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STATISTICAL ANALYSIS OF SHEF CODING ERRORS

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ABSTRACT

The Standard Hydrometeorological Exchange Format (SHEF) is used throughout the Central Region to facilitate the automatic communication and processing of hydrometeorological data. Insuring the integrity of coded data is essential to the automation of procedures which utilize the data. This paper describes software developed to statistically analyze the coding errors in SHEF messages encountered during parsing and posting.

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1. INTRODUCTION

The Missouri Basin River Forecast Center (MBRFC) utilizes observed hydrometeorological data transmitted over the AFOS network from a total of 36 WSFO's and WSO's. Except for the state temperature and precipitation tables (STP category AFOS products), all of these operational data are coded in the Standard Hydrometeorological Exchange Format (SHEF). Predominantly, the data are manually encoded in SHEF by personnel at the responsible WSFO/WSO's and transmitted as RRx category products over AFOS. As the AFOS products are received at MBRFC, they are passed on to the S/140 RFC Gateway computer where they are decoded and the data are posted to the RFC's DATACOL database.

Often, data are not posted properly to the RFC's database because of coding errors in the SHEF message. The SHEF decoding software has been devised to detect a total of 37 different types of parsing (syntactic) errors and five posting (databasing) errors. See Appendices A and B for listings of the possible SHEF errors. A printed copy of each decoded message is provided along with an accounting of any detected coding errors. Currently, the hydrologists at MBRFC are responsible for taking any corrective action necessary to insure that all received SHEF-coded data are posted properly to the database. The hydrologist may choose to either edit the erroneously-coded products himself and retransmit them to the S/140 or notify the responsible WSFO/WSO and ask them to correct and retransmit the products over AFOS.

The SHEFSTAT program has been written to provide a statistical summary of the coding errors encountered by the SHEF decoder. Statistics are generated for each of the 42 possible types of coding errors from each of the 36 WSFO/WSO's. Statistics are also generated for the products from the GOES Data Distribution System (GDDS), Airborne GAMMA Snow Survey, and Remote Observation System Automation (ROSA). By determining the scale and distribution of the SHEF coding errors being encountered at MBRFC, it is hoped that efforts can be concentrated in appropriate areas to most effectively improve the integrity of our incoming data.

This Technical Memorandum will describe the SHEF Error Statistics Program (SHEFSTAT). The purpose of program SHEFSTAT is to provide a set of nine tables containing statistics for the SHEF coding errors encountered in products decoded by the parsing and posting software at MBRFC. The program is written in Data General Fortran V and runs on the S/140 RFC Gateway computer. Program SHEFSTAT is fairly "hardwired" to fulfill the needs of MBRFC; adaptation of the program for use by other offices would require some modification of the source code. A listing of the SHEFSTAT source code is enclosed as Appendix C.

2. PROGRAM OUTLINE

a. Data Input

The data used by the SHEFSTAT program reside in a file named SHEFLOG. The standard SHEF parsing and posting software developed at MBRFC provides the option of generating file SHEFLOG whenever AFOS products are decoded. Information is appended to file SHEFLOG each time a product is decoded, regardless of whether any parsing or posting errors have been encountered. The file consists of . . .

1st record - "800"

2nd record - 1st product id, time of transmission, time of decoding

3rd record - first parsing error number (1-37)

4th record - second parsing error number

5th record - etc.

6th record - "900"

7th record - first posting error number (1-5)

8th record - second posting error number

9th record - etc.

10th record - "800"

11th record - 2nd product id, time of transmission, time of decoding

etc.

If a product is parsed and posted without error, the entry in SHEFLOG for that product will contain no parsing or posting error numbers.

All other data are input by the user at runtime through the console. These data consist of the beginning and ending dates for which errors will be counted as well as user responses to questions regarding how and when errors will be counted and statistics generated.

b. Program Operation

Because a significant amount of file management is required both before and after SHEFSTAT has been run, the use of macros is desirable if SHEFSTAT is to be run at regular

intervals. Listings of the two macros "STAT" and "RESETLOG" used at MBRFC are included as Appendix D. The "STAT" macro includes the execution of the SHEFSTAT program. The "RESETLOG" macro is run after the execution of SHEFSTAT to reinitialize the SHEFLOG files at the discretion of the user.

The program SHEFSTAT itself contains the following operations:

(1) Sort the entries in SHEFLOG into files:

    (a) SHEFLOG.2 - data within the time period entered by the user.

    (b) SHEFLOG.3 - data later than the time period entered by the user. (These data will be re-entered in SHEFLOG for subsequent program executions.)

(2) Count and sort all SHEF errors encountered, including:

    (a) Sorting according to the error number (parsing or posting).

    (b) Sorting according to the originating office.

    (c) Maintaining separate counts for ROSA, GDDS, and GAMMA survey data.

    (d) Counting only one posting error #3, #4, or #5 per message.

    (e) Counting the total number of messages decoded for each office.

    (f) Counting the number of error-free messages from each office.

(3) Compute pertinent error statistics, including:

    (a) Summing errors by categories (parsing, posting, total)

    (b) Computing percentages of erroneous messages as well as average error counts.

(4) Provide output to a file called STATTABLES. This file contains a set of nine statistical tables for all offices served by MBRFC.

(5) Provide straight forward instructions which lead the user easily through completion of the program.

c. Data Output

Examples of the nine statistical tables output by SHEFSTAT are included as Appendix E. Represented in the first three tables are error statistics sorted by WSFO as well as separate columns for GDDS, GAMMA Survey, and ROSA (RR3 category) products. The last six tables list the error statistics further sorted by originating office. The statistics for all offices in a state are grouped together and listed alphabetically according to three-character identifier. The title for each table contains the time period for which the statistics were generated.

The first table in each set represents a statistical analysis of the parsing errors which have been encountered. The number of occurrences of each of the 37 possible parsing errors are listed. In addition, the total number of parsing errors during the period, the total number of decoded messages, the total number of messages without parsing errors, and the percent of messages without parsing errors are included in this table.

The second table in each set contains similar statistics to those above for the five possible posting errors. The third table contains statistics for all SHEF coding errors (both parsing and posting). This table includes:

- The total number of decoded messages
- The total number of errors encountered
- The percentage of error-free messages
- The percentage of messages with errors
- The average number of errors in each erroneous message

3. FILES

There are eight files used by SHEFSTAT:

SHEFLOG
SHEFLOG.1
SHEFLOG.2
SHEFLOG.3
OFFICE
COUNT
STATS
STATTABLES

a. SHEFLOG

SHEFLOG is the file described in paragraph 2.a and is generated as AFOS products are decoded.

b. SHEFLOG.1

File SHEFLOG must be renamed as SHEFLOG.1 prior to the execution of SHEFSTAT. This is the input file used by the SHEFSTAT program. SHEFLOG must be recreated to insure that no SHEF messages are decoded without statistics generated.

SHEFLOG.2

c. The SHEFSTAT program will first sort the entries in the SHEFLOG.1 file to determine if the products were decoded within the time period specified by the user at runtime. The entries within the specified time period are stored in SHEFLOG.2 and will be used to generate statistics.

d. SHEFLOG.3

File SHEFLOG.3 contains entries for products which were decoded after the time period specified by the user. SHEFLOG.3 will be appended to SHEFLOG after SHEFSTAT has been run.

e. OFFICE

Each record in File OFFICE is the three-character identifier for one of the offices from which MBRFC expects to receive SHEF-CODED messages. This not only includes all WSFO's and WSO's, but also the identifier for GAMMA Survey products (ASP) and GDDS products (KRF). These are the id's by which the error counts are sorted.

f. COUNT

File COUNT contains the count of each of the 42 possible errors for each of the originating offices as well as a total for all WSFO/WSO's, GDDS, ROSA, and GAMMA Survey products.

g. STATS

File STATS contains a set of eleven statistics generated from file COUNT for each of the originating offices.

h. STATTABLES

Both files COUNT and STATS are used to generate the tables in their final form. These tables are stored as file

STATTABLES and are directed to the TI printer using an ASCII transfer.

4. SUMMARY

The SHEFSTAT program is an attempt to assess the quality of the SHEF-coded products received and used by MBRFC. It is hoped that the program output will enlighten us as to where encoding problems lie and where our efforts should be concentrated to minimize these problems. As companions to the error statistics generated by SHEFSTAT, the error message logs and the trouble-shooting guide included as Appendices F and G should assist the responsible offices greatly to "zero in" on specific coding problems.

It bears mentioning that the subject software deals only with coding errors detected by the SHEF parsing and posting software. Numerous erroneous data can and do become posted to the MBRFC database without detection by the decoding software. These problems must be dealt with in a separate manner, at present, a manual process.

