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# **Description of Card and Tape Formats for Supplying Data to Users**

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## 1. INTRODUCTION

Streamflow and sediment data can be supplied in card format either on cards or magnetic tape. Daily discharge data can also be supplied in main file format on magnetic tape. At this time the only data that can be supplied are daily discharges, monthly and annual mean discharges and annual maximum instantaneous discharges in cfs for the period of record to December 1971 inclusive; and daily suspended sediment concentration in mg/l for the period of record to December 1969 inclusive. Period of record summary listings, indicating the months and/or years for which data are available, will also be supplied.

Data may be obtained upon application to the Director, Water Resources Branch, Department of the Environment, Ottawa. Since costs for supplying data have not been established as yet, requests will be processed free-of-charge. However, the user will be required to supply his own magnetic tape or tapes.

This booklet contains a description of the various formats in which data can be supplied and will be updated as other types of hydrometric data become available on punched cards or magnetic tape for distribution to users.

### 1.1 Procedure for Requesting Data

The formats in which data can be supplied are as follows:

	<u>On cards or tape</u>	<u>On tape only</u>
Daily discharges	67-002 or 68-025	67-600
Monthly and annual mean discharges	72-102	
Maximum instantaneous discharges	72-101	
Daily suspended sediment concentration	72-100	

The following should be specified when requesting data:

1. List of station numbers and station names or the province or region for which data are being requested;
2. Type of data, e.g. daily discharges, monthly means, etc.;
3. Whether on magnetic tape or punched cards;
4. Format number, e.g. 67-002, 68-025, 72-101, etc.;
5. Number of tracks, i.e. 7 or 9; BCD or EBCDIC; even or odd parity;
6. Tape density, i.e. 556, 800 or 1600 bpi;
7. Blocking factor - for card images on tape only.

It is recommended that data be supplied in BCD (even parity) on 7-track, 800 bpi unlabelled magnetic tape in card format with a blocking factor of 9. Card formats will probably be retained for some time, whereas the main file tape format (67-600) is subject to major changes without notice as improved data handling techniques are developed. Data can also be supplied at a density of 1600 bpi but it will take longer to process the request.

## 1.2 Updated Data

When the historical 1970 FLOW file of daily discharges was updated to include 1971 data, changes were made to data for the following stations (and years):

### Vancouver District

08CG004 - 1970  
08EB005 - 1970  
08GA047 - 1969 and 1970  
08GA062 - 1970  
08HA006 - 1951 to 1966  
08ND011 - 1955 to 1967  
08NH057 - 1966 to 1968  
08NH123 - 1966 to 1968 (deleted)  
08NM145 - 1970  
09AB009 - 1970

### Calgary District

05AB028 - 1970  
05AG002 - 1925 and 1926  
07PA001 - 1968  
07SB008 - 1967 to 1969 (deleted)  
11AA025 - 1930

### Regina District

05JF008 - 1952  
05KA001 - 1920  
11AB008 - 1915  
11AB043 - 1918 to 1931  
11AB058 - 1912 and 1918  
11AB060 - 1916  
11AB082 - 1960  
11AC009 - 1909  
11AC040 - 1916  
11AE005 - 1966

### Guelph District

02CD104 - 1967 to 1969  
02CD109 - 1967 to 1969  
02CF100 - 1970  
02CF101 - 1970  
02DD007 - 1951 to 1955  
02EB103 - 1969  
02EB104 - 1969  
02EB105 - 1969  
02EC101 - 1970  
02EC103 - 1969  
02ED100 - 1968 and 1969  
02ED101 - 1967 to 1969  
02ED102 - 1967 to 1969  
02ED103 - 1967 to 1969  
02GA003 - 1931 and 1932  
02GA032 - 1970  
02GB009 - 1970  
02GC002 - 1966  
02GC004 - 1970  
02HC012 - 1967 and 1968  
02HC025 - 1968  
02HL101 - 1968 and 1969  
02HL102 - 1968 and 1969  
02HL103 - 1968 and 1969  
02KF005 - 1960 to 1970  
02LB006 - 1967

## 2. CARD FORMAT 67-002 (DAILY DISCHARGES)

Daily discharge data can be supplied in card format 67-002 either on punched cards or magnetic tape.

