
62                                  LINK CARD ;
63                                  LINK CNPOS ;
64                                  GO TO OK ;
65                              END ;
66                          END ;
67                          I=J ;
68                          END ;
69                      * THEY ARE ON THE SAME CARD ;
70                      ELSE DO ;
71                         * GET POSITION ON CARD ;
72                          I=MOD(MIN/INTER,12) ;
73                          IF I=0 THEN I=12 ;
74                          GO TO OK ;
75                          END ;
76                      END ;
77                  ELSE DO ;
78                      J=I ;
79                      DO OVER P ;
80                      IF P NE . THEN DO ;
81                          LINK CARD ;
82                          LINK CNPOS ;
83                          GO TO OK ;
84                          END ;
85                      END ;
86                      I=J ;
87                  END ;
88              END ;
89              END ;
90      OK :
91              IF LAST.STATION THEN SAVEID=STATION ;
92              IF PC=00065 THEN P=VALUE*100. ;
93              ELSE P=VALUE ;
94              IF EOF THEN DO ;
95                  LINK CARD ;
96                  IF OPT=1 THEN PUT @80 '9' ;
97              RETURN ;
98              END ;
99      * THIS CODE TAKES CARE OF 2 CASES
100     *  WHEN THE FIRST CARD HAS ONLY ONE ENTRY AND IT IS IN POSITION 12
101     *  AND WHEN THE LAST VALUE OF THE DAY IS ON THE CARD
102     *  WHICH HAS DATE=DAY+1 AND TIME=0 ;
103             IF TIMEX NE 0 THEN CURDATE=DATEX ;
104     *  DATE-1 SINCE THE FIRST VALUE FOR DATEX WANTS TO BE
105     *  THE LAST VALUE FOR DATE-1 FOR THE MODEL ;
106             IF TIMEX EQ 0 AND _N_=1 THEN CURDATE=DATEX-1 ;
107             CURTIME=TIMEX ;
108             IF I EQ 12 THEN LINK CARD ;
109             CURDATE=DATEX ;
110                 RETURN ;
111     CARD :
112             STATIONX=SUBSTR(STATION,1,1) ;
113             IF STATIONX EQ ' ' THEN STATION=SUBSTR(STATION,8,8) ;
```

```
114               FILE XPUTFILE ;
115               IF INTER = 1 THEN
116                    PUT @1 STATION $8.
117                    CURDATE YYMMDD6.
118                    INTER 15-16
119                    CN 17-19
120                    (P1-P12) (5.2)
121                    CODE 80 ;
122               ELSE PUT @1 STATION $8.
123                    CURDATE YYMMDD6.
124                    INTER 15-16
125                    CN 17-18
126                    (P1-P12) (5.2)  +1
127                    CODE 80 ;
128               CN=CN+1 ;
129               IF I=12 THEN IND=1 ;
130               ELSE LINK INITCARD ;
131               I=0 ;
132          * IND INDICATES THAT A CARD WAS PUNCHED, BUT A NEW CARD NUMBER
133          * WAS NOT DETERMINED SINCE THE NEXT CARD HASN'T BEEN READ YET ;
134               RETURN ;
135          * ;
136          CARDNO :
137          * DETERMINE CARD NUMBER ;
138               MIN=MINUTE(DATETIME) ;
139               HOURS=HOUR(DATETIME) ;
140               TOTALMIN=HOURS*60+MIN ;
141               CN=CEIL(TOTALMIN/(12*INTERVAL)) ;
142               RETURN ;
143          CNPOS :
144               LINK CARDNO ;
145          *DETERMINE POSITION OF FIRST VALUE ON CARD ;
146               LINK INITCARD ;
147               I=MOD(MIN/INTER,12) ;
148               IF I=0 THEN I=12 ;
149               RETURN ;
150          INITCARD :
151               DO OVER P ;
152               P=. ;
153               END ;
154          * I IS 13 WHEN WE LEAVE THIS LOOP ;
155               RETURN ;
156          NEWGAGE :
157               IF PC EQ 00045 AND _N_ NE 1 THEN DO ;
158                    FILE CARDX ;
159                    PUT @80 '8' ;
160                    END ;
161                    RETURN ;
162               %
163          MACRO CGROUP34
164          * ;
165          * ;
166          * ;
167               DATA _NULL_ ;
168               SET TEMP1 END=EOF ;
169               ARRAY P(I) P1-P16 ;
170               ARRAY LSTDAY(K) LSTDAY1-LSTDAY12 ;
171               RETAIN LSTDAY1 31
```

```
                    LSTDAY2 28
                    LSTDAY3 31
                    LSTDAY4 30
                    LSTDAY5 31
                    LSTDAY6 30
                    LSTDAY7 31
                    LSTDAY8 31
                    LSTDAY9 30
                    LSTDAY10 31
                    LSTDAY11 30
                    LSTDAY12 31
;
          RETAIN P1-P16 I CDAY CMON CYR 0 ;
          RETAIN NEWCARD 0 CODE DATATYPE CN ;
          RETAIN CARDEND 0 ;
          MISSING M ;
          DATEX=DATEPART(DATETIME) ;
          YR=YEAR(DATEX) ;
          K=2 ;
          IF MOD(YR,4) EQ 0 THEN LSTDAY2=29 ;
          MON=MONTH(DATEX) ;
          DAY=DAY(DATEX) ;
          FILE PRINT ;
          IF DEBUG THEN PUT STATION= DATETIME= YR= MON=  DAY= _N_= ;
* IF FIRST ONE SKIP THE CHECKS ;
          IF _N_=1 THEN DO ;
                    LINK INITCARD ;
               LINK CMND ;
               LINK CALCI ;
               P=VALUE ;
          FILE PRINT ;
          IF DEBUG THEN PUT 'FIRST' YR= MON= DAY= CN= P= I= ;
               LINK PUNCH1 ;
               RETURN ;
               END ;
          IF NEWCARD=1 THEN DO ;
               LINK CMND ;
               LINK CALCI ;
               NEWCARD=0 ;
               CARDEND=1 ;
               END ;
          IF YR EQ CYR THEN DO ;
          IF MON EQ CMON THEN DO ;
          IF DAY EQ CDAY THEN DO ;
               PUT '***' / 'YOUR FILE CONTAINS DUPLICATE OBS AT '
                    YR= MON= DAY= ' IN CODE= ' CODE ' CARDS' / '***' ;
               K=MON ;
               IF DAY=16 OR DAY GE LSTDAY THEN NEWCARD=1 ;
               RETURN ;
               END ;
START3 ;
          IF DAY EQ CDAY+1 THEN DO ;
               P=VALUE ;
               LINK PUNCH1 ;
               RETURN ;
               END ;
               ELSE DO ;
          FILE PRINT ;
```

```
230               IF DEBUG THEN PUT '%, LOOP' ;
231               IF DEBUG THEN PUT STATION= DATETIME= YR= MON= DAY= ;
232                         LINK MISSINGM ;
233                         NEWCARD=0 ;
234                         GO TO START3 ;
235                         END ;
236               END ;
237         * WE HAVE GONE TO A NEW MONTH ;
238               ELSE DO ;
239               IF MON EQ CMON+1 THEN DO ;
240         * WE KNOW ITS THE NEXT MONTH ;
241               IF DAY EQ 1 THEN DO ;
242         * WE KNOW ITS THE FIRST DAY OF THE NEXT MONTH ;
243               K=CMON ;
244               IF CDAY GE _STDAY    THEN DO ;
245                         IF DEBUG THEN PUT ' END OF MON      ' DATEX= CYR= CMON= CDAY=;
246         * WE KNOW THERE IS NO GAP SO PUNCH THIS CARD
247         * AND CONTINUE TO THE NEXT MONTH ;
248         * PUNCH PREVIOUS MONTH ;
249               I = 1 ;
250               LINK CNNO ;
251               P=VALUE ;
252               LINK PUNCH1 ;
253               RETURN ;
254               END ;
255               ELSE DO ;
256         * WE KNOW THERE IS A GAP AT THE END OF THE MONTH ;
257               FILE PRINT ;
258                         IF DEBUG THEN PUT ' NEW MON W/ GAP ' DATEX= CYR= CMON= CDAY=;
259                    CDAY=CDAY+1 ;
260         START6:
261               PUT '***3***' _ALL_ ;
262               LINK MISSINGM ;
263               IF NEWCARD EQ 1 THEN DO;
264                    NEWCARD=0 ;
265                    IF CDAY = 17 THEN DO ;
266                         CN=2 ;
267                         I=17;
268                         GO TO START5 ;
269                         END ;
270                    I=1 ;
271                    CN=1 ;
272                    P=VALUE ;
273                    LINK INIT ;
274               PUT '***4***' _ALL_ ;
275                    RETURN ;
276                    END ;
277                    ELSE GO TO START5 ;
278               END ;
279               END ;
280                    END ;
281         * WE KNOW ITS A GAP ACROSS THE END OF THE MONTH OR OVER SEVERAL MONTHS ;
282               IF DEBUG THEN PUT ' LOCATED GAP AT END OF MONTH ' ;
283               LINK GAP ;
284               RETURN ;
285               END ;
286               END ;
287         * YEAR ISNT EQUAL ;
```

```
288               ELSE DO ;
289                    IF MON EQ 1 AND DAY = 1
290                       AND CMON=12 AND CDAY=31 THEN DO ;
291                         I = 1 ;
292                         P=VALUE ;
293                         LINK PUNCH1 ;
294                         END ;
295               ELSE DO ;
296                    IF DEBUG THEN PUT 'LOCATED GAP AT END OF YEAR ' ;
297                    LINK GAP ;
298                    END ;
299               END ;
300               RETURN ;
301         CALCI:
302               I=MOD(DAY,15) ;
303               IF I=0 THEN I=16 ;
304               FILE PRINT ;
305               IF DEBUG THEN PUT 'CALCI ' DAY= I= _N_= ;
306               RETURN ;
307         CNNO:
308                    IF DAY LE 16 THEN CN=1 ;
309                    ELSE CN=2 ;
310               FILE PRINT ;
311               IF DEBUG THEN PUT 'CNNO ' CN= ;
312               RETURN ;
313         *
314         * GAP CODE WILL PUNCH TWO 9999 VALUES INTO
315         *  THE OUTPUT CARDS INDICATING A GAP HAS BEEN
316         *  FOUND ;
317         GAP:
318         ** IT IS ONLY LEGAL TO HAVE A GAP IN THE DATA TYPE 3
319         **  CARDS ;
320               IF CODE NE 3 THEN DO ;
321                    PUT '***' / ' AN ILLEGAL GAP HAS BEEN LOCATED IN
322                    THE DATA AT ' YR= MON= DAY= DATETIME=
323                    ' IN TYPE 4 CARDS ' / '***' ;
324                    RETURN ;
325                    END ;
326         * ;
327         * A GAP HAS OCCURRED IN TYPE 3 CARDS ;
328               PUT '***' / ' A GAP HAS BEEN FOUND IN TYPE 3 DATA AND '
329                   '9999 VALUES WERE PUT ON DATA CARDS FOR THE MODEL' / '***' ;
330         *
331         * ARE WE AT THE END OF A CARD ? ;
332               SAVEDAY=DAY ;
333               SAVEMON=MON ;
334               SAVEYR=YR ;
335               IF CARDEND=0 THEN GO TO GO_2 ;
336         PUT _ALL_ ;
337         * YES, MOVE TO NEXT CARD ;
338               CARDEND=0 ;
339               DAY=CDAY+1 ;
340               MON=CMON ;
341               YR=CYR ;
342               K=MON ;
343               IF DAY => LSTDAY THEN GO TO GO_1 ;
344               DAY=1 ;
345               MON=MON+1 ;
```

```
346               IF MON¬> 12 THEN GO TO GO_1 ;
347               MON=1 ;
348               YEAR=YEAR+1 ;
349       GO_1:
350               LINK CNNO ;
351               LINK CALCI ;
352       GO_2 :
353               PUT _ALL_ ;
354               P=9999 ;
355       * GO PUNCH THIS CARD ;
356               LINK PUNCH2 ;
357               DAY=SAVEDAY-1 ;
358               MON=SAVEMON ;
359               YR=SAVEYR ;
360               LINK INIT ;
361               IF DAY>0 THEN GO TO GO_3 ;
362               MON=MON-1 ;
363               IF MON ¬> 0 THEN DO ;
364                    MON=12 ;
365                    YR=YR-1 ;
366                    END ;
367               K=MON ;
368               DAY=LSTDAY ;
369       GO_3 :
370               LINK CNNO ;
371               LINK CALCI ;
372               P=9999 ;
373               LINK PUNCH1 ;
374               DAY=SAVEDAY ;
375               MON=SAVEMON ;
376               YR=SAVEYR ;
377               LINK CNNO ;
378               LINK CALCI ;
379               P=VALUE ;
380               LINK PUNCH1 ;
381               RETURN ;
382       INIT:
383                    CYR=YR ;
384                   CMON=MON ;
385                    CDAY=DAY ;
386               FILE PRINT ;
387                    IF DEBUG THEN PUT 'INIT' ;
388                    RETURN ;
389       INITCARD :
390       * INITIALIZE THE ARRAY ;
391                         DO OVER P ;
392                         P=. ;
393                         END ;
394               RETURN ;
395       MISSINGM:
396               PUT '***1***' _ALL_ ;
397                         P=.M ;
398                         K=CMON ;
399                         IF I=16 OR CDAY GE _STDAY OR EOF THEN DO ;
400                                   LINK PUNCH2 ;
401                                   NEWCARD=1 ;
402                                   I=1 ;
403                                   END ;
```

```
404                       ELSE I=I+1 ;
405                       CDAY=CDAY+1 ;
406               PUT '***2***' _ALL_ ;
407               RETURN ;
408         PUNCH1 :
409         * SHOULD WE PUNCH A CARD ;
410                 K = MON ;
411                IF I=16 OR DAY  GE LSTDAY OR EOF THEN LINK PUNCH2 ;
412                 ELSE I=I+1 ;
413                      LINK INIT ;
414                      RETURN ;
415         PUNCH2 :
416                 K = MON ;
417                 FILE PRINT ;
418                 IF DEBUG THEN PUT 'PUNCH2 ' CN= ;
419                 CYRMON=(CYR-1900)*100+CMON ;
420                 STATIONX=SUBSTR(STATION,1,1) ;
421                 IF STATIONX EQ ' ' THEN STATION=SUBSTR(STATION,8,8) ;
422                 FILE XPUTFILE ;
423                 PUT #1 STATION $8.
424                     #9 CYRMON 4.
425                     #13 CN 1.
426                     #14 (P1-P16) (4.2)
427                     #80 CODE 1. ;
428         * INDICATE THAT A CARD WAS PUNCHED AND
429         *  THE NEXT OBSERVATION HAS NOT BEEN READ YET ;
430                          IF I=16 OR DAY GE LSTDAY THEN NEWCARD=1 ;
431                          LINK INITCARD ;
432                       IF EOF AND CODE EQ 4 THEN PUT #80 '9' ;
433                       IF NEWCARD=1 THEN DO ;
434                          LINK INIT ;
435                          RETURN ;
436                          END ;
437                       LINK CMND ;
438                 LINK CALCI ;
439                      RETURN ;
440         %
441                 MACRO RID
442         *;
443         * TO SELECT THE OBSERVATIONS FOR THE APPROPRIATE TIME INTERVALS ;
444         * RID THE DATASET OF EXTRANEOUS OBSERVATIONS ;
445         *;
446                 KEEP STATION DATETIME TAG1 VALUE ;
447                 DROP TAG IND ;
448                 RETAIN TAG1 0 IND 0 ;
449                 IF TAG NE . AND
450                    TAG NE TAG1 AND
451                    IND=0 THEN DO;
452                          TAG1=TAG ;
453                          IND=1 ;
454                          DELETE ;
455                          END ;
456                 IF IND =0 THEN DELETE ;
457                 IF TAG EQ TAG1 AND
458                    IND=1 THEN DO ;
459                          IND= 0 ;
460                          DELETE ;
461                          END ;
```

```
462                 ELSE OUTPUT ;
463         * NOW THE DATA SET CONTAINS ONLY THE REQUIRED OBSERVATIONS ;
464                 %
465                 MACRO XDTIME
466         * ;
467         *READ IN STORM START AND STOP TIMES;
468         * ;
469                 DATA TEMP ;
470                 KEEP STATION TAG DATETIME PARMCODE ;
471                 INPUT STATION $CHAR15. SDATE : YYMMDD6. SHOUR : 2. SMIN : 2.
472                                        EDATE : YYMMDD6. EHOUR : 2. EMIN : 2. ;
473                 TAG+1 ;
474                 PARMCODE=PC ;
475                 DATETIME=DHMS(SDATE,SHOUR,SMIN,0) ;
476                 OUTPUT ;
477                 DATETIME= DHMS(EDATE,EHOUR,EMIN,0) ;
478                 OUTPUT ;
479                 CARDS ;
480         %
481         * ;
482         * ;
483         * ;
484                 MACRO PC 00045 %

NOTE: DATA SET WORK.TEMP HAS 6 OBSERVATIONS AND 4 VARIABLES. 302 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.44 SECONDS AND 130K.

489         * ;
490                 DATA RAINFALL ;
491                 SET TEMP UVFILE.UVMASTER ;
492                 BY STATION PARMCODE DATETIME ;
493         * ;
494

NOTE: DATA SET WORK.RAINFALL HAS 19792 OBSERVATIONS AND 8 VARIABLES. 224 OBS/TRK.
NOTE: THE DATA STATEMENT USED 4.07 SECONDS AND 132K.

494                 DATA TEMP1 (RENAME=(TAG1=TAG)) ;
495                 SET RAINFALL ;
496                 RID
497                 MACRO INTERVAL 1 %
498                 MACRO DATATYPE 1 %
499                 MACRO OPT 0 %
500                 MACRO XPUTFILE CARDX OLD %

NOTE: DATA SET WORK.TEMP1 HAS 515 OBSERVATIONS AND 4 VARIABLES. 334 OBS/TRK.
NOTE: THE DATA STATEMENT USED 1.18 SECONDS AND 130K.

501                 CGROUP12
502                 MACRO PC 00060 %


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.DSARR.DATA,
      UNIT=SYSDK,VOL=SER=SYS302,DISP=OLD,
      DCB=(BLKSIZE=4000,LRECL=80,RECFM=F3)

NOTE: 54 LINES WERE WRITTEN TO FILE CARDX.
```

```
NOTE: THE DATA STATEMENT USED 0.36 SECONDS AND 138K.


NOTE: DATA SET WORK.TEMP HAS 6 OBSERVATIONS AND 4 VARIABLES. 302 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.06 SECONDS AND 130K.

507       * ;
508                 DATA DISCH ;
509                 SET TEMP DVFILE.DVMASTER ;
510                 BY STATION PARMCODE DATETIME ;
511       * ;
512

NOTE: DATA SET WORK.DISCH HAS 19792 OBSERVATIONS AND 8 VARIABLES. 224 OBS/TRK.
NOTE: THE DATA STATEMENT USED 3.84 SECONDS AND 132K.

512                 DATA TEMP1 (RENAME=(TAG1=TAG)) ;
513                 SET DISCH ;
514                 WID
515                 MACRO OPT 1 &
516                 MACRO INTERVAL 1 &
517                 MACRO DATATYPE 2 &
518                 MACRO XPUTFILE CARDX MOD &

NOTE: DATA SET WORK.TEMP1 HAS 515 OBSERVATIONS AND 4 VARIABLES. 334 OBS/TRK.
NOTE: THE DATA STATEMENT USED 1.20 SECONDS AND 130K.

519                 CGROUP12
520                 MACRO DATATYPE 3&
521                 MACRO PC 00045 &


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.DSARR.DATA,
      UNIT=SYSDK,VOL=SER=SYS302,DISP=MOD,
      DCB=(BLKSIZE=4000,LRECL=80,RECFM=FB)

NOTE: 99 LINES WERE WRITTEN TO FILE CARDX.
NOTE: THE DATA STATEMENT USED 0.38 SECONDS AND 138K.


NOTE: DATA SET WORK.TEMP HAS 2 OBSERVATIONS AND 4 VARIABLES. 302 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.06 SECONDS AND 130K.

524                 DATA RAINFALL ;
525                 SET TEMP DVFILE.DVMASTER ;
526                 BY STATION PARMCODE DATETIME ;
527

NOTE: DATA SET WORK.RAINFALL HAS 886 OBSERVATIONS AND 7 VARIABLES. 220 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.30 SECONDS AND 132K.

527                 DATA TEMP1 (RENAME=(TAG1=TAG)) ;
528                 SET RAINFALL ;
529                 WID
530

NOTE: DATA SET WORK.TEMP1 HAS 381 OBSERVATIONS AND 4 VARIABLES. 334 OBS/TRK.
```

151

```
NOTE: THE DATA STATEMENT USED 0.15 SECONDS AND 130K.

530          PROC SORT DATA=TEMP1 ;
531              BY DATETIME ;
532                 MACRO DEBUG 0 %

NOTE: DATA SET WORK.TEMP1 HAS 381 OBSERVATIONS AND 4 VARIABLES. 334 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.28 SECONDS AND 235K.

533                 CGROUP34
534                 MACRO DATATYPE 4%
535                 MACRO PC 00050 %


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.DSARR.DATA,
      UNIT=SYSDK,VOL=SER=SYS302,LABEL=2,DISP=MOD,
      DCB=(BLKSIZE=4000,LRECL=80,RECFM=FB)

NOTE: 0 LINES WERE WRITTEN TO FILE PRINT.
NOTE: 25 LINES WERE WRITTEN TO FILE CARDX.
NOTE: THE DATA STATEMENT USED 0.45 SECONDS AND 160K.


NOTE: DATA SET WORK.TEMP HAS 2 OBSERVATIONS AND 6 VARIABLES. 302 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.06 SECONDS AND 130K.

538                 DATA EVAP ;
539                 SET TEMP DVFILE.DVMASTER ;
540                 BY STATION PARMCODE DATETIME ;
541

NOTE: DATA SET WORK.EVAP HAS 896 OBSERVATIONS AND 7 VARIABLES. 220 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.26 SECONDS AND 132K.

541                 DATA TEMP1 (RENAME=(TAG1=TAG)) ;
542                 SET EVAP ;
543                 RID
544

NOTE: DATA SET WORK.TEMP1 HAS 381 OBSERVATIONS AND 4 VARIABLES. 334 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.12 SECONDS AND 130K.

544          PROC SORT DATA=TEMP1 ;
545              BY DATETIME ;

NOTE: DATA SET WORK.TEMP1 HAS 381 OBSERVATIONS AND 4 VARIABLES. 334 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.21 SECONDS AND 235K.

546                 CGROUP34


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.DSARR.DATA,
      UNIT=SYSDK,VOL=SER=SYS302,LABEL=2,DISP=MOD,
      DCB=(BLKSIZE=4000,LRECL=80,RECFM=FB)

NOTE: 0 LINES WERE WRITTEN TO FILE PRINT.
```

```
NOTE: 26 LINES WERE WRITTEN TO FILE CARDX.
NOTE: THE DATA STATEMENT USED 0.47 SECONDS AND 140K.

547       DATA _NULL_ ;
548       INFILE CARDX ;
549       INPUT LINE $80. ;
550       PUT _INFILE_ ;


NOTE: INFILE CARDX IS:
      DSNAME=AG4254J.DSARR.DATA,
      UNIT=SYSDK,VOL=SER=SYS302,LABEL=2,DISP=MOD,
      DCB=(BLKSIZE=4000,LRECL=80,RECFM=FB)
25403108770808 1 89                                                  0.00 3.00 1.00 1.001
25403108770808 1 90 2.00 2.50 3.00 2.00 3.00 2.50 1.00 1.00 1.00 1.50 1.50 1.001
25403108770808 1 91 1.50 1.00 1.00 1.00 0.50 0.50 1.00 0.50 0.50 0.00 0.50 0.001
25403108770808 1 92 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1 93 0.00 0.00 0.50 0.00 0.50 0.00 0.50 0.00 0.00 0.00 0.00 0.001
25403108770808 1 94 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1 95 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1 96 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1 97 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1 98 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.50 0.001
25403108770808 1 99 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1100 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1101 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1102 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1103 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1104 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1105 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1106 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1107 0.00 0.50 1.50 3.00 3.50 3.50 3.50 9.00 2.50 1.50 1.50 9.001
25403108770808 1108 4.00 4.00 0.00 1.50 1.00 0.00 0.50 0.00 0.00 0.00 0.00 1.001
25403108770808 1109 0.00 1.00 0.50 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.001
25403108770808 1110 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1111 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.15 0.08 0.15 0.151
25403108770808 1112 0.08 0.08 0.00 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.00 0.081
25403108770808 1113 0.08 0.08 0.00 0.08 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1114 0.00 0.00 0.00 0.00 0.00 0.00 0.08 0.00 0.00 0.00 0.00 0.00 0.001
25403108770808 1115 0.00 0.00 0.00 0.00 0.00 0.08 0.15 0.00 0.08 0.08 0.08 0.001
25403108780518 1 58                                   0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108780518 1 59 0.50 0.00 0.00 0.00 0.50 0.00 0.00 0.50 0.00 0.00 1.00 0.001
25403108780518 1 60 0.00 0.50 0.50 0.00 0.00 0.50 0.00 0.50 0.00 0.50 0.50 0.501
25403108780518 1 61 0.50 1.00 0.50 0.00 0.50 1.00 0.50 1.00 1.50 4.00 5.00 4.001
25403108780518 1 62 2.50 0.50 1.00 1.00 0.50 0.50 0.50 0.50 0.00 0.00 0.00 0.501
25403108780518 1 63 0.50 0.00 0.00 0.00 1.00 0.00 0.00 0.00 0.50 0.50 0.00 0.501
25403108780518 1 64 0.50 0.00 0.50 0.00 0.00 0.50 0.50 0.00 0.50 0.50 0.50 0.501
25403108780518 1 65 0.00 0.50 0.50 0.00 1.00 0.00 0.00 1.00 0.00 1.00 0.00 1.001
25403108780518 1 66 0.00 0.50 0.50 0.50 0.50 0.00 1.00 0.00 1.00 0.00 0.50 0.501
25403108780518 1 67 0.50 0.00 1.00 0.00 0.00 1.00 0.00 0.50 0.00 0.50 0.50 0.501
25403108780518 1 68 0.00 1.00 0.00 1.00 0.00 1.00 0.00 0.00 1.00 0.00 0.50 0.001
25403108780518 1 69 0.00 0.50 0.50 0.50 0.00 0.00 0.50 0.00 0.50 0.00 0.50 0.001
25403108780518 1 70 0.00 0.00 0.00 0.50 0.50 0.00 0.00 0.50 0.00 0.50 0.50 0.001
25403108780518 1 71 0.00 0.00 0.50 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.501
25403108780518 1 72 0.50 0.00 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.50 0.001
25403108780518 1 73 0.00 0.00 0.50 0.00 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.001
25403108780518 1 74 0.50 0.00 0.50 0.00 0.00 0.00 0.50 0.00 0.50 0.00 0.00 0.001
25403108780518 1 75 0.00 0.00 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.501
```

```
254031108780518 1 76 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.50 0.00 0.001
254031108780518 1 77 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.00                    1
254031108780612 1 78                                          0.00 7.0010.0013.501
254031108780612 1 79 7.50 6.5014.50 6.50 4.00 3.50 4.00 2.50 1.50 1.50 0.50 0.001
254031108780612 1 80 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 1.00 2.00 3.00 5.001
254031108780612 1 81 5.00 1.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
254031108780612 1 82 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
254031108780612 1 83 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
254031108780612 1 84 0.00 0.00 0.00 0.00                                        1
254031108770808 1 89                                          0.00 0.00 0.20 0.802
254031108770808 1 90 1.92 2.96 3.66 4.69 5.67 6.30 6.77 6.93 6.84 6.80 6.79 6.752
254031108770808 1 91 6.52 6.14 5.87 5.79 5.78 5.73 5.78 5.59 5.26 4.95 4.64 4.412
254031108770808 1 92 4.29 4.32 4.38 4.40 4.51 4.59 4.55 4.49 4.37 4.18 3.90 3.652
254031108770808 1 93 3.44 3.19 2.85 2.44 1.95 1.49 1.18 0.96 0.80 0.66 0.56 0.462
254031108770808 1 94 0.38 0.31 0.24 0.18 0.12 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1 95 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1 96 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1 97 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1 98 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1 99 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1100 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1101 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1102 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1103 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1104 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1105 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1106 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1107 0.00 0.67 2.14 3.22 3.59 3.93 4.85 5.86 6.83 8.6110.8512.382
254031108770808 110812.9813.2213.3913.8813.4512.7312.2210.64 8.99 7.75 6.80 6.062
254031108770808 1109 5.46 4.91 4.57 4.48 4.55 4.60 4.49 4.23 3.92 3.69 3.72 3.822
254031108770808 1110 3.83 3.82 3.74 3.46 2.98 2.39 1.82 1.40 1.12 0.92 0.76 0.642
254031108770808 1111 0.53 0.44 0.36 0.29 0.23 0.15 0.11 0.00 0.00 0.00 0.00 0.002
254031108770808 1112 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1113 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1114 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108770808 1115 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
254031108780518 1 58                                    0.00 0.00 0.00 0.00 0.00 0.002
254031108780518 1 59 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.40 0.40 0.222
254031108780518 1 60 0.22 0.22 0.36 0.40 0.36 0.31 0.31 0.31 0.40 0.58 0.81 0.632
254031108780518 1 61 0.45 0.67 0.90 0.99 0.90 0.94 0.85 0.90 1.08 1.39 2.56 3.782
254031108780518 1 62 5.40 6.84 7.96 8.50 7.69 6.79 5.80 4.90 4.05 2.92 2.11 1.482
254031108780518 1 63 0.99 0.90 0.99 1.26 1.44 1.30 1.03 0.72 0.72 0.81 0.76 0.812
254031108780518 1 64 1.03 1.08 0.99 0.90 0.72 0.58 0.54 0.63 0.67 0.81 0.94 1.032
254031108780518 1 65 0.99 0.85 0.76 0.72 0.90 1.13 1.30 1.39 1.30 1.17 1.03 0.992
254031108780518 1 66 1.13 1.26 1.30 1.39 1.44 1.44 1.48 1.57 1.57 1.53 1.57 1.572
254031108780518 1 67 1.57 1.53 1.48 1.30 1.08 0.94 0.90 0.90 0.90 0.90 0.90 0.942
254031108780518 1 68 0.94 0.90 0.85 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.812
254031108780518 1 69 0.81 0.81 0.81 0.81 0.81 0.81 0.76 0.76 0.76 0.76 0.76 0.722
254031108780518 1 70 0.67 0.67 0.67 0.67 0.63 0.63 0.63 0.58 0.58 0.58 0.54 0.542
254031108780518 1 71 0.54 0.54 0.54 0.54 0.54 0.58 0.58 0.58 0.58 0.58 0.49 0.452
254031108780518 1 72 0.40 0.40 0.40 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.452
254031108780518 1 73 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.40 0.40 0.402
254031108780518 1 74 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
254031108780518 1 75 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
254031108780518 1 76 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
254031108780518 1 77 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40                    2
 403108780612 1 78                                          0.00 0.76 0.76 6.482
 403108780612 1 79 9.3113.2317.6423.0427.1325.5124.0321.2419.0817.9517.1415.392
 403108780612 1 8013.7711.9210.30 9.58 8.55 4.90 4.27 3.15 2.65 2.20 2.34 3.332
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25403108780612 1 81 4.68 6.12 7.11 6.21 5.13 4.14 3.33 2.83 3.38 2.43 1.93 2.292
25403108780612 1 82 2.20 1.89 1.57 2.02 1.89 1.80 1.48 1.35 1.26 1.08 0.99 0.992
25403108780612 1 83 1.03 0.99 0.72 0.54 1.35 1.39 1.21 1.03 0.45 0.49 0.58 0.542
25403108780612 1 84 0.36 0.31 0.40 0.45                                          2
                                                                                 9

25403108770612.252.330.410.420.000.030.000.000.220.000.000.000.000.000.000.00  3
25403108770620.000.000.001.160.000.000.000.000.030.000.000.000.000.00           3
25403108770710.000.000.000.090.000.080.000.000.030.000.000.010.110.001.622.12   3
25403108770720.020.010.010.000.130.001.250.150.190.120.000.000.020.000.00       3
25403108770810.000.010.000.290.001.120.001.550.000.030.081.160.570.000.000.27   3
25403108770820.130.000.000.000.041.310.000.390.040.150.190.110.100.830.43       3
25403108770912.851.500.730.000.000.000.590.150.000.000.440.000.000.000.270.01   3
25403108770920.000.210.000.160.100.001.390.020.030.320.160.070.000.00           3
25403108771010.000.000.000.000.000.000.540.000.000.000.000.000.000.000.000.00  3
25403108771020.000.000.000.000.000.001.120.040.000.030.000.000.000.000.000.00  3
25403108771110.000.000.000.050.120.000.000.000.100.000.000.000.000.000.000.00  3
25403108771120.000.070.240.000.130.080.134.470.030.000.000.000.000.00           3
25403108771210.000.000.000.000.001.020.000.000.250.000.000.000.090.000.000.00  3
25403108771220.000.000.430.000.000.000.000.000.030.020.000.000.000.000.25      3
25403108780110.000.010.300.250.010.030.000.300.000.000.000.000.270.000.000.00  3
25403108780120.010.020.380.500.010.020.010.020.050.040.000.000.000.000.00       3
25403108780210.000.000.000.120.370.000.000.450.150.000.000.000.000.000.010.01  3
25403108780220.421.350.900.190.190.000.000.000.030.000.000.00                    3
25403108780310.010.001.650.000.000.000.000.000.950.000.000.000.070.030.000.00  3
25403108780320.000.000.000.000.000.000.000.000.030.000.040.280.030.000.49       3
25403108780410.000.021.700.000.000.000.000.000.030.000.000.000.000.130.120.00  3
25403108780420.000.000.110.000.000.000.740.000.030.000.000.000.000.00           3
25403108780510.000.000.000.040.240.000.000.000.000.310.580.000.000.010.000.00  3
25403108780520.000.820.150.000.000.000.000.000.230.630.052.740.020.000.00       3
25403108780610.000.000.150.000.000.010.000.000.000.000.001.030.000.000.000.00  3
25403108770610.130.000.000.000.270.290.200.300.130.300.200.300.200.300.200.35  4
25403108770620.300.240.360.030.390.480.600.340.420.300.400.200.400.30           4
25403108770710.370.200.280.300.230.270.160.130.290.360.420.260.400.370.070.12  4
25403108770720.000.000.180.000.390.360.210.350.150.300.300.240.380.410.32       4
25403108770810.380.000.230.000.330.310.260.340.000.320.310.100.050.100.200.45  4
25403108770820.230.180.230.290.270.150.180.260.230.230.350.220.320.150.24       4
25403108770910.290.000.000.120.200.180.150.200.000.000.300.120.180.140.360.19  4
25403108770920.210.100.250.150.270.130.050.130.130.110.100.180.210.18           4
25403108771010.290.410.230.270.290.310.000.400.000.240.260.200.240.340.200.23  4
25403108771020.260.230.280.210.210.140.050.130.150.170.180.260.250.190.13       4
25403108771110.230.100.200.000.140.040.290.120.220.170.280.190.210.190.180.00  4
25403108771120.210.150.210.230.460.220.000.000.130.210.120.120.070.10           4
25403108771210.130.000.090.250.210.130.000.300.120.120.150.190.200.120.120.07  4
25403108771220.170.160.200.100.100.200.210.090.130.050.100.200.100.150.09       4
25403108780110.140.000.000.000.120.130.050.140.190.250.070.170.100.140.090.07  4
25403108780120.230.090.000.000.240.130.040.200.130.240.140.120.310.200.10       4
25403108780210.220.000.260.120.100.030.170.300.100.110.230.110.130.250.320.08  4
25403108780220.140.060.200.160.160.060.180.120.270.030.300.20                    4
25403108780310.210.060.290.220.280.200.150.240.240.080.320.140.220.200.350.21  4
25403108780320.330.380.250.290.200.210.300.480.270.200.270.190.070.080.27       4
25403108780410.130.290.320.140.250.200.300.280.270.310.340.320.250.160.210.20  4
25403108780420.330.270.210.120.390.260.000.000.120.170.370.380.270.30           4
25403108780510.200.200.250.300.250.150.300.310.380.280.270.040.220.280.400.38  4
25403108780520.220.000.000.000.290.340.220.380.390.200.300.170.000.450.30       4
25403108780610.000.000.290.340.280.360.080.340.400.400.200.200.220.280.330.35  4
                                                                                 9
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NOTE: 160 LINES WERE READ FROM INFILE CARDX.
NOTE: THE DATA STATEMENT USED 0.10 SECONDS AND 132K.

5.322 RRCOMB

The FORTRAN program RRCOMB combines the user-created DR3M input cards with the input cards created by RRCARD. RRCOMB requires the following data sets:

FT15F001	User-created input cards or data set containing card groups 1-7 and 12-23
FT16F001	Final data set created by RRCOMB
FT17F001	Data set created by RRCARD containing card groups 8, 9, 10, and 11
FT06F001	Output to printer

Data set 15 must first contain card groups 1-7. Before the group 7 cards, include a 'GAGE' card which specifies the number of rainfall gages which will be included in this run. There must be one group 7 card included for each gage. A separator card which has four '+' characters in columns 1-4 (fig. 5.322.1, card 13) follows card groups 1-7 and finally, card groups 12-23 as they are to appear as input to the model are included. RRCOMB simply inserts the 8-11 cards between the 1-7 cards and marks the storm days on the daily rainfall cards from information it saves from the unit rainfall cards.

RRCOMB is a load module stored in the partitioned data set AG4254J.URBAN.SOURCE as member RRCOMB. The following is a card by card description of the example run deck in figure 5.322.1.