Appendix A. Parsing Error Messages

1. This line not decoded
2. No space in positional data
3. Less than 3 characters in I.D. or message source
4. Time Zone code error
5. Date group error
6. Illegal character in I.D. or message source
7. Error in date code
8. Observation time error
9. Date relative code error
10. Julian day error
11. Illegal data string qualifier
12. Units code error
13. Not a date or data element
14. Not a date or data element, maybe a missing slash
15. Illegal character in parameter code
16. File read error on SHEFPARM
17. Non-existent parameter code
18. Parameters coded with a send code
19. Continuation of a format does not follow the correct format
20. A format revision continuation follows an original
21. The format that this is continuing had an error
22. Year not in the range 1976-1999 for default time zone
23. Forecast data without creation date
24. Bad date somehow
25. Variable duration not defined
26. Variable duration code error
27. Time increment code error
28. Trace specified for other than PY, PP, PC, SD, SF and SW
29. No time increment specified
30. Too many values in .B body line
31. Bad character in the line
32. Not enough values in .B body line
33. No value specified
34. No .END at end of .B format
35. Zulu, DR or DI coded with send code QY, PY or HY
36. Explicit date referenced by DRE or DIE is not the end of month
37. Time between 0201 & 0259 on date of change from standard to daylight

Appendix B. Posting Error Messages

1. This is a stranger station
2. Station or sensor does not exist
3. Trying to revise data without revision code set
4. DATACOL will not accept this parameter code
5. This observation has a future date