When these data are requested on magnetic tape, the tapes are usually written in BCD (even parity) on 7-track at a density of 800 bpi. They do not contain tape labels. The first record on tape is the first data record (card image) and the last data record (card image) is followed by an 80-character "end-of-data" record containing 9's in all 80 columns except columns 4-5 which are Z's and by padding records (if necessary) also containing 9's in all columns except columns 4-5 which are Z's. The last tape block is followed by an end-of-file mark. Unless otherwise specified the data will be supplied as unblocked card images on tape. A blocking factor of 9 is suggested since this will accommodate machines of any word-length.

When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way. A maximum of 2000 cards can be provided; the sequence of the cards cannot be guaranteed.

### 2.1 Format Description

Col. 1	type of data and units, coded as follows: 1 for mean discharges in cfs
Col. 2-8	station number, e.g. 08AA023
Col. 9-11	year, e.g. "968" for 1968
Col. 12-13	month, e.g. "b7" for July
Col. 14	time interval, coded as follows: 1 for daily figures from day 1 to day 10 2 for daily figures from day 11 to day 20 3 for daily figures from day 21 to day 31
Col. 15-80	eleven 6-digit data fields.

#### 2.1.1 Description of Data Fields

Each data field has six positions. Discharges are punched right justified with a decimal point if necessary. A negative value is entered with a minus sign just to the left of the most significant figure. The data fields are in Fortran F-type format; discharges are read as F6.0.

The date shown on the card applies to the first data field (Col. 15-20). The successive fields are for consecutive days or months depending on the interval (Col. 14) used. The value "-99999" is entered whenever a figure is missing in a field that would normally contain a figure.

### 2.2 Daily Figures

Three cards per month are required. The first card (1 in col. 14) contains 10 days from day 1 to 10; col. 75-78 are not used; the number of days in the month, e.g. "30" for November, is punched in col. 79-80. The second card (2 in col. 14) contains 10 days from day 11 to 20; col. 75-80 are not used. The third card (3 in col. 14) contains 11 days from day 21 to 31; however, the figure "-11111" is punched in the appropriate field for days that do not apply to the month in question, e.g. 30 and 31 for February 1968.

### 3. CARD FORMAT 68-025 (DAILY DISCHARGES)

Data can be supplied in card format 68-025 either on punched cards or magnetic tape. This format provides the same numeric data as format 67-002. The only difference is that the following symbols are included where applicable: A for Manual Gauge; B for Ice Conditions; E for Estimated.

Therefore, the same card and tape descriptions and limitations apply to both formats 67-002 and 68-025, except as outlined below.

#### 3.1 Format Description

Col. 1	type of data and units, coded as follows: 1 for mean discharges in cfs
Col. 2-8	station number, e.g. 08AA023
Col. 9-11	year, e.g. "968" for 1968
Col.12-13	month, e.g. "b7" for July
Col.14	time interval, coded as follows: 1 for daily figures from day 1 to day 8 2 for daily figures from day 9 to day 16 3 for daily figures from day 17 to day 24 4 for daily figures from day 25 to day 31
Col.15-16	number of days in the month, i.e. 28, 29, 30 or 31
Col.17-80	eight 8-digit data fields.

#### 3.1.1 Description of Data Fields

Each data field has eight positions as follows:

Pos. 1-6	contain the daily discharges which are punched right justified with a decimal point if necessary. A negative value is entered with a minus sign just to the left of the most significant figure. When using Fortran the data should be read under F6.0 format.
Pos. 7	contains a "figure code" as follows: 1 for no data 2 for a discharge with no decimal point 3 for a discharge with 1 decimal place 4 for a discharge with 2 decimal places.
Pos. 8	contains a "symbol code" as follows: 1 for no data 2 for no symbol 3 for A (Manual Gauge) 4 for B (Ice Conditions) 5 for E (Estimated).

The date shown on the card applies to the first data field (col. 17-24). The successive fields are for consecutive days. The value "-99999" is entered whenever a figure is missing in a field that would normally contain a figure. The positions 7 and 8 each contain a "1" (one).