Card 1..	Job card
2..	Job library card specifying where the program RRCOMB is to be found
3..	Execute program RRCOMB
4..	Output to the printer
5..	Unit 15 is user-created cards (or data set) for card groups 1-7 and 12-23
6-12..	Card goups 1-7. Card 11 indicates that input for one gage will be processed.
13..	Separator card must be four '+' characters in columns 1-4
14-88..	Card groups 12-23
89..	JCL delimiter card
90..	Unit 16 specifies the JCL for the output data set
91..	Unit 17 specifies the data set created by RRCARD in a previous job
92-93..	End of step and job

The pages following figure 5.322.1 illustrate an example execution of RRCOMB.

```
 COL.1        COL.12
   ●           ●
1..//          JOB
2..//JOBLIB DD DSN=AG4254J.URBAN.LMOD,DISP=SHR
3..// EXEC PGM=RRCOMB
4..//FT06F001 DD SYSOUT=A
5..//FT15F001 DD *
6..            1000
7..25403108  MULTI-FAMILY RESIDENTIAL SITE -- MIAMI, FLORIDA    .023
8..25403108  MULTI-FAMILY RESIDENTIAL SITE DAILY RAINFALL
9..25403108  MULTI-FAMILY RESIDENTIAL SITE DAILY EVAPORATION
10..                    77 06 01    78 06 16
11..GAGE1
12..25403108  MULTI-FAMILY RESIDENTIAL SITE UNIT RAINFALL         1.0
13..++++
14..   7   0   0      0.0
15..1.0         .5          3.0
16..1.2        0.05        1.25
17..10.0       5.0         20.0
18..5.0        2.0          6.0
19...7         .5          1.0
20...95        .7           .97
21..1.0        .85         1.15
22..
23..   57  1.0 1.92     1 0.02     1
24..L1                                  51010 200.  .01 .20  1.00  .00 1  1.0
25..L2                                  510 5  60.  .01 .025 1.00 1.00 1  1.0
26..L3                                  51010 300.  .01 .20  1.00  .00 1  1.0
27..L4                                  510 4  50.  .01 .025 1.00 1.00 1  1.0
28..L5                                  51010 450.  .01 .20  1.00  .00 1  1.0
29..L6                                  510 6  75.  .01 .025 1.00 1.00 1  1.0
30..L7                                  510 6  75.  .01 .025 1.00 1.00 1  1.0
31..L8                                  51010 450.  .01 .20  1.00  .00 1  1.0
32..L9                                  510 8  50.  .01 .025 1.00 1.00 1  1.0
33..L10                                 51010 200.  .01 .025 1.00 1.00 1  1.0
34..L11                                 51010 300.  .01 .2   1.00  .00 1  1.0
35..L12                                 51010 612.  .01 .2   1.00  .00 1  1.0
36..L13                                 51010 200.  .01 .025 1.00 1.00 1  1.0
37..L14                                 51010 300.  .01 .2   1.00  .00 1  1.0
38..L15                                 51010  80.  .01 .025 1.00 1.00 1  1.0
39..L16                                 510 6  35.  .01 .025 1.00 1.00 1  1.0
40..L17                                 51010 150.  .01 .2   1.00  .00 1  1.0
41..L18                                 510 5  55.  .01 .025 1.00 1.00 1  1.0
42..L19                                 51010 150.  .01 .025 1.00  .00 1  1.0
43..L20                                 510 8  60.  .01 .025 1.00  .00 1  1.0
44..L21                                 51010 190.  .01 .025 1.00 1.00 1  1.0
45..L22                                 510 5  30.  .01 .025 1.00 1.00 1  1.0
46..L23                                 51010 100.  .01 .2   1.00  .00 1  1.0
47..L24                                 510 7  50.  .01 .025 1.00 1.00 1  1.0
48. L25                                 51010 340.  .01 .2   1.00  .00 1  1.0
49..L26                                 51010 260.  .01 .025 1.00 1.00 1  1.0
50..L27                                 51010 270.  .01 .025 1.00 1.00 1  1.0
51..L28                                 51010 270.  .01 .2   1.00  .00 1  1.0
52..L29                                 51010 100.  .01 .2   1.00  .00 1  1.0
53..L30                                 510 7  50.  .01 .025 1.00 1.00 1  1.0
```

Figure 5.322.1.--JCL for executing RRCOMB.

```
54..P1                  L1                    210  1 162..005   .012 4.00
55..P2  P1                                    210  1  90..005   .012 4.00
56..P4                  L3                    210  1  65..0016  .012 3.00
57..P5  P4                                    210  1  58..0016  .012 3.00
58..P7                  L5                    210  3  82..0024  .028 1.75
59..P8  P7                                    210  2  82..0024  .028 1.75
60..P9                  L6  L7                21010 450..0024  .028 2.50
61..P11                 L8                    210  3  65..0024  .028 2.50
62..P13                 L14 L15 L16           21010 200..0004  .028 1.50
63..P15                 L12                   210  5  75..0008  .028 1.50
64..P19                 L29                   210  2 135..0038  .028 2.00
65..P20 P19                                   210  1  52..0038  .028 2.00
66..P22                 L23                   210  2  91..0038  .028 2.00
67..P25                 L26 L27               210  3 100..0015  .028 2.00
68..P10 P11                                   210  1  81..0024  .028 2.50
69..P14 P15             L13                   210  4  60..0008  .028 1.50
70..P21 P22                                   210  1  53..0038  .028 2.00
71..P24 P25             L25 L28               210  3 100..0015  .028 2.00
72..J2  P8  P9  P10                           7  0  5     .0024  .028 2.00
73..P12 P13 P14                               210  1  32..030   .028 1.50
74..P23 P24             L24 L30               210  1 100..0038  .028 2.00
75..P18 P20 P21 P23 L19 L20 L21 L22           2  0  1 150..0238  .028 2.25
76..P17 P18             L9  L10 L11           210  1 100..0072  .028 2.50
77..P16 P17             L17 L18               210  1 100..029   .028 3.00
78..P6  J2  P16         L4                    210  3 300..0016  .012 3.00
79..P3  P5  P6  P12 L2                        210  1 200..005   .012 4.00
80..J1  P2  P3                                7   1   5   .005  .028 2.00
81.. 3 1 1 1
82..10661391                                STORM 17  8/ 8/77
83.. 697 920                                STORM 48  5/18/78
84.. 9341000                                STORM 52  6/12/78
85.. 1 1 1
86.. 0 0 0
87.. 1 1 1
88.. 0 0 0
89../*
90..//FT16F001 DD DSN=AG4yyyz.STATEXX.FINAL.DATA,DISP=SHR
91..//FT17F001 DD DSN=AG4yyyz.STATEXX.DATA,DISP=SHR
92../*
93..//
```

Figure 5.322.1.--JCL for executing RRCOMB--Continued.

```
//AG4254J5 JOB ($$$$$$$$$$,J001,$,5),'LORENS',CLASS=A                    J6041
//JOBLIB DD DSN=AG4254J.JRBAN._MOD,DISP=SHR
// EXEC PGM=RRCOMB,TIME=(,10)
//FT06F001 DD SYSOUT=A
//FT15F001 DD *
//FT16F001 DD DSN=AG4254J.DSARR.FINAL.DATA,DISP=SHR
//FT17F001 DD DSN=AG4254J.DSARR.DATA,DISP=SHR
//
IEF236I ALLOC. FOR AG4254J5
IEF237I 744   ALLOCATED TO JOBLIB
IEF237I 4A1   ALLOCATED TO FT05F001
IEF237I 5E0   ALLOCATED TO FT15F001
IEF237I 744   ALLOCATED TO FT16F001
IEF237I 480   ALLOCATED TO FT17F001
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   AG4254J.JRBAN.LMOD                              PASSED
IEF285I   VOL SER NOS= CC0810.
IEF285I   AG4254J.DSARR.FINAL.DATA                        KEPT
IEF285I   VOL SER NOS= CC0810.
IEF285I   AG4254J.DSARR.DATA                              KEPT
IEF285I   VOL SER NOS= SYS302.
IEF373I STEP /         / START 81187.1631
IEF374I STEP /         / STOP  81187.1631 CPU    0MIN 00.87SEC MAIN  60K LCS    0K
CC0006I STEP /         / I/O IN DD SEQ: 744:0       4A1:13       5E0:5
CC0006I STEP /         / I/O IN DD SEQ: 744:12      480:8
CC0011I STEP /         / MEMORY RESERVED   70K; ACCESSES: DISK       38/ TAPE        0
IEF285I   AG4254J.JRBAN.LMOD                              KEPT
IEF285I   VOL SER NOS= CC0810.
IEF375I  JOB /AG4254J5/ START 81187.1631
IEF376I  JOB /AG4254J5/ STOP  81187.1631 CPU    0MIN 00.87SEC
CC0007A  JOB /AG4254J5/ BASIC CHRG: FIXED    CPU    DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                    3.09     1.32     .23                    4.64
CC0002I  JOB /AG4254J5/ TOTAL CHARGE RECORDED =       $4.64
CC0003I  JOB /AG4254J5/ US GEOLOGICAL SURVEY REL 05 REL 218 TIME = 16.31.35 DATE = 07/06/81

                        THE WORK SCHEDULE FOR FRI-SAT JULY 3-4 IS AS FOLLOWS
                          FRI 7AM TO SAT 7AM - UNATTENDED
                          SAT AFTER 7AM OPERATORS ON DUTY UNTIL THE BACKLOG OF WORK IS FINISHED
                          AFTER THE BACKLOG IS FINISHED, THE SYSTEM WILL BE LEFT UNATTENDED UNTIL
                            PREVEN. MAINT. TIME ON SUNDAY JULY 5TH.
```

```
          1000
25403108  MULTI-FAMILY RESIDENTIAL SITE -- MIAMI, FLORIDA   .023
25403108  MULTI-FAMILY RESIDENTIAL SITE DAILY RAINFALL
25403108  MULTI-FAMILY RESIDENTIAL SITE DAILY EVAPORATION
                    77 06 01    78 06 15
25403108  MULTI-FAMILY RESIDENTIAL SITE UNIT RAINFALL          1.0
25403108877708 8 1 89                                       0.00 3.00 1.00 1.001
25403108877708 8 1 90 2.00 2.50 3.00 2.00 3.00 2.50 1.00 1.00 1.00 1.50 1.50 1.001
25403108877708 8 1 91 1.50 1.00 1.00 1.00 0.50 0.50 1.00 0.50 0.50 0.00 0.50 0.001
25403108877708 8 1 92 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1 93 0.00 0.00 0.50 0.00 0.50 0.00 0.50 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1 94 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1 95 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1 96 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1 97 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1 98 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.50 0.001
25403108877708 8 1 99 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1100 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1101 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1102 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1103 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1104 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1105 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1106 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1107 0.00 0.50 1.50 3.00 3.50 3.50 3.50 9.00 2.50 1.50 1.50 9.001
25403108877708 8 1108 4.00 4.00 0.00 1.50 1.00 0.00 0.50 0.00 0.00 0.00 0.00 1.001
25403108877708 8 1109 0.00 1.00 0.50 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1110 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1111 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.15 0.08 0.15 0.151
25403108877708 8 1112 0.08 0.08 0.00 0.08 0.08 0.08 0.08 0.08 0.08 0.08 0.00 0.081
25403108877708 8 1113 0.08 0.08 0.00 0.08 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1114 0.00 0.00 0.00 0.00 0.00 0.00 0.08 0.00 0.00 0.00 0.00 0.001
25403108877708 8 1115 0.00 0.00 0.00 0.00 0.00 0.08 0.15 0.00 0.08 0.08 0.08 0.001
25403108780518 1 58                                      0.00 0.00 0.00 0.00 0.00 0.001
25403108780518 1 59 0.50 0.00 0.00 0.00 0.50 0.00 0.00 0.50 0.00 0.00 1.00 0.001
25403108780518 1 60 0.00 0.50 0.50 0.00 0.00 0.50 0.00 0.50 0.00 0.50 0.50 0.501
25403108780518 1 61 0.50 1.00 0.50 0.00 0.50 1.00 0.50 1.00 1.50 4.00 5.00 4.001
25403108780518 1 62 2.50 0.50 1.00 1.00 0.50 0.50 0.50 0.50 0.00 0.00 0.00 0.501
25403108780518 1 63 0.50 0.00 0.00 0.00 1.00 0.00 0.00 0.00 0.50 0.50 0.00 0.501
25403108780518 1 64 0.50 0.00 0.50 0.00 0.00 0.50 0.50 0.00 0.50 0.50 0.50 0.501
25403108780518 1 65 0.00 0.50 0.50 0.00 1.00 0.00 0.00 1.00 0.00 1.00 0.00 1.001
25403108780518 1 66 0.00 0.50 0.50 0.50 0.50 0.00 1.00 0.00 1.00 0.00 0.50 0.501
25403108780518 1 67 0.50 0.00 1.00 0.00 0.00 1.00 0.00 0.50 0.00 0.50 0.50 0.501
25403108780518 1 68 0.00 1.00 0.00 1.00 0.00 1.00 0.00 0.00 1.00 0.00 0.50 0.001
25403108780518 1 69 0.00 0.50 0.50 0.50 0.00 0.00 0.50 0.00 0.50 0.00 0.50 0.001
25403108780518 1 70 0.00 0.00 0.00 0.50 0.50 0.00 0.00 0.50 0.00 0.50 0.50 0.001
25403108780518 1 71 0.00 0.00 0.50 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.501
25403108780518 1 72 0.50 0.00 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.50 0.001
25403108780518 1 73 0.00 0.00 0.50 0.00 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.001
25403108780518 1 74 0.50 0.00 0.50 0.00 0.00 0.00 0.50 0.00 0.50 0.00 0.00 0.001
25403108780518 1 75 0.00 0.00 0.00 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.501
25403108780518 1 76 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.50 0.00 0.001
25403108780518 1 77 0.50 0.00 0.00 0.50 0.00 0.00 0.00 0.00                        1
25403108780612 1 78                                         0.00 7.0010.0013.501
25403108780612 1 79 7.50 6.5014.50 6.50 4.00 3.50 4.00 2.50 1.50 1.50 0.50 0.001
25403108780612 1 80 0.00 0.50 0.00 0.00 0.00 0.00 0.00 0.00 1.00 2.00 3.00 5.001
25403108780612 1 81 5.00 1.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108780612 1 82 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108780612 1 83 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.001
25403108780612 1 84 0.00 0.00 0.00 0.00                                          1
```

```
25403108770808 1 89                                                
```

```
25403108770912.851.500.730.000.000.000.590.150.000.000.440.000.000.000.270.01  3
25403108770920.000.210.000.160.100.001.380.020.000.320.160.070.000.00          3
25403108771010.000.000.000.000.000.000.540.000.000.000.000.000.000.000.000.00 3
25403108771020.000.000.000.000.000.001.120.040.000.000.000.000.000.000.000.00 3
25403108771110.000.000.000.000.050.120.000.000.000.000.150.000.000.000.000.00 3
25403108771120.000.070.240.000.130.080.134.470.000.000.000.000.000.00         3
25403108771210.000.000.000.000.000.001.020.000.000.250.000.000.000.090.000.00 3
25403108771220.000.000.000.430.000.000.000.000.000.000.000.020.000.000.000.25 3
25403108780110.000.010.300.250.010.030.000.300.000.000.000.000.270.000.000.00 3
25403108780120.010.020.380.500.010.020.010.020.050.040.000.000.000.000.00     3
25403108780210.000.000.000.120.370.000.000.450.150.000.000.000.000.000.010.01 3
25403108780220.421.350.900.190.190.000.000.000.000.000.000.00                  3
25403108780310.010.001.650.000.000.000.000.000.950.000.000.000.070.030.000.00 3
25403108780320.000.000.000.000.000.000.000.000.000.000.040.290.030.000.49     3
25403108780410.000.021.700.000.000.000.000.000.000.000.000.000.000.000.130.120.00 3
25403108780420.000.000.110.000.000.000.740.000.000.000.000.000.000.00         3
25403108780510.000.000.000.040.240.000.000.000.000.310.580.000.000.010.000.00 3
25403108780520.00-1000.150.000.000.000.000.000.000.290.630.052.740.020.000.00 3
25403108780610.000.000.150.000.000.010.000.000.000.000.00-1000.000.000.000.00 3
25403108770610.130.000.000.000.270.290.200.300.130.300.200.300.200.300.200.35 4
25403108770620.300.240.360.030.390.480.600.340.420.300.400.200.400.30         4
25403108770710.370.200.280.300.230.270.150.130.290.360.420.260.400.370.070.12 4
25403108770720.000.000.190.000.390.360.210.350.150.300.300.240.390.410.32     4
25403108770810.380.000.230.000.330.310.250.340.000.320.310.100.050.100.200.45 4
25403108770820.230.180.230.290.270.150.180.260.250.230.350.220.320.150.24     4
25403108770910.290.000.000.120.200.180.150.200.000.000.300.120.190.140.360.19 4
25403108770920.210.100.250.150.270.130.050.130.140.110.100.180.210.18         4
25403108771010.290.410.230.270.290.310.000.400.000.240.260.200.240.340.200.23 4
25403108771020.260.230.280.210.210.140.050.130.150.170.180.260.250.190.13     4
25403108771110.230.100.200.000.140.040.290.120.220.170.280.190.210.190.180.00 4
25403108771120.210.150.210.230.460.220.000.000.130.210.120.120.070.10         4
25403108771210.130.000.090.250.210.130.000.300.120.120.150.190.200.120.120.07 4
25403108771220.170.160.200.100.100.200.210.090.100.050.100.200.100.150.09     4
25403108780110.140.000.000.000.120.130.050.140.190.250.070.170.100.140.090.07 4
25403108780120.230.090.000.000.240.130.040.200.100.240.140.120.310.200.10     4
25403108780210.220.000.260.120.100.030.170.300.100.110.230.110.130.250.320.08 4
25403108780220.140.060.200.160.160.060.190.120.270.030.300.20                  4
25403108780310.210.060.290.220.280.200.150.240.240.080.320.140.220.200.350.21 4
25403108780320.330.380.250.290.200.210.300.490.270.200.270.190.070.080.27     4
25403108780410.130.290.320.140.250.200.300.290.270.310.340.320.250.160.210.20 4
25403108780420.330.270.210.120.390.260.000.000.120.170.370.380.270.30         4
25403108780510.200.200.250.300.250.150.300.310.330.280.270.040.220.280.400.38 4
25403108780520.220.000.000.000.290.340.220.380.330.200.300.170.000.450.30     4
25403108780610.000.000.290.340.280.360.090.340.490.400.200.200.220.280.330.35 4
                                                                               9
```

```
   7    0    0      0.0
1.0          .5         3.0
1.2         0.05        1.25
10.0        5.0        20.0
5.0         2.0         6.0
.7          .5         1.0
.95         .7          .97
1.0         .85        1.15

   57  1.0 1.92     1 0.02     1
L1                                  51010 200.  .01 .20  1.00  .00 1  1.0
L2                                  510 5  50.  .01 .025 1.00 1.00 1  1.0
L3                                  51010 300.  .01 .20  1.00  .00 1  1.0
L4                                  510 4  50.  .01 .025 1.00 1.00 1  1.0
L5                                  51010 450.  .01 .20  1.00  .00 1  1.0
L6                                  510 6  75.  .01 .025 1.00 1.00 1  1.0
```

```
L7                                      510 6  75.  .01 .025 1.00 1.00 1  1.0
L8                                      51010 450.  .01 .20  1.00  .00 1  1.0
L9                                      510 8  50.  .01 .025 1.00 1.00 1  1.0
L10                                     51010 200.  .01 .025 1.00 1.00 1  1.0
L11                                     51010 300.  .01 .2   1.00  .00 1  1.0
L12                                     51010 612.  .01 .2   1.00  .00 1  1.0
L13                                     51010 200.  .01 .025 1.00 1.00 1  1.0
L14                                     51010 300.  .01 .2   1.00  .00 1  1.0
L15                                     51010  80.  .01 .025 1.00 1.00 1  1.0
L16                                     510 6  35.  .01 .025 1.00 1.00 1  1.0
L17                                     51010 150.  .01 .2   1.00  .00 1  1.0
L18                                     510 5  55.  .01 .025 1.00 1.00 1  1.0
L19                                     51010 150.  .01 .025 1.00  .00 1  1.0
L20                                     510 8  50.  .01 .025 1.00  .00 1  1.0
L21                                     51010 190.  .01 .025 1.00 1.00 1  1.0
L22                                     510 5  30.  .01 .025 1.00 1.00 1  1.0
L23                                     51010 100.  .01 .2   1.00  .00 1  1.0
L24                                     510 7  50.  .01 .025 1.00 1.00 1  1.0
L25                                     51010 340.  .01 .2   1.00  .00 1  1.0
L26                                     51010 250.  .01 .025 1.00 1.00 1  1.0
L27                                     51010 270.  .01 .025 1.00 1.00 1  1.0
L28                                     51010 270.  .01 .2   1.00  .00 1  1.0
L29                                     51010 100.  .01 .2   1.00  .00 1  1.0
L30                                     510 7  50.  .01 .025 1.00 1.00 1  1.0
P1              L1                      210 1 152..005  .012 4.00
P2  P1                                  210 1  90..005  .012 4.00
P4              L3                      210 1  55..0016 .012 3.00
P5  P4                                  210 1  58..0016 .012 3.00
P7              L5                      210 3  92..0024 .028 1.75
P8  P7                                  210 2  82..0024 .028 1.75
P9              L6  L7                  21010 450..0024 .028 2.50
P11             L8                      210 3  55..0024 .028 2.50
P13             L14 L15 L16             21010 200..0004 .028 1.50
P15             L12                     210 5  75..0008 .028 1.50
P19             L29                     210 2 135..0038 .028 2.00
P20 P19                                 210 1  52..0038 .028 2.00
P22             L23                     210 2  91..0038 .028 2.00
P25             L26 L27                 210 3 100..0015 .028 2.00
P10 P11                                 210 1  91..0024 .028 2.50
P14 P13         L13                     210 4  50..0008 .028 1.50
P21 P22                                 210 1  53..0038 .028 2.00
P24 P23         L25 L28                 210 3 100..0015 .028 2.00
J2  P8  P9  P10                         7 0 5      .0024 .028 2.00
P12 P13 P14                             210 1  32..030  .028 1.50
P23 P24         L24 L30                 210 1 100..0038 .028 2.00
P18 P20 P21 P23 L19 L20 L21 L22         2 0 1 150..0238 .028 2.25
P17 P19         L9  L10 L11             210 1 100..0072 .028 2.50
P16 P17         L17 L18                 210 1 100..029  .028 3.00
P6  J2  P16     L4                      210 3 300..0016 .012 3.00
P3  P5  P6  P12 L2                      210 1 200..005  .012 4.00
J1  P2  P3                              7 1 5      .005  .028 2.00
 3 1 1 1
10661391                                STORM 17  9/ 8/77
 697 920                                STORM 48  5/18/73
 9341000                                STORM 52  6/12/73
 1 1 1
 0 0 0
 1 1 1
 0 0 0
```

5.33 Urban Runoff-Quality Model DR_3M-QUAL

An urban water-quality transport model DR_3M-QUAL that uses runoff generated by DR_3M as the transport mechanism for the water-quality constituents has been developed. This model is completely documented in Alley and Smith (1982b).

Daily rainfall and water-quality data from the User File are required model input data. The model has the capability of generating lumped runoff loads at the outlet and if this option is selected then unit discharge data is used as the transport mechanism. Lumped as used in this context means a distribution with respect to time but not spatially.

In section 5.31 reference was made to a several-step run whereby in step 1, data was retrieved and transformed into required model format, in step 2, the data were combined with other required input model data, and in step 3, DR_3M is executed. The same procedure occurs with the water-quality model with the exception being that in step 3 DR_3M-QUAL is executed. Section 5.34 describes the programs (QWCARD and QWCOMB) used in steps 1 and 2 when preparing data for a DR_3M-QUAL run.

5.34 Runoff-Quality Model DR_3M-QUAL Interface Program

The DR_3M-QUAL Interface program is two programs which retrieve data from the data management system and create the formatted cards for DR_3M-QUAL. The set of SAS macros, QWCARD, retrieves data from UVMASTER, DVMASTER, and QWMASTER to create card groups 11-17. The FORTRAN program, QWCOMB, combines the QWCARD created cards with the user supplied card groups 1-10 and 18-29 to create a run ready deck for DR_3M-QUAL. The following is a brief description of QWCARD and QWCOMB and sample run decks.

5.341 QWCARD

The program QWCARD is a set of SAS macros which retrieves data from UVMASTER, DVMASTER, and QWMASTER and creates the unit-discharge cards (card group 11) and daily-rainfall cards (card group 12). QWCARD uses the macros CGROUP12 and CGROUP34 which are also used by RRCARD and are briefly discussed in that section. In addition QWCARD creates the following cards:

Card Group	Description
13	Storm sequencing card
14	Storm-identification
15	Constituent identification
16	Constituent data
17	Sampling times

The user supplies the information to QWCARD for creating card groups 13-17 by including two cards per storm as input to the macro KSKEIN (figure 5.341.1, cards 53-58). A description of the free field format cards is given in figure 5.341.2. Since the cards are free field format, a wetfall value and alphanumeric identification must be supplied for each of the four constituents even if less than four are to be examined. The wetfalls can be zero and the identifications 'xxxxxx' on the card. Also, since blanks are the field delimiters, do not use blanks in the alphanumeric constituent labels. Instead use an underscore. For example, for total nitrogen one could use T_NIT. The card images created by QWCARD are stored in the data set specified by the data definition card named CARDX (figure 5.341.1, card 9). Also macros PCODE1-PCODE4 must be defined with the parameter codes (figure 5.341.1, cards 61-64).

After running QWCARD, the program QWCOMB is run to create the final DR_3M-QUAL data set.

```
        COL.1      COL.12
          ●          ●
Card   1..//          JOB
       2..// EXEC SAS,TIME=3
       3..//QWFILE DD DSN=AG4yyyz.STATEXX.URBAN.QW.VALUES,
       4..// DISP=SHR
       5..//DVFILE DD DSN=AG4yyyz.STATEXX.URBAN.DAILY.VALUES,
       6..// DISP=SHR
       7..//UVFILE DD DSN=AG4yyyz.STATEXX.URBAN.UNIT.VALUES,
       8..// DISP=SHR
       9..//CARDX DD DSN=AG4yyyz.QUAL.MDATA,
      10..// DISP=OLD
      11..//QUALX DD DSN=AG4yyyz.STORM.DATES,
      12..// DISP=OLD
      13..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(QWCARD),DISP=SHR
      14..//       DD *
      15..* ;
      16..* ;
      17..* ;
      18..          MACRO PTIME 1 %
      19..          MACRO XPUTFILE CARDX OLD %
      20..          MACRO PC 00060 %
      21..          MACRO OPT 1 %
      22..          XDTIME
      23..254031080191100 770808 17 45 770808 23 01 STORM 17
      24..254031080191100 780518 11 30 780518 15 21 STORM 48
      25..254031080191100 780612 15 33 780612 16 41 STORM 52
      26..* ;
      27..          DATA DISCH ;
      28..          SET TEMP UVFILE.UVMASTER ;
      29..          BY STATION PARMCODE DATETIME ;
      30..* ;
      31..          DATA TEMP1 (RENAME=(TAG1=TAG)) ;
      32..          SET DISCH ;
      33..          RID
      34..          MACRO INTERVAL 1 %
      35..          MACRO DATATYPE 2 %
      36..          CGROUP12
      37..          MACRO XPUTFILE CARDX MOD %
      38..          MACRO DATATYPE 3%
      39..          MACRO PC 00045 %
      40..          XDTIME
      41..254031080191103 770601 00 00 780617 00 00 RAINFALL
      42..          DATA RAINFALL ;
      43..          SET TEMP DVFILE.DVMASTER ;
      44..          BY STATION PARMCODE DATETIME ;
      45..          DATA TEMP1 (RENAME=(TAG1=TAG)) ;
      46..          SET RAINFALL ;
      47..          RID
```

Figure 5.341.1--SAS and JCL commands for executing QWCARD.

```
48..  PROC SORT DATA=TEMP1 ;
49..       BY DATETIME ;
50..          MACRO DEBUG 0 %
51..          CGROUP34
52..          KSKEIN
53..254031080191100 77 08 08 1066 1391 03 0 0 0 0
54..S_SLDS NIT LEAD XX
55..254031080191100 78 05 18 0697 0920 03 0 0 0 0
56..S_SLDS NIT LEAD XX
57..254031080191100 78 06 12 0934 1000 03 0 0 0 0
58..S_SLDS NIT LEAD XX
59..* ;
60..          QUALRID
61..          MACRO PCODE1 P70299 %
62..          MACRO PCODE2 P00600 %
63..          MACRO PCODE3 P01051 %
64..          MACRO PCODE4 P00000 %
65..          XQWCARD
66..DATA  _NULL_ ;
67..INFILE CARDX ;
68..INPUT LINE $80. ;
69..PUT _INFILE_ ;
70../*
71..//
```

Figure 5.341.1.--SAS and JCL commands for executing QWCARD--Continued.

Card	Field	Format	Description
1	1	$15.	Station identification
	2	2.	Storm start year
	3	2.	Storm start month
	4	2.	Storm start day
	5	4.	Starting time increment for storm - KS
	6	4.	Ending time increment for storm - KE
	7	2.	Number of constituents
	8-11	5.2	Wetfall values for each constituent
2	1-4	$6.	Alphanumeric identification for each constituent

Figure 5.341.2.--Macro KSKEIN input data card description.

The run deck consists of job control language (JCL), SAS statements and input data cards. The following is a card by card description of a sample run deck (figure 5.341.1). For further discussion of the JCL see the CCD User's Guide.

Card	1..	Job card
	2..	Execute a SAS program for a maximum of three minutes
	3-4..	Data definition card specifying water-quality data set for state XX
	5-6..	Specifies the daily values data set for state XX
	7-8..	Specifies the unit values data set for state XX
	9-10..	Data definition card for the data set where the card images will be stored
	11-12..	Data definition card for the data set created by QWCARD which contains storm dates
	13..	Data definition card specifying macro source data set and member QWCARD
	14..	Indicates rest of SAS input follows in card deck
	15-17..	Optional SAS comment cards to divide the deck
	18..	Time interval for unit data (in minutes)
	19..	Defines macro XPUTFILE, which is the dd name of the data set where the card images are to be stored. Specify OLD so that cards from previous runs are not saved.
	20..	Defines the macro PC, which is the parameter code of the data you want selected; in this case, 60 for discharge data
	21..	Defines the macro OPT; when OPT=1, the program (CGROUP12) writes a card with a nine in column 80 after the unit discharge cards. When OPT=0 it does not.
	22..	Calls the macro XDTIME to read the storm interval cards
	23-25..	Storm interval cards (see section 5.41 and figure 5.41.2)
	26..	SAS statement
	27-36..	SAS statements to retrieve the requested data and produce the formatted card group 11 cards
	37..	Defines the macro XPUTFILE, which is the dd name of the data set the group 12 cards will be stored in. Disposition is MOD so that these cards are added to the 11 cards.
	38-51..	These cards cause the daily rainfall data to be selected and card group 12 cards created (see RRCARD Run Deck Description in section 5.321, cards 50-63 for a description of these cards)
	52..	Calls the macro KSKEIN which reads the following input cards describing the requested water-quality data
	53-58..	KSKEIN input data cards described in QWCARD program description and figure 5.341.2

Card 59..	SAS statement specifies end of data
60..	The QUALRID macro adds a storm start and end time to each observation created by QWCARD. It also writes all storm dates to data set specified by dd name QUALX in JCL. The QUALX data set is used by the QWCOMB program to mark storm days on daily rainfall cards. QUALRID also lists the QUALX data set. It converts the character TIME value in the water-quality data set (QWMASTER) produced by QWSAS to numeric. QUALRID also merges the storm dates and times into the modified QWMASTER data set and selects only the requested data.
61-64..	Define the macros PCODE1 to PCODE4; these are the parameter codes of the constituents to be examined by DR_3M-QUAL. Four cards must be supplied. In this example, three constituents are to be examined; therefore, PCODE4 is specified as P00000.
65..	Calls macro XQWCARD to create card groups 11-17 from the requested data
66-69..	Optional SAS statements to request a listing of the cards just created by XQWCARD
70-71..	End of step and job

The following pages present an example execution of QWCARD.

```
 1      //AG4254J4 JOB (*********,J001,5,5),'LORENS',CLASS=B                        JOB 9219
 2      // EXEC SAS,TIME=(,15)
 3      XXSAS       PROC OPTIONS=,SORT=4,ENTRY=SAS                                 00001000
        ************** 11/12/81, 2/22/82-11 ********************************      00002000
        ***  STATISTICAL ANALYSIS SYSTEM,  VERSION 79.5                    ***     00003000
        ***  DOCUMENTATION:  SAS USER'S GUIDE, 1979 EDITION                ***     00004000
        ***  ENHANCEMENTS:  SAS TECHNICAL REPORT P-115                     ***     00005000
        ***  FROM: SAS INSTITUTE INC., BOX 8000, CARY, NC  27511           ***     00006000
        ************************************************************************ 00007000
 4      XXSAS    EXEC PGM=&ENTRY,PARM='&OPTIONS SORT=&SORT',REGION=400K          00008000
 5      XXLIBRARY  DD  DSN=&LIBRARY,UNIT=SYSDA,SPACE=(CYL,(1,,20)),             00009000
        XX             DISP=(MOD,PASS)                                          00010000
 6      XXSTEPLIB  DD  DSN=SYS1.SAS.LIBRARY,DISP=SHR                            00011000
 7      XX         DD  DSN=SYS1.PLIX.TRANSLIB,DISP=SHR                          00012000
 8      XX         DD  DSN=SYS1.SYNC.LINKLIB,DISP=SHR                           00013000
 9      XX         DD  DSN=*.LIBRARY,DISP=(OLD,PASS),VOL=REF=*.LIBRARY          00014000
10      XXWORK     DD  UNIT=SYSDA,SPACE=(6160,(500,200),,,ROUND) SAS WORK SPACE 00015000
11      XXFT11F001 DD  SYSOUT=A,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA) LOG        00016000
12      XXFT12F001 DD  SYSOUT=A,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA) PRINT      00017000
13      XXFT13F001 DD  SYSOUT=B,DCB=(RECFM=F,BLKSIZE=80)              PUNCH      00018000
14      XXFT15F001 DD  UNIT=SYSDA,SPACE=(400,(100,300)),          PARMCARDS      00019000
        XX             DCB=(RECFM=FB,LRECL=80,BLKSIZE=400,BUFNO=1)              00020000
15      XXFT06F001 DD  SYSOUT=A       PLOT DRIVER MESSAGES                      00021000
16      XXSORTMSG  DD  SYSOUT=A,DCB=BUFNO=1 OR DDNAME=SYSOUT                    00022000
17      XXSORTLIB  DD  DSN=SYS1.SYNC.SORTLIB,DISP=SHR                           00023000
18      //QWFILE DD DSN=AG4254J.STATE12.URBAN.QW.VALUES,
        // DISP=SHR
19      //DVFILE DD DSN=AG4254J.STATE12.URBAN.DAILY.VALUES,
        // DISP=SHR
20      //UVFILE DD DSN=AG4254J.STATE12.URBAN.UNIT.VALUES,
        // DISP=SHR
21      //CARDX DD DSN=AG4254J.QUAL.MDATA,
        // DISP=OLD
22      //QUALX DD DSN=AG4254J.STORM.DATES,
        // DISP=OLD
23      //SYSIN DD DSN=AG4254J.URBAN.SOURCE(QWCARD),DISP=SHR
24      //       DD *
        //
```

```
IEF285I   AG4254J.STORM.DATES                          KEPT
IEF285I   VOL SER NOS= CCD810.
IEF285I   AG4254J.URBAN.SOURCE                         KEPT
IEF285I   VOL SER NOS= CCD810.
IEF285I   JES2.JOB09219.S10101                         SYSIN
IEF285I   JES2.JOB09219.S00107                         SYSOUT
IEF285I   SYS82070.T085834.RA000.AG4254J4.R0000000     DELETED
IEF285I   VOL SER NOS= SYS501.
IEF285I   SYS82070.T085834.RA000.AG4254J4.R0000001     DELETED
IEF285I   VOL SER NOS= SYS501.
IEF285I   SYS82070.T085834.RA000.AG4254J4.R0000002     DELETED
IEF285I   VOL SER NOS= SYS501.
IEF373I STEP /SAS      / START 82070.0857
IEF374I STEP /SAS      / STOP  82070.0859 CPU     0MIN 09.22SEC SRB     0MIN 00.51SEC VIRT   460K SYS   232K
```

```
*                                                                                                                                *
*                                                  KOMAND DATA ACQUISITION SYSTEM                                                *
*                                                                                                                                *
```

```
*                                                        EXCP STATISTICS                                                         *
*                                                                                                                                *
* UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT     UNIT   EXCP COUNT  *
*                                                                                                                                *
*  E41            0      E42            0      E42            0      481            0      E41            0      E40        1,186  *
*  E42            0      481            0      49C           15      780            0      48C           15      48C           77  *
*  48C           11      48C            3      49C           18      E41            0      E41            0      E41            0  *
*                                                                                                                                *
* EXCP TOTAL      1,325       VIO PAGE INS          0       VIO PAGE OUTS          0       PAGES SWAPPED IN         58          *
```

```
CCD007  JOB /AG4254J4/ BASIC STEP CHARGE         CPU     DISK-IO   TAPE-IO   KBYTE-HR     TOTAL
                                                  7.39      4.01       .00       4.36      15.76
IEF237I E41  ALLOCATED TO SYS00004
IEF285I   SYS82070.T085910.RA000.AG4254J4.R0000004     KEPT
IEF285I   VOL SER NOS= SYS501.
IEF285I   SYS82070.T085754.RA000.AG4254J4.LIBRARY      DELETED
IEF285I   VOL SER NOS= SYS501.
IEF285I   SYS82070.T085754.RA000.AG4254J4.LIBRARY      KEPT
IEF285I   VOL SER NOS= SYS501.
IEF373I  JOB /AG4254J4/ START 82070.0857
IEF374I  JOB /AG4254J4/ STOP  82070.0859 CPU     0MIN 09.22SEC SRB     0MIN 00.51SEC
```

```
*                                                                                                                                *
*                                                  KOMAND DATA ACQUISITION SYSTEM                                                *
*                                                                                                                                *
*  JOB LOG NUMBER - AG4254J4 82070 00.00.00.00                CPU TIME   00.00.09.22          SRB TIME            00.00.00.51  *
*                                                                                                                                *
*  PROGRAMMER  LORENS                                         INIT DATE  03/11/82  82.070     INITIATION TIME     08.57.54.87  *
*                                                                                                                                *
*  ACCTG DATA  $$$$$$$$$.J001.5,5                             TERM DATE  03/11/82  82.070     TERMINATION TIME    08.59.10.64  *
*                                                                                                                                *
*  OS-VS2 REL  03.8                                           PGN/SERVICE     1/   43.268     ELAPSED TIME        00.00.00.00  *
*                                                                                                                                *
*  SYSTEM ID   VSV7                                           CLASS             B             COMPLETION STATUS       C0000  *
*                                                                                                                                *
```

```
002 JOB/AG4254J4/ TOTAL BASIC JOB CHARGE      1.24  (FIXED) +      15.76  (STEPS) =     17.00
3 CHARGE DOES NOT INCLUDE CHARGES FOR TAPE OR DISK MOUNTS, IF APPLICABLE, OR UNIT RECORD CHARGES
```

NOTE: THE JOB AG4254J4 HAS BEEN RUN UNDER RELEASE 79.5 OF SAS AT U. S. GEOLOGICAL SURVEY (00592).