APPENDIX C

SHEFSTAT Source Code

```
      TYPE "*************************************************"
      TYPE "* PROGRAM SHEFSTAT  APR 1985  ROBERT S COX  MBRFC *"
      TYPE "*                                               *"
      TYPE "* READ SHEFLOG AS INPUT, COUNT AND SORT SHEF    *"
      TYPE "* ERRORS AND GENERATE STATISTICS.               *"
      TYPE "*************************************************"
      TYPE " "
      TYPE " "
C
C
C**** SORT PRODUCT ENTRIES ACCORDING TO DATES INPUT ****
C     SHEFLOG.1 IS UNSORTED
C     SHEFLOG.2 IS DATA WITHIN SPECIFIED TIME PERIOD
C     SHEFLOG.3 IS DATA AFTER SPECIFIED TIME PERIOD
C
C
      ACCEPT "BEGINNING DATE OF COUNT (MO,DA,YR) : ",IMO,IDA,IYR
      ACCEPT "ENDING DATE OF COUNT (MO,DA,YR) : ",JMO,JDA,JYR
      IBEGIN=(IMO*100)+IDA
      IEND=(JMO*100)+JDA
      IF(IEND.GE.IBEGIN)GO TO 1
      IEND=IEND+1200
      TYPE " "
      TYPE "****THIS TIME PERIOD SPANS TWO CALENDAR YEARS"
C
C.... OPEN FILES
C
    1 ICHN=1
      JCHN=2
      KCHN=3
      OPEN ICHN,"SHEFLOG.1"
      OPEN JCHN,"SHEFLOG.2"
      OPEN KCHN,"SHEFLOG.3"
C
C.... READ FIRST "800"
C
      TYPE " "
      TYPE "SHEFLOG IS NOW BEING SORTED BY DATE"
   10 READ(ICHN,ERR=2000,END=2005) NUMBER
      IF(NUMBER.NE.800) GO TO 10
C
C.... READ 2ND RECORD - PROD ID, DECODING TIME, SENDING TIME
C
   20 READ(ICHN,END=2005)(IPROD(I),I=1,5),IMON,IDAY,IHOUR,IMIN,JDAY,
     1JHOUR,JMIN
C
C.... IS THIS PRODUCT LACKING A TRANSMISSION TIME (MKCRRAKRF)?
C
      IF(JDAY.NE.0)GO TO 30
      JDAY=IDAY
      TYPE " "
      WRITE(10,1031)IPROD(1)
 1031 FORMAT(1X,"****SYSTEM TIME USED FOR PRODUCT ",S9)
C
```

```
C.... DID THE MONTH CHANGE BETWEEN TRANSMITTING AND DECODING TIME?
C
   30 IF(IDAY.GE.JDAY)GO TO 40
      IF(IMON.EQ.1)IMON=13
      IMON=IMON-1
C
C.... CREATE FOUR DIGIT DATE
C
   40 MON=IMON*100
      IDATE=MON+JDAY
C
C.... IS DATE WITHIN REQUESTED TIME PERIOD?
C
      IF(IDATE.LT.IBEGIN)GO TO 10
      IF(IDATE.GE.IBEGIN.AND.IDATE.LE.IEND)GO TO 41
      IF(IDATE.GT.IEND)GO TO 43
C
C.... SAVE GOOD DATA IN SHEFLOG.2
C
   41 WRITE(JCHN)NUMBER
      WRITE(JCHN)IPROD
   42 READ(ICHN,ERR=2000,END=2005) NUMBER
      IF((NUMBER.LT.1.OR.NUMBER.GT.37).AND.NUMBER.NE.900) GO TO 10
      IF( NUMBER.EQ.900 ) GO TO 4210
      WRITE(JCHN) NUMBER
C     GO TO 42
 4210 WRITE(JCHN) NUMBER
 4220 READ(ICHN,ERR=2000,END=2005) NUMBER
      IF((NUMBER.LT.1.OR.NUMBER.GT.5).AND.NUMBER.NE.800) GO TO 10
      IF( NUMBER.EQ.800 ) GO TO 20
      WRITE(JCHN) NUMBER
      GO TO 4220
C
C.... SAVE DATA AFTER SPECIFIED TIME PERIOD IN SHEFLOG.3
C
   43 WRITE(KCHN)NUMBER
      WRITE(KCHN)IPROD,IMON,JDAY,IHOUR,IMIN,JDAY,JHOUR,JMIN
   44 READ(ICHN,ERR=2000,END=2005) NUMBER
      IF(NUMBER.EQ.800)GO TO 20
      WRITE(KCHN)NUMBER
      GO TO 44
C
C.... CLOSE THE FILES
C
 2005 CLOSE ICHN
      CLOSE JCHN
      CLOSE KCHN
      TYPE " "
      TYPE "SORTING IS COMPLETE"
C
C
C**** COUNT AND SORT SHEF ERRORS, BUILD ARRAY ICOUNT ****
C
```

```
C
      DIMENSION IPROD(5),ICOUNT(50,46)
      DIMENSION OFFICE(50)
C
C.... OPEN THE FILES
C
      ICHN=1
      JCHN=2
      KCHN=3
      OPEN ICHN,"SHEFLOG.2"
      OPEN JCHN,"OFFICE"
      OPEN KCHN,"COUNT"
C
C.... NEW COUNT FILE OR APPENDED?
C
      TYPE " "
      TYPE "DO YOU WISH TO APPEND TO AN EXISTING COUNT FILE OR
     1 BEGIN A NEW COUNT?"
      ACCEPT "  APPEND = 0,  NEW COUNT =1  : ", NEW
      IF(NEW.EQ.0) GO TO 52
C
C.... ZERO OUT COUNT FILE FOR NEW COUNT
C
      ICNT=50
      JCNT=46
      DO 49 J=1,JCNT
      DO 49 I=1,ICNT
      ICOUNT(I,J)=0
   49 CONTINUE
      GO TO 48
C
C.... READ OFFICE AND CARRYOVER COUNT FILE
C
   52 READ(KCHN,END=2001)ICOUNT
 1001 FORMAT(I4)
   48 MREC=50
      TYPE " "
      TYPE "ERROR COUNTING IN PROGRESS"
      DO 47 I=1,MREC
      READ(JCHN,1000,END=2001)OFFICE(I)
 1000 FORMAT(A3)
   47 CONTINUE
C
C.... READ FIRST "800"
C
   45 READ(ICHN,ERR=2004,END=2001) NUMBER
      IF(NUMBER.NE.800)GO TO 45
C
C.... READ PRODUCT ID
C
   46 READ(ICHN,END=2005)IPROD
C
C.... FIND OFFICE(I) EQUAL TO XXX
C
```

```
      DO 50 I=1,MREC
      CALL STRCMP(IPROD(4),OFFICE(I),3,NCOMP)
      IF(NCOMP.EQ.0) GO TO 51
   50 CONTINUE
      GO TO 2002
C
C.... INCREMENT NO. OF MESSAGES DECODED
C
   51 IF(I.EQ.50)GO TO 45
      ICOUNT(I,43)=ICOUNT(I,43)+1
      CALL STRCMP(IPROD(3),"R3",2,NCOMP)
      IF(NCOMP.EQ.0)ICOUNT(50,43)=ICOUNT(50,43)+1
C
C.... SET VALUES FOR NO. OF MESSAGES WITH ERRORS
C
      MPARS=ICOUNT(I,45);     NO. MESSAGES WITH PARSING ERRORS
      MPOST=ICOUNT(I,46);     NO. OF MESSAGES WITH POSTING ERRORS
      IRPOST=ICOUNT(50,46);   NO. ROSA MESSAGES WITH POSTING ERRORS
      K3=ICOUNT(I,40);     POSTING ERROR 3
      K4=ICOUNT(I,41);     POSTING ERROR 4
      K5=ICOUNT(I,42);     POSTING ERROR 5
      L3=ICOUNT(50,40);    POSTING ERROR 3 - ROSA
      L4=ICOUNT(50,41);    POSTING ERROR 4 - ROSA
      L5=ICOUNT(50,42);    POSTING ERROR 5 - ROSA
C
C.... CHECK FOR PARSING ERRORS
C
   60 READ(ICHN,ERR=2004,END=2001)  IPARS
      IF(IPARS.EQ.900)GO TO 61
      IF(IPARS.LT.1.OR.IPARS.GT.37)GO TO 2003
      GO TO 70
C
C.... THERE ARE NO PARSING ERRORS, CHECK FOR POSTING ERRORS
C
   61 READ(ICHN,ERR=2004,END=2000) IPOST
      IF(IPOST.EQ.900)GO TO 65
      IF(IPOST.LT.1.OR.IPOST.GT.5)GO TO 2003
      GO TO 110
C
C.... INCREMENT NO. OF ERROR-FREE MESSAGES, TOTAL AND ROSA
C
   65 ICOUNT(I,44)=ICOUNT(I,44)+1
      CALL STRCMP(IPROD(3),"R3",2,NCOMP)
      IF(NCOMP.EQ.0) ICOUNT(50,44)=ICOUNT(50,44)+1
C
C.... GO TO READ ANOTHER PRODUCT ID
C
      GO TO 46
C
C.... PARSING ERRORS EXIST, INCREMENT NO. OF MESSAGES WITH ERRORS
C
   70 ICOUNT(I,45)=MPARS+1
      CALL STRCMP(IPROD(3),"R3",2,NCOMP)
```

```
      IF(NCOMP.EQ.0)  ICOUNT(50,45)=IRPARS+1
C
C.... INCREMENT PARSING ERROR COUNT
C
   80 J=IPARS
      ICOUNT(I,J)=ICOUNT(I,J)+1
      CALL STRCMP(IPROD(3),"R3",2,NCOMP)
      IF(NCOMP.EQ.0)  ICOUNT(50,J)=ICOUNT(50,J)+1
C
C.... CHECK FOR ANOTHER PARSING ERROR
C
   90 READ(ICHN,ERR=2004,END=2001)  IPARS
      IF(IPARS.NE.900)GO TO 80
C
C.... THATS ALL THE PARSING ERRORS, CHECK FOR POSTING ERRORS
C
  100 READ(ICHN,ERR=2004,END=2001)  IPOST
      IF(IPOST.EQ.800)GO TO 131
C
C.... INCREMENT NO.  OF MESSAGES WITH POSTING ERRORS
C
  110 ICOUNT(I,46)=MPOST+1
      CALL STRCMP(IPROD(3),"R3",2,NCOMP)
      IF(NCOMP.EQ.0)  ICOUNT(50,46)=IRPOST+1
C
C.... INCREMENT NO.  OF POSTING ERRORS...3,4,5 SHOULD ONLY
C.... INCREMENT ONCE PER MESSAGE
C
  120 J=IPOST+37
      IF(IPOST.LE.2)ICOUNT(I,J)=ICOUNT(I,J)+1
      IF(IPOST.EQ.3)ICOUNT(I,J)=K3+1
      IF(IPOST.EQ.4)ICOUNT(I,J)=K4+1
      IF(IPOST.EQ.5)ICOUNT(I,J)=K5+1
      CALL STRCMP(IPROD(3),"R3",2,NCOMP)
      IF(NCOMP.EQ.0.AND.J.LE.39)ICOUNT(50,J)=ICOUNT(50,J)+1
      IF(NCOMP.EQ.0.AND.J.EQ.40)ICOUNT(50,J)=L3+1
      IF(NCOMP.EQ.0.AND.J.EQ.41)ICOUNT(50,J)=L4+1
      IF(NCOMP.EQ.0.AND.J.EQ.42)ICOUNT(50,J)=L5+1
C
C.... GO CHECK FOR ANOTHER POSTING ERROR
C
  130 GO TO 100
C
C.... THAT'S ALL THE POSTING ERRORS, RESET ICOUNT FOR ERRORS 3,4,5
C
  131 CONTINUE
C
C.... GO READ ANOTHER PRODUCT ID
C
      GO TO 46
C
C.... INCREMENT NO.  OF ERROR-FREE MESSAGES WHEN EOF ENCOUNTERED
C
 2000 ICOUNT(I,44)=ICOUNT(I,44)+1
```

```
      CALL STRCMP(IPROD(3),"R3",2,NCOMP)
      IF(NCOMP.EQ.0) ICOUNT(50,44)=ICOUNT(50,44)+1
C
C.... END OF FILE ENCOUNTERED, GO ON TO COMPUTE SUMS
C
 2001 TYPE " "
      TYPE "ALL ENTRIES IN SHEFLOG HAVE NOW BEEN COUNTED"
      GO TO 132
C
C.... ILLEGAL XXX, OFFICE NOT IN FILE
C
 2002 TYPE " "
      WRITE(10,1032) IPROD(4)
 1032 FORMAT(1X,"****OFFICE NOT IN FILE****    ",S3)
      TYPE "****PRODUCT FROM THIS OFFICE WILL NOT BE COUNTED"
      GO TO 45
C
C.... INVALID SHEF ERROR NUMBER ENCOUNTERED
C
 2003 TYPE " "
      TYPE "INVALID ERROR NUMBER ENCOUNTERED"
      GO TO 45
C
C.... SYSTEM ERROR, EXIT PROGRAM, DO NOT WRITE TO FILES
C
 2004 TYPE " "
      TYPE "****SYSTEM ERROR"
      GO TO 150
C
C.... SUM ERROR COUNTS BY HSA
C
  132 DO 140 J=1,46
      ICOUNT(37,J)=ICOUNT(1,J)+ICOUNT(2,J)+ICOUNT(3,J)
      ICOUNT(38,J)=ICOUNT(4,J)+ICOUNT(5,J)+ICOUNT(6,J)+ICOUNT(7,J)
      ICOUNT(39,J)=ICOUNT(8,J)
      ICOUNT(40,J)=ICOUNT(9,J)+ICOUNT(10,J)
      ICOUNT(41,J)=ICOUNT(11,J)+ICOUNT(12,J)+ICOUNT(13,J)+ICOUNT(14,J)
      ICOUNT(42,J)=ICOUNT(15,J)+ICOUNT(16,J)+ICOUNT(17,J)+ICOUNT(18,J)
     1+ICOUNT(19,J)
      ICOUNT(43,J)=ICOUNT(20,J)
      ICOUNT(44,J)=ICOUNT(21,J)+ICOUNT(22,J)+ICOUNT(23,J)+ICOUNT(24,J)
     1+ICOUNT(25,J)+ICOUNT(26,J)+ICOUNT(27,J)
      ICOUNT(45,J)=ICOUNT(28,J)+ICOUNT(29,J)+ICOUNT(30,J)+ICOUNT(31,J)
      ICOUNT(46,J)=ICOUNT(32,J)+ICOUNT(33,J)+ICOUNT(34,J)+ICOUNT(35,J)
     1+ICOUNT(36,J)
C
C.... SUM ERRORS FROM ALL HSA'S
C
      ICOUNT(47,J)=ICOUNT(37,J)+ICOUNT(38,J)+ICOUNT(39,J)+ICOUNT(40,J)
     1+ICOUNT(41,J)+ICOUNT(42,J)+ICOUNT(43,J)+ICOUNT(44,J)+
     2ICOUNT(45,J)+ICOUNT(46,J)
  140 CONTINUE
C
C.... WRITE ERROR COUNT INTO FILE "COUNT"
```

```
C
      WRITE(KCHN)ICOUNT
C
C.... CLOSE THE FILES
C
  150 CLOSE ICHN
      CLOSE JCHN
      CLOSE KCHN
C
C.... ERROR COUNTING IS COMPLETE
C
      TYPE " "
      TYPE "ERRORS HAVE NOW BEEN SUMMED BY HSA"
      ACCEPT "DO YOU WISH TO COMPUTE STATISTICS (YES-1,NO-0): ",IDO
      IF(IDO.EQ.0)GO TO 380
      IF(NEW.NE.0.AND.IDO.NE.0)GO TO 153
      ACCEPT "BEGINNING DATE OF STATISTICS (MO,DA,YR): ",IMO,IDA,IYR
      ACCEPT "ENDING DATE OF STATISTICS (MO,DA,YR): ",JMO,JDA,JYR
C
C
C**** COMPUTE SHEF ERROR STATISTICS ****
C
C
      DIMENSION ISTAT(50,11)
C
C.... OPEN THE FILES
C
  153 TYPE " "
      TYPE "STATISTICAL TABLES ARE NOW BEING GENERATED"
      KCHN=3
      LCHN=4
      OPEN KCHN,"COUNT"
      OPEN LCHN,"STATS",ATT="C"
C
C.... READ IN ERROR COUNTS
C
      READ(KCHN,END=152)ICOUNT
  152 CONTINUE
C
C.... COMPUTE STATISTICS FOR ALL VALUES OF I IN ARRAY ICOUNT
C
      DO 170 I=1,50
C
C.... SUM ALL PARSING ERRORS FOR EACH VALUE OF I
C
      ISUMPARS=0
      DO 151 J=1,37
      ISUMPARS=ISUMPARS+ICOUNT(I,J)
  151 CONTINUE
C
C.... SUM ALL POSTING ERRORS FOR EACH VALUE OF I
C
      ISUMPOST=0
      DO 160 J=38,42
```

```
      ISUMPOST=ISUMPOST+ICOUNT(I,J)
  160 CONTINUE
C
C.... COMPUTE ALL STATISTICS FOR ALL VALUES OF I
C
      ISTAT(I,1)=ISUMPARS;     NO. OF PARSING ERRORS
      ISTAT(I,2)=ICOUNT(I,43);     NO. OF DECODED MESSAGES
      ISTAT(I,3)=ICOUNT(I,43)-ICOUNT(I,45); MSGS W/O PARSING ERRORS
      X=FLOAT(ISTAT(I,3))*100.0/FLOAT(ISTAT(I,2))
      ISTAT(I,4)=X+.5;     % OF MESSAGES W/O PARSING ERRORS
      ISTAT(I,5)=ISUMPOST;     NO. OF POSTING ERRORS
      ISTAT(I,6)=ICOUNT(I,43)-ICOUNT(I,46); MSGS W/O POSTING ERRORS,
      Y=FLOAT(ISTAT(I,6))*100.0/FLOAT(ISTAT(I,2))
      ISTAT(I,7)=Y+.5;     % OF MESSAGES W/O POSTING ERRORS
      ISTAT(I,8)=ISTAT(I,1)+ISTAT(I,5);     TOTAL NUMBER OF ERRORS
      Z=FLOAT(ICOUNT(I,44))*100.0/FLOAT(ICOUNT(I,43))
      ISTAT(I,9)=Z+.5;     % OF MESSAGES ERROR-FREE
C.... IF ZERO DECODED MESSAGES, THEN ZERO ERRONEOUS MESSAGES
      IF(ISTAT(I,2).NE.0)GO TO 165
      ISTAT(I,10)=0
      GO TO 166
  165 ISTAT(I,10)=100-ISTAT(I,9); % OF MSGS W/ AT LEAST ONE ERROR
  166 ZZ=FLOAT(ISTAT(I,8))/(FLOAT(ICOUNT(I,45))+FLOAT(ICOUNT(I,46)))
      ISTAT(I,11)=ZZ+.5; AVE. NO. OF ERRORS PER ERRONEOUS MESSAGE
  170 CONTINUE
C
C.... WRITE STATISTICS TO FILE "STATS"
C
      WRITE(LCHN,1001)ISTAT
C
C.... CLOSE THE FILES
C
      CLOSE KCHN
C     CLOSE LCHN
C
C**** PRINT OUT TABLES OF SHEF ERROR STATISTICS ****
C
C
      MCHN=5 ;    PRINT FILE STATPRINT
C
C----- PARSING ERROR STATISTICS BY STATE--PAGE 1----
C
C
C.... HEADER
C
      OPEN MCHN,"STATTABLES",ATT="P"
      WRITE(MCHN,1008)IMO,IDA,IYR,JMO,JDA,JYR
 1008 FORMAT('1',/34X,'SHEF PARSING ERRORS ENCOUNTERED AT MBRFC',
     1/25X,'STATISTICS GENERATED FOR THE PERIOD ',I2,'/',I2,'/',I2,
     2ICOL=14',I2,'/',I2,'/',I2/)
      LENGTH=53
      WRITE(MCHN,1009)(("**"),I=1,LENGTH)
```

```
 1009 FORMAT('+',66A2)
      WRITE(MCHN,1010)
 1010 FORMAT('+','*',15X,'HSA  *',14(5X,'*'),/'+','*',20X,'* BIS
     1* CYS * DEN * DSM * FSD * GTF * MSP * OMA * STL * TOP *TOTAL
     2*GDDS *GAMMA*ROSA *',/'+','*',2X,'SHEF ERROR',8X,'*',
     314(5X,'*'))
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      M=37
      N=50
C
C.... STATISTICS FOR PARSING ERRORS 1 - 37
C 179 DO 190 J=1,37
      WRITE(MCHN,1011)J,(ICOUNT(I,J),I=M,N)
 1011 FORMAT('+','*',8X,I2,10X,'*',18(I4,1X,'*'))
  190 CONTINUE
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... TOTAL PARSING ERROR STATISTICS
C
      WRITE(MCHN,1013)(('      *'),I=1,ICOL);TOTAL PARSING ERRORS
 1013 FORMAT('+','*',2X,'TOTAL NUMBER OF',3X,'*',(22A6))
      J=1
      WRITE(MCHN,1029)(ISTAT(I,J),I=M,N)
 1029 FORMAT('+','*',2X,'PARSING ERRORS',4X,'*',18(I4,1X,'*'))
      GO TO 200
  191 WRITE(MCHN,1013)(('      *'),I=1,ICOL); TOTAL DECODED MSGS
      WRITE(MCHN,1014)(ISTAT(I,J),I=M,N)
 1014 FORMAT('+',"*",2X,'DECODED MESSAGES',2X,'*',18(I4,1X,'*'))
      GO TO 200
  192 WRITE(MCHN,1015)(('      *'),I=1,ICOL);TOTAL MSGS W/O PARSING
 1015 FORMAT('+','*',2X,'NUMBER OF MESSAGES','*',(22A6))
      WRITE(MCHN,1030)(ISTAT(I,J),I=M,N)
 1030 FORMAT('+','*',2X,'W/O PARSING ERRORS','*',18(I4,1X,'*'))
      GO TO 200
  193 WRITE(MCHN,1016)(('      *'),I=1,ICOL); % MSGS W/O PARSING ERRS
 1016 FORMAT('+','*',2X,'PERCENT MESSAGES',2X,'*',(22A6))
      WRITE(MCHN,1030)(ISTAT(I,J),I=M,N)
      WRITE(MCHN,1009)(('**'),K=1,LENGTH)
      GO TO 220
  200 WRITE(MCHN,1009)(('**'),K=1,LENGTH)
      J=J+1
      GO TO (3000,191,192,193,3000)J
C
C---- POSTING AND TOTAL ERROR STATISTICS BY STATE--PAGE 2 ----
C
C
C.... HEADER #1
C
  220 IF(N-36)310,320,221
  221 WRITE(MCHN,1017)IMO,IDA,IYR,JMO,JDA,JYR
 1017 FORMAT('1',//34X,'SHEF POSTING ERRORS ENCOUNTERED AT MBRFC',
     1/25X,'STATISTICS GENERATED FOR THE PERIOD ',I2,'/',I2,'/',I2,
     2' THRU ',I2,'/',I2,'/',I2/)
```

```
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      WRITE(MCHN,1010)
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR POSTING ERRORS 1 - 5
C
  222 DO 240 J=38,42
      WRITE(MCHN,1011)J-37,(ICOUNT(I,J),I=M,N)
  240 CONTINUE
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... TOTAL POSTING ERROR STATISTICS
C
      WRITE(MCHN,1013)(('      *'),I=1,ICOL); TOTAL POSTING ERRORS
      J=5
      WRITE(MCHN,1018)(ISTAT(I,J),I=M,N)
 1018 FORMAT('+','*',2X,'POSTING ERRORS',4X,'*',18(I4,1X,'*'))
      GO TO 250
  241 WRITE(MCHN,1013)(('      *'),I=1,ICOL); TOTAL DECODED MSGS
      J=2
      WRITE(MCHN,1014)(ISTAT(I,J),I=M,N)
      GO TO 250
  242 WRITE(MCHN,1015)(('      *'),I=1,ICOL); MSGS W/O POSTING ERRS
      J=6
      WRITE(MCHN,1019)(ISTAT(I,J),I=M,N)
 1019 FORMAT('+','*',2X,'W/O POSTING ERRORS','*',18(I4,1X,'*'))
      GO TO 250
  243 WRITE(MCHN,1016)(('      *'),I=1,ICOL); % MSGS W/O POSTING ERRS
      J=7
      WRITE(MCHN,1019)(ISTAT(I,J),I=M,N)
  250 WRITE(MCHN,1009)(('**'),K=1,LENGTH)
      GO TO (3000,242,3000,3000,241,243,268)J
C
C.... HEADER #2
C
  268 IF(N-36)330,350,269
  269 WRITE(MCHN,1021)IMO,IDA,IYR,JMO,JDA,JYR
 1021 FORMAT(//35X,'ALL SHEF ERRORS ENCOUNTERED AT MBRFC',/
     125X,'STATISTICS GENERATED FOR THE PERIOD ',I2,'/',I2,'/',I2,
     2' THRU ',I2,'/',I2,'/',I2/)
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      WRITE(MCHN,1022)
 1022 FORMAT('+','*',15X,'HSA  *',14(5X,'*'),/'+','*',20X,'* BIS',
     1' * CYS * DEN * DSM * FSD * GTF * MSP * OMA * STL * TOP *',
     2'TOTAL*GDDS *GAMMA*ROSA *',/'+','*',2X,'TYPE OF STATISTIC',1X,
     3'*',14(5X,'*'))
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR ALL SHEF ERRORS
C
  270 WRITE(MCHN,1013)(('      *'),I=1,ICOL); TOTAL DECODED MSGS
      J=2
      WRITE(MCHN,1014)(ISTAT(I,J),I=M,N)
      GO TO 280
```

```
  271 WRITE(MCHN,1013)((' *'),I=1,ICOL);TOTAL NUMBER OF ERRORS
      J=8
      WRITE(MCHN,1023)(ISTAT(I,J),I=M,N)
 1023 FORMAT('+','*',2X,'ERRORS',12X,'*',18(I4,1X,'*'))
      GO TO 280
  272 WRITE(MCHN,1016)((' *'),I=1,ICOL); % MSGS W/O ERRORS
      J=9
      WRITE(MCHN,1024)(ISTAT(I,J),I=M,N)
 1024 FORMAT('+','*',2X,'WITHOUT ERRORS',4X,'*',18(I4,1X,'*'))
      GO TO 280
  273 WRITE(MCHN,1016)((' *'),I=1,ICOL); % MSGS WITH ERRORS
      WRITE(MCHN,1025)(ISTAT(I,J),I=M,N)
 1025 FORMAT('+','*',2X,'WITH ERRORS',7X,'*',18(I4,1X,'*'))
      GO TO 280
  274 WRITE(MCHN,1026)((' *'),I=1,ICOL); ERRORS PER BAD MESSAGE
 1026 FORMAT('+','*',2X,'NO. OF ERRORS PER',1X,'*',(22A6))
      J=11
      WRITE(MCHN,1020)(ISTAT(I,J),I=M,N)
 1020 FORMAT('+','*',2X,'ERRONEOUS MESSAGE *',18(I4,1X,'*'))
  280 WRITE(MCHN,1009)(('**'),K=1,LENGTH)
      GO TO (3000,271,3000,3000,3000,3000,3000,272,273,274,300)J
C
C
C
C---- PARSING ERROR STATISTICS BY OFFICE -- PAGE 3+4 ----
C
C
C.... HEADER, PAGE 3
C
  300 IF(N-36)340,360,301
  301 WRITE(MCHN,1008)IMO,IDA,IYR,JMO,JDA,JYR
      ICOL=18
      LENGTH=65
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      WRITE(MCHN,1027)
 1027 FORMAT('+','*',12X,'OFFICE  *',18(5X,'*'),/'+','*',20X,'* BIS
     1 * FAR * ISN * CPR * CYS * LND * SHR * DEN * DSM * SUX * ABR
     2 * FSD * HON * RAP * BIL * GGW * GTF * HLN *',/'+','*',2X,
     3'SHEF ERROR',8X,'*',18(5X,'*'))
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR PARSING ERRORS, OFFICES 1 - 18
C
      M=1
      N=18
      GO TO 179
C
C.... HEADER, PAGE 4
C
  310 WRITE(MCHN,1008)IMO,IDA,IYR,JMO,JDA,JYR
      ICOL=18
      LENGTH=65
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
```

```
      WRITE(MCHN,1028)
 1028 FORMAT('+','*',12X,'OFFICE  *',18(5X,'*'),/'+','*',20X,'* HVR
     1* MSP * BFF * GRI * LBF * LNK * OFK * OMA * VTN * COU * MCI *
     2 SGF * STL * CNK * DDC * GLD * ICT * TOP *',/'+','*',2X,
     3'SHEF ERROR',8X,'*',18(5X,'*'))
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR PARSING ERRORS, OFFICES 19 - 36
C
      M=19
      N=36
      GO TO 179
C
C
C----- POSTING AND TOTAL ERROR STATISTICS BY OFFICE -----
C
C
C.... HEADER #1, PAGE 5
C
  320 WRITE(MCHN,1017)IMO,IDA,IYR,JMO,JDA,JYR
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      WRITE(MCHN,1027)
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR POSTING ERRORS BY OFFICE, PAGE 5
C
      M=1
      N=18
      GO TO 222
C
C.... HEADER #2, PAGE 5
C
  330 WRITE(MCHN,1021)IMO,IDA,IYR,JMO,JDA,JYR
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      WRITE(MCHN,1027)
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR ALL SHEF ERRORS BY OFFICE, PAGE 5
C
      GO TO 270
C
C.... HEADER #1, PAGE 6
C
  340 M=19
      N=36
  341 WRITE(MCHN,1017)IMO,IDA,IYR,JMO,JDA,JYR
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      WRITE(MCHN,1028)
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR POSTING ERRORS BY OFFICE, PAGE 6
C
```

```
      GO TO 222
C
C.... HEADER #2, PAGE 6
C
  350 WRITE(MCHN,1021)IMO,IDA,IYR,JMO,JDA,JYR
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
      WRITE(MCHN,1028)
      WRITE(MCHN,1009)(('**'),I=1,LENGTH)
C
C.... STATISTICS FOR ALL SHEF ERRORS BY OFFICE, PAGE 6
C
      GO TO 270
C
C.... THAT'S ALL
C
 3000 TYPE "OUT OF SINK IN TABLE ISTAT"
  360 CLOSE MCHN
  370 CONTINUE
      TYPE " "
      TYPE "SHEF ERROR STATISTICS HAVE BEEN WRITTEN TO FILE
     1STATTABLES"
      GO TO 390
  380 TYPE " "
      TYPE "SHEF ERRORS HAVE BEEN COUNTED AND STORED IN FILE COUNT"
      TYPE "HOWEVER STATISTICS HAVE NOT BEEN COMPUTED.  NEXT TIME"
      TYPE "YOU RUN THIS PROGRAM YOU WILL PROBABLY WANT TO APPEND"
      TYPE "TO THE EXISTING COUNT FILE."
  390 CONTINUE
      STOP
      END
```