#### 3.2 Daily Figures

Four cards per month are required. Whenever days 29, 30 or 31 are not applicable to the month in question, e.g. day 31 for November, positions 1-6 of the fields in question contain "-11111" and positions 7 and 8 each contain a "1" (one).

#### 4. TAPE FORMAT 67-600 (DAILY DISCHARGES)

This is the master file containing historical daily discharge data on magnetic tape.

The format and contents of this file will change from time to time as new or improved procedures are developed. However, a copy of this file will be supplied to users upon request on the understanding that the format may change without notice.

The tapes are 7-track and are written in BCD (even parity) at a density of 800 bpi. Each logical record contains 300 characters and the block size is 1500 characters or 5 records. The letter "b" in all record descriptions represents a blank. All records except the Padding Records (67-405) have a 6-digit sequence number in positions 295-300. The records are numbered sequentially starting at 1 for the Tape Header Record (67-401).

This file actually contains six record formats which are described below.

##### 4.1 Header Record (Tape Format 67-401)

There is only one per reel. It is always the first record on the reel of tape.

<u>Positions</u>	<u>Length</u>	<u>Description</u>
1-12	12	"00H0000000bb"
13-16	4	"bbb1"
17-24	8	blank
25-32	8	"FILEbEMR"
33-44	12	file number, e.g. "-WSC-0401-b1"
45-52	8	"bbSERIAL"
53	1	blank
54-58	5	reel serial number, e.g. "bb136"
59	1	blank
60-67	8	number of the program that created the tape (the program number is right justified), e.g. "bbJ20967"
68	1	blank
69-79	11	date on which the tape was written, e.g. "JANb31b1967" for January 31, 1967
80	1	blank
81-100	20	range of station numbers, e.g. "b01AE003bT0b01MN124b"
101-288	188	blank
289-294	6	date on which the tape was written, e.g. "670131" for January 31, 1967
295-300	6	"bbbbbb1", record sequence number.

##### 4.2 Station Header Record (Tape Format 67-502)

There is one per station. It is always the first record for each station.

<u>Position</u>	<u>Length</u>	<u>Description</u>
1-7	7	station number, e.g. 01AB003
8-12	5	"101b1"

13-24	12	blank
25-28	4	number of words used
29-36	8	contains "1" in pos. 29 to indicate no data in this field (not used at this time)
37-44	8	contains "2" in pos. 37 to indicate that there are data in this field. The Districts are coded in pos. 42 as follows: 2 for Vancouver          6 for Montreal 3 for Calgary            7 for Halifax 4 for Winnipeg          8 for Regina 5 for Guelph
45-288	244	blank
289-294	6	date on which this record was last updated e.g. "670131" for January 31, 1967
295-300	6	record sequence number.

#### 4.3 Data Record (Tape Format 67-501)

This tape format contains one month of daily discharges per record. The monthly total discharge and the first day of occurrence of both the minimum and maximum daily discharges for that month are also stored.

<u>Positions</u>	<u>Length</u>	<u>Description</u>
1-7	7	station number, e.g. 01AB003
8-10	3	year, e.g. "965" for 1965
11-12	2	month, e.g. "10" for October or "b7" for July
13-14	2	type of data, e.g. "b1" for daily discharges in cfs
15	1	status code, contains 1 (not used at this time)
16	1	month code, a digit 1-8
17-24	8	blank (not used at this time)
25-272	248	31 8-digit fields for daily figures and codes
273-284	12	monthly total in cfs-days
285-286	2	date on which the minimum daily discharge first occurred
287-288	2	date on which the maximum daily discharge first occurred
289-294	6	date on which the record was last updated
295-300	6	record sequence number.

The MONTH Code (Pos. 16) is as follows:

1, 2, 3, 4 for an incomplete month of 28, 29, 30, 31 days respectively.  
5, 6, 7, 8 for a complete month of 28, 29, 30, 31 days respectively.

The DAILY figures and codes (Pos. 25-272) are as follows:

char. 1-6:      daily discharges in cfs, right justified with leading blanks, in Fortran F-type format (to be read as F6.0).  
                    The decimal point, if present, is stored as a character.

char. 7 :        figure code.

char. 8 :        symbol code.