NOTE: SAS OPTIONS SPECIFIED ARE:
SORT=4

```
1                MACRO RID
2           *;
3           * TO SELECT THE OBSERVATIONS FOR THE APPROPRIATE TIME INTERVALS ;
4           * RID THE DATASET OF EXTRANEOUS OBSERVATIONS ;
5           *;
6                KEEP STATION DATETIME TAG1 VALUE ;
7                DROP TAG IND ;
8                RETAIN TAG1 0 IND 0 ;
9                IF TAG NE . AND
10                  TAG NE TAG1 AND
11                  IND=0 THEN DO;
12                       TAG1=TAG ;
13                       IND=1 ;
14                       DELETE ;
15                       END ;
16               IF IND =0 THEN DELETE ;
17               IF TAG EQ TAG1 AND
18                  IND=1 THEN DO ;
19                       IND= 0 ;
20                       DELETE ;
21                       END ;
22               ELSE OUTPUT ;
23          * NOW THE DATA SET CONTAINS ONLY THE REQUIRED OBSERVATIONS ;
24               %
25               MACRO XDTIME
26          * ;
27          *READ IN STORM START AND STOP TIMES;
28          * ;
29               DATA TEMP ;
30               KEEP STATION TAG DATETIME PARMCODE ;
31               INPUT STATION $CHAR15. SDATE : YYMMDD6. SHOUR : 2. SMIN : 2.
32                                 EDATE : YYMMDD6. EHOUR : 2. EMIN : 2. ;
33               TAG+1 ;
34               PARMCODE=PC ;
35               DATETIME=DHMS(SDATE,SHOUR,SMIN,0) ;
36               OUTPUT ;
37               DATETIME= DHMS(EDATE,EHOUR,EMIN,0) ;
38               OUTPUT ;
39               CARDS ;
40          %
41               MACRO QUALRID
42               DATA TEMP ;
43               SET QUAL13 ;
44               DROP START SSTORM ESTORM ;
45               FILE QUALX OLD ;
46               DATETIME = START ;
47               OUTPUT TEMP ;
48               DATETIME=EDATIME ;
49               OUTPUT TEMP ;
50          * SAVE STORM DATES FOR CARD GROUP 3 DATA CARDS
51          * THIS DATA SET IS USED BY THE FORTRAN PROGRAM TO MARK STORM DAYS ON
```

```
52          *  GROUP 3 CARDS ;
53                SSTORM=DATEPART(START) ;
54                ESTORM=DATEPART(EDATIME) ;
55                PUT SSTORM YYMMDD6. ;
56                IF SSTORM EQ ESTORM THEN  RETURN ;
57                XSTORM=SSTORM ;
58          PUT :
59                XSTORM=XSTORM+1 ;
60                IF XSTORM=ESTORM AND TIMEPART(EDATIME) EQ 0
61                     OR XSTORM>ESTORM THEN RETURN ;
62                PUT XSTORM YYMMDD6. ;
63                GO TO PUT ;
64                RETURN ;
65          DATA: INFILE QUALX ; INPUT LINE $. ; PUT _INFILE_ ;
66                DATA QWTEMP ;
67                SET QWFILE.QWMASTER ;
68                DROP TIMEX HOUR MIN TIME DATE ;
69                TIMEX=INPUT(TIME,4.) ;
70                HOUR=INT(TIMEX/100) ;
71                MIN=MOD(TIMEX,100);
72                MIN=INT(MIN) ;
73                DATETIME=DHMS(DATE,HOUR,MIN,0) ;
74                DATA QWTEMP ;
75                SET TEMP QWTEMP ;
76                BY STATION DATETIME ;
77                DROP EDATIME ;
78                RETAIN START ENDTIME ;
79                IF DATETIME NE EDATIME & EDATIME NE . THEN DO ;
80                START=DATETIME ;
81                ENDTIME=EDATIME ;
82                END ;
83                DATA QWTEMP (RENAME=(TAG1=TAG)) ;
84                SET QWTEMP ;
85          * TO SELECT THE OBSERVATIONS FOR THE APPROPRIATE TIME INTERVALS ;
86          * RID THE DATASET OF EXTRANEOUS OBSERVATIONS ;
87                DROP TAG IND ;
88                RETAIN TAG1 0 IND 0 ;
89                IF TAG NE . AND
90                   TAG NE TAG1 AND
91                   IND=0 THEN DO;
92                         TAG1=TAG ;
93                         IND=1 ;
94                           OUTPUT ;
95                         RETURN ;
96                         END ;
97                IF IND =0 THEN DELETE ;
98                IF TAG EQ TAG1 AND
99                   IND=1 THEN DO ;
100                        IND= 0 ;
101                        DELETE ;
102                        END ;
103               ELSE OUTPUT ;
104         * NOW THE DATA SET CONTAINS ONLY THE REQUIRED OBSERVATIONS ;
105               %
106         MACRO DEBUG 0 %
  7         MACRO PTIME 1 %
  8         ********************************************************************************
  9         *         KSKEIN MACRO UPDATED AS OF FEB 25, 1982
```

```
110       *                                                                      *
111       ************************************************************************;
112                MACRO KSKEIN
113                DATA QUAL13 (RENAME= (STARTDTE=START ENDDATE=EDATIME)
114                     KEEP= STARTDTE ENDDATE NDSD STATION
115                           WFALL0-WFALL4 ALPHA1-ALPHA4
116                           NWQP KS KE TAG ) ;
117                INPUT STATION $CHAR15. SYR : 2. SMON : 2. SDAY : 2.
118                                KS : 2. KE : 2.
119                                NWQP : 2.  WFALL1 : 5.2
120                                WFALL2 : 5.2 WFALL3 : 5.2 WFALL4 : 5.2
121                      #2  ALPHA1 : $6. ALPHA2 : $6. ALPHA3 : $6. ALPHA4 : $6. ;
122                ARRAY WFALL (I) WFALL0-WFALL6 ;
123                ARRAY ALPHA (I) ALPHA1-ALPHA4 ;
124                ARRAY LSTDAY(K) LSTDAY1-LSTDAY12 ;
125                RETAIN LSTDAY1  31
126                       LSTDAY2  28
127                       LSTDAY3  31
128                       LSTDAY4  30
129                       LSTDAY5  31
130                       LSTDAY6  30
131                       LSTDAY7  31
132                       LSTDAY8  31
133                       LSTDAY9  30
134                       LSTDAY10 31
135                       LSTDAY11 30
136                       LSTDAY12 31 ;
137                RETAIN  COL 3 LASTYR LASTMON LASTDAY LINE 1 ;
138                 RETAIN NDSD 0 STORMS 0 TAG 0 ;
139                FORMAT STARTDTE ENDDATE DATETIME18. SDATE EDATE YYMMDD6. ;
140                 INFILE CARDS END=EOF ;
141                TAG+1 ;
142                SDATE=MDY(SMON,SDAY,SYR) ;
143                CONST=1440/PTIME ;
144                 LINK CALCDT ;
145                STARTDTE=DHMS(SDATE,SHR,SMIN,0) ;
146                ENDDATE=DHMS(EDATE,EHR,EMIN,0) ;
147                 FILE PRINT  ;
148                 IF DEBUG THEN PUT SYR= SMON= SDAY=
149                                   SHR= SMIN= EHR= EMIN= NDSD=
150                                   STARTDTE= ENDDATE= CONST= ;
151                  IF _N_=1 THEN DO ;
152                     FILE CARDX MOD ;
153                     PUT #1 @80 '9' ;
154                       LINK CONSEQU ;
155                       NDSD=INT(KE/CONST)+1 ;
156                     OUTPUT QUAL13 ;
157                       RETURN ;
158                       END ;
159                  IF LASTYR=SYR THEN DO ;
160       * SAME YEAR ;    IF LASTMON=SMON THEN DO ;
161       * SAME MON ;          IF LASTDAY=SDAY THEN DO ;
162       * SAME DAY ;               LINK CONSEQU ;
163                                  END ;
164                           ELSE DO ;
165                                IF LASTDAY+1=SDAY THEN DO ;
166       * NEXT CONSEQUTIVE DAY ;       LINK CONSEQU ;
167                                      NDSD=INT(KE/CONST) ;
```

```
168                                   END ;
169                              ELSE DO ;
170       * NOT CONSEQUTIVE PUT VALUES ON CARD AND CONTINUE ;
171                                   LINK PUNCH ;
172                                   END ;
173                         END ;
174                    END;
175                    ELSE DO ;
176       * MONTHS NOT THE SAME ;
177       * CHECK TO SEE IF ITS THE NEXT MONTH ;
178                    K=LASTMON ;
179                    IF SMON = LASTMON+1 & SDAY = 1 & LASTDAY = LSTDAY
180                         THEN DO ;
181                         LINK CONSEQU ;
182                         NDSD=INT(KE/CONST) ;
183                         END ;
184                    ELSE DO ;
185                         LINK PUNCH ;
186                         END ;
187                    END ;
188               END ;
189       * YEARS NOT EQUAL ;
190               ELSE DO ;
191                    IF LASTYR+1=SYR & LASTMON=12 & LASTDAY=31 &
192                      SMON=1 & SDAY=1 THEN DO ;
193       * NEXT DAY IN NEXT YEAR ;
194                      LINK CONSEQU ;
195                      NDSD=INT(KE/CONST) ;
196                      END ;
197                    ELSE DO ;
198       * NOT CONSEQUTIVE ;
199                      LINK PUNCH ;
200                      END ;
201               END ;
202               OUTPUT QUAL13 ;
203       * CHECK FOR LAST OBSERVATION ;
204               IF EOF THEN DO ;
205                    LINK PUNCH ;
206       * OUTPUT TOTAL NUMBER OF STORMS ;
207               FILE CARDX ;
208                    PUT #1 $1 _N_ 2. ;
209                    END ;
210               RETURN ;
211       * ;
212       CONSEQU :
213               STORMS=STORMS + 1 ;
214       INIT:
215               LASTYR=YEAR(EDATE) - 1900 ;
216               LASTMON=MONTH(EDATE) ;
217               LASTDAY=DAY(EDATE) ;
218               FILE PRINT ;
219               IF DEBUG THEN PUT ENDDATE= LASTYR= LASTMON= LASTDAY= ;
220               RETURN ;
221       * ;
222       * PUT ENTRIES ON CARD ;
223       PUNCH:
224               FILE PRINT ;
225               IF DEBUG THEN PUT _N_= STORMS= ;
```

```
226                FILE CARDX MOD ;
227                DO I= 1 TO STORMS ;
228                     PUT #LINE @COL STORMS 2. @ ;
229                     COL=COL+2 ;
230                     IF COL GT 79 THEN DO ;
231                          COL=3 ;
232                          LINE=LINE+1 ;
233                          END ;
234                 END ;
235                STORMS=1 ;
236                NDSD=0 ;
237                LINK INIT ;
238                RETURN ;
239           CALCDT:
240                KX=(KS-(CONST*NDSD))*PTIME ;
241                IF KX<0 THEN KX=KS*PTIME ;
242                LINK CALCTIME ;
243                SHR=HRX ;
244                SMIN=MINX ;
245                DAYSX=INT(KE/CONST)-NDSD ;
246                IF DAYSX<0 THEN DAYSX=INT(KE/CONST) ;
247                EDATE=SDATE+DAYSX ;
248                KX=(KE-CONST*(DAYSX+NDSD))*PTIME ;
249                IF KX<0 THEN KX=MOD(KE,CONST)*PTIME ;
250                LINK CALCTIME ;
251                EHR=HRX ;
252                EMIN=MINX ;
253                RETURN ;
254           CALCTIME:
255                HRX=INT(KX/60) ;
256                MINX=MOD(KX,60) ;
257                RETURN ;
258           CARDS;
259                %
260                MACRO XQWCARD
261                DATA ;
262                SET QWTEMP ;
263                BY TAG ;
264                RETAIN ALPH1-ALPH4 'XXXXXX' DAYSEC 86400 ;
265                ARRAY CONTIME1 (I1) CONS1T1-CONS1T24 ;
266                ARRAY CONTIME2 (I2) CONS2T1-CONS2T24 ;
267                ARRAY CONTIME3 (I3) CONS3T1-CONS3T24 ;
268                ARRAY CONTIME4 (I4) CONS4T1-CONS4T24 ;
269                ARRAY CONVAL1 (I1) CONS1V1-CONS1V24 ;
270                ARRAY CONVAL2 (I2) CONS2V1-CONS2V24 ;
271                ARRAY CONVAL3 (I3) CONS3V1-CONS3V24 ;
272                ARRAY CONVAL4 (I4) CONS4V1-CONS4V24 ;
273                ARRAY ALPHA(J) ALPHA1-ALPHA4  ;
274                ARRAY ALPH (J) ALPH1-ALPH4 ;
275                ARRAY WFALL (J) WFALL1-WFALL4 ;
276                RETAIN CONS1V1-CONS1V24 CONS2V1-CONS2V24
277                       CONS3V1-CONS3V24 CONS4V1-CONS4V24 ;
278                RETAIN CONS1T1-CONS1T24 CONS2T1-CONS2T24
279                       CONS3T1-CONS3T24 CONS4T1-CONS4T24 ;
280                RETAIN I1 I2 I3 I4 1 ;
281                RETAIN ALPHA1-ALPHA4
282                     STARTD STARTT ;
283                FILE CARDX MOD ;
```

```
284              IF FIRST.TAG THEN DO ;
285         * PUNCH CARD 14 ;
286               PUT KS 4. KE 4. NWQP  2. @ ;
287              DO J=1 TO NWQP - 1 ;
288              PUT WFALL 5.2 @ ;
289              END ;
290              PUT WFALL 5.2 ;
291              I1=0 ;
292              I2=0 ;
293              I3=0 ;
294              I4= 0 ;
295              DO OVER ALPHA ;
296                   ALPH=ALPHA ;
297              END ;
298              STARTD=DATEPART(START) ;
299              STARTT=TIMEPART(START) ;
300              RETURN ;
301              END ;
302         * CALCULATE TIME FROM BEGINNING OF STORM IN MINUTES ;
303              SAMPLED=DATEPART(DATETIME ) ;
304              SAMPLET=TIMEPART(DATETIME) ;
305              IF SAMPLED EQ STARTD THEN
306                   CTIME=(SAMPLET-STARTT)/60. ;
307              ELSE CTIME=(DAYSEC-STARTT+SAMPLET)/60 ;
308              IF PCODE1 NE . THEN DO ;
309                   I1+1 ;
310                   CONVAL1=PCODE1 ;
311                   CONTIME1=CTIME ;
312                   END ;
313              IF PCODE2 NE . THEN DO ;
314                   I2+1 ;
315              CONVAL2=PCODE2 ;
316              CONTIME2=CTIME ;
317                   END ;
318              IF PCODE3 NE . THEN DO ;
319                   I3+1 ;
320              CONVAL3=PCODE3 ;
321              CONTIME3=CTIME ;
322                   END ;
323              IF PCODE4 NE . THEN DO ;
324                   I4+1 ;
325              CONVAL4=PCODE4 ;
326              CONTIME4=CTIME ;
327                   END ;
328              IF LAST.TAG THEN LINK PUNCH ;
329                   RETURN ;
330         PUNCH ;
331              IF I1 EQ 0 THEN GO TO CONST2 ;
332              NWQM=I1 ;
333         * PUNCH 15 CARD ;
334              PUT ALPH1 $6. NWQM 2. ;
335         * PUNCH 16 CARDS ;
336              COL=1 ;
337              DO I1=1 TO NWQM ;
338                   IF COL LT 72 AND I1 < NWQM THEN DO ;
339                        PUT @COL CONVAL1 8.2 @ ;
340                        COL+8 ;
341                        END ;
```

```
342                   ELSE DO ;
343                        PUT @COL CONVAL1 8.2 ;
344                   COL=1 ;
345                   END ;
346              END ;
347         * PUNCH 17 CARDS ;
348              COL=1 ;
349              DO I1= 1 TO NWQM ;
350                   IF COL LT 72 AND I1 < NWQM THEN DO ;
351                        PUT @COL CONTIME1 8.2 @ ;
352                        COL+8 ;
353                        END ;
354                   ELSE DO ;
355                        PUT @COL CONTIME1 8.2 ;
356                        COL=1 ;
357                   END ;
358              END ;
359         CONST2:
360              IF I2 EQ 0 THEN GO TO CONST3 ;
361              NWQM=I2 ;
362         * PUNCH 15 CARD ;
363              PUT ALPH2 $6. NWQM 2. ;
364         * PUNCH 16 CARDS ;
365              COL=1 ;
366              DO I2=1 TO NWQM ;
367                   IF COL LT 72 AND I2 < NWQM THEN DO ;
368                        PUT @COL CONVAL2 8.2 @ ;
369                        COL+8 ;
370                        END ;
371                   ELSE DO ;
372                        PUT @COL CONVAL2 8.2 ;
373                   COL=1 ;
374                   END ;
375              END ;
376         * PUNCH 17 CARDS ;
377              COL=1 ;
378              DO I2= 1 TO NWQM ;
379                   IF COL LT 72 AND I2 < NWQM THEN DO ;
380                        PUT @COL CONTIME2 8.2 @ ;
381                        COL+8 ;
382                        END ;
383                   ELSE DO ;
384                        PUT @COL CONTIME2 8.2 ;
385                        COL=1 ;
386                   END ;
387              END ;
388         CONST3:
389              IF I3 EQ 0 THEN GO TO CONST4 ;
390              NWQM=I3 ;
391         * PUNCH 15 CARD ;
392              PUT ALPH3 $6. NWQM 2. ;
393         * PUNCH 16 CARDS ;
394              COL=1 ;
395              DO I3=1 TO NWQM ;
396                   IF COL LT 72 AND I3 < NWQM THEN DO ;
397                        PUT @COL CONVAL3 8.2 @ ;
398                        COL+8 ;
399                        END ;
```

```
400                   ELSE DO ;
401                        PUT @COL CONVAL3 8.2 ;
402                        COL=1 ;
403                        END ;
404              END ;
405         * PUNCH 17 CARDS ;
406              COL=1 ;
407              DO I3= 1 TO NWQM ;
408                   IF COL< LT 72 AND I3 < NWQM THEN DO ;
409                        PUT @COL CONTIME3 9.2 @ ;
410                        COL+8 ;
411                        END ;
412                   ELSE DO ;
413                        PUT @COL CONTIME3 9.2 ;
414                        COL=1 ;
415                        END ;
416              END ;
417         CONST4:
418              IF I4 EQ 0 THEN RETURN ;
419              NWQM=I4 ;
420         * PUNCH 15 CARD ;
421              PUT ALPH4 $6. NWQM 2. ;
422         * PUNCH 16 CARDS ;
423              COL=1 ;
424              DO I4=1 TO NWQM ;
425                   IF COL< LT 72 AND I4 < NWQM THEN DO ;
426                        PUT @COL CONVAL4 8.2 @ ;
427                        COL+8 ;
428                        END ;
429                   ELSE DO ;
430                        PUT @COL CONVAL4 8.2 ;
431                        COL=1 ;
432                        END ;
433              END ;
434         * PUNCH 17 CARDS ;
435              COL=1 ;
436              DO I4= 1 TO NWQM ;
437                   IF COL< LT 72 AND I4 < NWQM THEN DO ;
438                        PUT @COL CONTIME4 9.2 @ ;
439                        COL+8 ;
440                        END ;
441                   ELSE DO ;
442                        PUT @COL CONTIME4 9.2 ;
443                        COL=1 ;
444                        END ;
445              END ;
446              %
447         ********************************************************************************
448         *                                                                              *
449         *        THIS PROGRAM UPDATED DEC  9, 1981                                     *
450         *                                                                              *
451         ********************************************************************************;
452              OPTIONS MISSING=' ' ;
453              MACRO CGROUP12
454         * ;
455         * ;
456         * ;
457              DATA _NULL_ ;
```

```
458              SET TEMP1 END=EOF ;
459              BY STATION ;
460              ARRAY P(I) P1-P12 ;
461              FORMAT CURDATE YYMMDD6. P1-P12 5.2 ;
462              FORMAT DATEX YYMMDD6. ;
463              RETAIN I 0 CN CURDATE CURTIME 0 ;
464              RETAIN P1-P12 ;
465              RETAIN SAVEID ;
466              RETAIN INTER INTERVAL CODE DATATYPE ;
467              RETAIN IND 0 ;
468              DATEX=DATEPART(DATETIME) ;
469              TIMEX=TIMEPART(DATETIME) ;
470              IF IND EQ 1 OR _N_ EQ 1 THEN DO ;
471                   LINK CNPOS ;
472                   IND=0 ;
473                   END ;
474              ELSE I=I+1 ;
475              IF FIRST.STATION THEN DO ;
476                   SAVEID2=STATION ;
477                   STATION=SAVEID ;
478                   DO OVER P ;
479                        IF P NE . THEN DO ;
480                             LINK CARD ;
481                             GO TO SKIP ;
482                             END ;
483                        END ;
484         SKIP :
485                   LINK CNPOS ;
486                   LINK NEWGAGE ;
487                   STATION=SAVEID2 ;
488                   END ;
489              ELSE DO ;
490         * IS THIS THE LAST INTERVAL OF THE DAY  ;
491              IF DATEX EQ CURDATE AND
492                 TIMEX EQ CURTIME+INTER*60 OR
493                 DATEX EQ CURDATE+1 AND
494                 TIMEX EQ 0 THEN GO TO OK ;
495              ELSE DO ;
496                   IF DATEX EQ CURDATE THEN DO ;
497         * THIS NEXT STORM MAY START ON THE SAME CARD ;
498                        CNN=CN ;                         * SAVE THIS CARD NO ;
499                        LINK CARDNO ;                    * GET NEW CARDNO ;
500                        IF CNN NE CN THEN DO ;
501                        * THEY ARE NOT ON THE SAME CARD ;
502                        * GO PUNCH PREVIOUS CARD SO WE CAN START NEW ONE ;
503                             CN=CNN ;                 * GET OLD CARDNO BACK ;
504                             J=I ;
505                             DO OVER P ;
506                                  IF P NE . THEN DO ;
507                                       LINK CARD ;
508                                       LINK CNPOS ;
509                                       GO TO OK ;
510                                  END ;
511                             END ;
512                             I=J ;
513                             END ;
514                        * THEY ARE ON THE SAME CARD ;
515                        ELSE DO ;
```

```
516                         * GET POSITION ON CARD ;
517                           LINK POSITION ;
518                           GO TO OK ;
519                           END ;
520                      END ;
521                 ELSE DO ;
522                      DO OVER P ;
523                      IF P NE . THEN DO ;
524                           LINK CARD ;
525                           LINK CNPOS ;
526                           GO TO OK ;
527                           END ;
528                      END ;
529                      LINK CNPOS ;
530                 END ;
531            END ;
532            END ;
533       OK ;
534            IF LAST.STATION THEN SAVEID=STATION ;
535            IF PC=00045 THEN P=VALUE*100. ;
536            ELSE P=VALUE ;
537            IF EOF THEN DO ;
538                 LINK CARD ;
539                 IF OPT=1 THEN PUT @80 '9' ;
540            RETURN ;
541            END ;
542       * THIS CODE TAKES CARE OF 2 CASES
543       *  WHEN THE FIRST CARD HAS ONLY ONE ENTRY AND IT IS IN POSITION 12
544       *  AND WHEN THE LAST VALUE OF THE DAY IS ON THE CARD
545       *  WHICH HAS DATE=DAY+1 AND TIME=0 ;
546            IF TIMEX NE 0 THEN CURDATE=DATEX ;
547       *  DATE-1 SINCE THE FIRST VALUE FOR DATEX WANTS TO BE
548       *  THE LAST VALUE FOR DATE-1 FOR THE MODEL ;
549            IF TIMEX EQ 0 AND _N_=1 THEN CURDATE=DATEX-1 ;
550            CURTIME=TIMEX ;
551            IF I EQ 12 THEN LINK CARD ;
552            CURDATE=DATEX ;
553                 RETURN ;
554       CARD ;
555            STATIONX=SUBSTR(STATION,1,1) ;
556            IF STATIONX EQ ' ' THEN STATION=SUBSTR(STATION,8,8) ;
557            FILE XPUTFILE ;
558            IF INTER = 1 THEN
559                 PUT @1 STATION $8.
560                 CURDATE YYMMDD6.
561                 INTER 15-16
562                 CN 17-19
563                 (P1-P12) (5.2)
564                 CODE $0 ;
565            ELSE PUT @1 STATION $8.
566                 CURDATE YYMMDD6.
567                 INTER 15-16
568                 CN 17-18
569                 (P1-P12) (5.2)  +1
570                 CODE $0 ;
571            CN=CN+1 ;
572            IF I=12 THEN IND=1 ;
573            ELSE LINK INITCARD ;
```

```
574             I=0 ;
575         * IND INDICATES THAT A CARD WAS PUNCHED BUT A NEW CARD NUMBER
576         * WAS NOT DETERMINED SINCE THE NEXT CARD HASN'T BEEN READ YET ;
577             RETURN ;
578         * ;
579         CARDNO :
580         * DETERMINE CARD NUMBER ;
581             MIN=MINUTE(TIMEX) ;
582             HOURS=HOUR(TIMEX) ;
583             TOTALMIN=HOURS*60+MIN ;
584             CN=CEIL(TOTALMIN/(12*INTERVA_D) ;
585             RETURN ;
586         CNPOS :
587             LINK CARDNO ;
588         *DETERMINE POSITION OF FIRST VALUE ON CARD ;
589             LINK INITCARD ;
590             LINK POSITION ;
591             RETURN ;
592         POSITION :
593         *   FOR DATA INTERVAL GREATER THAN 10 MIN MORE THAN ONE HOURS DATA
594         *     IS STORED ON A CARD SO A MORE COMPLEX ALGORITHM IS NECESSARY ;
595             IF INTER GE 10 THEN DO ;
596             SLOT= HOUR(TIMEX   ) - ((CN-1)*(12/(60/INTER))-1)  ;
597             I=MOD(MIN/INTER,12) +(60/INTER*(SLOT-1))   ;
598             END ;
599             ELSE I=MOD(MIN/INTER,12) ;
600             IF I=0 THEN I=12 ;
601             RETURN ;
602         INITCARD :
603             DO OVER P ;
604             P=. ;
605             END ;
606         * I IS 13 WHEN WE LEAVE THIS LOOP ;
607             RETURN ;
608         NEWPAGE :
609             IF PC EQ 00045 AND _N_ NE 1 THEN DO ;
610                 FILE CARDX ;
611                 PUT @80 '8' ;
612                 END ;
613                 RETURN ;
614             %
615         MACRO CGROUP34
616         * ;
617         * ;
618         * ;
619             DATA _NULL_ ;
620             SET TEMP1 END=EOF ;
621             ARRAY P(I) P1-P16 ;
622             ARRAY LSTDAY(K) LSTDAY1-LSTDAY12 ;
623             RETAIN LSTDAY1 31
624                    LSTDAY2 28
625                    LSTDAY3 31
626                    LSTDAY4 30
627                    LSTDAY5 31
628                    LSTDAY6 30
629                    LSTDAY7 31
630                    LSTDAY8 31
631                    LSTDAY9 30
```

```
                    LSTDAY10 31
                    LSTDAY11 30
                    LSTDAY12 31
;
          RETAIN P1-P16 I CDAY CMON CYR 0 ;
          RETAIN NEWCARD 0 CODE DATATYPE CN ;
          RETAIN CARDEND 0 ;
          MISSING M ;
          DATEX=DATEPART(DATETIME) ;
          YR=YEAR(DATEX) ;
          K=2 ;
          IF MOD(YR,4) EQ 0 THEN LSTDAY2=29 ;
          MON=MONTH(DATEX) ;
          DAY=DAY(DATEX) ;
          FILE PRINT ;
          IF DEBUG THEN PUT STATION= DATETIME= YR= MON=  DAY= _N_= ;
* IF FIRST ONE, SKIP THE CHECKS ;
          IF _N_=1 THEN DO ;
                    LINK INITCARD ;
               LINK CNNO ;
               LINK CALCI ;
               P=VALUE ;
          FILE PRINT ;
          IF DEBUG THEN PUT 'FIRST' YR= MON= DAY= CN= P= I= ;
               LINK PUNCH1 ;
               RETURN ;
               END ;
          IF NEWCARD=1 THEN DO ;
               LINK CNNO ;
               LINK CALCI ;
               NEWCARD=0 ;
               CARDEND=1 ;
               END ;
          IF YR EQ CYR THEN DO ;
          IF MON EQ CMON THEN DO ;
          IF DAY EQ CDAY THEN DO ;
               PUT '***' / 'YOUR FILE CONTAINS DUPLICATE OBS AT '
                    YR= MON= DAY= ' IN CODE= ' CODE ' CARDS' / '***' ;
               K=MON ;
               IF DAY=16 OR DAY GE LSTDAY THEN NEWCARD=1 ;
               RETURN ;
               END ;
START3 ;
          IF DAY EQ CDAY+1 THEN DO ;
               P=VALUE ;
               LINK PUNCH1 ;
               RETURN ;
               END ;
               ELSE DO ;
          FILE PRINT ;
          IF DEBUG THEN PUT 'M. LOOP' ;
          IF DEBUG THEN PUT STATION= DATETIME= YR= MON= DAY= ;
                    LINK MISSINGM ;
                    NEWCARD=0 ;
                    GO TO START3 ;
                    END ;
          END ;
* WE HAVE GONE TO A NEW MONTH ;
```

```
690               ELSE DO ;
691               IF MON EQ CMON+1 THEN DO ;
692          * WE KNOW ITS THE NEXT MONTH ;
693               IF DAY EQ 1 THEN DO ;
694          * WE KNOW ITS THE FIRST DAY OF THE NEXT MONTH ;
695               K=CMON ;
696               IF CDAY GE LSTDAY     THEN DO ;
697                         IF DEBUG THEN PUT ' END OF MON      ' DATEX= CYR= CMON= CDAY=;
698          * WE KNOW THERE IS NO GAP SO PUNCH THIS CARD
699          * AND CONTINUE TO THE NEXT MONTH ;
700          * PUNCH PREVIOUS MONTH ;
701               I = 1 ;
702               LINK CNNO ;
703               P=VALUE ;
704               LINK PUNCH1 ;
705               RETURN ;
706               END ;
707               ELSE DO ;
708          * WE KNOW THERE IS A GAP AT THE END OF THE MONTH ;
709               FILE PRINT ;
710                         IF DEBUG THEN PUT ' NEW MON W/ GAP ' DATEX= CYR= CMON= CDAY=;
711                    CDAY=CDAY+1 ;
712          START6:
713               PUT '***3***' _ALL_ ;
714               LINK MISSINGM ;
715               IF NEWCARD EQ 1 THEN DO;
716                    NEWCARD=0 ;
717                    IF CDAY = 17 THEN DO ;
718                         CN=2 ;
719                         I=17;
720                         GO TO START6 ;
721                         END ;
722                    I=1 ;
723                    CN=1 ;
724                    P=VALUE ;
725                    LINK INIT ;
726               PUT '***4***' _ALL_ ;
727                    RETURN ;
728                    END ;
729                    ELSE GO TO START6 ;
730               END ;
731               END ;
732                    END ;
733          * WE KNOW ITS A GAP ACROSS THE END OF THE MONTH OR OVER SEVERAL MONTHS ;
734               IF DEBUG THEN PUT ' LOCATED GAP AT END OF MONTH ' ;
735               LINK GAP ;
736               RETURN ;
737               END ;
738               END ;
739          * YEAR ISNT EQUAL ;
740               ELSE DO ;
741                    IF MON EQ 1 AND DAY = 1
742                       AND CMON=12 AND CDAY=31 THEN DO ;
743                         I = 1 ;
744                         P=VALUE ;
745                         LINK PUNCH1 ;
746                         END ;
747               ELSE DO ;
```

```
748                  IF DEBUG THEN PUT 'LOCATED GAP AT END OF YEAR ' ;
749                  LINK GAP ;
750                  END ;
751             END ;
752             RETURN ;
753       CALCI:
754             I=MOD(DAY,16) ;
755             IF I=0 THEN I=16 ;
756             FILE PRINT ;
757             IF DEBUG THEN PUT 'CALCI ' DAY= I= _N_= ;
758             RETURN ;
759       CNNO:
760                  IF DAY LE 16 THEN CN=1 ;
761                  ELSE CN=2 ;
762             FILE PRINT ;
763             IF DEBUG THEN PUT 'CNNO ' CN= ;
764             RETURN ;
765       *
766       * GAP CODE WILL PUNCH TWO 9999 VALUES INTO
767       *  THE OUTPUT CARDS INDICATING A GAP HAS BEEN
768       *  FOUND ;
769       GAP:
770       * ;
771       * A GAP HAS OCCURRED IN DAILY VALUES CARDS ;
772             PUT '***' / ' A GAP HAS BEEN FOUND IN TYPE ' CODE 2. ' DATA AND '
773                 '9999 VALUES WERE PUT ON DATA CARDS FOR THE MODEL' / '***' ;
774       *
775       * ARE WE AT THE END OF A CARD ? ;
776             SAVEDAY=DAY ;
777             SAVEMON=MON ;
778             SAVEYR=YR ;
779             IF CARDEND=0 THEN GO TO GO_2 ;
780       * YES, MOVE TO NEXT CARD ;
781             CARDEND=0 ;
782             DAY=CDAY+1 ;
783             MON=CMON ;
784             YR=CYR ;
785             K=MON ;
786             IF DAY ~> LSTDAY THEN GO TO GO_1 ;
787             DAY=1 ;
788             MON=MON+1 ;
789             IF MON~> 12 THEN GO TO GO_1 ;
790             MON=1 ;
791             YEAR=YEAR+1 ;
792       GO_1:
793             LINK CNNO ;
794             LINK CALCI ;
795       GO_2 :
796             P=9999 ;
797       * GO PUNCH THIS CARD ;
798             LINK PUNCH2 ;
799             DAY=SAVEDAY-1 ;
800             MON=SAVEMON ;
801             YR=SAVEYR ;
802             LINK INIT ;
803             IF DAY>0 THEN GO TO GO_3 ;
804             MON=MON-1 ;
805             IF MON ~> 0 THEN DO ;
```

```
806                   MON=12 ;
807                   YR=YR-1 ;
808                   END ;
809              K=MON ;
810              DAY=LSTDAY ;
811         GO_3 :
812              LINK CNNO ;
813              LINK CALCI ;
814              P=9999 ;
815              LINK INIT ;
816              LINK PUNCH1 ;
817              DAY=SAVEDAY ;
818              MON=SAVEMON ;
819              YR=SAVEYR ;
820              LINK CNNO ;
821              LINK CALCI ;
822              P=VALUE ;
823              LINK INIT ;
824              LINK PUNCH1 ;
825              RETURN ;
826         INIT:
827                   CYR=YR ;
828                  CMON=MON ;
829                   CDAY=DAY ;
830              FILE PRINT ;
831                   IF DEBUG THEN PUT 'INIT' ;
832                   RETURN ;
833         INITCARD :
834         * INITIALIZE THE ARRAY ;
835                         DO OVER P ;
836                         P=. ;
837                         END ;
838              RETURN ;
839         MISSINGM:
840                         P=.M ;
841                         K=CMON ;
842                         IF I=16 OR CDAY GE LSTDAY OR EOF THEN DO ;
843                                   LINK PUNCH2 ;
844                                   NEWCARD=1 ;
845                                   I=1 ;
846                                   END ;
847                         ELSE I=I+1 ;
848                         CDAY=CDAY+1 ;
849              RETURN ;
850         PUNCH1 :
851         * SHOULD WE PUNCH A CARD ;
852                K = MON ;
853                IF I=16 OR DAY  GE LSTDAY OR EOF THEN LINK PUNCH2 ;
854                 ELSE I=I+1 ;
855                      LINK INIT ;
856                      RETURN ;
857         PUNCH2 :
858              K = MON ;
859              FILE PRINT ;
860              IF DEBUG THEN PUT 'PUNCH2 ' CN= ;
861              CYRMON=(CYR-1900)*100+CMON ;
862              STATIONX=SUBSTR(STATION,1,1) ;
863              IF STATIONX EQ ' ' THEN STATION=SUBSTR(STATION,8,8) ;
```

```
864                 FILE XPUTFILE ;
865                 PUT @1 STATION $8.
866                     @9 CYRMON 4.
867                     @13 CN 1.
868                     @14 (P1-P16) (4.2)
869                     @80 CODE 1. ;
870       * INDICATE THAT A CARD WAS PUNCHED AND
871       *  THE NEXT OBSERVATION HAS NOT BEEN READ YET ;
872                          IF I=16 OR DAY GE LSTDAY THEN NEWCARD=1 ;
873                          LINK INITCARD ;
874                      IF EOF AND CODE EQ 4 THEN PUT @80 '9' ;
875                      IF NEWCARD=1 THEN DO ;
876                          LINK INIT ;
877                          RETURN ;
878                          END ;
879                     LINK CNNO ;
880                 LINK CALCI ;
881                     RETURN ;
882       %
883       * ;
884       * ;
885       * ;
886                 MACRO PTIME 1 %
887                 MACRO XPUTFILE CARDX OLD %
888                 MACRO PC 00060 %
889                 MACRO OPT 1 %
39                  CARDS ;

NOTE: DATA SET WORK.TEMP HAS 6 OBSERVATIONS AND 4 VARIABLES. 443 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.38 SECONDS AND 192K.

894       * ;
895                 DATA DISCH ;
896                 SET TEMP UVFILE.UVMASTER ;
897                 BY STATION PARMCODE DATETIME ;
898       * ;
899

NOTE: DATA SET WORK.DISCH HAS 19792 OBSERVATIONS AND 8 VARIABLES. 328 OBS/TRK.
NOTE: THE DATA STATEMENT USED 3.45 SECONDS AND 194K.

899                 DATA TEMP1 (RENAME=(TAG1=TAG)) ;
900                 SET DISCH ;
901                 BY
902                 MACRO INTERVAL 1 %
903                 MACRO DATATYPE 2 %

NOTE: DATA SET WORK.TEMP1 HAS 615 OBSERVATIONS AND 4 VARIABLES. 488 OBS/TRK.
NOTE: THE DATA STATEMENT USED 1.14 SECONDS AND 194K.

904                 CGROUP12
905                 MACRO XPUTFILE CARDX MOD %
906                 MACRO DATATYPE 3%
907                 MACRO PC 00045 %


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.QUAL.MDATA,
```

```
      UNIT=SYSDA,VOL=SER=CCD810,DISP=OLD,
      DCB=(BLKSIZE=4160,LRECL=80,RECFM=FB)

NOTE: 55 LINES WERE WRITTEN TO FILE CARDX.
NOTE: THE DATA STATEMENT USED 0.40 SECONDS AND 194K.

39                    CARDS ;

NOTE: DATA SET WORK.TEMP HAS 2 OBSERVATIONS AND 4 VARIABLES. 443 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.09 SECONDS AND 194K.

910                   DATA RAINFALL ;
911                   SET TEMP DVFILE.DVMASTER ;
912                   BY STATION PARMCODE DATETIME ;
913

NOTE: DATA SET WORK.RAINFALL HAS 886 OBSERVATIONS AND 7 VARIABLES. 323 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.25 SECONDS AND 194K.

913                   DATA TEMP1 (RENAME=(TAG1=TAG)) ;
914                   SET RAINFALL ;
915                   RID
916

NOTE: DATA SET WORK.TEMP1 HAS 412 OBSERVATIONS AND 4 VARIABLES. 488 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.16 SECONDS AND 194K.

916           PROC SORT DATA=TEMP1 ;
917               BY DATETIME ;
918                   MACRO DEBUG 0 %

NOTE: 4 CYLINDERS DYNAMICALLY ALLOCATED PER SORT WORK DATA SET.
NOTE: DATA SET WORK.TEMP1 HAS 412 OBSERVATIONS AND 4 VARIABLES. 488 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.41 SECONDS AND 256K.

919                   CGROUP34


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.QUAL.MDATA,
      UNIT=SYSDA,VOL=SER=CCD810,DISP=MOD,
      DCB=(BLKSIZE=4160,LRECL=80,RECFM=FB)

NOTE: 0 LINES WERE WRITTEN TO FILE PRINT.
NOTE: 27 LINES WERE WRITTEN TO FILE CARDX.
NOTE: THE DATA STATEMENT USED 0.52 SECONDS AND 194K.

258         CARDS;


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.QUAL.MDATA,
      UNIT=SYSDA,VOL=SER=CCD810,DISP=MOD,
      DCB=(BLKSIZE=4160,LRECL=80,RECFM=FB)

NOTE: 0 LINES WERE WRITTEN TO FILE PRINT.
NOTE: 2 LINES WERE WRITTEN TO FILE CARDX.
NOTE: DATA SET WORK.QUAL13 HAS 3 OBSERVATIONS AND 16 VARIABLES. 145 OBS/TRK.
```

```
NOTE: THE DATA STATEMENT USED 0.31 SECONDS AND 194K.

927         * ;


NOTE: FILE QUALX IS:
      DSNAME=AG4254J.STORM.DATES,
      UNIT=SYSDA,VOL=SER=CCD810,DISP=OLD,
      DCB=(BLKSIZE=4248,LRECL=6,RECFM=FB)

NOTE: 3 LINES WERE WRITTEN TO FILE QUALX.
NOTE: DATA SET WORK.TEMP HAS 6 OBSERVATIONS AND 17 VARIABLES. 137 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.15 SECONDS AND 194K.



NOTE: INFILE QUALX IS:
      DSNAME=AG4254J.STORM.DATES,
      UNIT=SYSDA,VOL=SER=CCD810,DISP=OLD,
      DCB=(BLKSIZE=4248,LRECL=6,RECFM=FB)
770808
780518
780612

NOTE: 3 LINES WERE READ FROM INFILE QUALX.
NOTE: DATA SET WORK.DATA1 HAS 3 OBSERVATIONS AND 1 VARIABLES. 1588 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.07 SECONDS AND 175K.


NOTE: DATA SET WORK.QWTEMP HAS 171 OBSERVATIONS AND 66 VARIABLES. 60 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.18 SECONDS AND 192K.


NOTE: DATA SET WORK.QWTEMP HAS 177 OBSERVATIONS AND 82 VARIABLES. 43 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.23 SECONDS AND 192K.

928                   QUALRID
929                   MACRO PCODE1 P00625 %
930                   MACRO PCODE2 P00000 %
931                   MACRO PCODE3 P00000 %
932                   MACRO PCODE4 P00000 %

NOTE: DATA SET WORK.QWTEMP HAS 37 OBSERVATIONS AND 82 VARIABLES. 43 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.20 SECONDS AND 192K.

933                   XQWCARD


NOTE: FILE CARDX IS:
      DSNAME=AG4254J.QUAL.MDATA,
      UNIT=SYSDA,VOL=SER=CCD810,DISP=MOD,
      DCB=(BLKSIZE=4160,LRECL=80,RECFM=FB)

NOTE: THE VARIABLE P00000 IS UNINITIALIZED.
NOTE: 14 LINES WERE WRITTEN TO FILE CARDX.
NOTE: DATA SET WORK.DATA2 HAS 37 OBSERVATIONS AND 292 VARIABLES. 9 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.68 SECONDS AND 216K.
```

```
934         DATA _NULL_ ;
935         INFILE CARDX ;
936         INPUT LINE $80. ;
937         PUT _INFILE_ ;
```

```
NOTE: INFILE CARDX IS:
      DSNAME=AG4254J.QUAL.MDATA,
      UNIT=SYSDA,VOL=SER=CCD810,DISP=MOD,
      DCB=(BLKSIZE=4160,LRECL=80,RECFM=FB)
25403108770808 1 89                                                  0.00 0.00 0.20 0.802
25403108770808 1 90 1.92 2.96 3.66 4.69 5.67 6.30 6.77 6.93 6.84 6.80 6.79 6.752
25403108770808 1 91 6.52 6.14 5.87 5.79 5.78 5.78 5.78 5.58 5.26 4.95 4.64 4.412
25403108770808 1 92 4.29 4.32 4.38 4.40 4.51 4.59 4.55 4.49 4.37 4.18 3.98 3.652
25403108770808 1 93 3.44 3.19 2.85 2.44 1.95 1.48 1.18 0.96 0.80 0.66 0.56 0.462
25403108770808 1 94 0.38 0.31 0.24 0.18 0.12 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 95 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 96 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 97 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 98 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 99 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1100 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1101 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1102 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1103 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1104 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1105 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1106 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1107 0.00 0.67 2.14 3.22 3.59 3.93 4.85 5.86 6.83 8.61 10.85 12.382
25403108770808 1108 12.98 13.22 13.39 13.88 13.45 12.73 12.22 10.64 8.99 7.75 6.80 6.062
25403108770808 1109 5.46 4.91 4.57 4.48 4.55 4.60 4.49 4.23 3.92 3.69 3.72 3.822
25403108770808 1110 3.83 3.82 3.74 3.46 2.98 2.39 1.82 1.40 1.12 0.92 0.76 0.642
25403108770808 1111 0.53 0.44 0.36 0.29 0.23 0.16 0.11 0.00 0.00 0.00 0.00 0.002
25403108770808 1112 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1113 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1114 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1115 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108780518 1 58                                                   0.00 0.00 0.00 0.002
25403108780518 1 59 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.40 0.222
25403108780518 1 60 0.22 0.22 0.36 0.40 0.36 0.31 0.31 0.31 0.40 0.58 0.81 0.632
25403108780518 1 61 0.45 0.67 0.90 0.99 0.90 0.94 0.85 0.90 1.08 1.39 2.56 3.782
25403108780518 1 62 5.40 6.84 7.96 8.50 7.69 6.79 5.80 4.90 4.05 2.92 2.11 1.482
25403108780518 1 63 0.99 0.90 0.99 1.26 1.44 1.30 1.03 0.72 0.72 0.81 0.76 0.812
25403108780518 1 64 1.03 1.08 0.99 0.90 0.72 0.58 0.54 0.63 0.67 0.81 0.94 1.032
25403108780518 1 65 0.99 0.85 0.76 0.72 0.90 1.13 1.30 1.39 1.30 1.17 1.03 0.992
25403108780518 1 66 1.13 1.26 1.30 1.39 1.44 1.44 1.48 1.57 1.57 1.53 1.57 1.572
25403108780518 1 67 1.57 1.53 1.48 1.30 1.08 0.94 0.90 0.90 0.90 0.90 0.90 0.942
25403108780518 1 68 0.94 0.90 0.85 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.812
25403108780518 1 69 0.81 0.81 0.81 0.81 0.81 0.81 0.76 0.76 0.76 0.76 0.76 0.722
25403108780518 1 70 0.67 0.67 0.67 0.67 0.63 0.63 0.63 0.58 0.58 0.58 0.54 0.542
25403108780518 1 71 0.54 0.54 0.54 0.54 0.54 0.58 0.58 0.58 0.58 0.58 0.49 0.452
25403108780518 1 72 0.40 0.40 0.40 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.452
25403108780518 1 73 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.40 0.40 0.402
25403108780518 1 74 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
25403108780518 1 75 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
25403108780518 1 76 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
25403108780518 1 77 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40                                  2
25403108780612 1 78                                                  0.00 0.76 0.76 6.482
```

```
25403108780612 1 79 9.3113.2317.6423.0427.1325.5124.0321.2419.0817.9517.1415.392
25403108780612 1 8013.7711.9210.30 9.58 8.55 4.90 4.27 3.15 2.65 2.20 2.34 3.332
25403108780612 1 01 4.68 6.12 7.11 6.21 5.13 4.14 3.33 2.83 3.38 2.43 1.93 2.292
25403108780612 1 82 2.20 1.89 1.57 2.02 1.89 1.80 1.48 1.35 1.26 1.08 0.99 0.992
25403108780612 1 83 1.03 0.99 0.72 0.54 1.35 1.39 1.21 1.03 0.45 0.49 0.58 0.542
25403108780612 1 84 0.36 0.31 0.40 0.45                                          2
                                                                                 9
25403108770510.000.000.006.700.040.060.000.010.180.453.310.020.210.000.000.00  3
25403108770520.000.000.000.000.000.000.000.000.430.070.230.280.000.000.00       3
25403108770612.252.330.410.420.000.030.000.000.220.000.000.000.000.000.000.00  3
25403108770620.000.000.001.160.000.000.000.000.000.000.000.000.000.00          3
25403108770710.000.000.000.090.000.080.000.000.000.000.000.010.110.001.622.12  3
25403108770720.020.010.010.000.130.001.250.150.190.120.000.000.020.000.00       3
25403108770810.000.010.000.290.001.120.001.550.000.030.081.180.570.000.000.27  3
25403108770020.130.000.000.000.000.041.310.000.390.040.150.190.110.100.830.43  3
25403108770912.851.500.730.000.000.000.590.150.000.000.440.000.000.000.270.01  3
25403108770920.000.210.000.160.100.001.380.020.000.320.160.070.000.00          3
25403108771010.000.000.000.000.000.540.000.000.000.000.000.000.000.000.000.00  3
25403108771020.000.000.000.000.000.001.120.040.000.000.000.000.000.000.00      3
25403108771110.000.000.000.000.050.120.000.000.000.100.000.000.000.000.000.00  3
25403108771120.000.070.240.000.130.080.134.470.000.000.000.000.000.90          3
25403108771210.000.000.000.000.000.001.020.000.000.250.000.000.000.000.000.00  3
25403108771220.000.000.430.000.000.000.000.000.000.020.000.000.000.000.25      3
25403108780110.000.010.300.250.010.030.000.300.000.000.000.000.000.270.000.000.00  3
25403108780120.010.020.380.500.010.020.010.020.060.040.000.000.000.000.00      3
25403108780210.000.000.000.120.370.000.000.450.150.000.000.000.000.000.010.01  3
25403108780220.421.350.900.190.190.000.000.000.000.000.000.00                   3
25403108780310.010.001.650.000.000.000.000.000.000.960.000.000.000.070.030.000.00  3
25403108780320.000.000.000.000.000.000.000.000.000.000.000.040.280.030.000.49  3
25403108780410.000.021.700.000.000.000.000.000.000.000.000.000.000.000.130.120.00  3
25403108780420.000.000.110.000.000.000.740.000.000.000.000.000.000.00          3
25403108780510.000.000.000.000.040.240.000.000.000.000.310.580.000.000.010.000.00  3
25403108780520.000.820.150.000.000.000.000.000.000.200.630.052.740.020.000.00  3
25403108780610.000.000.150.000.000.010.000.000.000.000.001.030.000.000.000.00  3
                                                                                 9

 3 1 1 1
19661391 3 0.00 0.00 0.00
T_NIT  8
    0.39    0.45    0.43    0.52    0.52    0.27    0.39    0.35
  216.00  217.00  220.00  223.00  225.00  228.00  232.00  237.00
 697 920 3 0.00 0.00 0.00
T_NIT 10
    1.55    1.77    1.07    0.95    1.03    0.99    0.99    0.77    0.91    0.94
   36.00   38.00   40.00   42.00   44.00   50.00   57.00   69.00   87.00   96.00
 9341000 3 0.00 0.00 0.00
T_NIT 16
    4.56    1.59    1.62    1.57    1.71    1.92    1.93    1.66    1.26    1.26
    1.96    0.91    0.97    0.85    0.64    0.85
    6.00    8.00   11.00   13.00   16.00   18.00   20.00   23.00   25.00   28.00
   30.00   32.00   35.00   42.00   49.00   59.00
```