APPENDIX D. Macros STAT, RESETLOG, and STATPRINT

```
MESSAGE MACRO -STAT- WILL...
MESSAGE   1. CREATE A BACKUP OF SHEFLOG CALLED SHEFLOG.BK
MESSAGE   2. COPY FILE SHEFLOG TO PROD1 AS SHEFLOG.1
MESSAGE   3. RECREATE FILE SHEFLOG IN PROD2
MESSAGE   4. EXECUTE PROGRAM -SHEFSTAT-
MESSAGE   5. PRINT ON THE TI PRINTER STATISTICAL TABLES FOR YOUR REVIEW
MESSAGE
MESSAGE IF YOU DO NOT WISH TO PERFORM THE ABOVE TASKS, STRIKE <CTRL> <A>
MESSAGE/P OTHERWISE...
DIR PROD2
XFER SHEFLOG SHEFLOG.BK
XFER SHEFLOG PROD1:SHEFLOG.1
DELETE SHEFLOG
CRAND SHEFLOG
DIR PROD1
SHEFSTAT.SV
XFER/A STATTABLES TI
MESSAGE
MESSAGE PRINTING OF STATISTICAL TABLES COMPLETE
MESSAGE IF THE TABLES ARE OKAY, ENTER <STATPRINT> FOR EXTRA COPIES
MESSAGE
MESSAGE TO REINITIALIZE SHEFLOG ENTER <RESETLOG>
```

```
MESSAGE MACRO -RESETLOG- WILL...
MESSAGE   1. APPEND INTERIM DATA IN SHEFLOG TO SHEFLOG.3
MESSAGE   2. DELETE FILES SHEFLOG,SHEFLOG.1,SHEFLOG.2,SHEFLOG.3,SHEFLOG.BK
MESSAGE   3. RENAME FILE SHEFLOG.3 AS SHEFLOG IN PROD1
MESSAGE   4. RECREATE FILES SHEFLOG.2 AND SHEFLOG.3
MESSAGE
MESSAGE IF YOU DO NOT WANT TO PERFORM THE ABOVE TASKS, STRIKE <CTRL> <A>,
MESSAGE/P OTHERWISE...
MESSAGE
MESSAGE ARE YOU SURE YOU ARE READY TO DELETE THE FILES?
MESSAGE THERE CAN BE NO PARSING OR POSTING GOING ON WHEN YOU DO THIS!
MESSAGE/P THEN...
XFER/B PROD2:SHEFLOG PROD1:SHEFLOG.3
DELETE PROD2:SHEFLOG PROD2:SHEFLOG.BK
XFER PROD1:SHEFLOG.3 PROD2:SHEFLOG
DELETE SHEFLOG.1 SHEFLOG.2 SHEFLOG.3
CRAND SHEFLOG.2 SHEFLOG.3
MESSAGE ALL FILES HAVE BEEN RESET
```

```
MESSAGE MACRO -STATPRINT- WILL PROVIDE 5 COPIES OF STATISTICAL TABLES
XFER/A STATTABLES TI; XFER/A STATTABLES TI; XFER/A STATTABLES TI
XFER/A STATTABLES TI; XFER/A STATTABLES TI
```

APPENDIX E

SHEF Error Statistical Tables

SHEF PARSING ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

HSA / SHEF ERROR	BIS	CYS	DEN	DSM	FSD	GTF	MSP	OMA	STL	TOP	TOTAL	ODDS	GAMMA	ROSA
1	7	1	9	2	7	14	11	5	27	17	100	67	0	0
2	1	11	0	0	0	21	0	0	4	2	39	8	0	1
3	0	0	0	0	0	4	0	0	6	0	10	7	0	0
4	0	0	0	0	0	0	0	0	0	1	1	0	0	0
5	0	1	3	0	3	2	0	1	4	5	19	0	0	0
6	15	0	16	0	3	10	28	8	29	107	216	133	0	0
7	0	0	0	0	0	0	24	0	0	0	24	2	0	0
8	4	0	0	0	0	0	0	0	2	0	6	7	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	1	0	0
14	0	0	0	0	0	23	0	0	0	0	23	0	0	0
15	3	0	0	0	1	3	0	0	0	1	8	2	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	24	0	0	0	24	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	123	0	123	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	2	0	0	2	0	0	2
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	1	0	0	0	0	0	0	1	2	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	10	0	2	92	24	0	5	3	136	0	0	0
31	7	0	3	6	1	29	9	15	31	28	129	40	0	0
32	18	10	16	1	2	82	27	18	65	118	357	143	0	0
33	0	1	0	0	0	0	0	0	0	0	1	0	0	1
34	19	1	1	0	1	8	13	0	5	15	63	11	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NUMBER OF PARSING ERRORS	74	25	59	9	20	288	160	49	301	298	1283	421	0	4
TOTAL NUMBER OF DECODED MESSAGES	163	184	30	136	232	104	136	254	582	309	2130	992	0	446
NUMBER OF MESSAGES W/O PARSING ERRORS	129	172	11	130	221	41	87	235	511	181	1718	909	0	443
PERCENT MESSAGES W/O PARSING ERRORS	79	93	37	96	95	39	64	93	88	59	81	92	0	99