NOTE: 98 LINES WERE READ FROM INFILE CARDX.
NOTE: THE DATA STATEMENT USED 0.09 SECONDS AND 176K.

NOTE: SAS USED 256K MEMORY.

5.342 QWCOMB

The FORTRAN program QWCOMB combines the QWCARD created cards with the user supplied cards for card groups 1-10 and 18-29. QWCARD uses the following data sets:

Unit	Description
FT15F001	User supplied data cards
FT16F001	Final DR_3M-QUAL data set
FT17F001	QWCARD created data set with card groups 11-17
FT18F001	QWCARD created data set containing storm dates

The first card in the user supplied data cards must be 'QUAL' in columns 1-4 of the card (figure 5.342.1, card 6). This signals to QWCOMB that this data deck will be for DR_3M-QUAL. Also, a card must be included to separate the 1-10 cards and 18-29 cards in the user supplied cards. This card is four '+' characters in columns 1-4 (figure 5.342.1, card 14).

QWCOMB first copies card groups 1-10 and the unit-discharge cards. Next, the program marks the storm days on the daily-rainfall cards using the information in unit 18 and copies these cards into the final data set. Lastly, the card groups 18-29 are copied.

The run deck consists of job control language (JCL) and input data cards. The program QWCOMB is stored as a load module in the partitioned data set AG4254J.URBAN.SOURCE. The following is a card by card description of the example run deck in figure 5.342.1.

Card	1..	Job card
	2..	Job library card specifying where QWCOMB is to be found
	3..	Execute program QWCOMB
	4..	Output to the printer
	5..	Unit 15 is user-created cards (or data set) for card groups 1-10 and 18-29
	6..	Card specifies this will be a DR_3M-QUAL data set. 'QUAL' in columns 1-4.
	7-13..	Card groups 1-10
	14..	Separator card. Four '+' characters in columns 1-4.
	15-51..	Card groups 18-29
	52..	End of data card
	53-54..	Specifies JCL for final data set created by QWCOMB
	55-56..	Input data set created by QWCARD with card groups 11-17
	57..	Input data set created by QWCARD with storm dates
	58..	End of job.

The pages following figure 5.342.1 illustrate an example execution of program QWCOMB.

```
        COL.1   COL.12
          ●       ●
Card  1..//         JOB
      2..//JOBLIB DD DSN=AG4254J.URBAN.LMOD,DISP=SHR
      3..// EXEC PGM=QWCOMB
      4..//FT06F001 DD SYSOUT=A
      5..//FT15F001 DD *
      6..QUAL
      7..     3    3      1500
      8..S_SLDSNIT   LEAD
      9.. 1 1 2
     10..11111144 MULTI-FAMILY RESIDENTIAL SITE, DADE COUNTY,FL.    .023
     11..44444444
     12..                      77  4  1    78  6 15
     13..  1.0    1
     14..++++
     15.. 0 1
     16..
     17.. 0
     18.. 6.5  0.0
     19..    1M. FAMILY
     20..   28
     21..CATA                              2      369 1.0 .455
     22..CATB                              2     369. 1.0 .455
     23..CATC                              2     266. 1.0 .510
     24..CATD                              2     583. 1.0 .486
     25..CATE                              2     191. 1.0 .319
     26..CATF                              2     513. 1.0 .371
     27..CATG                              2     146. 1.0 .310
     28..CATH                              2     586. 1.0 .402
     29..CATI                              2     229. 1.0 .359
     30..CATJ                              2     153. 1.0 .471
     31..CATK                              2     508. 1.0 .357
     32..CATL                              2     253. 1.0 .595
     33..CATM                              2     313. 1.0 .411
     34..P13A            CATM              1      1501.50 1.0          M. FAMILY
     35..P12AP13A        CATL              1      250 1.621.0          M. FAMILY
     36..P11AP12A        CATK              1       90 1.741.0          M. FAMILY
     37..P011P11A                          1      1651.74 1.0          M. FAMILY
     38..P010            CATACATB          1     210. 1.501.0          M. FAMILY
     39..P009P010        CATC              1      165229  1.0          M. FAMILY
     40..P008P009                          1      406.03  1.0          M. FAMILY
     41..P007P008        CATD              1      903.68  1.0          M. FAMILY
     42..P06A            CATE              1      901.24  1.0          M. FAMILY
     43..P006P06AP007                      1      401.96  1.0          M. FAMILY
     44..P005P006P011    CATJ              1     2404.58  1.0          M. FAMILY
     45..P004            CATF              1     1051.24  1.0          M. FAMILY
     46..P003            CATGCATH          1     1051.24  1.0          M. FAMILY
     47..P002P003P004                      1 1    324.79  1.0          M. FAMILY
     48..P001P005P002    CATI              1     2208.78  1.0          M. FAMILY
     49..M. FAMILYS_SLDS    180.   .2000   4.200  1.0     .002
     50..M. FAMILYLEAD     1.000   .1000   2.400  1.0     .002
     51..M. FAMILYNIT       .500   .2301   2.20   1.0     .002
     52../*
     53..//FT16F001 DD DSN=AG4yyyz.QUAL.DATA.FINAL,
     54..// DISP=OLD
     55..//FT17F001 DD DSN=AG4yyyz.QUAL.MDATA,
     56..// DISP=OLD
     57..//FT18F001 DD DSN=AG4yyyz.STORM.DATES,DISP=OLD
     58..//
```

Figure 5.342.1.--SAS and JCL commands for executing QWCOMB.

```
//AG4254J5 JOB ($$$$$$$$$$,J001,$,5),'LORENS',CLASS=B                    J5649
//JOBLIB DD DSN=AG4254J.URBAN.LMOD,DISP=SHR
// EXEC PGM=QWCOMB
//FT06F001 DD SYSOUT=A
//FT15F001 DD *
//FT16F001 DD DSN=AG4254J.DSAQJAL.DATA.FINAL,
// DISP=OLD
//FT17F001 DD DSN=AG4254J.DSAQJAL.MDATA,
// DISP=OLD
//FT18F001 DD DSN=AG4254J.STORM.DATES,DISP=OLD
//
IEF236I ALLOC. FOR AG4254J5
IEF237I 744   ALLOCATED TO JOBLIB
IEF237I 4A5   ALLOCATED TO FT06F001
IEF237I 4D1   ALLOCATED TO FT15F001
IEF237I 744   ALLOCATED TO FT16F001
IEF237I 744   ALLOCATED TO FT17F001
IEF237I 744   ALLOCATED TO FT18F001
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   AG4254J.URBAN.LMOD                              PASSED
IEF285I   VOL SER NOS= CCD810.
IEF285I   AG4254J.DSAQUAL.DATA.FINAL                      KEPT
IEF285I   VOL SER NOS= CCD810.
IEF285I   AG4254J.DSAQJAL.MDATA                           KEPT
IEF285I   VOL SER NOS= CCD810.
IEF285I   AG4254J.STORM.DATES                             KEPT
IEF285I   VOL SER NOS= CCD810.
IEF373I STEP /         / START 81188.0852
IEF374I STEP /         / STOP  81188.0852 CPU   0MIN 00.60SEC MAIN  70K LCS   0K
CCD006I STEP /         / I/O IN DD SEQ: 744:0       4A5:9       4D1:5
CCD006I STEP /         / I/O IN DD SEQ: 744:10      744:7       744:3
CCD001I STEP /         / MEMORY RESERVED   70K; ACCESSES: DISK      34/ TAPE       0
IEF285I   AG4254J.URBAN.LMOD                              KEPT
IEF285I   VOL SER NOS= CCD810.
IEF375I  JOB /AG4254J5/ START 81188.0852
IEF376I  JOB /AG4254J5/ STOP  81188.0852 CPU   0MIN 00.60SEC
CCD007A  JOB /AG4254J5/ BASIC CHRG: FIXED   CPU   DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                     1.24     .45     .10                  1.79
CCD002I  JOB /AG4254J5/ TOTAL CHARGE RECORDED =      $1.79
CCD003I  JOB /AG4254J5/ US GEOLOGICAL SURVEY REL OS REL 218 TIME = 08.52.33 DATE = 07/07/81
```

```
    1    3      1000
T_NIT
 1
25403108 MULTI-FAMILY RESIDENTIAL SITE, DADE CO., FLORIDA   .023
25403108
                    77 06 01    78 06 16
  1.0    1
25403108770808 1 89                                                 0.00 0.00 0.20 0.802
25403108770808 1 90 1.92 2.96 3.66 4.69 5.67 6.30 6.77 6.93 6.84 6.80 6.79 6.752
25403108770808 1 91 6.52 6.14 5.87 5.79 5.78 5.79 5.78 5.58 5.26 4.95 4.64 4.412
25403108770808 1 92 4.29 4.32 4.38 4.40 4.51 4.59 4.55 4.49 4.37 4.18 3.90 3.652
25403108770808 1 93 3.44 3.19 2.85 2.44 1.95 1.49 1.18 0.96 0.80 0.66 0.56 0.462
25403108770808 1 94 0.38 0.31 0.24 0.18 0.12 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 95 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 96 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 97 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 98 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1 99 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1100 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1101 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1102 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1103 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1104 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1105 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1106 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1107 0.00 0.67 2.14 3.22 3.59 3.93 4.85 5.86 6.83 8.61 10.85 12.382
25403108770808 110812.98 13.22 13.39 13.88 13.45 12.73 12.22 10.64 8.99 7.75 6.80 6.062
25403108770808 1109 5.46 4.91 4.57 4.48 4.55 4.60 4.49 4.23 3.92 3.69 3.72 3.822
25403108770808 1110 3.83 3.82 3.74 3.46 2.98 2.39 1.82 1.40 1.12 0.92 0.76 0.642
25403108770808 1111 0.53 0.44 0.36 0.29 0.23 0.18 0.11 0.00 0.00 0.00 0.00 0.002
25403108770808 1112 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1113 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1114 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108770808 1115 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108780518 1 58                                                  0.00 0.00 0.00 0.00 0.00 0.00 0.002
25403108780518 1 59 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.40 0.40 0.222
25403108780518 1 60 0.22 0.22 0.36 0.40 0.36 0.31 0.31 0.31 0.40 0.58 0.81 0.632
25403108780518 1 61 0.45 0.67 0.90 0.99 0.90 0.94 0.85 0.90 1.08 1.39 2.56 3.782
25403108780518 1 62 5.40 6.84 7.96 8.50 7.69 6.79 5.80 4.90 4.05 2.92 2.11 1.482
25403108780518 1 63 0.99 0.90 0.99 1.26 1.44 1.30 1.03 0.72 0.72 0.81 0.76 0.812
25403108780518 1 64 1.03 1.08 0.99 0.90 0.72 0.59 0.54 0.63 0.67 0.81 0.94 1.032
25403108780518 1 65 0.99 0.85 0.76 0.72 0.90 1.13 1.30 1.39 1.30 1.17 1.03 0.992
25403108780518 1 66 1.13 1.26 1.30 1.39 1.44 1.44 1.48 1.57 1.57 1.53 1.57 1.572
25403108780518 1 67 1.57 1.53 1.48 1.30 1.08 0.94 0.90 0.90 0.90 0.90 0.90 0.942
25403108780518 1 68 0.94 0.90 0.85 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.812
25403108780518 1 69 0.81 0.81 0.81 0.81 0.81 0.81 0.76 0.76 0.76 0.76 0.76 0.722
25403108780518 1 70 0.67 0.67 0.67 0.67 0.63 0.63 0.63 0.58 0.58 0.58 0.54 0.542
25403108780518 1 71 0.54 0.54 0.54 0.54 0.54 0.58 0.58 0.58 0.58 0.58 0.49 0.452
25403108780518 1 72 0.40 0.40 0.40 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.452
25403108780518 1 73 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.40 0.40 0.402
25403108780518 1 74 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
25403108780518 1 75 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
25403108780518 1 76 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.402
25403108780518 1 77 0.40 0.40 0.40 0.40 0.40 0.40 0.40 0.40                                                    2
25403108780612 1 78                                                 0.00 0.76 0.76 6.482
25403108780612 1 79 9.31 13.23 17.64 23.04 27.13 25.51 24.03 21.24 19.08 17.95 17.14 15.392
25403108780612 1 8013.77 11.92 10.30 9.58 8.55 4.90 4.27 3.15 2.65 2.20 2.34 3.332
25403108780612 1 81 4.68 6.12 7.11 6.21 5.13 4.14 3.33 2.83 3.38 2.43 1.93 2.292
25403108780612 1 82 2.20 1.89 1.57 2.02 1.89 1.80 1.48 1.35 1.26 1.08 0.99 0.992
25403108780612 1 83 1.03 0.99 0.72 0.54 1.35 1.39 1.21 1.03 0.45 0.49 0.58 0.542
```

```
25403108780612 1 84 0.36 0.31 0.40 0.45                                                                  2
                                                                                                         9
25403108770510.000.000.006.700.040.060.000.010.130.453.310.020.210.000.009.00  3
25403108770520.000.000.000.000.000.000.000.000.430.070.230.280.000.000.00      3
25403108770612.252.330.410.420.000.030.000.000.220.000.000.000.000.000.000.00 3
25403108770620.000.000.001.160.000.000.000.000.000.000.000.000.000.00         3
25403108770710.000.000.000.090.000.080.000.000.000.000.000.010.110.001.622.12 3
25403108770720.020.010.010.000.130.001.250.150.190.120.000.000.020.000.00     3
25403108770810.000.010.000.290.001.120.00-1000.000.030.081.160.570.000.000.27 3
25403108770820.130.000.000.000.041.310.000.390.040.150.190.110.100.830.43     3
25403108770912.851.500.730.000.000.000.590.150.000.000.440.000.000.000.270.01 3
25403108770920.000.210.000.160.100.001.380.020.000.320.160.070.000.00         3
25403108771010.000.000.000.000.000.000.540.000.000.000.000.000.000.000.000.00 3
25403108771020.000.000.000.000.000.001.120.040.000.000.000.000.000.000.000.00 3
25403108771110.000.000.000.000.050.120.000.000.000.100.000.000.000.000.000.00 3
25403108771120.000.070.240.000.130.080.134.470.000.000.000.000.000.00         3
25403108771210.000.000.000.000.000.001.020.000.000.250.000.000.000.080.000.00 3
25403108771220.000.000.430.000.000.000.000.000.000.000.020.000.000.000.000.25 3
25403108780110.000.010.300.250.010.030.000.300.000.000.000.000.000.270.000.00 3
25403108780120.010.020.380.500.010.020.010.020.050.040.000.000.000.000.00     3
25403108780210.000.000.000.120.370.000.000.450.150.000.000.000.000.000.010.01 3
25403108780220.421.350.900.190.190.000.000.000.000.000.000.00                 3
25403108780310.010.001.650.000.000.000.000.000.000.950.000.000.000.000.070.030.000.00 3
25403108780320.000.000.000.000.000.000.000.000.000.000.000.040.280.030.000.49 3
25403108780410.000.021.700.000.000.000.000.000.000.000.000.000.000.000.130.120.00 3
25403108780420.000.000.110.000.000.000.740.000.000.000.000.000.000.00         3
25403108780510.000.000.000.000.040.240.000.000.000.000.000.310.580.000.000.010.000.00 3
25403108780520.00-1000.150.000.000.000.000.000.000.230.630.052.740.020.000.00 3
25403108780610.000.000.150.000.000.010.000.000.000.000.000.00-1000.000.000.000.00 3
                                                                                                         9

 3 1 1 1
10661391 3 0.00 0.00 0.00
T_NIT  8
    0.39    0.45    0.43    0.52    0.52    0.27    0.39    0.35
  216.00  217.00  220.00  223.00  225.00  228.00  232.00  237.00
 697 920 3 0.00 0.00 0.00
T_NIT 10
    1.55    1.77    1.07    0.95    1.03    0.99    0.99    0.77    0.91    0.94
   36.00   38.00   40.00   42.00   44.00   50.00   57.00   69.00   87.00   96.00
 9341000 3 0.00 0.00 0.00
T_NIT 16
    4.56    1.59    1.62    1.57    1.71    1.92    1.93    1.66    1.26    1.26
    1.86    0.91    0.97    0.85    0.64    0.85
    6.00    8.00   11.00   13.00   16.00   18.00   20.00   23.00   25.00   28.00
   30.00   32.00   35.00   42.00   49.00   59.00
 1 1 1
 2 2 2
  6.5  .02
   1MULTI-FAM
   57
L1                                  2     200.  1.0  0.0
L2                                  2      50.  1.0  1.0
L3                                  2     300.  1.0  0.0
L4                                  2      50.  1.0  1.0
L5                                  2     450.  1.0  0.0
L6                                  2      75.  1.0  1.0
L7                                  2      75.  1.0  1.0
L8                                  2     450.  1.0  0.0
L9                                  2      50.  1.0  1.0
L10                                 2     200.  1.0  1.0
L11                                 2     300.  1.0  0.0
```

```
L12                                          2      612.  1.0  0.0
L13                                          2      200.  1.0  1.0
L14                                          2      300.  1.0  0.0
L15                                          2       80.  1.0  1.0
L16                                          2       35.  1.0  1.0
L17                                          2      150.  1.0  0.0
L18                                          2       55.  1.0  1.0
L19                                          2      150.  1.0  0.0
L20                                          2       50.  1.0  0.0
L21                                          2      190.  1.0  1.0
L22                                          2       30.  1.0  1.0
L23                                          2      100.  1.0  0.0
L24                                          2       50.  1.0  1.0
L25                                          2      340.  1.0  0.0
L26                                          2      250.  1.0  1.0
L27                                          2      270.  1.0  1.0
L28                                          2      270.  1.0  0.0
L29                                          2      100.  1.0  0.0
L30                                          2       50.  1.0  1.0
P1                  L1                       1      152. 8.78  1.0          MULTI-FAM
P2  P1                                       1       90. 9.78  1.0          MULTI-FAM
P4                  L3                       1       65. 4.10  1.0          MULTI-FAM
P5  P4                                       1       58. 4.10  1.0          MULTI-FAM
P7                  L5                       1       82. 1.50  1.0          MULTI-FAM
P8  P7                                       1       82. 1.50  1.0          MULTI-FAM
P9                  L6  L7                   1      450. 1.91  1.0          MULTI-FAM
P11                 L8                       1       55. 1.91  1.0          MULTI-FAM
P13                 L14 L15 L16              1      200. 0.55  1.0          MULTI-FAM
P15                 L12                      1       75. 0.78  1.0          MULTI-FAM
P19                 L29                      1      135. 2.07  1.0          MULTI-FAM
P20 P19                                      1       52. 2.07  1.0          MULTI-FAM
P22                 L23                      1       91. 2.07  1.0          MULTI-FAM
P25                 L26 L27                  1      100. 1.30  1.0          MULTI-FAM
P10 P11                                      1       81. 1.91  1.0          MULTI-FAM
P14 P15             L13                      1       60. 0.78  1.0          MULTI-FAM
P21 P22                                      1       53. 2.07  1.0          MULTI-FAM
P24 P25             L25 L28                  1      100. 1.30  1.0          MULTI-FAM
J2  P8  P9  P10                              4
P12 P13 P14                                  1       32. 4.79  1.0          MULTI-FAM
P23 P24             L24 L30                  1      100. 2.07  1.0          MULTI-FAM
P18 P20 P21 P23     L19 L20 L21 L22          1      150. 5.59  1.0          MULTI-FAM
P17 P18             L9  L10 L11              1      100. 3.30  1.0          MULTI-FAM
P16 P17             L17 L18                  1      100. 7.48  1.0          MULTI-FAM
P6  J2  P16         L4                       1      300. 4.10  1.0          MULTI-FAM
P3  P5  P6  P12     L2                       1      200. 8.78  1.0          MULTI-FAM
J1  P2  P3                                   4
MULTI-FAMT_NIT      0.73      .10    0.95
```

5.4 Other User Programs

This section describes several user programs that have been developed to assist users in retrieving and analyzing data from the USGS/USEPA Urban Hydrology Studies Program data base. Program updates and additional new programs will be included in subsequent updates of the manual.

5.41 Rainfall-Runoff Summary Utility Listing Program

The Rainfall-Runoff Summary Utility listing program (RRLIST) is a set of SAS macros which produces a listing of selected unit rainfall and discharge data from the UVMASTER data set. Data are from certain time periods (i.e., storms) and is listed in any length intervals (1 min, 5 min, etc.) selected by the user. RRLIST assumes that the requested data are already in UVMASTER.

The RRLIST macro source code is stored in the partitioned data set AG4254J.URBAN.SOURCE which resides on the urban disk (VOL=SER=CCD810). The input to SAS is specified by the SYSIN data definition card illustrated in the program JCL listed on the following page (figure 5.41.1). First, the macro source library is specified (cards 5-6). This causes the RRLIST macro definitions from the library to be included in this program run. Next, card 7 indicates that SAS input cards follow in the deck. Once a macro has been defined, anytime that macro name occurs in the following SAS code that macro code is inserted and executed. For example, Card 12 causes the code for the macro XDTIME to be included at this point during the execution of the deck. Macros may also be defined anytime during a SAS run. Several macros are defined in the run deck (cards 8-11, 18) which allows flexibility of the code. In the specific case of card 8

```
MACRO NUMDA 14.7 %
```

the macro NUMDA is being defined. Anything that appears after the macro name, NUMDA, and before the '%' is the macro. Wherever the name NUMDA is found in the program code, the number 14.7 will be substituted. In this manner the drainage area is a variable value and can be modified for different runs of RRLIST. One needs only to include this card with the appropriate drainage area in the run deck. A description of the various macros follows.

Macro XDTIME

This macro reads input data cards describing time intervals from which data are to be included in the run. The input card format is free format. Each field is separated from another by at least one blank and does not have to start in any specific column except that STATION begins in column 1. A complete description of the card is listed in figure 5.41.2.

```
        COL.1   COL.12
          ●       ●
Card  1..//         JOB
      2..// EXEC SAS,TIME=3
      3..//UVFILE DD DSN=AG4yyyz.STATEXX.URBAN.UNIT.VALUES,
      4..// DISP=SHR
      5..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(RRLIST),
      6..//  DISP=SHR
      7..//       DD *
      8..          MACRO NUMDA 14.7 %
      9..          MACRO INTERVAL 5 %
     10..          MACRO DINTERV 1 %
     11..          MACRO PC 00045 %
     12..          XDTIME
     13..254031080191103 770511 04 40 770511 06 59 RAINFALL
     14..254031080191103 770715 06 30 770715 09 41 RAINFALL
     15..* ;
     16..          XRAINF
     17..          RID
     18..          MACRO PC 00060 %
     19..          XDTIME
     20..254031080191100 770511 04 40 770511 06 59 DISCHARGE
     21..254031080191100 770715 06 30 770715 09 41 DISCHARGE
     22..* ;
     23..          XDISCH
     24..          RID
     25..          DATA TEMP3 ;
     26..          MERGE RAINFALL (RENAME=(VALUE=RAIN1 STATION=STATION1))
     27..          DISCH (RENAME=(VALUE=DISCHARG STATION=STATIOND)) ;
     28..          BY TAG DATETIME ;
     29..          MACRO WEIGHT1 1.0%
     30..          MACRO WEIGHT2 0.0%
     31..          MACRO WEIGHT3 0.0%
     32..          XRRLIST
     33../*
     34..//
```

Figure 5.41.1.--SAS and JCL commands for executing RRLIST.

Variable name	Description	Data type	Format
STATION	Station ID under which data is stored in UVMASTER	Char.	$CHAR15.
SDATE	Start date of the interval - where YY is year, MM is month, DD is day	Num.	YYMMDD6.
SHOUR	Start hour of interval - 24-hour time	Num.	2.
SMIN	Start minute of the interval	Num.	2.
EDATE	End date of interval - where YY is year, MM is month, DD is day	Num.	YYMMDD6.
EHOUR	End hour of interval in 24-hour time	Num.	2.
EMIN	End minute of interval + 1	Num.	2.
.....	Rest of card can contain comments		

Figure 5.41.2.--Storm interval card format for input to XDTIME.

For each input card, macro XDTIME creates two observations in a data set called TEMP. Each observation has the following variables:

NAME	DESCRIPTION
STATION	Station identification
TAG	Temporary storm number
PARMCODE	Parameter code
DATETIME	Beginning or end datetime
EDATIME	Ending datetime

In the first observation, the variable DATETIME is equal to the start date and time of the interval; in the second observation, DATETIME is the end date and time of the interval. Both observations are assigned the same STATION, TAG, and PARMCODE values.

In this particular example, cards 13-14 (fig. 5.41.1), data with station ID 254031080191103 are being requested from May 11, 1977, 4:40 to May 11, 1977, 6:58; and from July 15, 1977 at 6:30 to July 15, 1977 at 9:40. An extra minute must be added to the end time to ensure that the last observation requested in the interval is included in the final data. A similar request is made in data cards 20-21. In this example rainfall and discharge data are stored under two different station identifications. When using an eight digit station ID be sure to code the ID in columns 8-15.

Macro XRAINF

Macro XRAINF interleaves the observations from data set TEMP created by XDTIME and the data set UVMASTER. The new data set is called RAINFALL. The observations are merged in order of STATION, DATETIME, and PARMCODE. As a result we have observations from TEMP bracketing certain sequences of observations from UVMASTER as shown in figure 5.41.3. In addition to interleaving the data sets, XRAINF adds the variables START and ENDTIME to each observation from UVMASTER so that the start and endtime of the interval (STORM) in which data belongs is available for later use. Each observation in the RAINFALL data set has the following variables:

STATION	Station identification
TAG	Storm tag
PARMCODE	Parameter code
START	Start time
ENDTIME	End time
VALUE	Parameter value

and others since SAS will store all variable values used unless they are specifically dropped.