SHEF POSTING ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

HSA / SHEF ERROR	BIS	CYS	DEN	DSM	FSD	GTF	MSP	OMA	STL	TOP	TOTAL	GODS	GAMMA	ROSA
1	0	0	0	0	0	0	0	0	16	0	16	0	0	0
2	36	27	164	17	82	30	9	86	190	101	742	1541	0	235
3	19	5	2	23	11	6	0	50	69	24	209	244	0	36
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	9	3	0	3	3	2	4	22	23	21	90	0	0	29
TOTAL NUMBER OF POSTING ERRORS	64	35	166	43	96	38	13	158	298	146	1057	1785	0	300
TOTAL NUMBER OF DECODED MESSAGES	163	184	30	136	232	104	136	254	582	309	2130	992	0	446
NUMBER OF MESSAGES W/O POSTING ERRORS	119	169	24	99	185	91	128	154	436	206	1611	613	0	305
PERCENT MESSAGES W/O POSTING ERRORS	73	92	80	73	80	88	94	61	75	67	76	62	0	68

ALL SHEF ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

HSA / TYPE OF STATISTIC	BIS	CYS	DEN	DSM	FSD	GTF	MSP	OMA	STL	TOP	TOTAL	GODS	GAMMA	ROSA
TOTAL NUMBER OF DECODED MESSAGES	163	184	30	136	232	104	136	254	582	309	2130	992	0	446
TOTAL NUMBER OF ERRORS	136	60	225	52	116	326	173	207	599	444	2340	2206	0	304
PERCENT MESSAGES WITHOUT ERRORS	60	86	23	70	76	31	59	56	68	37	61	58	0	68
PERCENT MESSAGES WITH ERRORS	40	14	77	30	24	69	41	44	32	63	39	42	0	32
NO. OF ERRORS PER ERRONEOUS MESSAGE	2	2	9	1	2	4	3	2	3	2	3	5	0	2

SHEF PARSING ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

OFFICE / SHEF ERROR	BIS	FAR	ISN	CPR	CYS	LND	SHR	DEN	DSM	SUX	ABR	FSD	HON	RAP	BIL	OGW	GTF	HLN
1	6	1	0	0	1	0	0	9	2	0	0	7	0	0	0	0	14	0
2	0	1	0	0	11	0	0	0	0	0	0	0	0	0	0	0	21	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	1	0	0	3	0	0	0	3	0	0	0	0	2	0
6	3	12	0	0	0	0	0	16	0	0	2	1	0	0	0	0	10	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0
15	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	10	0	0	0	1	0	1	0	0	92	0
31	7	0	0	0	0	0	0	3	3	3	1	0	0	0	2	0	27	0
32	7	11	0	0	10	0	0	16	0	1	2	0	0	0	1	0	81	0
33	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
34	5	14	0	0	1	0	0	1	0	0	1	0	0	0	8	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NUMBER OF PARSING ERRORS	35	39	0	0	25	0	0	59	5	4	6	13	0	1	11	0	277	0
TOTAL NUMBER OF DECODED MESSAGES	75	88	0	0	157	0	27	30	112	24	8	215	0	9	22	0	82	0
NUMBER OF MESSAGES W/O PARSING ERRORS	60	69	0	0	145	0	27	11	110	20	6	207	0	8	12	0	29	0
PERCENT MESSAGES W/O PARSING ERRORS	80	78	0	0	92	0	100	37	98	83	75	96	0	89	55	0	35	0

SHEF PARSING ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

OFFICE / SHEF ERROR	HVR	MSP	BFF	GRI	LBF	LNK	OFK	OMA	VTN	COU	MCI	SGF	STL	CNK	DDC	GLD	ICT	TOP
1	0	11	0	0	0	3	0	2	0	3	6	4	14	5	5	0	2	5
2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	2
3	0	0	0	0	0	0	0	0	0	1	1	0	4	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5	0	0	0	0	0	1	0	0	0	1	0	0	3	3	1	0	1	0
6	0	28	0	0	0	0	0	8	0	4	5	5	15	0	4	0	65	38
7	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	120	0	0	3	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	24	0	0	0	0	0	0	0	1	0	4	0	0	0	0	0	3
31	0	9	0	0	0	8	0	7	0	5	1	7	18	0	8	0	4	16
32	0	27	0	0	0	8	0	10	0	33	6	6	20	0	4	0	67	47
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	13	0	0	0	0	0	0	0	1	0	1	3	1	0	2	4	8
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NUMBER OF PARSING ERRORS	0	160	0	0	0	20	0	29	0	170	19	28	84	10	22	2	144	120
TOTAL NUMBER OF DECODED MESSAGES	0	136	1	36	4	33	2	178	0	94	159	73	256	44	12	2	84	167
NUMBER OF MESSAGES W/O PARSING ERRORS	0	87	1	36	4	23	2	169	0	66	155	63	227	38	7	0	15	121
PERCENT MESSAGES W/O PARSING ERRORS	0	64	100	100	100	70	100	95	0	70	97	86	89	86	58	0	18	72

SHEF POSTING ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

OFFICE / SHEF ERROR	BIS	FAR	ISN	CPR	CYS	LND	SHR	DEN	DSM	SUX	ABR	FSD	HON	RAP	BIL	GGW	GTF	HLN
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	30	6	0	0	27	0	0	164	16	1	8	74	0	0	0	0	30	0
3	19	0	0	0	5	0	0	2	15	8	0	9	0	2	1	0	5	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	7	2	0	0	3	0	0	0	2	1	0	3	0	0	0	0	2	0
TOTAL NUMBER OF POSTING ERRORS	56	8	0	0	35	0	0	166	33	10	8	86	0	2	1	0	37	0
TOTAL NUMBER OF DECODED MESSAGES	75	88	0	0	157	0	27	30	112	24	8	215	0	9	22	0	82	0
NUMBER OF MESSAGES W/O POSTING ERRORS	38	81	0	0	142	0	27	24	84	15	2	176	0	7	21	0	70	0
PERCENT MESSAGES W/O POSTING ERRORS	51	92	0	0	90	0	100	80	75	63	25	82	0	78	95	0	85	0

ALL SHEF ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

OFFICE / SHEF ERROR	BIS	FAR	ISN	CPR	CYS	LND	SHR	DEN	DSM	SUX	ABR	FSD	HON	RAP	BIL	GGW	GTF	HLN
TOTAL NUMBER OF DECODED MESSAGES	75	88	0	0	157	0	27	30	112	24	8	215	0	9	22	0	82	0
TOTAL NUMBER OF ERRORS	91	47	0	0	60	0	0	225	38	14	14	99	0	3	12	0	314	0
PERCENT MESSAGES WITHOUT ERRORS	44	73	0	0	83	0	100	23	74	50	25	78	0	67	50	0	26	0
PERCENT MESSAGES WITH ERRORS	56	27	0	0	17	0	0	77	26	50	75	22	0	33	50	0	74	0
NO. OF ERRORS PER ERRONEOUS MESSAGE	2	2	0	0	2	0	0	9	1	1	2	2	0	1	1	0	5	0

SHEF POSTING ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

OFFICE / SHEF ERROR	HVR	MSP	BFF	GRI	LBF	LNK	OFK	OMA	VTN	COU	MCI	SGF	STL	CNK	DDC	GLD	ICT	TOP
1	0	0	0	0	0	0	0	0	0	9	0	3	4	0	0	0	0	0
2	0	9	0	0	0	1	0	85	0	122	5	0	63	0	2	0	12	87
3	0	0	0	1	0	5	0	44	0	6	19	7	37	4	0	0	0	20
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	4	0	2	0	1	0	19	0	2	4	0	17	5	1	0	3	12
TOTAL NUMBER OF POSTING ERRORS	0	13	0	3	0	7	0	148	0	139	28	10	121	9	3	0	15	119
TOTAL NUMBER OF DECODED MESSAGES	0	136	1	36	4	33	2	178	0	94	159	73	256	44	12	2	84	167
NUMBER OF MESSAGES W/O POSTING ERRORS	0	128	1	33	4	26	2	88	0	57	131	63	185	35	9	2	74	86
PERCENT MESSAGES W/O POSTING ERRORS	0	94	100	92	100	79	100	49	0	61	82	86	72	80	75	100	88	51

ALL SHEF ERRORS ENCOUNTERED AT MBRFC

STATISTICS GENERATED FOR THE PERIOD 6/ 1/85 THRU 6/30/85

OFFICE / SHEF ERROR	HVR	MSP	BFF	GRI	LBF	LNK	OFK	OMA	VTN	COU	MCI	SGF	STL	CNK	DDC	GLD	ICT	TOP
TOTAL NUMBER OF DECODED MESSAGES	0	136	1	36	4	33	2	178	0	94	159	73	256	44	12	2	84	167
TOTAL NUMBER OF ERRORS	0	173	0	3	0	27	0	177	0	309	47	38	205	19	25	2	159	239
PERCENT MESSAGES WITHOUT ERRORS	0	59	100	92	100	52	100	47	0	52	80	73	64	68	42	0	15	40
PERCENT MESSAGES WITH ERRORS	0	41	0	8	0	48	0	53	0	48	20	27	36	32	58	100	85	60
NO. OF ERRORS PER ERRONEOUS MESSAGE	0	3	0	1	0	2	0	2	0	5	1	3	2	1	3	1	2	2