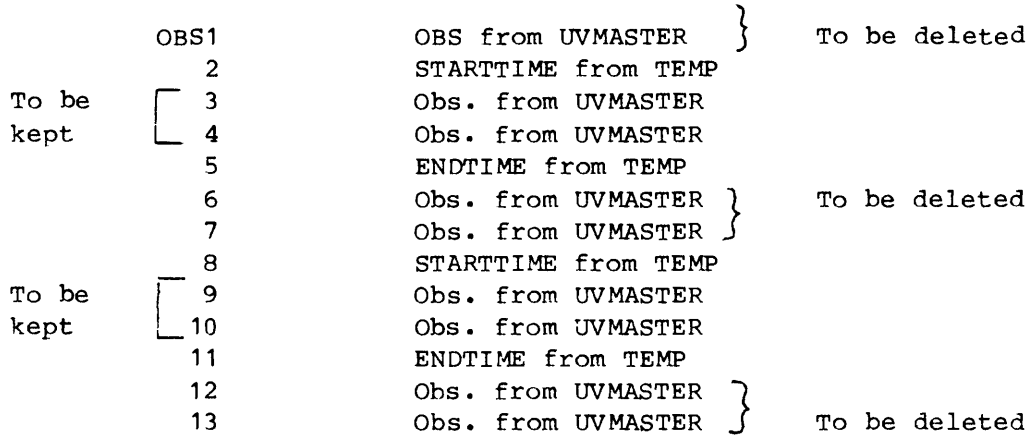


Figure 5.41.3.--Data set created from macro XRAINF.

Macro XDISCH

Macro XDISCH performs the same function as macro XRAINF except for the discharge data. The resultant data set is called DISCH, and has the same variables as RAINFALL.

Macro RID

Macro RID takes the data sets produced by XRAINF and XDISCH and deletes the data which is not in the requested intervals. The resulting RAINFALL and DISCH data sets contain only the rainfall and discharge data necessary for the Rainfall-Runoff listing.

Macro XRRLIST

Macro XRRLIST produces the Rainfall-Runoff output listing. The table heading information includes the station identification for the discharge data and each rain gage, the time span over which data was requested, the basic data interval, and the print interval. XRRLIST lists the following information for each observation in the body of the listing:

1) The time of the observation
2) Discharge value
3) Accumulated runoff
4) Rainfall for each gage
5) Accumulated rainfall for each gage.

At the end of the listing XRRLIST prints the total runoff for that storm and the percent runoff for each rain gage. The user can request a listing interval which differs from the data interval by modifying card 9 (fig. 5.41.1) which is a macro definition specifying INTERVAL, the print interval in minutes. In this case the listed discharge is the instantaneous discharge at the listed time; the value for rainfall is the accumulated rainfall over that interval.

In addition, RRLIST lists the maximum rainfall rate for up to three intervals. For 1 and 5 minute data RRLIST lists the 5-minute, 15-minute, and hourly maximums. For intervals of 10 minutes or longer the maximum rainfall for that interval is listed, and 1 hourly maximum is listed if 60 minutes is evenly divisible by the interval. The maximum rates are determined using a weighted rainfall value.

```
W_RAIN = WEIGHT1*RAIN1 +
         WEIGHT2*RAIN2 +
         WEIGHT3*RAIN3 ;
```

where WEIGHT1, WEIGHT2 and WEIGHT3 are weighting values entered via macros (fig. 5.41.1, cards 29-31). The weights will default to 1, 0, and 0 for WEIGHT1, WEIGHT2, and WEIGHT3, respectively, if the default macros are not overridden.

Up to three rain gages may be handled on one listing. If fewer than three gages are requested, the rainfall values for the unused gages will appear as missing values in the table.

The run deck consists of job control language (JCL), SAS statements and input data cards. The following is a card by card description of a sample run deck (fig. 5.41.1). For further discussion of the JCL see the CCD User's Guide.

The JCL must be entered in certain card columns as shown in figure 5.41.1. The SAS statements may be entered in any columns on the cards with spaces separating the values except where noted. For a more complete description of the storm data cards see the discussion on XDTIME MACRO and figure 5.41.2.

Card	1..	Job card.
	2..	Execute a SAS program using a maximum of 3 minutes time.
	3-4..	JCL specifying the name of the OS data set which contains the SAS data set UVMASTER for STATE XX.
	5-7..	Input to SAS will come from the partitioned data set URBAN.SOURCE. Member RRLIST is to be included in the source. The cards following the '*' are to be concatenated to the statements from member RRLIST and executed.
	8..	Defines the macro NUMDA, the numerical value of the drainage area in acres to be used in calculations.
	9..	Defines the macro INTERVAL, the time interval to be used in the listing.
	10..	Defines the macro DINTERV, the data interval.
	11..	Defines the macro PC, the parmcode of the rainfall data.
	12..	Calls the macro XDTIME which reads the following input storm data cards which will be used to select rainfall data.
	13-14..	Input storm cards; see fig. 5.41.2 for complete description.
	15..	SAS comment statement needed to indicate end of data.
	16..	Calls the macro XRAINF which interleaves the storm datetime information into the UVMASTER data set.
	17..	Calls the RID macro which deletes all observations which do not fall into the time periods specified on the storm cards.
	18..	Defines the macro PC, the parmcode of the discharge data.
	19..	Calls the macro XDTIME which reads the input storm cards which will be used to select discharge data.
	20-21..	Input storm cards; see fig. 5.41.2 for complete description.
	22..	SAS comment statement needed to indicate end of data.
	23..	Calls macro XDISCH which interleaves the storm datetime information into the UVMASTER data set.
	24..	Calls the RID macro which deletes all observations which do not fall into the selected time periods.

Card 25-28..	Merges the selected discharge and rainfall data into one data set.
29-31..	Macros which assign weights to the 3 gages. Weights should add up to 1.0.
32..	Calls the macro XRRLIST which will produce the Rainfall-Runoff listing.
33-34..	End of step and job

Figure 5.41.4 documents variables used in the RRLIST program. The following pages illustrate a complete example run. Also, Appendix B contains a description of some common errors which may be encountered when running RRLIST and some possible solutions.

Variable	Definition
DA	Drainage area
RAIN1-RAIN3	Rainfall value
DISCHARG	Discharge value
ACCRAIN1-ACCRAIN3	Accumulated rainfall for entire storm
RINTACC1-RINTACC3	Accumulated rainfall for the print interval
ACCDIS	Accumulated discharge
DATAINT	Data time interval in minutes
INTER	Print interval in minutes
ACCRUN	Accumulated runoff
RUNPER1-RUNPER3	Percent runoff

Figure 5.41.4.--Variable list for program RRLIST.

```
//AG4254J8 JOB ($$$$$$$$$,J001,$,9),'LORENS',CLASS=B,MSGLEVEL=(2,0)          J1407
// EXEC SAS,TIME=1
//UVFILE DD DSN=AG4254J.STATE12.URBAN.UNIT.VALUES,
// DISP=SHR
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(RRLIST),
//  DISP=SHR
//       DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81173.0902
IEF374I STEP /SAS      / STOP  81173.0904 CPU    0MIN 11.14SEC MAIN 240K LCS    0K
CCD0061 STEP /SAS      / I/O IN DD SEQ: 563:0       481:0       314:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 314:0       563:0       155:787
CCD0061 STEP /SAS      / I/O IN DD SEQ: 4A0:14      4A1:8       4B0:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 563:0       314:0       4A2:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 155:0       553:0       553:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 744:154     744:9       5E0:2
CCD0011 STEP /SAS      / MEMORY RESERVED  240K: ACCESSES: DISK     974/ TAPE        0
IEF375I  JOB /AG4254J8/ START 81173.0902
IEF376I  JOB /AG4254J8/ STOP  81173.0904 CPU    0MIN 11.14SEC
CCD007A  JOB /AG4254J8/ BASIC CHRG: FIXED   CPU   DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                    1.24    8.47    2.96            1.86   14.53
CCD002I  JOB /AG4254J8/ TOTAL CHARGE RECORDED =     $14.53
CCD003I  JOB /AG4254J8/ US GEOLOGICAL SURVEY REL OS REL 218 TIME = 09.04.24 DATE = 06/22/81

                        CONSERVATION DISK CCD926 DESTROYED.
                        RESTORED FROM BACKUP OF 2:38PM, JUNE 6, 1981.
                        QUESTIONS SHOULD BE DIRECTED TO DOUG SIMMONS, FTS-928-7584.
```

NOTE: THE JOB AG4234JB HAS BEEN RUN UNDER RELEASE 79.3B OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1          ********************************************************************************
2          *                                                                              *
3          *        THIS PROGRAM UPDATED JUNE 2, 1981                                     *
4          *                                                                              *
5          ********************************************************************************;
6                  MACRO XDTIME
7          * ;
8          * ;
9          *READ IN STORM START AND STOP TIMES;
10                 DATA TEMP ;
11                 KEEP STATION TAG DATETIME PARMCODE EDATIME ;
12                 INPUT STATION $CHAR15. SDATE : YYMMDD6. SHOUR : 2. SMIN : 2.
13                                    EDATE : YYMMDD6. EHOUR : 2. EMIN : 2. ;
14                 TAG+1 ;
15                 PARMCODE=PC ;
16                 DATETIME=DHMS(SDATE,SHOUR,SMIN,0) ;
17                 EDATIME=DHMS(EDATE,EHOUR,EMIN,0) ;
18                 OUTPUT ;
19                 DATETIME= DHMS(EDATE,EHOUR,EMIN,0) ;
20                 OUTPUT ;
21                 CARDS ;
22         %
23         * ;
24         *;
25         * ;
26                 MACRO RID
27         * TO SELECT THE OBSERVATIONS FOR THE APPROPRIATE TIME INTERVALS ;
28         * RID THE DATASET OF EXTRANEOUS OBSERVATIONS ;
29                 DROP TAG IND ;
30                 RETAIN TAG1 0 IND 0 ;
31                 IF TAG NE . AND
32                    TAG NE TAG1 AND
33                    IND=0 THEN DO;
34                          TAG1=TAG ;
35                          IND=1 ;
36                          DELETE ;
37                          END ;
38                 IF IND =0 THEN DELETE ;
39                 IF TAG EQ TAG1 AND
40                    IND=1 THEN DO ;
41                          IND= 0 ;
42                          DELETE ;
43                          END ;
44                 ELSE OUTPUT ;
45         * NOW THE DATA SET CONTAINS ONLY THE REQUIRED OBSERVATIONS ;
46                 %
47         * ;
48         * ;
49         * ;
50                 MACRO XRAINF
51                 DATA RAINFALL ;
52                 SET TEMP UVFILE.UVMASTER ;
53                 BY STATION PARMCODE DATETIME ;
54                 DROP EDATIME ;
55                 RETAIN START ENDTIME ;
```

```
56                IF DATETIME NE EDATIME AND EDATIME NE . THEN DO ;
57                     START=DATETIME ;
58                     ENDTIME=EDATIME ;
59                     END ;
60                DATA RAINFALL (RENAME=(TAG1=TAG)) ;
61                SET RAINFALL ;
62          %
63                MACRO XDISCH
64                DATA DISCH ;
65                SET TEMP UVFILE.UVMASTER ;
66                BY STATION PARMCODE DATETIME ;
67                DATA DISCH    (RENAME=(TAG1=TAG)) ;
68                SET DISCH ;
69          %
70                MACRO WEIGHT1 1.0 %
71                MACRO WEIGHT2 0.0 %
72                MACRO WEIGHT3 0.0 %
73                MACRO XRRLIST
74                DATA _NULL_ ;
75          SET;
76                BY TAG ;
77                RETAIN DA NUMDA ;
78                RETAIN N ;
79                RETAIN RINTACC1 RINTACC2 RINTACC3 0 ;
80                RETAIN DATAINT DINTERV INTER INTERVAL ;
81                RETAIN MAX51 MAXINT1 MAXHR1 ;
82                RETAIN MULT_HR MULT_INT MULT_5 ;
83                RETAIN DO5 JOINT JUMR ;
84                RETAIN S51M1-S51M5 ;
85                RETAIN SI1M1-SI1M45 ;
86                RETAIN SH1M1-SH1M60 ;
87                RETAIN WT1 WEIGHT1 WT2 WEIGHT2 WT3 WEIGHT3 ;
88                ARRAY S51M (I) S51M1-S51M5 ;
89                ARRAY SI1M (J) SI1M1-SI1M45 ;
90                ARRAY SH1M (K) SH1M1-SH1M60 ;
91                FILE PRINT LINESLEFT=L NOTITLES ;
92                IF FIRST.TAG THEN DO ;
93                     LINK TABLETOP ;
94                     LINK COLUMN ;
95                     N=0 ;
96                     END ;
97                N=N+1 ;
98                IF L<4 THEN LINK NEWPAGE ;
99          * ACCUMULATE TOTALS BEFORE PRINTING ;
100               ACCRAIN1+RAIN1 ;
101                ACCRAIN2+RAIN2 ;
102               ACCRAIN3+RAIN3 ;
103               IF RAIN1 NE . THEN RINTACC1+RAIN1 ;
104               ELSE RINTACC1=. ;
105               IF RAIN2 NE . THEN RINTACC2+RAIN2 ;
106               ELSE RINTACC2=. ;
107               IF RAIN3 NE . THEN RINTACC3+RAIN3 ;
108               ELSE RINTACC3=. ;
109               ACCDIS+DISCHARG ;
110               SFD=ACCDIS*DATAINT/1440. ;
111                ACCRUN=SFD/((DA/640.)*26.9) ;
112               IF MOD(N*DATAINT,INTERVAL)=0 OR LAST.TAG THEN LINK PRINT ;
113               IF RAIN1 = . THEN RAIN1 = 0. ;
```

```
116              IF RAIN2 = . THEN RAIN2 = 0. ;
115              IF RAIN3 = . THEN RAIN3 = 0. ;
116              W_RAIN =WEIGHT1*RAIN1 + WEIGHT2*RAIN2 + WEIGHT3*RAIN3 ;
117              IF FIRST.TAG THEN DO ;
118              IF DATAINT EQ 1 OR DATAINT EQ 5 THEN DO ;
119                   DO5=1 ;
120                   DOINT=1 ;
121                   DOHR=1 ;
122                   MULT_INT=15/DATAINT ;
123              MULT_HR=60/DATAINT ;
124              MULT_5=5/DATAINT ;
125                   END ;
126              IF DATAINT GE 10 AND DATAINT LT 30 THEN DO ;
127                   DO5=0 ;
128                   DOINT=1 ;
129                   MULT_INT=1 ;
130                   IF MOD(60,DATAINT)=0 THEN DO ;
131                   DOHR=1 ;
132              MULT_HR=60/DATAINT ;
133                   END ;
134              ELSE DOHR=0 ;
135              END ;
136              IF DATAINT GT 30 THEN DO ;
137                   DO5=0 ;
138                   DOINT=1 ;
139                   MULT_INT=1 ;
140                   DOHR=0 ;
141              END ;
142              I=1 ;
143              J=1 ;
144              K=1 ;
145              S51M=W_RAIN ;
146              SI1M=W_RAIN ;
147              SH1M=W_RAIN ;
148              MAX51=W_RAIN ;
149              MAXINT1=W_RAIN ;
150              MAXHR1=W_RAIN ;
151              END ;
152              ELSE DO ;
153              IF DO5=2 THEN GO TO GETMAX1 ;
154              IF MULT_5=1 AND MAX51 < S51M     THEN DO ;
155              MAX51=S51M ;
156                   I=1 ;
157                   GO TO IS_IT1 ;
158                   END ;
159              ELSE DO ;
160                   I+1 ;
161                   S51M=W_RAIN ;
162              IF I>=MULT_5 & DO5=1 THEN DO ;
163                   DO5=2 ;
164              LINK GO_MAX5 ;
165              END ;
166              END ;
167         IS_IT1 :
168              IF DOINT=2 THEN GO TO GETMAXI ;
169              IF MULT_INT=1 AND MAXINT1<SI1M    THEN DO ;
170                   MAXINT1=SI1M ;
171              J=1 ;
```

```
172                GO TO IS_IT2 ;
173                END ;
174                ELSE DO ;
175                     J+1 ;
176                     SIIM=W_RAIN ;
177                     IF J>= MULT_INT AND DOINT=1 THEN DO ;
178                     DOINT=2 ;
179                     LINK GO_MAXI;
180                     END ;
181                END ;
182           IS_IT2 :
183                IF DOHR=2 THEN GO TO GETMAXHR ;
184                IF MULT_HR=1 AND MAXHR1<SH1M    THEN DO ;
185                MAXHR1=SH1M ;
186                     K=1 ;
187                     RETURN ;
188                     END ;
189                ELSE DO ;
190                     K+1 ;
191                SH1M=W_RAIN ;
192                IF K>=MULT_HR AND DOHR=1 THEN DO ;
193                     DOHR=2 ;
194                     LINK GO_MAXHR ;
195                     END ;
196                     END ;
197                END ;
198           * PRINTS TOTALS ;
199           PRNT:
200                IF LAST.TAG THEN LINK TABLEEND ;
201                RETURN ;
202           GO_MAX5:
203                TOTAL=0 ;
204                DO I=1 TO MULT_5 ;
205                TOTAL+S51M ;
206                END ;
207                IF TOTAL > MAX51 THEN MAX51= TOTAL ;
208                DO I=2 TO MULT_5 ;
209                TEMP=S51M ;
210                I=I-1 ;
211                S51M=TEMP ;
212                I+1 ;
213                 END ;
214                I=MULT_5 ;
215                RETURN ;
216           GO_MAXI :
217                TOTAL=0 ;
218                DO J= 1 TO MULT_INT ;
219                TOTAL+SIIM ;
220                END ;
221                IF TOTAL > MAXINT1 THEN MAXINT1 = TOTAL ;
222                DO J = 2 TO MULT_INT ;
223                TEMP=SIIM ;
224                J=J-1 ;
225                SII1M=TEMP ;
226                J+1 ;
227                END ;
228                J=MULT_INT ;
229                RETURN ;
```

```
230       GO_MAXHR :
231                 TOTAL=0 ;
232                 DO K=1 TO MULT_HR ;
233                 TOTAL+SM1M ;
234                 END ;
235                 IF TOTAL>MAXHR1 THEN MAXHR1=TOTAL ;
236                 DO K=2 TO MULT_HR ;
237                 TEMP=SM1M ;
238                 K=K-1;
239                 SM1M=TEMP ;
240                 K+1 ;
241                 END ;
242                 K=60 ;
243                 RETURN ;
244       GETMAX1:
245                 S51M=W_RAIN ;
246                 LINK GO_MAX5 ;
247                 GO TO IS_IT1 ;
248       GETMAXI:
249                 SI1M=W_RAIN ;
250                 LINK GO_MAXI ;
251                 GO TO IS_IT2 ;
252       GETMAXHR :
253                 SM1M=W_RAIN ;
254                 LINK GO_MAXHR ;
255                 GO TO PRNT ;
256       TABLEEND:
257       * CALCULATE RUNOFF PERCENT ;
258                 IF ACCRAIN1 NE . THEN RUNPER1=ACCRUN/ACCRAIN1*100. ;
259                 ELSE RUNPER1=. ;
260                 IF ACCRAIN2 NE . THEN RUNPER2=ACCRUN/ACCRAIN2*100. ;
261                 ELSE RUNPER2=. ;
262                 IF ACCRAIN3 NE . THEN RUNPER3=ACCRUN/ACCRAIN3*100. ;
263                 ELSE RUNPER3=. ;
264                 IF L<8 THEN PUT _PAGE_ ;
265                 PUT ////
266                     @27 'INCHES OF RUNOFF' +6 '= ' ACCRUN 6.3 /
267                     @27 'RUNOFF PERCENT, GAGE1 = ' RUNPER1 6.3 /
268                     @43                 'GAGE2 = ' RUNPER2 6.3 /
269                     @43                 'GAGE3 = ' RUNPER3 6.3 ;
270                 INT2=MULT_INT*DATAINT ;
271                 MAX51=12*MAX51 ;
272                 MAXINT1=MAXINT1*(60/(MULT_INT*DATAINT)) ;
273                 IF L<9 THEN PUT _PAGE_ ;
274                 PUT /
275                     @27 'WEIGHTS, GAGE1 : ' WT1 5.2 /
276                     @36 'GAGE2 : ' WT2 5.2 /
277                     @36 'GAGE3 : ' WT3 5.2 ;
278                 PUT /  @15 'WEIGHTED RAINFALL : ' /
279                 @27 ' 5 MIN MAXIMUM RAINFALL RATE ' MAX51 8.2 ' IN/HR' /
280                 @27 INT2 2. ' MIN MAXIMUM RAINFALL RATE ' MAXINT1 8.2 ' IN/HR' /
281                 @27 '60 MIN MAXIMUM RAINFALL RATE ' MAXHR1 8.2 ' IN/HR' ;
282                 RETURN ;
283       NEWPAGE:
284                 PUT _PAGE_ ;
285                 LINK COLUMN ;
286                 RETURN ;
287       * PRINTS COLUMN HEADINGS ;
```

```
288     COLUMN:
289               PUT
290               #27 'ACCUMULATED'
291               +5  'RAINFALL'
292               +5  'ACCUMULATED'
293               +5  'RAINFALL'
294               +5  'ACCUMULATED'
295               +5  'RAINFALL'
296               +5  'ACCUMULATED' /
297               #2  'TIME'
298               +6  'DISCHARGE'
299               +8  'RUNOFF'
300               +9  'GAGE 1'
301               +8  'RAIN 1'
302               +9  'GAGE 2'
303               +8  'RAIN 2'
304               +9  'GAGE 3'
305               +8  'RAIN 3'/ ;
306               RETURN ;
307     * PRINTS DATA ;
308     PRINT:
309               TIME=TIMEPART(DATETIME) ;
310               PUT #1  TIME      TIME8.
311                   #13 DISCHARG        6.2
312                   #29 ACCRUN          6.3
313                   #43 RINTACC1        6.2
314                   #57 ACCRAIN1        6.2
315                   #72 RINTACC2        6.2
316                   #86 ACCRAIN2        6.2
317                   #101 RINTACC3       6.2
318                   #115 ACCRAIN3       6.2 ;
319               RINTACC1=0 ;
320               RINTACC2=0 ;
321               RINTACC3=0 ;
322               RETURN ;
323     *PRINTS TABLE HEADINGS ;
324     TABLETOP :
325     * INITIALIZE VARIABLES ;
326               IF RAIN1 NE . THEN ACCRAIN1=0 ;
327               ELSE ACCRAIN1=. ;
328               IF RAIN2 NE . THEN ACCRAIN2=0 ;
329               ELSE ACCRAIN2=. ;
330               IF RAIN3 NE . THEN ACCRAIN3=0 ;
331               ELSE ACCRAIN3=. ;
332               ACCDIS  =0;
333                RINTACC1=0 ;
334                RINTACC2=0 ;
335                RINTACC3=0 ;
336               TIME=TIMEPART(DATETIME) ;
337               DATE=DATEPART(DATETIME) ;
338               EDATE=DATEPART(ENDTIME) ;
339               ETIME=TIMEPART(ENDTIME)-60 ;
340               PUT _PAGE_ ;
341               PUT //// #43 'RAINFALL AND RUNOFF DATA' //
342                         #34 'DISCHARGE STATION ID: ' STATION0 $15.  /
343                         #34 'RAINFALL GAGE # 1 ID: ' STATION1 $15. /
344                         #43          'GAGE # 2 ID: ' STATION2 $15. /
345                         #43          'GAGE # 3 ID: ' STATION3 $15. //
```

```
346                        #34 'TIME: FROM ' DATE WORDDATE18. +1 TIME TIME8. +1 'TO' +1
347                           EDATE WORDDATE18. +1 ETIME TIME8. /
348                        #20 'NOTE:  * * * RAINFALL AND RUNOFF IN INCHES, DISCHA'
349                           'RGE IN CUBIC FEET PER SECOND'/
350                        #31 'TIME INTERVAL OF BASIC DATA:' +4 DATAINT 4.1
351                           ' MINUTE(S)'/
352                        #31 'PRINT INTERVAL : EVERY' +1  INTER    2. ' MINUTES' // ;
353                  RETURN ;
354          %
355                  MACRO NUMDA 14.7 %
356                  MACRO INTERVAL 5 %
357                  MACRO DINTERV 1 %
358                  MACRO PC 00045 %

NOTE: DATA SET WORK.TEMP HAS 4 OBSERVATIONS AND 5 VARIABLES. 255 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.33 SECONDS AND 130K.

362          * ;

NOTE: DATA SET WORK.RAINFALL HAS 19730 OBSERVATIONS AND 10 VARIABLES. 176 OBS/TRK.
NOTE: THE DATA STATEMENT USED 3.86 SECONDS AND 132K.

363                  XRAINF
364                  RID
365                  MACRO PC 00060 %

NOTE: DATA SET WORK.RAINFALL HAS 330 OBSERVATIONS AND 10 VARIABLES. 176 OBS/TRK.
NOTE: THE DATA STATEMENT USED 1.15 SECONDS AND 130K.


NOTE: DATA SET WORK.TEMP HAS 4 OBSERVATIONS AND 5 VARIABLES. 255 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.06 SECONDS AND 130K.

369          * ;

NOTE: DATA SET WORK.DISCH HAS 19790 OBSERVATIONS AND 9 VARIABLES. 197 OBS/TRK.
NOTE: THE DATA STATEMENT USED 3.35 SECONDS AND 132K.

370                  XDISCH
371                  RID
372

NOTE: DATA SET WORK.DISCH HAS 330 OBSERVATIONS AND 9 VARIABLES. 197 OBS/TRK.
NOTE: THE DATA STATEMENT USED 1.14 SECONDS AND 130K.

372                  DATA TEMP3 ;
373                  MERGE RAINFALL (RENAME=(VALUE=RAIN1 STATION=STATION1))
374                  DISCH (RENAME=(VALUE=DISCHARG STATION=STATION2)) ;
375                  BY TAG DATETIME ;

NOTE: DATA SET WORK.TEMP3 HAS 330 OBSERVATIONS AND 13 VARIABLES. 128 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.17 SECONDS AND 130K.

376                  XRRLIST

NOTE: THE VARIABLE STATION2 IS UNINITIALIZED.
NOTE: THE VARIABLE STATION3 IS UNINITIALIZED.
```

RAINFALL AND RUNOFF DATA

DISCHARGE STATION ID: 254031080191100
RAINFALL GAGE # 1 ID: 254031080191103
GAGE # 2 ID:
GAGE # 3 ID:

TIME: FROM MAY 11, 1977 4:40:00 TO MAY 11, 1977 6:58:00
NOTE: * * * RAINFALL AND RUNOFF IN INCHES, DISCHARGE IN CUBIC FEET PER SECOND
TIME INTERVAL OF BASIC DATA: 1.0 MINUTE(S)
PRINT INTERVAL : EVERY 5 MINUTES

TIME	DISCHARGE	ACCUMULATED RUNOFF	RAINFALL GAGE 1	ACCUMULATED RAIN 1	RAINFALL GAGE 2	ACCUMULATED RAIN 2	RAINFALL GAGE 3	ACCUMULATED RAIN 3
4:44:00	0.00	0.000	0.20	0.20	.	.	.	.
4:49:00	14.32	0.046	0.32	0.52	.	.	.	.
4:54:00	29.22	0.190	0.39	0.91	.	.	.	.
4:59:00	28.13	0.357	0.20	1.11	.	.	.	.
5:04:00	20.18	0.488	0.04	1.15	.	.	.	.
5:09:00	12.16	0.573	0.00	1.15	.	.	.	.
5:14:00	7.96	0.624	0.01	1.16	.	.	.	.
5:19:00	2.19	0.650	0.00	1.16	.	.	.	.
5:24:00	0.71	0.656	0.00	1.16	.	.	.	.
5:29:00	0.27	0.659	0.00	1.16	.	.	.	.
5:34:00	0.00	0.659	0.01	1.17	.	.	.	.
5:39:00	0.00	0.659	0.00	1.17	.	.	.	.
5:44:00	0.00	0.659	0.00	1.17	.	.	.	.
5:49:00	0.00	0.659	0.00	1.17	.	.	.	.
5:54:00	0.00	0.659	0.00	1.17	.	.	.	.
5:59:00	0.00	0.659	0.00	1.17	.	.	.	.
6:04:00	0.00	0.659	0.00	1.17	.	.	.	.
6:09:00	0.00	0.659	0.00	1.17	.	.	.	.
6:14:00	0.00	0.659	0.00	1.17	.	.	.	.
6:19:00	0.00	0.659	0.00	1.17	.	.	.	.
6:24:00	0.00	0.659	0.01	1.18	.	.	.	.
6:29:00	0.00	0.659	0.00	1.19	.	.	.	.
6:34:00	0.00	0.659	0.00	1.19	.	.	.	.
6:39:00	0.00	0.659	0.00	1.19	.	.	.	.
6:44:00	0.00	0.659	0.01	1.20	.	.	.	.
6:49:00	0.00	0.659	0.00	1.20	.	.	.	.
6:54:00	0.00	0.659	0.00	1.20	.	.	.	.
6:58:00	0.00	0.659	0.01	1.21	.	.	.	.

INCHES OF RUNOFF = 0.659
RUNOFF PERCENT, GAGE1 = 54.568
GAGE2 = .
GAGE3 = .

WEIGHTS, GAGE1 : 1.00
GAGE2 : 0.00
GAGE3 : 0.00

WEIGHTED RAINFALL :

5 MIN MAXIMUM RAINFALL RATE	5.64	IN/HR
15 MIN MAXIMUM RAINFALL RATE	3.92	IN/HR
60 MIN MAXIMUM RAINFALL RATE	1.17	IN/HR

RAINFALL AND RUNOFF DATA

DISCHARGE STATION ID: 254031080191100
RAINFALL GAGE # 1 ID: 254031080191103
GAGE # 2 ID:
GAGE # 3 ID:

TIME: FROM JULY 15, 1977 6:30:00 TO JULY 15, 1977 9:40:00

NOTE: * * * RAINFALL AND RUNOFF IN INCHES, DISCHARGE IN CUBIC FEET PER SECOND
TIME INTERVAL OF BASIC DATA: 1.0 MINUTE(S)
PRINT INTERVAL : EVERY 5 MINUTES

TIME	DISCHARGE	ACCUMULATED RUNOFF	RAINFALL GAGE 1	ACCUMULATED RAIN 1	RAINFALL GAGE 2	ACCUMULATED RAIN 2	RAINFALL GAGE 3	ACCUMULATED RAIN 3
6:34:00	0.00	0.000	0.06	0.06	.	.	.	.
6:39:00	2.23	0.007	0.01	0.07	.	.	.	.
6:44:00	2.13	0.020	0.00	0.07	.	.	.	.
6:49:00	1.30	0.029	0.00	0.07	.	.	.	.
6:54:00	1.01	0.035	0.00	0.07	.	.	.	.
6:59:00	0.94	0.040	0.00	0.07	.	.	.	.
7:04:00	0.92	0.046	0.00	0.07	.	.	.	.
7:09:00	0.08	0.049	0.04	0.11	.	.	.	.
7:14:00	1.72	0.053	0.07	0.18	.	.	.	.
7:19:00	3.39	0.063	0.12	0.31	.	.	.	.
7:24:00	9.60	0.105	0.17	0.48	.	.	.	.
7:29:00	9.29	0.163	0.06	0.54	.	.	.	.
7:34:00	3.96	0.196	0.12	0.66	.	.	.	.
7:39:00	8.03	0.233	0.06	0.72	.	.	.	.
7:44:00	2.36	0.259	0.01	0.74	.	.	.	.
7:49:00	0.00	0.262	0.00	0.74	.	.	.	.
7:54:00	0.00	0.262	0.00	0.74	.	.	.	.
7:59:00	0.00	0.262	0.00	0.74	.	.	.	.
8:04:00	0.00	0.262	0.00	0.74	.	.	.	.
8:09:00	0.00	0.262	0.00	0.74	.	.	.	.
8:14:00	0.90	0.265	0.00	0.74	.	.	.	.
8:19:00	0.47	0.271	0.00	0.74	.	.	.	.
8:24:00	0.00	0.271	0.00	0.74	.	.	.	.
8:29:00	0.00	0.271	0.00	0.75	.	.	.	.
8:34:00	2.83	0.274	0.18	0.93	.	.	.	.
8:39:00	7.22	0.315	0.03	0.96	.	.	.	.
8:44:00	4.61	0.346	0.07	1.03	.	.	.	.
8:49:00	7.89	0.378	0.20	1.24	.	.	.	.
8:54:00	16.07	0.454	0.16	1.40	.	.	.	.
8:59:00	13.17	0.536	0.08	1.49	.	.	.	.
9:04:00	9.97	0.600	0.05	1.54	.	.	.	.
9:09:00	6.41	0.644	0.00	1.55	.	.	.	.
9:14:00	1.33	0.665	0.01	1.56	.	.	.	.
9:19:00	0.00	0.665	0.00	1.56	.	.	.	.
9:24:00	0.00	0.665	0.00	1.56	.	.	.	.
9:29:00	0.00	0.665	0.00	1.56	.	.	.	.

TIME	DISCHARGE	ACCUMULATED RUNOFF	RAINFALL GAGE 1	ACCUMULATED RAIN 1	RAINFALL GAGE 2	ACCUMULATED RAIN 2	RAINFALL GAGE 3	ACCUMULATED RAIN 3
9:34:00	0.20	0.665	0.00	1.56	.	.	.	.
9:39:00	0.77	0.669	0.00	1.56	.	.	.	.
9:40:00	0.73	0.670	0.00	1.56	.	.	.	.

INCHES OF RUNOFF = 0.670
RUNOFF PERCENT, GAGE1 = 42.936
GAGE2 = .
GAGE3 = .

WEIGHTS, GAGE1 : 1.00
GAGE2 : 0.00
GAGE3 : 0.00

WEIGHTED RAINFALL :
5 MIN MAXIMUM RAINFALL RATE 2.70 IN/HR
15 MIN MAXIMUM RAINFALL RATE 1.82 IN/HR
60 MIN MAXIMUM RAINFALL RATE 0.81 IN/HR

5.42 Water-Quality Summary Utility Listing Program

The Water-Quality Summary Utility listing program (QWLIST) is a set of SAS macros which produces a tabular listing of the core list of water-quality constituents. The data are from certain time periods (i.e., storms) which are specified by the user.

The QWLIST macro source code is stored in the partitioned data set AG4254J.URBAN.SOURCE which resides on the urban disk (VOL=SER=CCD810). The input to SAS is specified by the SYSIN data definition card in the JCL (figure 5.42.1). First, the macro source library is specified (card 5). This causes the QWLIST macro definitions from the library to be included in this program run. Next, card 6 indicates that SAS input cards follow in the deck. Once a macro has been defined, anytime that macro name occurs in the following SAS code that macro code is inserted and executed. For example, card 7 causes the code for the macro XDTIME to be included at this point during program execution. Macros may also be defined anytime during a SAS run which allows flexibility in the code.

The storm periods are specified on input data cards by the user. These cards are read in by the macro XDTIME. (See section 5.41 and figure 5.41.2 for a complete description of the input cards.) The macro XDTIME creates SAS observations from the datetime information and creates the data set TEMP. Macro XQWTIME converts the character TIME value in the QWMASTER data set which was created during WATSTORE retrieval to a numeric value. (This will not be necessary at a future time when a numeric TIME value is available from QWSAS.) Macro XQWTIME then interleaves this data set with TEMP and also adds the start and end times of the requested period to each observation from QWMASTER during the interleaving. The macro RID takes the resultant data set QWTEMP and eliminates any observations not needed for the listing.

The macro QWLIST creates the actual listing. Figure 5.42.2 is a table of the core list of constituents. If QWMASTER does not contain values for certain of these core constituents, the missing indicator, '.', will appear on the listing for that value. Also, the message

THE VARIABLE Pxxxxx IS UNINITIALIZED.

will appear in the SAS log notes. There will be a note for each missing constituent with the appropriate parameter code listed. For example, if discharge values were missing for all samples for this storm, then the message

THE VARIABLE P00061 IS UNINITIALIZED.

would appear in the SAS log.

```
      COL.1       COL.12
        ●           ●
Card 1..//          JOB
     2..// EXEC SAS,TIME=3
     3..//QWFILE DD DSN=AG4yyyz.STATEXX.URBAN.QW.VALUES,
     4..// DISP=SHR
     5..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(QWLIST),DISP=SHR
     6..//       DD *
     7..          XDTIME
     8..254031080191100 770504 07 34 770504 13 31 STORM1
     9..254031080191100 770511 04 40 770511 06 59 STORM3
    10..    ;
    11..          XQWTIME
    12..          RID
    13..          XQWLIST
    14../*
    15..//
```

Figure 5.42.1.--SAS and JCL commands for executing QWLIST.

Parameter Code	Constituent
00061	Discharge
00095	Specific Conductance
00340	Chemical Oxygen Demand
00400	pH
00608	Dissolved NH_3 as N
00623	Dissolved Kjeldahl N
00625	Total Kjeldahl N
00631	Dissolved NO_2 + NO_3 as N
00665	Total Phosphorus as P
00666	Dissolved Phosphorus as P
00681	Dissolved Organic Carbon
00689	Suspended Organic Carbon
01051	Total Lead
31625	Fecal Coliform Bacteria
70300	Dissolved Solids

Figure 5.42.2.--Core list of water-quality constituents.

The run deck consists of job control language (JCL), SAS statements and input data cards. The following is a card by card description of a sample run deck which is listed in figure 5.42.1. For further discussion of the JCL see the CCD User's Guide.

The JCL must be entered in certain card columns as shown (figure 5.42.1). The SAS statements may be entered in any columns on the cards with spaces separating the values except where noted. For a complete description of the storm data cards (cards 8-9) see the discussion on the XDTIME macro in the RRLIST program description and figure 5.41.2.

Card	1..	Job card.
	2..	Execute a SAS program using a maximum of 3 minutes time.
	3-4..	JCL specifying the name of the OS data set which contains the SAS data set QWMASTER for STATE XX.
	5-6..	Input to SAS will come from the partitioned data set AG4254J.URBAN.SOURCE. Member QWLIST is specified. The cards following the '*' are to be concatenated to the source statements from QWLIST and executed.
	7..	Calls the macro XDTIME which reads the following input storm data cards which will be used to select rainfall data.
	8-9..	Input storm data cards; see figure 5.41.2 for complete description.
	10..	SAS null statement signifying end of data.
	11..	Calls macro XQWTIME which converts character time values to numeric and interleaves the storm date-time information into the QWMASTER data set.
	12..	Calls macro RID which deletes all unnecessary observations from the interleaved data set.
	13..	Calls macro XQWLIST which produces the core list of water-quality constituents from the selected observations.
	14-15..	End of step and job

The following pages illustrate a complete sample run. The listing includes JCL commands, SAS instructions, and corresponding output. Also, Appendix B contains a description of some common errors which may be encountered when running QWLIST and some possible solutions.

```
//AG4254JL JOB ($$$$$$$$$,J001,$.5),'LORENS',CLASS=A                    J3461
// EXEC SAS,TIME=3
XXSAS    PROC  OPTIONS=,SORT=4,ENTRY=SAS                                00000010
*****,*************************************************************    00000020
***  STATISTICAL ANALYSIS SYSTEM,  VERSION 79.3                  ***    00000030
***  DOCUMENTATION:  SAS USER'S GUIDE 79 EDITION                 ***    00000040
***  FROM THE SAS INSTITUTE, BOX 8000, CARY, NC 27511            ***    00000050
***  R. SLOSSBERG   MARCH 1980                                   ***    00000060
*****,*************************************************************    00000070
XXSAS    EXEC  PGM=&ENTRY,PARM='&OPTIONS',REGION=240K                   00000080
IEF653I SUBSTITUTION JCL - PGM=SAS,PARM='',REGION=240K
XXLIBRARY  DD  DSN=&&LIBRARY,UNIT=SYSDK,SPACE=(TRK,(20,,20))            00000090
XXSTEPLIB  DD  DSNAME=SYS1.SAS.LIBRARY,DISP=SHR                         00000100
XX         DD  DSN=SYS1.PPLNKSRT,DISP=SHR                               00000110
XX         DD  DSN=SYS1.PPLNKOPT,DISP=SHR                               00000120
XX   DD   DSN=*.LIBRARY,DISP=(OLD,PASS),VOL=REF=*.LIBRARY               00000130
XXWORK     DD  UNIT=SYSDK,SPACE=(TRK,(240,80)) TEMPORARY DATA SETS      00000140
XXFT11F001 DD  SYSOUT=A,DCB=(BLKSIZE=141,LRECL=137,RECFM=VA) LOG        00000150
XXFT12F001 DD  SYSOUT=A,DCB=(BLKSIZE=141,LRECL=137,RECFM=VA) PRINT      00000160
XXFT13F001 DD  SYSOUT=B PUNCH                                           00000170
XXFT15F001 DD  UNIT=SYSDK,SPACE=(TRK,(10,10)), PARMCARDS                00000180
XX             DCB=(RECFM=FB,LRECL=80,BLKSIZE=400)                      00000190
XXSORTLIB DD DSN=SYS1.SM01SORT,DISP=SHR                                 00000200
XXSORTMSG  DD  SYSOUT=A                                                 00000210
XXSORTWK01 DD  SPACE=(CYL,(&SORT)),UNIT=SYSDK                           00000220
IEF653I SUBSTITUTION JCL - SPACE=(CYL,(4)),UNIT=SYSDK
XXSORTWK02 DD  SPACE=(CYL,(&SORT)),UNIT=(SYSDK,,SEP=(SORTWK01))         00000230
IEF653I SUBSTITUTION JCL - SPACE=(CYL,(4)),UNIT=(SYSDK,,SEP=(SORTWK01))
XXSORTWK03 DD  SPACE=(CYL,(&SORT)),UNIT=(SYSDK,,SEP=(SORTWK01,          00000240
IEF653I SUBSTITUTION JCL - SPACE=(CYL,(4)),UNIT=(SYSDK,,SEP=(SORTWK01,
XX             SORTWK02))                                               00000250
//QWFILE DD DSN=AG4254J.STATE12.URBAN.QW.VALUES,
// DISP=SHR
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(QWLIST),DISP=SHR
//       DD *
//
IEF236I ALLOC. FOR AG4254JL SAS
IEF237I 155   ALLOCATED TO LIBRARY
IEF237I 747   ALLOCATED TO STEPLIB
IEF237I 635   ALLOCATED TO
IEF237I 635   ALLOCATED TO
IEF237I 155   ALLOCATED TO
IEF237I 563   ALLOCATED TO WORK
IEF237I 4A2   ALLOCATED TO FT11F001
IEF237I 4A3   ALLOCATED TO FT12F001
IEF237I 4B0   ALLOCATED TO FT13F001
IEF237I 155   ALLOCATED TO FT15F001
IEF237I 635   ALLOCATED TO SORTLIB
IEF237I 4A4   ALLOCATED TO SORTMSG
IEF237I 563   ALLOCATED TO SORTWK01
IEF237I 155   ALLOCATED TO SORTWK02
IEF237I 155   ALLOCATED TO SORTWK03
IEF237I 630   ALLOCATED TO QWFILE
IEF237I 630   ALLOCATED TO SYSIN
IEF237I 5E0   ALLOCATED TO
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS80224.T084744.RV000.AG4254JL.LIBRARY       DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS1.SAS.LIBRARY                              KEPT
IEF285I   VOL SER NOS= SYS803.
IEF285I   SYS1.PPLNKSRT                                 KEPT
```

```
IEF285I   VOL SER NOS= SYS008.
IEF285I   SYS1.PPLWKDPT                                  KEPT
IEF285I   VOL SER NOS= SYS008.
IEF285I   SYS80224.T084744.RV000.AG4254JL.LIBRARY        PASSED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS80224.T084744.RV000.AG4254JL.R0002244       DELETED
IEF285I   VOL SER NOS= RE1WK2.
IEF285I   SYS80224.T084744.RV000.AG4254JL.R0002248       DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS1.SM01SORT                                  KEPT
IEF285I   VOL SER NOS= SYS008.
IEF285I   SYS80224.T084744.RV000.AG4254JL.R0002250       DELETED
IEF285I   VOL SER NOS= RE1WK2.
IEF285I   SYS80224.T084744.RV000.AG4254JL.R0002251       DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   SYS80224.T084744.RV000.AG4254JL.R0002252       DELETED
IEF285I   VOL SER NOS= RE1WK1.
IEF285I   AG4254J.STATE12.URBAN.DW.VALUES                KEPT
IEF285I   VOL SER NOS= CCD810.
IEF285I   AG4254J.URBAN.SOURCE                           KEPT
IEF285I   VOL SER NOS= CCD810.
IEF373I STEP /SAS      / START 80224.1052
IEF374I STEP /SAS      / STOP  80224.1053 CPU    0MIN 01.01SEC MAIN 240K LCS    0K
CCD0061 STEP /SAS      / I/O IN DD SEQ: 155:0        747:0        635:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 635:0        155:0        563:218
CCD0061 STEP /SAS      / I/O IN DD SEQ: 4A2:7        4A3:5        430:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 155:0        635:0        4A4:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 563:0        155:0        155:0
CCD0061 STEP /SAS      / I/O IN DD SEQ: 630:15       630:6        5E0:1
CCD0011 STEP /SAS      / MEMORY RESERVED  240K: ACCESSES: DISK      252/ TAPE         0
IEF285I   SYS80224.T084744.RV000.AG4254JL.LIBRARY        KEPT
IEF285I   VOL SER NOS= RE1WK1.
IEF375I  JOB /AG4254JL/ START 80224.1052
IEF376I  JOB /AG4254JL/ STOP  80224.1053 CPU    0MIN 01.01SEC
CCD0071  JOB /AG4254JL/ BASIC CHRG: FIXED    CPU    DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                    3.09     1.53     1.53                    6.16
CCD0021  JOB /AG4254JL/ TOTAL CHARGE RECORDED =       $6.16
CCD0031  JOB /AG4254JL/ US GEOLOGICAL SURVEY RE1 OS REL 218 TIME = 10.53.45 DATE = 08/11/80
```

THERE IS NOW ONLY ONE IBM-COMPATIBLE COMPUTER AT THE NATIONAL CENTER. THE AMDAHL 470V/7. IT IS RE1. (MULTICS IS, OF COURSE, STILL AVAILABLE.) BOTH IBM 370/155'S HAVE BEEN DISCONNECTED. RE3 (AMS) IS STILL CONNECTED FOR IBM-COMPATIBLE PROCESSING. CPUID'S ON RELAY/ROUTE CARDS ARE BEING CHANGED TO RE1.

NOTE: THE JOB AG4254JL HAS BEEN RUN UNDER RELEASE 79.3A OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1                   MACRO PC . %
2                   MACRO XDTIME
3           * ;
4           *READ IN STORM START AND STOP TIMES;
5                   DATA TEMP ;
6                   KEEP STATION TAG DATETIME PARMCODE EDATIME ;
7                   INPUT STATION $15. SDATE : YYMMDD6. SHOUR : 2. SMIN : 2.
8                                      EDATE : YYMMDD6. EHOUR : 2. EMIN : 2. ;
9                   TAG+1 ;
10                  PARMCODE=PC ;
11                  DATETIME=DHMS(SDATE,SHOUR,SMIN,0) ;
12                  EDATIME=DHMS(EDATE,EHOUR,EMIN,0) ;
13                  OUTPUT ;
14                  DATETIME= DHMS(EDATE,EHOUR,EMIN,0) ;
15                  OUTPUT ;
16                  CARDS ;
17          %
18          MACRO XQWTIME
19          * ;
20                  DATA QWTEMP ;
21                  SET QWFILE.QWMASTER ;
22                  DROP TIMEX HOUR MIN TIME DATE ;
23                  TIMEX=INPUT(TIME,4.) ;
24                  HOUR=INT(TIMEX/100) ;
25                  MIN=MOD(TIMEX,100);
26                  MIN=INT(MIN) ;
27                  DATETIME=DHMS(DATE,HOUR,MIN,0) ;
28                  DATA QWTEMP ;
29                  SET TEMP QWTEMP ;
30                  BY STATION DATETIME ;
31                  DROP EDATIME ;
32                  RETAIN START ENDTIME ;
33                  IF DATETIME NE EDATIME AND EDATIME NE . THEN DO ;
34                       START=DATETIME ;
35                       ENDTIME=EDATIME ;
36                       END ;
37          *;
38          %
39                  MACRO RID
40                  DATA QWTEMP (RENAME=(TAG1=TAG)) ;
41                  SET QWTEMP ;
42          * TO SELECT THE OBSERVATIONS FOR THE APPROPRIATE TIME INTERVALS ;
43          * RID THE DATASET OF EXTRANEOUS OBSERVATIONS ;
44                  DROP TAG IND ;
45                  RETAIN TAG1 0 IND 0 ;
46                  IF TAG NE . AND
47                     TAG NE TAG1 AND
48                     IND=0 THEN DO;
49                           TAG1=TAG ;
50                           IND=1 ;
51                           DELETE ;
52                           END ;
53                  IF IND =0 THEN DELETE ;
54                  IF TAG EQ TAG1 AND
55                     IND=1 THEN DO ;
```

```
56                      IND= 0 ;
57                      DELETE ;
58                      END ;
59              ELSE OUTPUT ;
60      * NOW THE DATA SET CONTAINS ONLY THE REQUIRED OBSERVATIONS ;
61              %
62              MACRO XQWLIST
63              DATA _NULL_ ;
64              SET ;
65              BY TAB ;
66              RETAIN T 8 ;
67      * ;
68              FILE PRINT NOTITLES N=PS ;
69              IF FIRST.TAB THEN LINK TABLETOP ;
70              IF FIRST.TAB THEN LINK COLUMN ;
71              IF T EQ 30 THEN LINK NEWPAGE ;
72      * TO PRINT DATA VALUES ;
73              LINK PRINT ;
74              RETURN ;
75      * ;
76      * TO CONTINUE LISTING ON NEXT PAGE ;
77      NEWPAGE:
78              PUT _PAGE_ ;
79              LINK COLUMN ;
80               RETURN ;
81      TABLETOP:
82              SDATE=DATEPART(START) ;
83              STIME=TIMEPART(START) ;
84              EDATE=DATEPART(ENDTIME) ;
85              ETIME=TIMEPART(ENDTIME)-60 ;
86              PUT _PAGE_ ;
87              PUT     @45 '***CORE LIST OF WATER QUALITY CONSTITUENTS***' /
88                      @46 '**FOR THE NATIONAL URBAN STUDIES PROGRAM**' //
89                      @12  'STATION ID: ' STATION $15.
90                      @41  'FROM'
91                      @49 SDATE WORDDATE19. +1 STIME HHMM5.
92                      @75 'TO'
93                      @79 EDATE WORDDATE19. +1 ETIME HHMM5. ;
94               RETURN ;
95      COLUMN :
96              PUT @8
97                      @37  'SPECIFIC'
98                      @64  'DISSOLVED'
99                      @78  'DISSOLVED'
100                     @92  'DISSOLVED'
101                     @106 'DISSOLVED'
102                     @122 'TOTAL' /
103                     @1   'D  M  YR'
104                     @14  ' TIME '
105                     @23  'DISCHARGE'
106                     @36  'CONDUCTANCE'
107                     @50  'PH (UNITS)'
108                     @65  'SOLIDS'
109                     @77  'NO2+NO3 AS N'
110                     @92  'NH3 AS N'
111                     @105 'KJELDAHL N.'
112                     @119 'KJELDAHL N.'/
113                     @25  '(CFS)'
```

```
                    @36  '(MICROMHOS)'
                    @65  '(MG/L)'
                    @79  '(MG/L)'
                    @93  '(MG/L)'
                    @107 '(MG/L)'
                    @121 '(MG/L)' ;
            PUT #34
                    @23  'DISSOLVED'
                    @39  'TOTAL'
                    @64  'DISSOLVED'
                    @78  'SUSPENDED'
                    @93  'CHEMICAL'
                    @105 'FEC.COLIFORM'/
                    @1   'D  M  YR'
                    @14  ' TIME '
                    @23  'PHOS. AS P'
                    @37  'PHOS. AS P'
                    @50  'TOTAL LEAD'
                    @63  'ORG. CARBON'
                    @77  'ORG. CARBON'
                    @92  'OXY. DEMAND'
                    @107 'BACTERIA'  /
                    @24  '(MG/L)'
                    @38  '(MG/L)'
                    @52  '(UG/L)'
                    @65  '(MG/L)'
                    @79  '(MG/L)'
                    @94  '(MG/L)'
                    @105 '(COL/100 ML)' ;
            T=12 ;
            B=38;
             RETURN ;
    * PRINT DATA ;
    PRINT :
            DATE=DATEPART(DATETIME) ;
            TIME=TIMEPART(DATETIME );
            PUT #T @1  DATE DATE9.
                    @15  TIME HHMM5.
                    @22 P00061 8.2
                    @36  P00095 7.
                    @52  P00400 4.2
                    @63  P70300 7.
                    @77  P00631 8.2
                    @91  P00608 8.2
                    @105 P00623 8.2
                    @119 P00625 8.2
                #8 @1 DATE DATE9.
                    @15  TIME HHMM5.
                    @22  P00666 8.2
                    @36  P00665 8.2
                    @49  P01051 8.2
                    @63  P00681 8.2
                    @77  P00689 8.2
                    @91  P00340 9.2
                    @105 P31625 9.2  ;
            T=T+1 ;
            B=B+1 ;
             RETURN ;
```

```
172       ;

NOTE: DATA SET WORK.TEMP HAS 4 OBSERVATIONS AND 5 VARIABLES. 255 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.23 SECONDS AND 130K.

176           ;

NOTE: DATA SET WORK.QWTEMP HAS 171 OBSERVATIONS AND 66 VARIABLES. 41 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.18 SECONDS AND 140K.

177                   XQWTIME

NOTE: DATA SET WORK.QWTEMP HAS 175 OBSERVATIONS AND 70 VARIABLES. 37 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.14 SECONDS AND 138K.

178                   RID

NOTE: DATA SET WORK.QWTEMP HAS 20 OBSERVATIONS AND 70 VARIABLES. 37 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.12 SECONDS AND 138K.

179                   XQWLIST

NOTE: THE VARIABLE P00061 IS UNINITIALIZED.
NOTE: THE VARIABLE P00400 IS UNINITIALIZED.
NOTE: THE VARIABLE P70300 IS UNINITIALIZED.
NOTE: THE VARIABLE P00631 IS UNINITIALIZED.
NOTE: THE VARIABLE P00608 IS UNINITIALIZED.
NOTE: THE VARIABLE P00623 IS UNINITIALIZED.
NOTE: THE VARIABLE P00666 IS UNINITIALIZED.
NOTE: THE VARIABLE P00681 IS UNINITIALIZED.
NOTE: THE VARIABLE P00689 IS UNINITIALIZED.
NOTE: 67 LINES WERE WRITTEN TO FILE PRINT.
NOTE: THE DATA STATEMENT USED 0.27 SECONDS AND 138K.

NOTE: SAS USED 140K MEMORY.

NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

CORE LIST OF WATER QUALITY CONSTITUENTS
FOR THE NATIONAL URBAN STUDIES PROGRAM

STATION ID: 254031080191100 FROM MAY 4, 1977 7:34 TO MAY 4, 1977 13:30

D M YR	TIME	DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	DISSOLVED SOLIDS (MG/L)	DISSOLVED NO2+NO3 AS N (MG/L)	DISSOLVED NH3 AS N (MG/L)	DISSOLVED KJELDAHL N. (MG/L)	TOTAL KJELDAHL N. (MG/L)
04MAY1977	9:27	.	.	.	.	.	.	.	1.41
04MAY1977	9:33	.	117	.	.	.	.	.	1.11
04MAY1977	9:42	.	122	.	.	.	.	.	0.83
04MAY1977	9:54	.	120	.	.	.	.	.	0.79
04MAY1977	10:06	.	92	.	.	.	.	.	0.73
04MAY1977	10:13	.	75	.	.	.	.	.	0.53
04MAY1977	10:30	.	82	.	.	.	.	.	2.62
04MAY1977	10:42	.	.	.	.	.	.	.	2.22
04MAY1977	10:54	.	140	.	.	.	.	.	0.78
04MAY1977	11:09	.	92	.	.	.	.	.	0.59
04MAY1977	11:27	.	97	.	.	.	.	.	0.85
04MAY1977	11:53	.	111	.	.	.	.	.	0.79

D M YR	TIME	DISSOLVED PHOS. AS P (MG/L)	TOTAL PHOS. AS P (MG/L)	TOTAL LEAD (UG/L)	DISSOLVED ORG. CARBON (MG/L)	SUSPENDED ORG. CARBON (MG/L)	CHEMICAL OXY. DEMAND (MG/L)	FEC.COLIFORM BACTERIA (COL/100 ML)
04MAY1977	9:27	.	0.21	610.00	.	.	110.00	.
04MAY1977	9:33	.	0.19	450.00	.	.	110.00	.
04MAY1977	9:42	.	0.14	230.00	.	.	65.00	.
04MAY1977	9:54	.	0.15	240.00	.	.	49.00	.
04MAY1977	10:06	.	0.16	220.00	.	.	11.00	.
04MAY1977	10:13	.	0.15	230.00	.	.	26.00	.
04MAY1977	10:30	.	0.50	1100.00	.	.	241.00	.
04MAY1977	10:42	.	0.43	860.00	.	.	234.00	.
04MAY1977	10:54	.	0.17	60.00	.	.	24.00	.
04MAY1977	11:09	.	0.21	70.00	.	.	10.00	.
04MAY1977	11:27	.	0.31	110.00	.	.	56.00	.
04MAY1977	11:53	.	0.29	150.00	.	.	37.00	.

CORE LIST OF WATER QUALITY CONSTITUENTS
FOR THE NATIONAL URBAN STUDIES PROGRAM

STATION ID: 254031080191100 FROM MAY 11, 1977 4:40 TO MAY 11, 1977 6:58

D M YR	TIME	DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	DISSOLVED SOLIDS (MG/L)	DISSOLVED NO2+NO3 AS N (MG/L)	DISSOLVED NH3 AS N (MG/L)	DISSOLVED KJELDAHL N. (MG/L)	TOTAL KJELDAHL N. (MG/L)
11MAY1977	4:56	.	150	.	.	.	.	.	1.84
11MAY1977	4:58	.	96	.	.	.	.	.	1.77
11MAY1977	5:00	.	92	.	.	.	.	.	1.25
11MAY1977	5:02	.	91	.	.	.	.	.	0.90
11MAY1977	5:04	.	95	.	.	.	.	.	0.78
11MAY1977	5:06	.	92	.	.	.	.	.	0.68
11MAY1977	5:08	.	89	.	.	.	.	.	0.63
11MAY1977	5:10	.	88	.	.	.	.	.	0.56

D M YR	TIME	DISSOLVED PHOS. AS P (MG/L)	TOTAL PHOS. AS P (MG/L)	TOTAL LEAD (UG/L)	DISSOLVED ORG. CARBON (MG/L)	SUSPENDED ORG. CARBON (MG/L)	CHEMICAL OXY. DEMAND (MG/L)	FEC.COLIFORM BACTERIA (COL/100 ML)
11MAY1977	4:56	.	0.27	630.00	.	.	150.00	.
11MAY1977	4:58	.	0.25	620.00	.	.	140.00	.
11MAY1977	5:00	.	0.20	500.00	.	.	87.00	.
11MAY1977	5:02	.	0.15	430.00	.	.	5.60	.
11MAY1977	5:04	.	0.14	370.00	.	.	52.00	.
11MAY1977	5:06	.	0.13	120.00	.	.	30.00	.
11MAY1977	5:08	.	0.12	70.00	.	.	47.00	.
11MAY1977	5:10	.	0.12	100.00	.	.	23.00	.

5.43 Water-Quality Loads and Loadings Utility Listing Program

The Water-Quality Loads and Loadings utility listing program (LOADS) is a set of SAS macros which produce: 1) an Individual Basin Chemical Constituent Load and Loading listing for any number of constituents and storms; 2) plots of the parameter value versus time, load versus time and accumulated load versus time for each constituent for each storm; and 3) a Total Loads and Loading listing for each storm. Both 1 and 2 above are optional.

The LOADS macro source code is stored in the partitioned data set AG4254J.URBAN.SOURCE which resides on the urban disk (VOL=SER=CCD810). The member name is LOADS. In the run deck the input to SAS is specified by the SYSIN data definition card in the JCL (figure 5.43.1). First, the macro source library is specified (card 7). This causes the LOADS macro definitions to be included in this run. Next, card 8 indicates that SAS input cards follow in the deck. Once a macro has been defined, anytime that macro name occurs in the following SAS code that macro code is inserted and executed. For example, card 13 causes the code for the macro XDTIME to be included at this point during the execution of the deck.

A description of the various macros follows.

Macro XDTIME and Macro RID

See the description of macros XDTIME and RID which are included in the description of RRLIST (Section 5.41).

Macro XQWTIME

The macro XQWTIME takes the data set QWMASTER as input and converts the character TIME value to numeric. The TIME value is in character format as an output from QWSAS. In the future a numeric value will be available and this step will not be necessary. Once the TIME value is in numeric form it is used to create a DATETIME value for each observation. The DATETIME value can then be used to merge discharge values with the water-quality values. In addition, the macro XQWTIME interleaves the storm observations from data set TEMP and adds the storm start and stop times to each QWMASTER observation to be used on listings during a later step. The output data set is QW.

```
       COL.1      COL.12
         ●          ●
Card  1..//          JOB
      2..// EXEC SAS,OPTIONS='MACROGEN',TIME=3
      3..//UVFILE DD DSN=AG4yyyz.STATEXX.URBAN.UNIT.VALUES,
      4..// DISP=SHR
      5..//QWFILE DD DSN=AG4yyyz.STATEXX.URBAN.QW.VALUES,
      6..// DISP=OLD
      7..//SYSIN DD DSN=AG4254J.URBAN.SOURCE(LOADS),DISP=SHR
      8..//       DD *
      9..          MACRO INTERVAL 1. %
     10..          MACRO DA '14.7' %
     11..          MACRO NUMDA 14.7 %
     12..          MACRO PC . %
     13..          XDTIME
     14..254031080191100 770511 04 40 770511 06 59
     15..254031080191100 770715 06 30 770715 09 41
     16..* ;
     17..          PROC PRINT ;
     18..          VAR STATION TAG DATETIME ;
     19..          FORMAT DATETIME DATETIME16. ;
     20..          XQWTIME
     21..          MACRO PC 60 %
     22..          XDTIME
     23..254031080191100 770511 04 40 770511 06 59
     24..254031080191100 770715 06 30 770715 09 41
     25..* ;
     26..          DATA DISCH ;
     27..          SET TEMP UVFILE.UVMASTER ;
     28..          BY STATION PARMCODE DATETIME ;
     29..* ;
     30..          DATA UV1 (RENAME=(TAG1=TAG VALUE=DISCH)) ;
     31..          SET DISCH ;
     32..          RID
     33..          DATA QW1 (RENAME=(TAG1=TAG)) ;
     34..          SET QW ;
     35..          RID
     36..          MACRO CHEMNAME 'TOTAL NITROGEN ' %
     37..          MACRO VPCODE P00625 %
     38..          MACRO PCODE '00625' %
     39..          XSLOPE
     40..          MACRO XPRINT 1 %
     41..          MACRO PINTER 5 %
     42..          XLOADTAB
     43..          XFIRSTTL
     44..          XPLOTS
     45..          MACRO CHEMNAME 'TOTAL PHOSPHORUS AS P' %
     46..          MACRO VPCODE P00665 %
     47..          MACRO PCODE '00665' %
     48..          XSLOPE
     49..          XLOADTAB
     50..          XTOTLOAD
     51..          XPLOTS
     52..          XTOTLIST
     53../*
     54..//
```

Figure 5.43.1.--SAS and JCL commands for executing LOADS.

Macro XSLOPE

The LOADS program uses a linear interpolation to estimate the constituent values between the sample points. For points before the first sample point the constituent value at the first sample point is used and for points after the last sample point the constituent value at the last point is used. The XSLOPE macro calculates the slopes (S) and intercepts (B) of these lines. Since each sample point is the first point of one of the approximation lines, that slope and intercept are assigned to it. Any point which comes after this sample point and before the next is given an approximated constituent value based on this slope and intercept. The output from this step is data set SLOPE. Macro XSLOPE prints a listing of SLOPE called Slopes and Intercepts calculated from Sample Points. An example of this listing can be seen in the sample LOADS run. The output includes the following information:

STATION	Station identification for the data.
TAG	Storm number.
PARAM	Constituent value.
DATETIME	Date and time of measurement.
INDSRUN	Indicates the first and last sample point for each storm.

The constituent name and parameter code are also listed.

In the next step of the XSLOPE macro the data set SLOPE is merged with the data set UV1 which has the selected discharge measurements. The output data set of this step is QWUV. This data set has all the information for interpolating the constituent values at the times when discharge values are available. The XSLOPE macro makes these calculations, and the results are stored in the data set FINAL.

Macro XLOADTAB

The macro XLOADTAB creates the Individual Basin Chemical Constituent Load and Loadings listing from the information in the data set FINAL. For each DATETIME the listing has the following information:

```
Discharge
Time interval data:  constituent value
                     load
                     loading
Accumulated data:  load
                   loading
                   accumulated runoff
```

The macro assumes that the data exists in certain intervals, INTERVAL (min), specified on a macro card in the run deck, and that no data is missing. The load is calculated with the following equation

```
TIMEX = 60. * INTERVAL   ;
LOAD = C * DISCH * PARAM * TIMEX   ;
```

where C is a conversion constant 6.245×10^{-5}; DISCH is the instantaneous discharge in cubic feet per second and PARAM is the constituent value for that particular time in mg/L and TIMEX is the interval in seconds. The accumulated runoff is calculated by the following formula:

```
ACCRUN = (ACCDIS * INTERVAL/1440.)/
         ((NUMDA/640.) * 26.9)
```

where

ACCDIS	Accumulated discharge
INTERVAL	Interval in minutes
NUMDA	Drainage area in acres

If the Individual Basin Chemical Constituent listing is desired set MACRO XPRINT to 1 (figure 5.43.1, card 40), if not, set MACRO XPRINT to 0. The size of the listing can be changed by MACRO PINTER. If MACRO PINTER is 1, every time will be included in the listing. If MACRO PINTER is 5, every fifth time will be listed. In the example (figure 5.43.1) the data interval is 1 minute and PINTER is 5, therefore, the table will list load and loadings for every fifth minute.

Macro XPLOTS

The macro XPLOTS produces three plots for each constituent for each storm. The plots are parameter value versus time, load versus time, and accumulated load versus time. The macro uses values which are stored in the data set PLOTDATA by macro XLOADTAB. If the plots are not wanted then do not include the XPLOTS card in the run deck sequence for that particular constituent.

Macro XTOTLOAD

The macro XTOTLOAD merges all the total load listing information which has been produced for this constituent together into a temporary data set called TOTLOAD2. The next step is to merge this information into the permanent total loads data set TOTLOAD as a SAS update. Any observations with the same STATION, TAG, and PARMCODE values will be replaced by the new total loads information calculated here. Any observations from TOTLOAD2 which do not have a match in TOTLOAD will be added to it.

For the first time only, specify the macro XFIRSTTL which will copy TOTLOAD2 into XTOTLOAD for the first constituent. For the second and succeeding constituents use macro XTOTLOAD which will update XTOTLOAD with the newest load values and add to the data set.

Each observation in the TOTLOAD data set has the information listed in figure 5.43.2.

Variable	Description
STATION	Station identification
TAG	Storm number
START	Storm start time
ENDTIME	Storm end time
PARMCODE	Constituent parameter code
CNAME	Constituent name
NUMSAMPT	Number of sample points
ACCLOAD	Total load
ACCLOADG	Total loading
SLOAD	Total sample load
SLOADG	Total sample loading
ACCRUN	Total runoff
ACCSRUN	Total sample runoff
PERCENT	Percent runoff sampled
TOTNUMPT	Total number of points

Figure 5.43.2.--Contents of data set TOTLOAD.

Macro XTOTLIST

The macro XTOTLIST creates the Total Basin Chemical Constituent Loads and Loading table from the data set TOTLOAD. The sampled load and loading are the load and loading calculated between the first and last sample points. The rest of the table is self explanatory. A separate listing is made for each storm.

Run Deck Description

The run deck consists of job control language (JCL), SAS statements and input data cards. The following is a card by card description of a sample run deck (figure 5.43.1). For further discussion of the JCL see the CCD User's Guide.

The JCL must be entered in certain card columns as shown (figure 5.43.1). The SAS statements may be entered in any columns on the cards with spaces separating the values except where noted. For a more complete description of the storm data cards see the discussion on XDTIME macro and figure 5.41.2.

Card	1..	Job card.
	2..	Execute a SAS program for a maximum of three minutes.
	3-4..	Specifies the OS data set containing the SAS data set UVMASTER for state XX. Specify data set disposition (DISP) equals SHR since the data set will not be written on.
	5-6..	Specifies the OS data set containing the SAS data set QWMASTER for state XX. Specify data set disposition (DISP) equals OLD since the data set will be written on.
	7..	The macro source for the LOADS program is contained in member LOADS of the partitioned data set AG4254J.URBAN.SOURCE.
	8..	Concatenate the following cards to the SAS input.
	9..	Defines the macro INTERVAL, the data interval.
	10..	Defines the macro DA, character drainage area for the listing; put the value in single quotes.
	11..	Defines the macro NUMDA, the drainage area for computations (in acres).
	12..	Defines the macro PC, the parmcode for selecting the water-quality data; set to the SAS missing indicator.
	13..	Calls the macro XDTIME which reads the following input storm data cards which will be used to select water-quality data from QWMASTER.
	14-15..	Input data cards describing the data sequences needed for the loads computation. See fig. 5.41.2 for a comple description of the cards.

Card 16..	SAS comment card indicates end of data.
17-19..	Optional SAS statements to list the data set TEMP created by XDTIME. This data set contains the storm start and end times.
20..	Calls the macro XQWTIME.
21..	Defines the macro PC, the parameter code for the discharge.
22..	Calls the macro XDTIME which reads the following input storm data cards which will be used to select the discharge observations from UVMASTER.
23-24..	Input data cards describing the data sequences needed for the loads computation. See fig. 5.41.2 for a complete description of the cards.
25..	SAS comment card indicates end of data.
26-28..	SAS statements which interleave the data set TEMP created by macro XDTIME with the unit values data set UVMASTER. The resultant data set is called DISCH.
29..	Optional SAS comment card.
30-32..	Calls the macro RID which deletes all unnecessary observations from DISCH. The remaining observations with discharge data are in data set UV1.
33-35..	Calls the macro RID which deletes all unnecessary water-quality observations from the data set QW. The remaining observations with water-quality data are in data set QW1.
36..	Defines the macro CHEMNAME, a short description of the constituent under consideration.
37..	Defines the macro VPCODE which is the variable name constructed from the parameter code, i.e., Pxxxxx, where xxxxx is the parameter code.
38..	Defines the macro PCODE which is the parameter code in single quotes for listing.
39..	Calls the macro XSLOPE which extrapolates and interpolates the constituent values for the selected discharges.
40..	Defines the macro XPRINT. If XPRINT is 1, the Individual Basin Chemical Constituent Load and Loadings listing will be listed. If XPRINT is Ø, it will not. This value will hold for the rest of the run deck unless another XPRINT card is included.
41..	Defines MACRO PINTER the print interval.
42..	Calls the macro XLOADTAB, which creates the individual listing and does the load and sample load calculation. Total load information is created and stored in the data set TOTLOAD2 and information for plots is saved in the data set PLOTDATA.
43..	Calls the macro XFIRSTTL which creates the permanent data set TOTLOAD with the total load information from the data sets TOTLOAD1 and TOTLOAD2. Note card 50 where XTOTLOAD is used for the second constituent and all others thereafter.
44..	Calls the macro XPLOTS which creates a series of three plots for each storm: 1) parameter value versus time; 2) load versus time; and 3) accumulated load versus time.

Card 45-51..	Cards for processing the second constituent with the same purposes as cards 37-44.
52..	Calls macro XTOTLIST to create total loads listing for each storm from information in the data set TOTLOAD.
53-54..	End of step and job

The following pages illustrate a complete sample run. The listing includes JCL commands, SAS instructions, and corresponding output. Also, Appendix B contains a description of some common errors which may be encountered when running the LOADS program and some possible solutions.

```
//AG4254J7 JOB ($$$$$$$$$$,J001,$.9),'LORENS',CLASS=B,MSGLEVEL=(2,0)          J3397
// EXEC SAS,TIME=3
//UVFILE DD DSN=AG4254J.STATE12.URBAN.UNIT.VALUES,
// DISP=SHR
//UWFILE DD DSN=AG4254J.STATE12.URBAN.UW.VALUES,
// DISP=OLD
//SYSIN DD DSN=AG4254J.URBAN.SOURCE(LOADS),DISP=SHR
//       DD *
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SAS      / START 81174.0842
IEF374I STEP /SAS      / STOP  81174.0847 CPU    0MIN 10.10SEC MAIN 240K LCS    0K
CCD006I STEP /SAS      / I/O IN DD SEQ: 563:0       481:68       314:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 314:0       563:0        563:2153
CCD006I STEP /SAS      / I/O IN DD SEQ: 4AA:19      4AC:35       430:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 155:0       314:0        4AD:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 563:0       155:0        155:0
CCD006I STEP /SAS      / I/O IN DD SEQ: 744:77      744:229      744:11
CCD006I STEP /SAS      / I/O IN DD SEQ: 5E2:3
CCD001I STEP /SAS      / MEMORY RESERVED  240K; ACCESSES: DISK    2595/ TAPE        0
IEF375I  JOB /AG4254J7/ START 81174.0842
IEF376I  JOB /AG4254J7/ STOP  81174.0847 CPU    0MIN 10.10SEC
CCD007A  JOB /AG4254J7/ BASIC CHRG: FIXED   CPU   DSK-IO  TPE-IO KBYTE-HR  TOTAL
                                     1.24    7.68    7.89            1.55   18.36
CCD002I  JOB /AG4254J7/ TOTAL CHARGE RECORDED =     $18.36
CCD003I  JOB /AG4254J7/ US GEOLOGICAL SURVEY RE1 OS REL 21B TIME = 08.47.42 DATE = 06/23/81

                        CONSERVATION DISK CCD925 DESTROYED.
                        RESTORED FROM BACKUP OF 2:38PM, JUNE 6, 1981.
                        QUESTIONS SHOULD BE DIRECTED TO DOUG SIMMONS, FTS-928-7584.
```

NOTE: THE JOB AG4254J7 HAS BEEN RUN UNDER RELEASE 79.3B OF SAS AT U.S. GEOLOGICAL SURVEY.