APPENDIX F

SHEF ERROR MESSAGE LOGS

FROM: MISSOURI BASIN RIVER FORECAST CENTER (MBRFC)

TO: WSO DODGE CITY

SUBJECT: SHEF CODING ERRORS ENCOUNTERED AT MBRFC

THE FOLLOWING SHEF ERROR LOG IS GENERATED FOR YOUR USE. IF YOU HAVE ANY QUESTIONS ABOUT THE ERRORS, PLEASE CALL BOB COX AT 8-758-2041, MONDAY THRU FRIDAY. THE LOG IS FOR THE PERIOD: JUNE 1,1985 THROUGH JULY 2,1985

```
************************************
SHEF DECODE ERROR LOG FOR TOPRR2DDC
************************************
TOPRR2DDC
E
SRAA00 KDDC 031243
RIVER REPORTS
NATIONAL WEATHER SERVICE DODGE CITY KS
0740AM CDT MON JUN 03 1985
.B DDC 0603 C DH07/HG/HI    :TRENDS 0=STDY  1=RISG  2=FAL  3=UNK
:       MMDD      TT             :MM=MONTH  DD=DAY  TT=TIME
                  -              ^

*** 6.  ILLEGAL CHARACTER IN ID OR MESSAGE SOURCE
                                 ^

*** 32.  NOT ENOUGH VALUES IN .B BODY LINE
:STATION ID       STAGE   TREND      FS  STATION NAME
DDCK1               2.50   / 0       13  DODGE CITY/ARKANSAS RIVER
                                      ^

*** 31.  BAD CHARACTER IN THE LINE
GCKK1               1.61   / 0       13  GARDEN CITY/ARKANSAS RIVER
                                      ^

*** 31.  BAD CHARACTER IN THE LINE
SYCK1               1.64   / 3       10  SYRACUSE/ARKANSAS RIVER
.END
  ^

*** 1.  THIS LINE NOT DECODED

      NUMBER OF WARNING ERRORS IS  1
      NUMBER OF  FATAL  ERRORS IS  4

           TOTAL NUMBER OF POSTING ERRORS IS  0
```

```
************************************
SHEF DECODE ERROR LOG FOR TOPRR1DDC
************************************
TOPRR1DDC
E
TTAA00 KDDC 041316
RAINFALL REPORTS
NATIONAL WEATHER SERVICE DODGE CITY KS
815 AM CST TUE JUN 4 1985
.B DDC 0604 C DH07/PPP
:       MMDD     TI
:PRECIPITATION FOR THE 24 HOUR PERIOD ENDING AT 07AM CST
:STATION ID    PRECIPITATION          STATION NAME
ASHK1          1.52                 : ASHLAND
COLK1          4.10                 : COLDWATER
GEEK1          2.90                 : GREENSBURG / PEA SIZE HAIL
SUNK1          1.60                 : SUN CITY
FORK1          1.20                 : FORD / NO IDENTIFIER AVBL.
.END
      NUMBER OF WARNING ERRORS IS  0
      NUMBER OF  FATAL  ERRORS IS  0

FORK1     85: 6: 4:12: 0  PP    1.20000
**** 2. STATION OR SENSOR DOES NOT EXIST

            TOTAL NUMBER OF POSTING ERRORS IS  1



************************************
SHEF DECODE ERROR LOG FOR TOPRR2DDC
************************************
TOPRR2DDC
E
SRAA00 KDDC 171420
RIVER REPORTS
NATIONAL WEATHER SERVICE DODGE CITY KS
915 AM CDT MON JUN 17 1985
.B DDC 0900 C DH15/HG      :TRENDS 0=STDY  1=RISG  2=FAL  3=UNK

*** 5.  DATE GROUP ERROR
:       MMDD     TI              MM=MONTH  DD=DAY  TI=TIME
:STATION ID       STAGE   TREND      FS  STATION NAME
DDCK1              2.5    /         : 13  DODGE CITY/ARKANSAS RIVER
GCKK1              5.4    /         : 13  GARDEN CITY/ARKANSAS RIVER
SYCK1              4.4    /         : 10  SYRACUSE/ARKANSAS RIVER
.END

*** 1.  THIS LINE NOT DECODED
      NUMBER OF WARNING ERRORS IS  0
      NUMBER OF  FATAL  ERRORS IS  2

            TOTAL NUMBER OF POSTING ERRORS IS  0
```

```
************************************
SHEF DECODE ERROR LOG FOR TOPRR1DDC
************************************
TOPRR1DDC
E
ITAA00 KDDC 241357
RAINFALL REPORTS
NATIONAL WEATHER SERVICE DODGE CITY KS
900AM CST MON JUN 24 1985
.B DDC 0624 C DH09/PP
:       MMDD      TT
:PRECIPITATION FOR THE 24 HOUR PERIOD ENDING AT 07AM CST
:STATION ID    PRECIPITATION          STATION NAME
  MDEK1            .60               : MEADE
  NESK1-           .77               : NESS CITY
.END
       NUMBER OF WARNING ERRORS IS  0
       NUMBER OF  FATAL  ERRORS IS  0

MDEK1      85: 6:24:14: 0  PP     .600000
**** 5. THIS OBSERVATION HAS A FUTURE DATE

NESK1      85: 6:24:14: 0  PP     .770000
**** 5. THIS OBSERVATION HAS A FUTURE DATE

               IOTAL NUMBER OF POSTING ERRORS IS  2



************************************
SHEF DECODE ERROR LOG FOR TOPRR2DDC
************************************
TOPRR2DDC
E
SRAA00 KDDC 251306
RIVER REPORTS
NATIONAL WEATHER SERVICE DODGE CITY KS
915 AM CDT TUE JUN 25 1985
.B DDC 0625 C DH08/HG       :TRENDS 0=STDY' 1=RISG  2=FAL  3=UNK
:       MMDD     TT              MM=MONTH  DD=DAY  IT=TIME

:STATION ID       STAGE    TREND       FS  STATION NAME
DDCK1              2.5   /           :  13  DODGE CITY/ARKANSAS RIVER
GCKK1              5.4   /           :  13  GARDEN CITY/ARKANSAS RIVER
SYCK1            STUCK   /           :  10  SYRACUSE/ARKANSAS RIVER

*** 31.  BAD CHARACTER IN THE LINE
.END
       NUMBER OF WARNING ERRORS IS  0
       NUMBER OF  FATAL  ERRORS IS  1

              TOTAL NUMBER OF POSTING ERRORS IS  0
```

```
************************************
SHEF DECODE ERROR LOG FOR TOPRR2DDC
************************************
TOPRR2DDC
E
SRAA00 KDDC 251315 COR
RIVER REPORTS
NATIONAL WEATHER SERVICE DODGE CITY KS
920  AM CDT TUE JUN 25 1985
.B DDC 0625 C DH08/HG       :TRENDS 0=STDY  1=RISG  2=FAL  3=UNK
:       MMDD     TT              MM=MONTH  DD=DAY  TT=TIME

:STATION ID        STAGE    TREND       FS  STATION NAME
GCKK1               4.5   /          :  13  (CORRECTED STAGE)
.END
      NUMBER OF WARNING ERRORS IS  0
      NUMBER OF  FATAL  ERRORS IS  0

GCKK1      85: 6:25:13: 0  HG    4.5000
**** 3. TRYING TO REVISE DATA WITHOUT REVISION CODE SET

               TOTAL NUMBER OF POSTING ERRORS IS  1
```

```
************************************
SHEF DECODE ERROR LOG FOR TOPRR2DDC
************************************
TOPRR2DDC
E
SRAA00 KDDC 011305
RIVER REPORTS
NATIONAL WEATHER SERVICE DODGE CITY KS
915 AM CDT MON JUL 01 1985
.B DDC 0701 C DH07/HG/HI    :TRENDS 0=STDY  1=RISG  2=FAL  3=UNK
:       MMDD     TT              MM=MONTH  DD=DAY  TT=TIME
:STATION ID        STAGE     TREND     FS  STATION NAME
DDCK1               2.5   /    0      : 13  DODGE CITY/ARKANSAS RIVER
GCKK1               3.9   /    2      : 13  GARDEN CITY/ARKANSAS RIVER
SYCK1              B0.9   /    3      : 13  SYRACUSE/ARKANSAS RIVER
                   ^

*** 31.  BAD CHARACTER IN THE LINE
                   ^

*** 32.  NOT ENOUGH VALUES IN .B BODY LINE
.END
      NUMBER OF WARNING ERRORS IS  1
      NUMBER OF  FATAL  ERRORS IS  1

               TOTAL NUMBER OF POSTING ERRORS IS  0
```

APPENDIX G

SHEF ERROR TROUBLE SHOOTING GUIDE

SHEF ERROR TROUBLE SHOOTING GUIDE

EXPLANATION OF SHEF PARSING ERROR MESSAGES (Version 1.1)

1. This line not decoded.

   a. The format has not been specified correctly. Either the "." does not occur in Column 1 or an unassigned format is specified; or . . .

   b. An error has been encountered in the .B header line; therefore, the ".END" will not be decoded; or . . .

   c. A threshold of errors has been met; therefore, further decoding of the message is terminated; or . . .

   d. Terminating the .A or .E formats with a ".END".