```
1          ********************************************************************************
2          *                                                                              *
3          *        UPDATED JUNE 5,1981                                                   *
4          *             SORTS ADDED TO XFIRSTTL AND XTOTLOAD MACROS          6/5/81      *
5          *                                                                              *
6          ********************************************************************************;
7          * ;
8          MACRO XDTIME
9          *READ IN STORM START AND STOP TIMES;
10                 DATA TEMP ;
11                 KEEP STATION TAG DATETIME PARMCODE EDATIME ;
12                 INPUT STATION $CHAR15. SDATE : YYMMDD6. SHOUR : 2. SMIN : 2.
13                                    EDATE : YYMMDD6. EHOUR : 2. EMIN : 2. ;
14                 TAG+1 ;
15                 PARMCODE=PC ;
16                 DATETIME=DHMS(SDATE,SHOUR,SMIN,0) ;
17                 EDATIME=DHMS(EDATE,EHOUR,EMIN,0) ;
18                 OUTPUT ;
19                 DATETIME= DHMS(EDATE,EHOUR,EMIN,0) ;
20                 OUTPUT ;
21                 CARDS ;
22         %
23         MACRO XQWTIME
24         * ;
25         * CONVERT WATER QUALITY CHAR TIME TO NUMERIC ;
26                 DATA QWTEMP ;
27                 SET QWFILE.JWMASTER ;
28                 DROP TIMEX HOUR MIN TIME DATE ;
29                 TIMEX=INPUT(TIME,4.) ;
30                 HOUR=INT(TIMEX/100) ;
31                 MIN=MOD(TIMEX,100);
32                 MIN=INT(MIN) ;
33                 DATETIME=DHMS(DATE,HOUR,MIN,0) ;
34         *;
35                 DATA QW ;
36         * TO PUT STORM START AND STOP TIMES ON EACH OBSERVATION ;
37                 SET TEMP QWTEMP ;
38                 BY STATION DATETIME ;
39                 DROP EDATIME ;
40                 RETAIN START ENDTIME ;
41                 IF DATETIME NE EDATIME AND EDATIME NE . THEN DO ;
42                      START=DATETIME ;
43                      ENDTIME=EDATIME - 60 ;
44                      END ;
45         %
46         MACRO XPSEUDO
47         * THIS ROUTINE IS ONLY TO SET UP A PSEUDO SAMPLE POINT TO
48          TO USE TO EXTRAPOLATE PARAMETER VALUES BEFORE THE FIRST SAMPLE POINT. ;
49         * ;
50                 DATA QW ;
51                 SET QW ;
52                 DROP IND TAG1 ;
53                 RETAIN TAG1 0 DATEX 0 IND 1 ;
54                 IF TAG NE . AND
55                     TAG NE TAG1 THEN DO ;
```

```
56                  TAG1=TAG ;
57                DATEX=DATETIME ;
58                OUTPUT ;
59                IND=0 ;
60                RETURN ;
61                END;
62                IF IND=0 THEN DO ;
63                TIMESAVE=DATETIME ;
64                DATETIME=DATEX ;
65                OUTPUT ;
66                DATETIME=TIMESAVE ;
67                OUTPUT ;
68                IND=1 ;
69                END ;
70                ELSE OUTPUT ;
71          * ;
72          %
73                MACRO RID
74          * TO SELECT THE OBSERVATIONS FOR THE APPROPRIATE TIME INTERVALS ;
75          * RID THE DATASET OF EXTRANEOUS OBSERVATIONS ;
76                DROP TAG IND ;
77                RETAIN TAG1 0 IND 0 ;
78                IF TAG NE . AND
79                   TAG NE TAG1 AND
80                   IND=0 THEN DO;
81                         TAG1=TAG ;
82                         IND=1 ;
83                         DELETE ;
84                         END ;
85                IF IND =0 THEN DELETE ;
86                IF TAG EQ TAG1 AND
87                   IND=1 THEN DO ;
88                         IND= 0 ;
89                         DELETE ;
90                         END ;
91                ELSE OUTPUT ;
92          * NOW THE DATA SET CONTAINS ONLY THE REQUIRED OBSERVATIONS ;
93                %
94          MACRO XSLOPE
95                DATA QW2 ;
96                SET QW1 ;
97                DROP IND TAG1 DATESAVE ;
98                RETAIN TAG1 0 IND 0 ;
99          * IS IT A NEW STORM ;
100               IF TAG NE TAG1 THEN DO ;
101         * NEW STORM ;
102                  TAG1=TAG ;
103                  LINK POINT ;
104                  END ;
105               ELSE DO ;
106                  IF IND = 1 THEN LINK POINT ;
107                  ELSE DO ;
108                  IF VPCODE NE . THEN OUTPUT ;
109                  ELSE DELETE ;
110                  END ;
111                  END ;
112               RETURN ;
113         POINT :
```

```
114              IF VPCODE NE . THEN LINK POINTX ;
115              ELSE DO ;
116                   IND = 1 ; *LOOK FOR GOOD VALUE ;
117                   DELETE ;
118                   END ;
119                   RETURN ;
120         POINTX :
121              DATESAVE=DATETIME ;
122              DATETIME=START ;
123              OUTPUT ;
124              IND=0 ;
125              DATETIME=DATESAVE ;
126              OUTPUT ;
127              RETURN ;
128              DATA SLOPE(RENAME=(DTX=DATETIME VALUE=PARAM)
129                        (KEEP= STATION DTX TAG VALUE S B INDSRUN START )
130                   TOTLOAD1(KEEP= STATION TAG START ENDTIME XCODE
131                                  CNAME NUMSAMPT) ;
132              SET QW2 ;
133              BY TAG; * DIFFERENTIATES STORMS ;
134              RETAIN VALUE SAMPTIME IND 0 DTX INDSRUN ;
135              RETAIN XCODE PCODE ;
136              RETAIN NUMSAMPT 0 CNAME CHEMNAME ;
137              TIME=TIMEPART(DATETIME) ;
138              TIME=TIME+86400*(DATEPART(DATETIME)-DATEPART(START)) ;
139              PARAM=VPCODE ;
140              IF FIRST.TAG THEN DO ;
141              NUMSAMPT=0 ;
142                   GO TO INIT ;
143                   END ;
144              IF LAST.TAG THEN DO ;
145                   GO TO FINAL ;
146                   END ;
147         * TO TAKE CARE OF FIRST SAMPLE POINT ;
148              IF IND=1 THEN DO ;
149              IND=0 ;
150              VALUE=PARAM ;
151              SAMPTIME=TIME ;
152              DTX=DATETIME ;
153                   INDSRUN='FIRST' ;
154                   RETURN ;
155                   END ;
156         SLOPE:
157              S=(PARAM-VALUE)/(TIME-SAMPTIME) ;
158         * INTERCEPT;
159              B=PARAM-S*TIME ;
160              OUTPUT SLOPE ;
161              NUMSAMPT=NUMSAMPT+1 ;
162              VALUE=PARAM ;
163              SAMPTIME=TIME ;
164              DTX=DATETIME ;
165              INDSRUN='     ';
166               RETURN ;
167         INIT:
168              IND=1 ;
169              VALUE=PARAM ;
170              SAMPTIME=TIME ;
171              DTX=DATETIME ;
```

```
172                S=0 ;
173                B=PARAM ;
174                OUTPUT SLOPE;
175                RETURN ;
176        FINAL:
177                LINK SLOPE ;
178                S=0 ;
179                B=PARAM ;
180                    INDSRUN='LAST' ;
181                OUTPUT SLOPE ;
182                NUMSAMPT=NUMSAMPT+1 ;
183                OUTPUT TOTLOAD1 ;
184                INDSRUN='    ' ;
185                RETURN ;
186        * ;
187                PROC PRINT DATA=SLOPE ;
188                TITLE SLOPES AND INTERCEPTS CALCULATED FROM SAMPLE POINTS ;
189                TITLE3 CHEMNAME ' PARMCODE=' PCODE ;
190                FORMAT DATETIME DATETIME15. ;
191        * ;
192        * MERGE SLOPES INTO COMPLETE DATA SET ;
193                DATA QWQV ;
194                MERGE SLOPE QV1 ;
195                BY DATETIME ;
196        * ;
197        * TO INTERPOLATE AND EXTRAPOLATE THE VALUES FROM THE SAMPLE INFO  ;
198                DATA FINAL ;
199                SET QWQV ;
200                KEEP STATION DATE TIME PARAM DISCH TAG SAMPIND START ;
201                RETAIN SLOPE INTER SAMPIND 0 SDAT ;
202                TIME=TIMEPART(DATETIME) ;
203                DATE=DATEPART(DATETIME) ;
204        * IF SLOPE=. THEN THIS IS A POINT FROM QV FILE WITH DISCHARGE ;
205        * IF SLOPE NE . THEN THIS IS A SAMPLE POINT ;
206        * TO MARK DISCHARGES FOR SAMPLE RUNOFF CALCULATION ;
207                IF INDSRUN EQ 'FIRST' THEN SAMPIND=1 ;
208                IF S NE . THEN DO ;
209                          SLOPE = S ;
210                          INTER = B ;
211                          SDAT=DATEPART(START) ;
212        * IF NO DISCHARGE FOR THIS PT. THEN DELETE ;
213                     IF DISCH=. THEN DO ;
214                           IF INDSRUN EQ 'LAST' THEN SAMPIND=0 ;
215                           DELETE ;
216                           END ;
217        * IF DISCHARGE FOR THIS PT. THEN SAVE ;
218                    ELSE DO ;
219                           OUTPUT ;
220                           IF INDSRUN EQ 'LAST' THEN SAMPIND=0 ;
221                           END ;
222                         END ;
223        * THIS IS DISCHARGE POINT ;
224        * INTERPOLATE THE QW VALUES ;
225                ELSE DO ;
226                PARAM=SLOPE*(TIME+86400*(DATE-SDAT)) + INTER ;
227                OUTPUT ;
228                END ;
229        * ;
```

```
230       %
231       MACRO XLOADTAB
232                DATA TOTLOAD2
233                     (KEEP=STATION TAG XCODE ACCLOAD SLOAD
234                                            ACCLOADG SLOADG
235                                            ACCRUN ACCSRUN
236                                            PERCENT TOTNUMPT )
237                     PLOTDATA (KEEP=TIME PARAM LOAD ACCLOAD TAG ) ;
238                SET ;
239                BY TAG ;
240                RETAIN SLOAD SLOADG 0    XCODE PCODE TOTNUMPT ;
241                RETAIN ACCLOAD ACCLOADG STARTIME ACCDISCH SAMPRUN ;
242                FILE PRINT _LINESLEFT=_ NOTITLES ;
243                IF FIRST.TAG THEN DO ;
244                          TOTNUMPT = 0 ;
245                          IF XPRINT THEN LINK TABLETOP ;
246                          IF XPRINT THEN LINK COLUMN ;
247                          STARTIME=TIME ;
248                     ACCLOAD=0. ;
249                     ACCLOADG=0. ;
250                     SAMPRUN=0. ;
251                     ACCDISCH=0. ;
252                SLOAD=0;
253                SLOADG=0 ;
254                     END ;
255                IF XPRINT AND L<5 THEN DO ;
256                     PUT _PAGE_ ;
257                     LINK COLUMN ;
258                     END ;
259                TOTNUMPT = TOTNUMPT+1 ;
260                TIMEX=60.*INTERVAL ;
261                LOAD=5.265E-5*DISCH*PARAM*TIMEX  ;
262       * CONVERT UG TO MG FOR LEAD ;
263                IF PCODE EQ '01051' THEN LOAD=LOAD/1000. ;
264                ACCLOAD=ACCLOAD + LOAD ;
265                LOADING = LOAD / NUMDA ;
266                ACCLOADG=ACCLOADG+LOADING ;
267                ACCDISCH=ACCDISCH+DISCH ;
268                SFD=ACCDISCH*INTERVAL/1440. ;
269                ACCRUN=SFD/(( NUMDA / 640.) * 25.9 ) ;
270       * ACCUMULATE SAMPLE RUNOFF, LOAD, AND LOADING ;
271                IF SAMPIND THEN DO ;
272                     SAMPRUN=SAMPRUN+DISCH ;
273                     SLOAD=S_OAD+LOAD ;
274                     SLOADG=SLOADG+LOADING ;
275                     END ;
276                OUTPUT PLOTDATA ;
277                IF XPRINT THEN LINK PRINT ;
278                IF LAST.TAG THEN DO ;
279                     LINK SAMPLED ;
280                     OUTPUT TOTLOAD2 ;
281                     END ;
282                RETURN ;
283       SAMPLED:
284                SFD=SAMPRUN*INTERVAL/1440. ;
285                ACCSRUN=SFD/((NUMDA/640.)*26.9) ;
286                PERCENT=ACCSRUN/ACCRUN*100. ;
287                IF XPRINT THEN
```

```
288             PUT // #35 'SAMPLED RUNOFF: ' ACCSRUN 8.3
289                 +2 '% PERCENT OF TOTAL RUNOFF: ' PERCENT 6.2 ;
290             RETURN ;
291     * PRINT TABLE TITLES ;
292     TABLETOP :
293             PUT _PAGE_ ;
294             PUT #25 'INDIVIDUAL BASIN CHEMICAL CONSTITUENT LOAD AND LOADINGS '//
295                 #8 'STATION ID : ' STATION $15. +2
296                     'FROM ' DATE DATE7. TIME TIME5. //
297                 #8 'CHEMICAL NAME:' CHEMNAME
298                 +5 'DRAINAGE AREA(ACRES): ' DA /
299                 #8 'PARAMETER CODE: ' PCODE ;
300             RETURN ;
301     * COLUMN HEADINGS ;
302     COLUMN:
303             PUT #44 '***TIME INTERVAL DATA***' +12 '***ACCUMULATED DATA***' ;
304             PUT #10 'DATE' +6 'TIME'
305                 #29 'DISCHARGE'
306                 #43 'CONSTITUENT'
307                 #55 'LOAD'
308                 #63 'LOADING'
309                 #77 'LOAD'
310                 #85 'LOADING'
311                 #95 'ACCUMULATED'/
312                 #31 '(CFS)'
313                 #45 'VALUE'
314                 #55 '(LBS)'
315                 #62 '(LBS/ACRE)'
316                 #77 '(LBS)'
317                 #84 '(LBS/ACRE)'
318                 #96 'RUNOFF(IN)' / ;
319             RETURN ;
320     * PRINT DATA ;
321     PRINT:
322     IF ~(MOD(TOTNUMPT,PINTER)=0 OR LAST.TAG) THEN RETURN ;
323             PUT #8 DATE DATE9.
324                 #21 TIME TIME5.
325                 #30 DISCH 6.2
326                 #44 PARAM 7.3
327                 #52 LOAD 5.3
328                 #60 LOADING 8.3
329                 #74 ACC_LOAD 8.2
330                 #83 ACC_LOADS 8.2
331                 #95 ACCRUN 8.2 ;
332             RETURN ;
333     %
334     MACRO XPLOTS
335             PROC PLOT DATA=PLOTDATA ;
336             BY TAG ;
337             FORMAT TIME HHMM5. ;
338             PLOT PARAM*TIME='*';
339             TITLE1 CHEMNAME ' PARMCODE=' PCODE ;
340             PLOT LOAD*TIME='*' ;
341             TITLE1 CHEMNAME ' PARMCODE=' PCODE ;
342             PLOT ACCLOAD*TIME='*' ;
343             TITLE1 CHEMNAME ' PARMCODE=' PCODE ;
344     %
345             MACRO XTOTLIST
```

```
346       *TOTAL LOADS LISTING PROGRAM ;
347       * WILL TAKE INFO FROM TOTLOAD DATASET AND
348       * PRESENT IN A FORMATTED TABLE
349       * PROCESS INFORMATION BY STORM STARTTIME ;
350                DATA _NULL_ ;
351                SET QWFILE.TOTLOAD ;
352                BY START ;
353                FILE PRINT NOTITLES ;
354                DATES=DATEPART(START) ;
355                TIMES=TIMEPART(START) ;
356                DATEE=DATEPART(ENDTIME) ;
357                TIMEE=TIMEPART(ENDTIME) ;
358                IF FIRST.START THEN LINK TABLETOP ;
359                LPERCENT=SLOADG/ACCLOADG * 100. ;
360                LINK PRINT ;
361                IF LAST.START THEN PUT _PAGE_ ;
362                RETURN ;
363       TABLETOP :
364              PUT #38 '***TOTAL BASIN CHEMICAL CONSTITUENT LOADS AND LOADINGS***' ///
365                   #10  'STATION ID: ' STATION $15. /
366                    #10  'TIME.START: ' DATES WORDDATE22. TIMES HHMM5. +2
367                         'TIME.END: ' DATEE WORDDATE22. TIMEE HHMM5. /
368                   #10  'TOTAL RUNOFF(IN): ' ACCRUN 5.3
369                   #10  'NUMBER OF POINTS IN EVENT: ' TOTNUMPT 4. //
370                   #2   'PARAMETER'
371                   #15  'CONSTITUENT NAME'
372                   #38  'NO. OF'
373                   #48  'ESTIMATED'
374                   #61  'SAMPLED'
375                   #75  'ESTIMATED'
376                   #88  'SAMPLED'
377                   #100 'PERCENT'
378                   #114 'SAMPLED'
379                   #125 'PERCENT' /
380                   #4   'CODE'
381                   #38  'SAMPLE'
382                   #48  'TOTAL LOAD'
383                   #62  'LOAD'
384                   #73  'TOTAL LOADING'
385                   #88  'LOADING'
386                   #100 'SAMPLED'
387                   #114 'RUNOFF'
388                   #125 'SAMPLED' /
389                   #38  'POINTS'
390                   #51  '(LBS)'
391                   #62  '(LBS)'
392                   #74  '(LBS/ACRE)'
393                   #87  '(LBS/ACRE)'
394                   #114 '(INS)' // ;
395              RETURN ;
396       PRINT:
397              PUT #2 PARMCODE $5.
398                   #15 CNAME $20.
399                   #38 NUMSAMPT 4.
400                   #48 ACC_LOAD 9.5
401                   #61 SLOAD 9.5
402                   #75 ACC_LOADG 9.5
403                   #88 SLOADG 9.5
```

```
404                     @100 LPERCENT 4.1
405                     @114 ACCSRUN 6.3
406                     @125 PERCENT 4.1 ;
407                 RETURN ;
408         %
409         MACRO XFINSTTL
410                 DATA TOTLOAD2 (RENAME=(XCODE=PARMCODE)) ;
411                 MERGE TOTLOAD1 TOTLOAD2 ;
412                 BY STATION TAG XCODE ;
413                 PROC SORT OUT=QWFILE.TOTLOAD ;
414                 BY STATION TAG PARMCODE ;
415         %
416         MACRO XTOTLOAD
417                 DATA TOTLOAD2 (RENAME=(XCODE=PARMCODE)) ;
418                 MERGE TOTLOAD1 TOTLOAD2 ;
419                 BY STATION TAG XCODE ;
420                 PROC SORT ;
421                 BY STATION TAG PARMCODE ;
422                 DATA QWFILE.TOTLOAD ;
423                 UPDATE QWFILE.TOTLOAD TOTLOAD2 ;
424                 BY STATION TAG PARMCODE ;
425         %
426         MACRO PINTER 5 %
427                 MACRO INTERVAL 1. %
428                 MACRO DA '14.7' %
429                 MACRO NUMDA 14.7 %
430                 MACRO PC . %

NOTE: DATA SET WORK.TEMP HAS 4 OBSERVATIONS AND 5 VARIABLES. 255 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.31 SECONDS AND 130K.

434         * ;

NOTE: DATA SET WORK.QWTEMP HAS 171 OBSERVATIONS AND 66 VARIABLES. 41 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.21 SECONDS AND 140K.

435                 XQWTIME
436                 MACRO PC 60 %

NOTE: DATA SET WORK.QW HAS 175 OBSERVATIONS AND 70 VARIABLES. 37 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.16 SECONDS AND 139K.


NOTE: DATA SET WORK.TEMP HAS 4 OBSERVATIONS AND 5 VARIABLES. 255 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.07 SECONDS AND 130K.

440         * ;
441                 DATA DISCH ;
442                 SET TEMP UVFILE.UVMASTER ;
443                 BY STATION PARMCODE DATETIME ;
444         * ;
445

NOTE: DATA SET WORK.DISCH HAS 19790 OBSERVATIONS AND 9 VARIABLES. 197 OBS/TRK.
NOTE: THE DATA STATEMENT USED 3.34 SECONDS AND 132K.

445                 DATA UV1 (RENAME=(TAG1=TAG VALUE=DISCH)) ;
446                 SET DISCH ;
```

```
447                 RID
448

NOTE: DATA SET WORK.JV1 HAS 495 OBSERVATIONS AND 9 VARIABLES. 197 OBS/TRK.
NOTE: THE DATA STATEMENT USED 1.22 SECONDS AND 130K.

448                 DATA QW1 (RENAME=(TAG1=TAG)) ;
449                 SET QW ;
450                 RID
451                 MACRO CHEMNAME 'TOTAL PHOSPHORUS AS P' &
452                 MACRO VPCODE P00665 &
453                 MACRO PCODE '00665' &

NOTE: DATA SET WORK.QW1 HAS 20 OBSERVATIONS AND 70 VARIABLES. 37 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.16 SECONDS AND 138K.


NOTE: DATA SET WORK.QW2 HAS 22 OBSERVATIONS AND 70 VARIABLES. 37 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.13 SECONDS AND 138K.


NOTE: DATA SET WORK.SLOPE HAS 22 OBSERVATIONS AND 8 VARIABLES. 190 OBS/TRK.
NOTE: DATA SET WORK.TOTLOAD1 HAS 2 OBSERVATIONS AND 7 VARIABLES. 169 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.24 SECONDS AND 148K.


NOTE: THE PROCEDURE PRINT USED 0.18 SECONDS AND 134K AND PRINTED PAGE 1.


NOTE: DATA SET WORK.QWJV HAS 496 OBSERVATIONS AND 14 VARIABLES. 126 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.19 SECONDS AND 130K.

454                 XSLOPE
455                 MACRO XPRINT 1 &

NOTE: DATA SET WORK.FINAL HAS 495 OBSERVATIONS AND 8 VARIABLES. 206 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.22 SECONDS AND 138K.

456                 XLOADTAB

NOTE: 122 LINES WERE WRITTEN TO FILE PRINT.
NOTE: DATA SET WORK.TOTLOAD2 HAS 2 OBSERVATIONS AND 11 VARIABLES. 135 OBS/TRK.
NOTE: DATA SET WORK.PLOTDATA HAS 496 OBSERVATIONS AND 5 VARIABLES. 325 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.45 SECONDS AND 140K.


NOTE: DATA SET WORK.TOTLOAD2 HAS 2 OBSERVATIONS AND 15 VARIABLES. 92 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.15 SECONDS AND 130K.

457                 XFIRSTTL
458                 MACRO CHEMNAME 'TOTAL NITROGEN ' &
459                 MACRO VPCODE P00625 &
460                 MACRO PCODE '00625' &

NOTE: DATA SET QWFILE.TOTLOAD HAS 2 OBSERVATIONS AND 15 VARIABLES. 92 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.32 SECONDS AND 235K.
```

```
NOTE: DATA SET WORK.QW2 HAS 22 OBSERVATIONS AND 70 VARIABLES. 37 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.11 SECONDS AND 136K.


NOTE: DATA SET WORK.SLOPE HAS 22 OBSERVATIONS AND 8 VARIABLES. 180 OBS/TRK.
NOTE: DATA SET WORK.TOTLOAD1 HAS 2 OBSERVATIONS AND 7 VARIABLES. 183 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.23 SECONDS AND 144K.


NOTE: THE PROCEDURE PRINT USED 0.16 SECONDS AND 134K AND PRINTED PAGE 2.


NOTE: DATA SET WORK.QWJV HAS 496 OBSERVATIONS AND 14 VARIABLES. 126 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.21 SECONDS AND 132K.

461                 XSLOPE

NOTE: DATA SET WORK.FINAL HAS 496 OBSERVATIONS AND 8 VARIABLES. 206 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.21 SECONDS AND 134K.

462                 XLOADTAB

NOTE: 122 LINES WERE WRITTEN TO FILE PRINT.
NOTE: DATA SET WORK.TOTLOAD2 HAS 2 OBSERVATIONS AND 11 VARIABLES. 135 OBS/TRK.
NOTE: DATA SET WORK.PLOTDATA HAS 496 OBSERVATIONS AND 5 VARIABLES. 325 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.41 SECONDS AND 142K.


NOTE: DATA SET WORK.TOTLOAD2 HAS 2 OBSERVATIONS AND 15 VARIABLES. 96 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.11 SECONDS AND 132K.


NOTE: DATA SET WORK.TOTLOAD2 HAS 2 OBSERVATIONS AND 15 VARIABLES. 96 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.26 SECONDS AND 236K.

463                 XTOTLOAD

NOTE: DATA SET QWFILE.TOTLOAD HAS 4 OBSERVATIONS AND 15 VARIABLES. 92 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.21 SECONDS AND 132K.

464                 XPLOTS

NOTE: THE PROCEDURE PLOT USED 0.42 SECONDS AND 144K AND PRINTED PAGES 3 TO 8.

465                 XTOTLIST

NOTE: 20 LINES WERE WRITTEN TO FILE PRINT.
NOTE: THE DATA STATEMENT USED 0.20 SECONDS AND 132K.


NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      BOX 8000
      CARY, N.C. 27511
```

SLOPES AND INTERCEPTS CALCULATED FROM SAMPLE POINTS 8:43 TUESDAY, JUNE 23, 1981 1

TOTAL PHOSPHORUS AS P PARMCODE= 00665

OBS	STATION	START	TAG	PARAM	DATETIME	INDSRUN	S	B
1	254031080191100	547198440	1	0.21	04MAY77:07:34:00		0.00000000	0.210
2	254031080191100	547198440	1	0.21	04MAY77:09:27:00	FIRST	-0.00005556	2.100
3	254031080191100	547198440	1	0.19	04MAY77:09:33:00		-0.00009259	3.373
4	254031080191100	547198440	1	0.14	04MAY77:09:42:00		0.00001389	-0.345
5	254031080191100	547198440	1	0.15	04MAY77:09:54:00		0.00001389	-0.345
6	254031080191100	547198440	1	0.16	04MAY77:10:06:00		-0.00002381	1.026
7	254031080191100	547198440	1	0.15	04MAY77:10:13:00		0.00034314	-12.471
8	254031080191100	547198440	1	0.50	04MAY77:10:30:00		-0.00009722	4.175
9	254031080191100	547198440	1	0.43	04MAY77:10:42:00		-0.00036111	14.340
10	254031080191100	547198440	1	0.17	04MAY77:10:54:00		0.00004444	-1.574
11	254031080191100	547198440	1	0.21	04MAY77:11:09:00		0.00009259	-3.507
12	254031080191100	547198440	1	0.31	04MAY77:11:27:00		-0.00001282	0.838
13	254031080191100	547198440	1	0.29	04MAY77:11:53:00	LAST	0.00000000	0.290
14	254031080191100	547792800	2	0.27	11MAY77:04:40:00		0.00000000	0.270
15	254031080191100	547792800	2	0.27	11MAY77:04:56:00	FIRST	-0.00016667	3.230
16	254031080191100	547792800	2	0.25	11MAY77:04:58:00		-0.00041667	7.700
17	254031080191100	547792800	2	0.20	11MAY77:05:00:00		-0.00041667	7.700
18	254031080191100	547792800	2	0.15	11MAY77:05:02:00		-0.00008333	1.660
19	254031080191100	547792800	2	0.14	11MAY77:05:04:00		-0.00008333	1.660
20	254031080191100	547792800	2	0.13	11MAY77:05:06:00		-0.00008333	1.660
21	254031080191100	547792800	2	0.12	11MAY77:05:08:00		0.00000000	0.120
22	254031080191100	547792800	2	0.12	11MAY77:05:10:00	LAST	0.00000000	0.120

INDIVIDUAL BASIN CHEMICAL CONSTITUENT LOAD AND LOADINGS

STATION ID : 254031080191100 FROM 04MAY77 7:34

CHEMICAL NAME:TOTAL PHOSPHORUS AS P DRAINAGE AREA(ACRES): 14.7
PARAMETER CODE: 00665

DATE	TIME	DISCHARGE (CFS)	***TIME INTERVAL DATA*** CONSTITUENT VALUE	LOAD (LBS)	LOADING (LBS/ACRE)	***ACCUMULATED DATA*** LOAD (LBS)	LOADING (LBS/ACRE)	ACCUMULATED RUNOFF(IN)
04MAY1977	7:38	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:43	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:48	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:53	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:58	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:03	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:08	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:13	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:18	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:23	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:28	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:33	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:38	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:43	0.00	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:48	0.18	0.210	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:53	1.15	0.210	0.001	0.000	0.00	0.00	0.00
04MAY1977	8:58	1.93	0.210	0.002	0.000	0.01	0.00	0.01
04MAY1977	9:03	3.20	0.210	0.003	0.000	0.02	0.00	0.03
04MAY1977	9:08	6.87	0.210	0.005	0.000	0.04	0.00	0.06
04MAY1977	9:13	8.78	0.210	0.007	0.000	0.07	0.00	0.10
04MAY1977	9:18	9.20	0.210	0.007	0.000	0.11	0.01	0.15
04MAY1977	9:23	8.52	0.210	0.007	0.000	0.14	0.01	0.20
04MAY1977	9:28	3.78	0.207	0.003	0.000	0.17	0.01	0.24
04MAY1977	9:33	2.44	0.190	0.002	0.000	0.18	0.01	0.26
04MAY1977	9:38	1.83	0.152	0.001	0.000	0.19	0.01	0.27
04MAY1977	9:43	4.71	0.141	0.002	0.000	0.20	0.01	0.29
04MAY1977	9:48	7.09	0.145	0.004	0.000	0.21	0.01	0.32
04MAY1977	9:53	7.67	0.149	0.004	0.000	0.23	0.02	0.37
04MAY1977	9:58	5.47	0.153	0.003	0.000	0.25	0.02	0.40
04MAY1977	10:03	4.34	0.157	0.003	0.000	0.27	0.02	0.43
04MAY1977	10:08	4.95	0.157	0.003	0.000	0.28	0.02	0.45
04MAY1977	10:13	3.93	0.150	0.002	0.000	0.29	0.02	0.47
04MAY1977	10:18	3.96	0.253	0.004	0.000	0.31	0.02	0.50
04MAY1977	10:23	2.44	0.355	0.003	0.000	0.33	0.02	0.52
04MAY1977	10:28	10.18	0.459	0.018	0.001	0.37	0.02	0.55
04MAY1977	10:33	14.24	0.482	0.026	0.002	0.49	0.03	0.62
04MAY1977	10:38	13.83	0.453	0.023	0.002	0.61	0.04	0.70
04MAY1977	10:43	14.44	0.408	0.022	0.002	0.73	0.05	0.78
04MAY1977	10:48	14.56	0.300	0.016	0.001	0.82	0.06	0.86
04MAY1977	10:53	20.21	0.192	0.015	0.001	0.90	0.06	0.96
04MAY1977	10:58	20.32	0.181	0.014	0.001	0.97	0.07	1.08
04MAY1977	11:03	18.60	0.194	0.014	0.001	1.04	0.07	1.19
04MAY1977	11:08	11.92	0.207	0.009	0.001	1.09	0.07	1.27
04MAY1977	11:13	3.39	0.232	0.003	0.000	1.12	0.08	1.31
04MAY1977	11:18	0.00	0.250	0.000	0.000	1.12	0.08	1.32

DATE	TIME	DISCHARGE (CFS)	***TIME INTERVAL DATA*** CONSTITUENT VALUE	LOAD (LBS)	LOADING (LBS/ACRE)	***ACCUMULATED DATA*** LOAD (LBS)	LOADING (LBS/ACRE)	ACCUMULATED RUNOFF (IN)
04MAY1977	11:23	0.00	0.290	0.000	0.000	1.12	0.08	1.32
04MAY1977	11:28	0.00	0.309	0.000	0.000	1.12	0.08	1.32
04MAY1977	11:33	0.79	0.305	0.001	0.000	1.13	0.08	1.32
04MAY1977	11:38	3.80	0.302	0.004	0.000	1.15	0.08	1.34
04MAY1977	11:43	3.51	0.298	0.004	0.000	1.17	0.08	1.36
04MAY1977	11:48	3.61	0.294	0.004	0.000	1.19	0.08	1.38
04MAY1977	11:53	3.50	0.290	0.004	0.000	1.21	0.08	1.40
04MAY1977	11:58	3.50	0.290	0.004	0.000	1.23	0.09	1.42
04MAY1977	12:03	3.47	0.290	0.004	0.000	1.24	0.09	1.44
04MAY1977	12:08	8.41	0.290	0.009	0.001	1.28	0.09	1.47
04MAY1977	12:13	9.82	0.290	0.011	0.001	1.33	0.09	1.53
04MAY1977	12:18	10.10	0.290	0.011	0.001	1.38	0.09	1.58
04MAY1977	12:23	8.34	0.290	0.009	0.001	1.43	0.10	1.63
04MAY1977	12:28	7.13	0.290	0.008	0.001	1.47	0.10	1.67
04MAY1977	12:33	7.13	0.290	0.008	0.001	1.51	0.10	1.71
04MAY1977	12:38	6.19	0.290	0.007	0.000	1.54	0.11	1.75
04MAY1977	12:43	6.62	0.290	0.007	0.000	1.58	0.11	1.79
04MAY1977	12:48	4.51	0.290	0.005	0.000	1.61	0.11	1.82
04MAY1977	12:53	5.01	0.290	0.005	0.000	1.64	0.11	1.84
04MAY1977	12:58	6.15	0.290	0.007	0.000	1.67	0.11	1.88
04MAY1977	13:03	6.15	0.290	0.007	0.000	1.70	0.12	1.91
04MAY1977	13:08	4.37	0.290	0.005	0.000	1.73	0.12	1.94
04MAY1977	13:13	5.01	0.290	0.005	0.000	1.75	0.12	1.97
04MAY1977	13:18	1.37	0.290	0.001	0.000	1.77	0.12	1.98
04MAY1977	13:23	0.53	0.290	0.001	0.000	1.77	0.12	1.99
04MAY1977	13:28	0.16	0.290	0.000	0.000	1.77	0.12	1.99
04MAY1977	13:30	0.00	0.290	0.000	0.000	1.77	0.12	1.99

SAMPLED RUNOFF: 1.173 ; PERCENT OF TOTAL RUNOFF: 59.02

INDIVIDUAL BASIN CHEMICAL CONSTITUENT LOAD AND LOADINGS

STATION ID : 254031080191100 FROM 11MAY77 4:40

CHEMICAL NAME:TOTAL PHOSPHORUS AS P DRAINAGE AREA(ACRES): 14.7
PARAMETER CODE: 00665

DATE	TIME	DISCHARGE (CFS)	***TIME INTERVAL DATA*** CONSTITUENT VALUE	LOAD (LBS)	LOADING (LBS/ACRE)	***ACCUMULATED DATA*** LOAD (LBS)	LOADING (LBS/ACRE)	ACCUMULATED RUNOFF(IN)
11MAY1977	4:44	0.00	0.270	0.000	0.000	0.00	0.00	0.00
11MAY1977	4:49	14.32	0.270	0.014	0.001	0.04	0.00	0.05
11MAY1977	4:54	29.22	0.270	0.030	0.002	0.17	0.01	0.19
11MAY1977	4:59	24.13	0.225	0.024	0.002	0.31	0.02	0.36
11MAY1977	5:04	20.18	0.140	0.011	0.001	0.39	0.03	0.49
11MAY1977	5:09	12.15	0.120	0.005	0.000	0.42	0.03	0.57
11MAY1977	5:14	7.96	0.120	0.004	0.000	0.44	0.03	0.62
11MAY1977	5:19	2.19	0.120	0.001	0.000	0.45	0.03	0.65
11MAY1977	5:24	0.71	0.120	0.000	0.000	0.45	0.03	0.66
11MAY1977	5:29	0.27	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	5:34	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	5:39	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	5:44	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	5:49	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	5:54	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	5:59	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:04	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:09	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:14	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:19	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:24	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:29	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:34	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:39	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:44	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:49	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:54	0.00	0.120	0.000	0.000	0.46	0.03	0.66
11MAY1977	6:58	0.00	0.120	0.000	0.000	0.46	0.03	0.66

SAMPLED RUNOFF: 0.359 : PERCENT OF TOTAL RUNOFF: 54.53

TOTAL NITROGEN PARMCODE= 00625

OBS	STATION	START	TAG	PARAM	DATETIME	INDSRUN	S	B
1	254031080191100	547198440	1	1.41	04MAY77:07:34:00		0.0000000	1.410
2	254031080191100	547198440	1	1.41	04MAY77:09:27:00	FIRST	-0.0008333	29.760
3	254031080191100	547198440	1	1.11	04MAY77:09:33:00		-0.0005185	18.937
4	254031080191100	547198440	1	0.83	04MAY77:09:42:00		-0.0000556	2.770
5	254031080191100	547198440	1	0.79	04MAY77:09:54:00		-0.0000833	3.760
6	254031080191100	547198440	1	0.73	04MAY77:10:06:00		-0.0004762	18.044
7	254031080191100	547198440	1	0.53	04MAY77:10:13:00		0.0020490	-74.833
8	254031080191100	547198440	1	2.62	04MAY77:10:30:00		-0.0005556	23.520
9	254031080191100	547198440	1	2.22	04MAY77:10:42:00		-0.0020000	79.260
10	254031080191100	547198440	1	0.78	04MAY77:10:54:00		-0.0002111	9.064
11	254031080191100	547198440	1	0.59	04MAY77:11:09:00		0.0002407	-9.073
12	254031080191100	547198440	1	0.85	04MAY77:11:27:00		-0.0000385	2.435
13	254031080191100	547198440	1	0.79	04MAY77:11:53:00	LAST	0.0000000	0.790
14	254031080191100	547792800	2	1.84	11MAY77:04:40:00		0.0000000	1.840
15	254031080191100	547792800	2	1.84	11MAY77:04:56:00	FIRST	-0.0005833	12.200
16	254031080191100	547792800	2	1.77	11MAY77:04:58:00		-0.0043333	79.250
17	254031080191100	547792800	2	1.25	11MAY77:05:00:00		-0.0029167	53.750
18	254031080191100	547792800	2	0.90	11MAY77:05:02:00		-0.0010000	19.020
19	254031080191100	547792800	2	0.78	11MAY77:05:04:00		-0.0008333	15.980
20	254031080191100	547792800	2	0.68	11MAY77:05:06:00		-0.0004167	8.330
21	254031080191100	547792800	2	0.63	11MAY77:05:08:00		-0.0005833	11.410
22	254031080191100	547792800	2	0.56	11MAY77:05:10:00	LAST	0.0000000	0.560

INDIVIDUAL BASIN CHEMICAL CONSTITUENT LOAD AND LOADINGS

STATION ID : 254031080191100 FROM 04MAY77 7:34

CHEMICAL NAME:TOTAL NITROGEN DRAINAGE AREA(ACRES): 14.7
PARAMETER CODE: 00625

DATE	TIME	DISCHARGE (CFS)	***TIME INTERVAL DATA*** CONSTITUENT VALUE	LOAD (LBS)	LOADING (LBS/ACRE)	***ACCUMULATED DATA*** LOAD (LBS)	LOADING (LBS/ACRE)	ACCUMULATED RUNOFF(IN)
04MAY1977	7:38	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:43	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:48	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:53	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	7:58	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:03	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:08	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:13	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:18	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:23	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:28	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:33	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:38	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:43	0.00	1.410	0.000	0.000	0.00	0.00	0.00
04MAY1977	8:48	0.18	1.410	0.001	0.000	0.00	0.00	0.00
04MAY1977	8:53	1.15	1.410	0.006	0.000	0.02	0.00	0.00
04MAY1977	8:58	1.93	1.410	0.010	0.001	0.06	0.00	0.01
04MAY1977	9:03	3.20	1.410	0.017	0.001	0.13	0.01	0.03
04MAY1977	9:08	6.87	1.410	0.036	0.002	0.29	0.02	0.06
04MAY1977	9:13	8.78	1.410	0.046	0.003	0.48	0.03	0.10
04MAY1977	9:18	9.20	1.410	0.049	0.003	0.72	0.05	0.15
04MAY1977	9:23	8.52	1.410	0.045	0.003	0.96	0.07	0.20
04MAY1977	9:28	3.78	1.350	0.019	0.001	1.12	0.08	0.24
04MAY1977	9:33	2.44	1.110	0.010	0.001	1.20	0.08	0.26
04MAY1977	9:38	1.83	0.954	0.007	0.000	1.24	0.08	0.27
04MAY1977	9:43	4.71	0.827	0.015	0.001	1.30	0.09	0.29
04MAY1977	9:48	7.09	0.810	0.022	0.001	1.39	0.09	0.32
04MAY1977	9:53	7.67	0.793	0.023	0.002	1.50	0.10	0.37
04MAY1977	9:58	5.47	0.770	0.016	0.001	1.60	0.11	0.40
04MAY1977	10:03	4.34	0.745	0.012	0.001	1.67	0.11	0.43
04MAY1977	10:08	4.95	0.673	0.012	0.001	1.72	0.12	0.45
04MAY1977	10:13	3.93	0.530	0.008	0.001	1.76	0.12	0.47
04MAY1977	10:18	3.96	1.145	0.017	0.001	1.84	0.12	0.50
04MAY1977	10:23	2.44	1.759	0.016	0.001	1.93	0.13	0.52
04MAY1977	10:28	10.18	2.374	0.091	0.006	2.13	0.15	0.55
04MAY1977	10:33	14.24	2.520	0.134	0.009	2.79	0.19	0.62
04MAY1977	10:38	13.83	2.353	0.122	0.008	3.42	0.23	0.70
04MAY1977	10:43	14.44	2.100	0.114	0.008	4.01	0.27	0.78
04MAY1977	10:48	14.56	1.500	0.082	0.006	4.48	0.31	0.86
04MAY1977	10:53	20.21	0.900	0.068	0.005	4.86	0.33	0.96
04MAY1977	10:58	20.32	0.729	0.056	0.004	5.16	0.35	1.08
04MAY1977	11:03	18.60	0.655	0.046	0.003	5.41	0.37	1.19
04MAY1977	11:08	11.92	0.603	0.027	0.002	5.59	0.38	1.27
04MAY1977	11:13	3.39	0.648	0.008	0.001	5.67	0.39	1.31
04MAY1977	11:18	0.00	0.720	0.000	0.000	5.68	0.39	1.32

DATE	TIME	DISCHARGE (CFS)	***TIME INTERVAL DATA*** CONSTITUENT VALUE	LOAD (LBS)	LOADING (LBS/ACRE)	***ACCUMULATED DATA*** LOAD (LBS)	LOADING (LBS/ACRE)	ACCUMULATED RUNOFF (IN)
04MAY1977	11:23	0.00	0.792	0.000	0.000	5.68	0.39	1.32
04MAY1977	11:28	0.00	0.848	0.000	0.000	5.68	0.39	1.32
04MAY1977	11:33	0.79	0.835	0.002	0.000	5.68	0.39	1.32
04MAY1977	11:38	3.80	0.825	0.012	0.001	5.74	0.39	1.34
04MAY1977	11:43	3.51	0.813	0.011	0.001	5.79	0.39	1.36
04MAY1977	11:48	3.61	0.802	0.011	0.001	5.85	0.40	1.38
04MAY1977	11:53	3.50	0.790	0.010	0.001	5.91	0.40	1.40
04MAY1977	11:58	3.50	0.790	0.010	0.001	5.96	0.41	1.42
04MAY1977	12:03	3.47	0.790	0.010	0.001	5.99	0.41	1.44
04MAY1977	12:08	8.41	0.790	0.025	0.002	6.09	0.41	1.47
04MAY1977	12:13	9.82	0.790	0.029	0.002	6.23	0.42	1.53
04MAY1977	12:18	10.10	0.790	0.030	0.002	6.38	0.43	1.58
04MAY1977	12:23	8.34	0.790	0.025	0.002	6.51	0.44	1.63
04MAY1977	12:28	7.13	0.790	0.021	0.001	6.62	0.45	1.67
04MAY1977	12:33	7.13	0.790	0.021	0.001	6.72	0.46	1.71
04MAY1977	12:38	6.19	0.790	0.018	0.001	6.82	0.46	1.75
04MAY1977	12:43	6.62	0.790	0.020	0.001	6.92	0.47	1.79
04MAY1977	12:48	4.51	0.790	0.013	0.001	7.00	0.48	1.82
04MAY1977	12:53	5.01	0.790	0.015	0.001	7.07	0.48	1.84
04MAY1977	12:58	6.15	0.790	0.018	0.001	7.15	0.49	1.88
04MAY1977	13:03	6.15	0.790	0.018	0.001	7.24	0.49	1.91
04MAY1977	13:08	4.37	0.790	0.013	0.001	7.32	0.50	1.94
04MAY1977	13:13	5.01	0.790	0.015	0.001	7.39	0.50	1.97
04MAY1977	13:18	1.37	0.790	0.004	0.000	7.43	0.51	1.98
04MAY1977	13:23	0.53	0.790	0.002	0.000	7.45	0.51	1.99
04MAY1977	13:28	0.16	0.790	0.000	0.000	7.45	0.51	1.99
04MAY1977	13:30	0.00	0.790	0.000	0.000	7.45	0.51	1.99

SAMPLED RUNOFF: 1.173 ; PERCENT OF TOTAL RUNOFF: 59.02

INDIVIDUAL BASIN CHEMICAL CONSTITUENT LOAD AND LOADINGS

STATION ID : 254031080191100 FROM 11MAY77 4:40

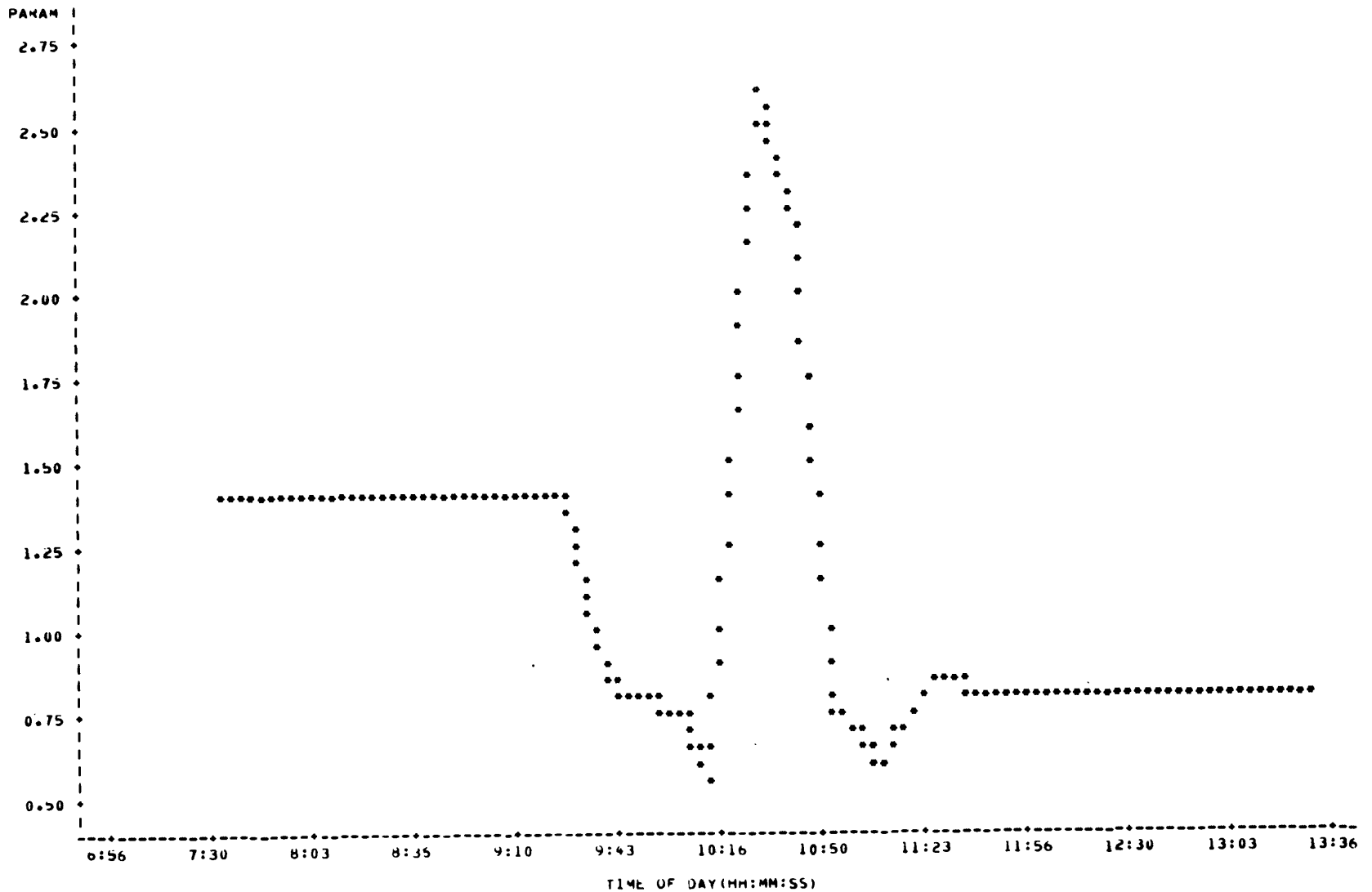
CHEMICAL NAME:TOTAL NITROGEN DRAINAGE AREA(ACRES): 14.7
PARAMETER CODE: 00625

DATE	TIME	DISCHARGE (CFS)	***TIME INTERVAL DATA*** CONSTITUENT VALUE	LOAD (LBS)	LOADING (LBS/ACRE)	***ACCUMULATED DATA*** LOAD (LBS)	LOADING (LBS/ACRE)	ACCUMULATED RUNOFF(IN)
11MAY1977	4:44	0.00	1.840	0.000	0.000	0.00	0.00	0.00
11MAY1977	4:49	14.32	1.840	0.099	0.007	0.28	0.02	0.05
11MAY1977	4:54	29.22	1.840	0.201	0.014	1.17	0.08	0.19
11MAY1977	4:59	28.13	1.510	0.159	0.011	2.14	0.15	0.36
11MAY1977	5:04	20.18	0.780	0.059	0.004	2.58	0.18	0.49
11MAY1977	5:09	12.16	0.595	0.027	0.002	2.75	0.19	0.57
11MAY1977	5:14	7.96	0.550	0.017	0.001	2.86	0.19	0.62
11MAY1977	5:19	2.19	0.550	0.005	0.000	2.91	0.20	0.65
11MAY1977	5:24	0.71	0.550	0.001	0.000	2.92	0.20	0.66
11MAY1977	5:29	0.27	0.550	0.001	0.000	2.92	0.20	0.66
11MAY1977	5:34	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	5:39	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	5:44	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	5:49	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	5:54	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	5:59	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:04	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:09	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:14	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:19	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:24	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:29	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:34	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:39	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:44	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:49	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:54	0.00	0.550	0.000	0.000	2.92	0.20	0.66
11MAY1977	6:58	0.00	0.550	0.000	0.000	2.92	0.20	0.66

SAMPLED RUNOFF: 0.359 : PERCENT OF TOTAL RUNOFF: 54.53

TOTAL NITROGEN PARMCODE= 00625
TAG=1

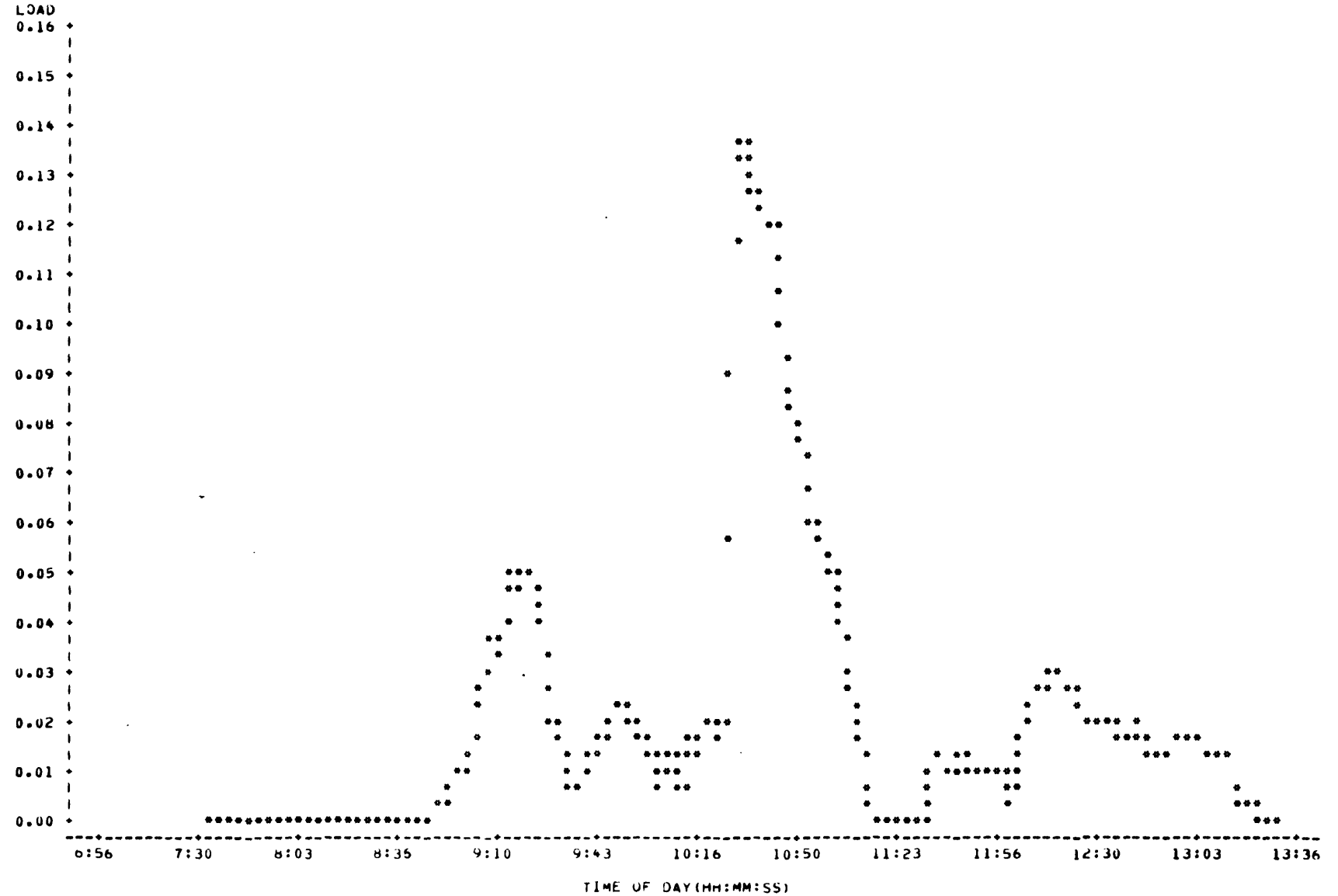
PLOT OF PARAM*TIME SYMBOL USED IS *



NOTE: 207 OBS HIDDEN

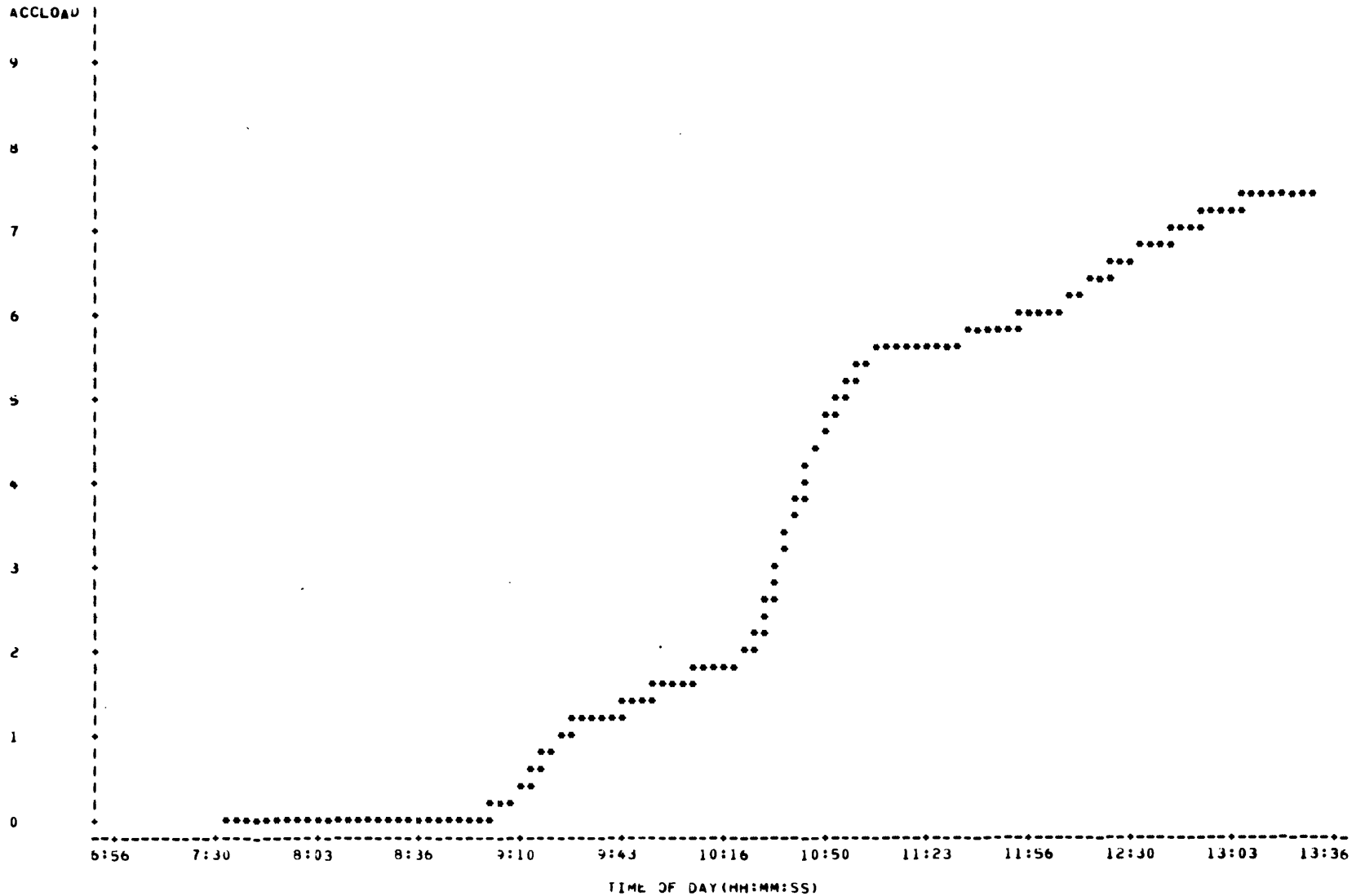
TAG=1

PLOT OF LOAD*TIME SYMBOL USED IS *



NOTE: 173 OBS HIDDEN

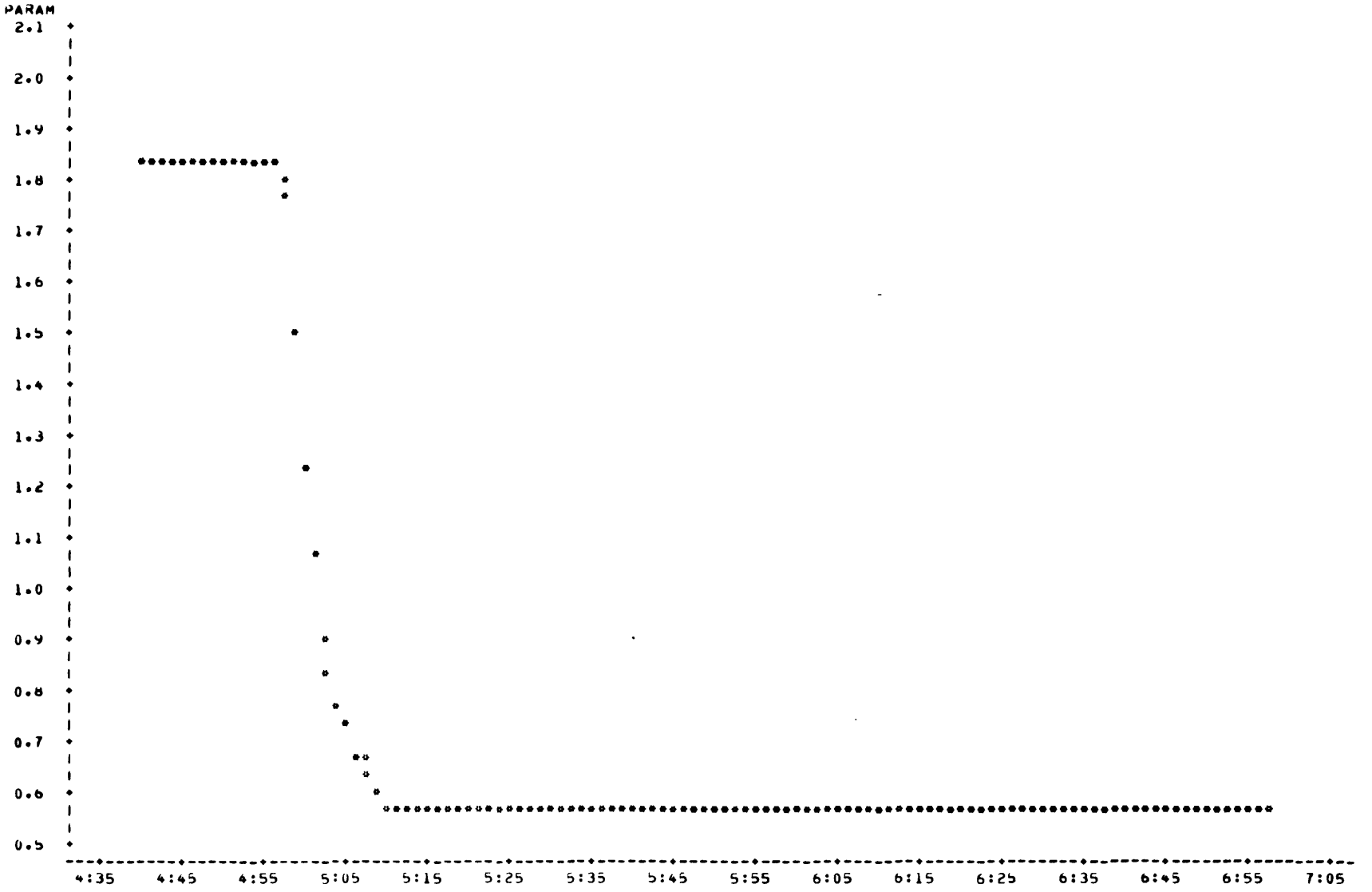
PLOT OF ACCLOAD*TIME SYMBOL USED IS *



NOTE: 224 OBS HIDDEN

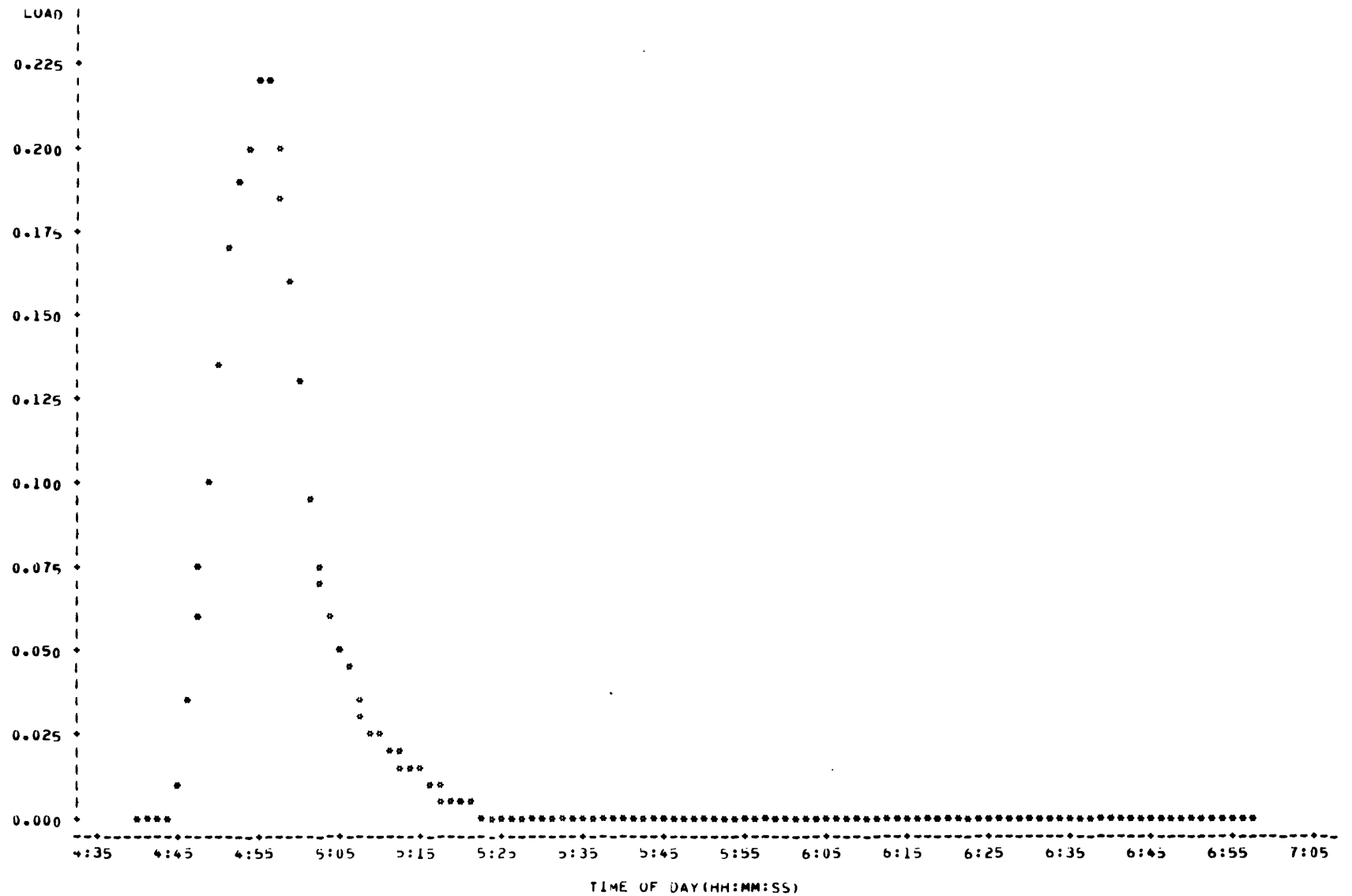
TAG=2

PLOT OF PARAM*TIME SYMBOL USED IS *



NOTE: 25 OBS HIDDEN

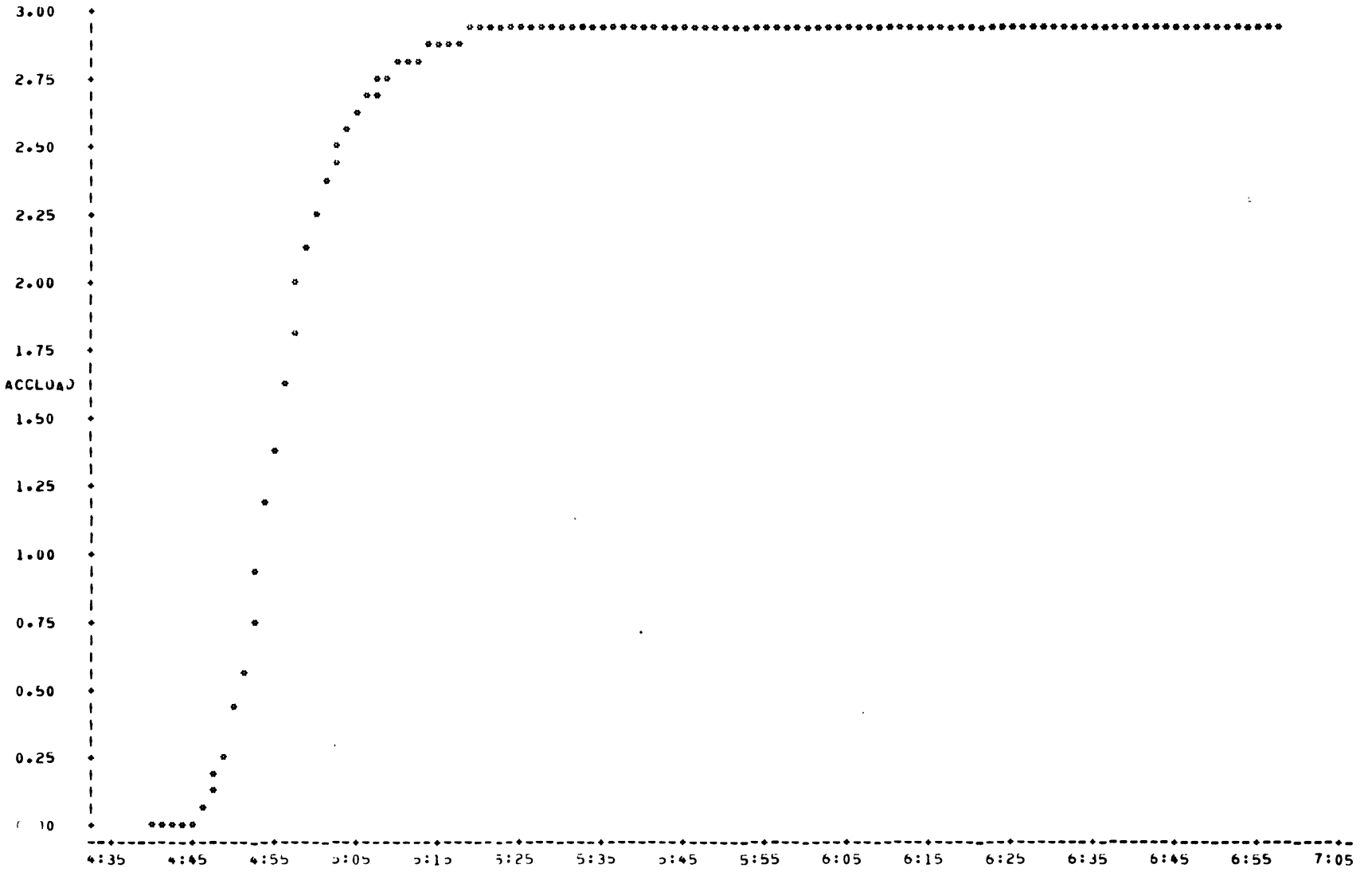
PLOT OF LOAD*TIME SYMBOL USED IS *



NOTE: 22 OBS HIDDEN

TOTAL NITROGEN PARMCODE= 00625 8:43 TUESDAY, JUNE 23, 1981 A
TAG=2

PLOT OF ACCLOAD*TIME SYMBOL USED IS *



NOTE: 23 OBS HIDDEN

TOTAL BASIN CHEMICAL CONSTITUENT LOADS AND LOADINGS

STATION ID: 2540310801911OO
TIME.START: MAY 4, 1977 7:34 TIME.END: MAY 4, 197713:30
NUMBER OF POINTS IN EVENT: 357

PARAMETER CODE	CONSTITUENT NAME	NO. OF SAMPLE POINTS	ESTIMATED TOTAL LOAD (LBS)	SAMPLED LOAD (LBS)	ESTIMATED TOTAL LOADING (LBS/ACRE)	SAMPLED LOADING (LBS/ACRE)	PERCENT SAMPLED	SAMPLED RUNOFF (INS)	PERCENT SAMPLED
00625	TOTAL NITROGEN	12	7.44990	4.83035	0.50680	0.32850	64.8	1.173	59.0
00665	TOTAL PHOSPHORUS AS	12	1.77492	1.04798	0.12074	0.07129	59.0	1.173	59.0

TOTAL BASIN CHEMICAL CONSTITUENT LOADS AND LOADINGS

STATION ID: 254031084014100
TIME.START: MAY 11, 1977 4:40 TIME.END: MAY 11, 1977 6:58
NUMBER OF POINTS IN EVENT: 139

PARAMETER CODE	CONSTITUENT NAME	NO. OF SAMPLE POINTS	ESTIMATED TOTAL LOAD (LBS)	SAMPLED LOAD (LBS)	ESTIMATED TOTAL LOADING (LBS/ACRE)	SAMPLED LOADING (LBS/ACRE)	PERCENT SAMPLED	SAMPLED RUNOFF (INS)	PERCENT SAMPLED
00625	TOTAL NITROGEN	8	2.92459	1.40271	0.19895	0.09542	48.0	0.359	54.5
00665	TOTAL PHOSPHORUS AS	8	0.45567	0.22298	0.03100	0.01517	48.9	0.359	54.5

REFERENCES

Alley, W. M., and Smith, P. E., 1982a, Distributed routing rainfall-runoff model--version II: U.S. Geological Survey Open-File Report 82-344, 186 p.

Alley, W. M., and Smith, P. E., 1982b, Multi-event urban runoff quality model: U.S. Geological Survey Open-File Report (in preparation).

Barr, A. J., Goodnight, J. H., Sall, J. P., and Helwig, J. T., 1979, SAS User's guide: SAS Institute, Inc., Raleigh, N.C., 494 p.

Dawdy, D. R., Lichty, R. W., and Bergmann, J. M., 1972, A rainfall-runoff simulation model for estimation of flood peaks for small drainage basins: U.S. Geological Survey Professional Paper 506-B, 28 p.

Hutchison, N. E., 1975, WATSTORE User's Guide: U.S. Geological Survey Open-File Report 75-426.

Showen, C. R., 1978, Storage and retrieval of water-resources data in collection, storage, retrieval, and publication of water-resources data: U.S. Geological Survey Circular 756, p. 20-25.

APPENDIX A

Information About SAS Data Sets

The basic unit that SAS works with is the data value. A data value is a single measurement such as rainfall amount. The data values associated with a single entity make up an observation. For example, an observation might include data values for a storm event like rainfall, runoff, or water-quality data. A SAS data set is a collection of observations or at the lowest level, a collection of data values.

A major purpose of the DATA step in SAS jobs is to create one or more SAS data sets from input data lines. In addition, many SAS procedures create SAS data sets containing the results of their calculations.

These data sets may be used later in the SAS job for such file-handling operations as subsetting, merging, and updating, or they may be used as input to SAS procedures.

SAS data sets have a special structure, and contain not only the data values but also documentation for the data values, including the variable names and labels, the date and time of their creation, the SAS statements that were used to create them, and information about their physical location on the storage medium.

When SAS creates a SAS data set, the data set is put into a SAS data base, an Operating System (OS) file that can contain many SAS data sets. Its structure is much like that of a partitioned data set, which can contain many members but it is not the same and does not require periodic compression as does a partitioned data set.

The default action of SAS is to store SAS data sets in a temporary SAS data base. A user asks SAS to store SAS data sets in a permanent OS data set, so that they will be available for later jobs.

Allowable Number of SAS Data Sets

The number of SAS data sets is limited to 40 for any one OS data set, or in other words, one OS data set can have as many as 40 SAS data set members.

Computation of OS Data Set Size

In the previous chapters of this report, reference was made to the SPACE parameter specifications on the JCL cards that defined a newly created OS data set. A reference is as follows:

```
          COL.1
            ●
Card 1..//BCFILE DD DSN=AG4yyyz.STATEXX.URBAN.BASIN.STORM.DATA,
     2..// DISP=(NEW,CATLG),DCB=DSORG=DA,
     3..// SPACE=(TRK,(N1,N2),RLSE),UNIT=3330-1,VOL=SER=CCD810
```

On Card 3 above, the following variables are as follows:

SPACE = Parameter option for space to contain OS data set.
TRK = Request OS data set allocation to be so many tracks of disk space. In addition to request for space by tracks, cylinders (CYL) or blocks (BLK) may be requested instead. Cylinders are a certain number of tracks, for example, 20 tracks equal one cylinder. Blocks are an allocation request for a certain number of bytes.
N1 = Primary number of tracks requested for establishment of data set.
N2 = Up to 15 N2 secondary allocations generated to contain OS data set being established.

The number of tracks needed for a particular OS data set can be computed from the following algorithm.

$$N1 = 2 + (NOBS/(13030/(LEN + 4)))$$

where

NOBS = Number of observations
LEN = Length of an observation in bytes which is the number of data values times the word length. The default word length is 8 bytes. If data values contain character data or numeric values of length other than 8 bytes, then sum the lengths for all the variables.

SAS provides during execution a built-in printed report that informs the user of the number of observations per track. Therefore, this information can be used instead of the above formula for computing the required space.

APPENDIX B

Common Errors and Possible Solutions

1. Problem: The SAS data set WORK.TEMP created by macro XDTIME is unsorted.

   To correct: Make sure all storm interval cards (figure 5.41.2) are in correct order by station identification number and start date. Be certain that no error was made keying in the station identifiers and dates which would create erroneous values.

2. Problem: The data set created using storm interval cards which should contain the selected unit, daily or water-quality observations has zero observations or less observations than expected.

   To correct: Make sure that correct start and end dates and times are specified on the storm interval cards. Also, examine UVMASTER, DVMASTER, or QWMASTER where appropriate to verify that the specified observations are in the data set. The retrieval or update to create the data may have failed.

3. Problem: In the RRLIST program, runoff values are not as expected.

   To correct: Verify that the macros NUMDA (drainage area) and DINTERV (data interval in minutes) are specified correctly in the RRLIST job deck.

4. Problem: In the LOADS program, the loads values are not as expected.

   To correct: Verify that the macros NUMDA (drainage area) and INTERVAL (data interval) are specified correctly in the LOADS run deck.

5. Problem: In the LOADS Program, several 'missing values created' messages appear on the job output.

   To correct: Make sure that correct station identification numbers and start and end times are specified on both water-quality and discharge storm interval cards. Also, verify that the requested data are in the respective data sets.

   One water-quality value does not define an interval over which the LOADS program can interpolate values.

6. Problem: In RRCARD or QWCARD programs, only one card group remains in the final data set when several were expected.

   To correct: Verify that a

   MACRO XPUTFILE CARDX OLD %

   (figure 5.321.1, card 30) is included in your deck only before the cards that create the first group of output cards and that a

   MACRO XPUTFILE CARDX MOD %

   is included before the program cards that create the second group of output cards. The disposition OLD sets the data set position pointer to the top of the data set and writes over any records which are already there. A data set disposition of MOD sets the data set position pointer after any records already in the data set and adds records to the data set.

7. Problem: Data set QW2 is unsorted in the LOADS program.

   To correct: Check that the data set QWMASTER is sorted keeping in mind that any missing values are considered less than other values. In particular, check for any missing dates and times which would result in missing datetime values.

8. Problem: In RRCARD, messages about gaps and duplicate observations appear on the program listing.

   To correct: Examine the daily value (DVMASTER) data set being processed. Gaps in the data record are legal when soil moisture accounting by the model is not required over this gap. Duplicate observations should be removed from the data set.

9. Problem: When doing an update to a SAS data set and storing the result in the same data set, a SAS error message indicates that the space allocated to the data set has been exceeded; but the user calculates that there is sufficient space.

To correct: When SAS performs an UPDATE of a data set, SAS tries to create the new copy on disk before disposing of the old copy. Therefore, the data set must be large enough to hold both copies. When dealing with large data sets, this can be a problem. To avoid this problem (assuming that the updated data set really will fit into the allocated space) create a temporary SAS data set and then copy the updated data set out to the original data set. For example:

```
DATA TEMPUV;
SET UVFILE.UVMASTER;
DATA TEMPUV;
UPDATE TEMPUV UVUPDATE;
DATA UVFILE.UVMASTER;
SET TEMPUV;
```

Before writing over any old data set, make sure the new result is correct.