2. No space in positional data.

   a. One of the positional fields contains more than the allowable number of characters; or . . .

   b. An illegal continuation line specifier has been used. It must be numeric 1-9; or . . .

   c. An illegal revision mode specifier has been used. It must be an "R".

3. Less than 3 characters in ID or message source.

   a. The station identifier or message source does not have a minimum of three alphnumeric characters; or . . .

   b. A space has been inserted between the format specifier and a revision mode or continuation line indicator; or . . .

   c. A data value may contain a comma instead of a decimal point.

4. Time zone code error. Either one or two character time zone specifications are allowed as outlined in Table 8 of NWS Technical Memorandum WR-180.

5. Date group error.

   a. A non-exsitent day or month has been specified; e.g., 830431; or . . .

   b. The date group does not contain either 4 or 6 characters; or . . .

   c. The date group contains an alphic character (check "O" used for zero).

6. Illegal character in ID or message source.

   a. A non-alphanumeric character has been included in the station identifier or message source; or . . .

   b. The ".END" does not begin in Column 1 (it will be decoded as a station ID); or . . .

   c. Some character besides a space has been used as a delimiter for positional data; or . . .

   d. Comments were not preceded by a colon; or . . .

   e. More than one colon in a line.

7. Error in date code. The date code does not contain the correct number of characters, possibly a space has been inserted after the "D" code.

8. Observation time error.

   a. A space exists between the date element (DM, DD, DH, etc.) and the time specification; or . . .

   b. An alphic character is used instead of numeric (check "O" used for zero); or . . .

   c. A non-existent month, day, hour, minute is specified, e.g., DM04310700.

9. Date relative code error.

   a. The date relative code contains an illegal time units specification; or . . .

   b. A space occurs between the time units indicator and the "+" or "-", e.g., DRH_+6; or . . .

   c. An illegal character exists in the code (only alphanumerics, +, and -); or . . .

   d. An alphic character exists in the date increment (check "O" used for zero).

10. Julian day error.

   a. The day specification exceeds the number of days in the year (DJ367); or . . .

   b. An alphic character exists in the day specification, (check "O" used for zero).

11. Illegal data string qualifier.

   a. A non-existent data string qualifier is used; or . . .

   b. A space exists between the data element code and the qualifier (DQ_E).

12. Units code error.

   a. A non-existent units code is used (must be "S" or "E"); or . . .

   b. A space exists between the data element code and units specifier (DU_S).

13. Not a date or data type element.

   a. The code that follows the "D" has not been assigned; or . . .

   b. A space exists after the "D"; or . . .

c. A parameter code erroneously begins with a "D".

14. Not a date or data type element, maybe a missing slash.

a. The date or data element contains more than the allowable number of characters; or . . .

b. The slash which should follow the "D" element is missing.

15. Illegal character in parameter code.

a. The parameter code contains a character which is not alphanumeric; or . . .

b. The space which should exist between the parameter code and the data value (.A format) is missing or another delimiter (/) is used; or . . .

c. The parameter code contains only one character.

16. File read error on SHEFPARM. This error cannot be produced by incorrectly coded data.

17. Non-existent parameter code. One of the elements of the parameter code, although alphanumeric, has not been assigned.

18. Parameters coded with a send code. A send code is a two character abbreviation of a seven character parameter code, e.g., TX=TAIRZXZ. Using a send code with other elements of the parameter code (TXD) creates a contradiction.

19. Continuation of a format does not follow the correct format.

a. A continuation indicator of one format cannot be used to continue a different format (.A2 cannot continue a .B format line); or . . .

b. Possibly, the space between the format specifier and the message source or station identifier has been omitted.

20. A format revision continuation follows an original. It is allowable to continue a .AR (revision) format line, for instance, with a .A1. However, a .A (original) format line cannot be continued with a .AR1 format line.

21. The format that this is continuing had an error. This is self-explanatory. See the previous error message for the nature of the error.

22. Year not in the range 1976-1999 for default time zone. The decoding software contains a table of dates on which local time standards change (standard to daylight savings, etc.). The limits of the table are the years 76 through 99. Data beyond the limits of this table should be coded using a two-digit local time zone or zulu time specification.

23. Forecast data without creation date. When the decoder intercepts a parameter code in which the type code is "F" for forecast, it searches to find a creation date code (DCmmddhh). If a creation date is not found, this error results.

24. Bad date somehow. One of the date elements (DY, DM, DD, DH, DN) contains a non-existent date or time specification (DM0230).

25. DV not defined for ZZV. The specification of variable duration (DVH05 for 5-hourly duration) must preceed the parameter code in which the duration code is set to "V".

26. Variable duration code error.

    a. An alphic character occurs where a numeric character is expected (check "0" used for zero); or . . .

    b. A space exists in the variable duration code (DVH_06); or . . .

    c. An illegal time units specification is used (DVA06).

27. Time increment code error.

    a. An alphic character occurs where a numeric character is expected (check "0" used for zero); or . . .

    b. A space exists in the time increment code (DIH_06); or . . .

    c. An illegal time units specification is used (DIA06).

28. Trace specified for other than PP, PC, SF, SD, or SW. A "T" can be used to specify "trace" only for those parameter codes beginning with PP, PC, SF, SD, or SW.

29. No time increment specified.

    a. The required time increment (DIxxx) in the .E format has been omitted; or . . .

    b. The .E format was specified when the .A format was really intended.

30. Too many values in .B body line.

    a. The number of data values for a station in a .B format exceeds the number of parameter codes in the header; or . . .

    b. Slashes (////) have been used indiscriminately to report missing data; or . . .

    c. An error was encountered in the data string of the .B header line, or . . .

    d. A data value was specified as a fraction; e.g., 1/4 instead of .25.

31. Bad character in the line.

    a. A character other than a comma (,) has been used to separate stations in the packed .B format; or . . .

    b. The comma required to separate stations in the packed .B format has been omitted; or . . .

    c. An invalid code for trace has been used. Only "T" is allowed; or . . .

    d. An unassigned data qualifier has been appended to the data value; or . . .

    e. A slash (/) has been omitted between parameter codes in the .B header line; or . . .

    f. Comments were not preceded by a colon; or . . .

    g. Station identifier has a space in it; or . . .

    h. A negative value has been encoded as "B"; or . . .

    i. An invalid code for missing has been used.

32. Not enough items in .B body line.

    a. The number of data values for a station in the body of the .B message is not equal to the number of parameter codes in the .B header line; or . . .

    b. The leading or trailing slashes have been omitted which are required when fewer data values are reported than the number of parameter codes in the .B header line; or . . .

    c. The ".END" does not occur in Column 1; or . . .

    d. The sender's name occurs before the ".END".

33. No value specified.

    a. An illegal code has been used to specify missing data; or . . .

    b. A space exists in the parameter code; or . . .

    c. A non-numeric character exists in the data value.

34. No .END at end of .B. Either the ".END" terminator has been omitted or it does not begin in Column 1.

35. Zulu, DR, or DI coded with send code QY, PY, or HY. Ambiguities can arise from the use of parameter codes QY, PY, and HY (which imply changes in observation time) in conjunction with zulu time specifications, date relative codes or the .E format.

36. The explicit date referenced by DRE is not the end of the month. The end-of-month date relative code can only relate to an explicit date specification which is the last day of a month.

37. Observation or creation time is between 0201 and 0259 on the date of change from local standard time to daylight time. During the change from local standard time to daylight time, 2 A.M. local time is assumed to become 3 A.M. local time. Time specifications between these hours are, therefore, not allowed in conjunction with one character local time zone codes.

EXPLANATION OF SHEF POSTING ERRORS

1. This is a stranger station. SHEF is designed to allow "stranger" reports by specifying a station identifier composed of a W, X, Y, or Z (X for the northwest global quadrant) and a seven-digit (numeric) latitude/longitude. Stranger reports are not posted to the DATACOL database; therefore, no "official" station identifiers should have the characteristics of stranger station IDs.

2. Station or sensor does not exist. No file has been established in DATACOL for the storage of this particular parameter code for this station identifier. Either . . .

   a. The station identifier and sensor type have not been set correctly in DATACOL; or . . .

   b. The message contains the incorrect station identifier; or . . .

   c. An improper parameter code has been used (check in particular that the precipitation code in the message corresponds with the sensor type set in DATACOL).

3. Trying to revise data without revision code set. The revision mode, activated by coding .AR, .BR, or .ER as the format specifier, must be used when the sender wishes to correct a data value transmitted previously for a particular station, date, observation time, and parameter code. If this error message occurs, either . . .

   a. The revision mode has not been specified as intended; or . . .

   b. A data value was obtained from another source and posted to DATACOL in this particular time slot; or . . .

   c. Possibly the sender has edited a previous version of the product and neglected to change the date/time of observation.

4. Datacol will not accept this parameter code. DATACOL cannot accept all of the parameters possible with SHEF. Because of this, with the exception of data types listed on page 6 of NWS Technical Memorandum CR-68, parameter codes with the following characteristics will not be posted. Either . . .

   a. A duration other than the default duration has been specified; or . . .

   b. The type code is something other than an "R"; or . . .

   c. An extremum code has been specified; or . . .

   d. A probability code has been specified.

5. This observation has a future date. Observed data will be rejected when the observation time specified in the SHEF message is later than the time on the system clock when the message is decoded.