The FIGURE code is as follows:

1 for no data  
2 for a figure with no decimal (applies to "0" also)  
3 for a figure with one decimal place



4 for a figure with two decimal places.

The SYMBOL code is as follows:

- 1 for no data
- 2 for no symbol
- 3 for A (Manual Gauge)
- 4 for B (Ice Conditions)
- 5 for E (Estimated).

The MONTHLY TOTAL (Pos. 273-284) is stored in Fortran F-type format as F12.3 (to be read as F12.0). The decimal point is always stored in pos. 281.

The DATE (Pos. 289-294) on which the record was last updated is as follows: year-month-day, e.g. "650205" for February 5, 1965.

#### 4.4 End of Data Record (Tape Format 67-404)

There is only one per reel. This record follows the last Data Record.

<u>Positions</u>	<u>Length</u>	<u>Description</u>
1-12	12	"99ZZ99999999"
13-288	276	blank
289-294	6	date on which the tape was written, e.g. "670125" for January 25, 1967
295-300	6	record sequence number.

#### 4.5 Trailer Record (Tape Format 67-403)

There is only one per reel. This record follows the End of Data Record.

<u>Positions</u>	<u>Length</u>	<u>Description</u>
1-12	12	"00TR000000bb"
13-16	4	"bbb9"
17-288	272	blank
289-294	6	date on which the tape was written, e.g. "670131" for January 31, 1967
295-300	6	record sequence number.

#### 4.6 Padding Record (Tape Format 67-405)

These records follow the Tape Trailer Record. They are used if necessary to pad the last tape block to a total of 1500 characters, i.e. 5 records.

<u>Positions</u>	<u>Length</u>	<u>Description</u>
1-12	12	"99ZZ99999999"
13-288	276	blank
289-300	12	"999999999999".

## 5. CARD FORMAT 72-101 (ANNUAL MAXIMUM INSTANTANEOUS DISCHARGES)

Annual maximum instantaneous discharge data can be supplied in card format 72-101 either on punched cards or magnetic tape.

When these data are requested on magnetic tape, the tapes are usually written in BCD (even parity) on 7-track at a density of 800 bpi. They do not contain tape labels. The first record on tape is the first data record (card image). The last data record is followed by an end-of-file mark without an "end of data" record or a padding record. Unless otherwise specified the data will be supplied as unblocked card images on tape. A blocking factor of 9 is suggested since this will accommodate machines of any word-length.

Three instantaneous discharges are punched per card together with their respective year, month, day, time of day, and time zone. Only the years with data available are punched. All the cards or card images for any one station will each have three instantaneous discharges except possibly the last one, which may have only one or two.

When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way. A maximum of 2000 cards will be provided; the sequence of the cards cannot be guaranteed.

### 5.1 Format Description

Col. 1	type of data and units, coded as follows: 1 for discharge in cfs
Col. 2	blank
Col. 3-9	station number, e.g. 04AA001
Col. 10	blank
Col. 11-14	year, e.g. 1959
Col. 15-16	month, e.g. "03" for March
Col. 17-18	day, e.g. 02 or 27
Col. 19-22	time of day, using the 24-hour clock, e.g. "0323" for 3:23 a.m.
Col. 23-25	time zone, e.g. "EST" for Eastern Standard Time
Col. 26-32	maximum instantaneous discharge, right justified with a decimal point if necessary
Col. 33	blank
Columns 34-56	and 57 to 79 are a repeat of columns 11 to 33 above
Col. 80	blank.

## 6. CARD FORMAT 72-100 (DAILY SUSPENDED SEDIMENT CONCENTRATION)

Daily suspended sediment concentration data can be supplied in card format 72-100 either on punched cards or magnetic tape.

When these data are requested on magnetic tape, the tapes are usually written in BCD (even parity) on 7-track at a density of 800 bpi. They do not contain tape labels. The first record on tape is the first data record (card image) and the last data record (card image) is followed by an 80-character "end-of-data" record containing 9's in all 80 columns except columns 4-5 which are Z's and by padding records (if necessary) also containing 9's in all columns except columns 4-5 which are Z's. The last tape block is followed by an end-of-file mark. Unless otherwise specified the data will be supplied as unblocked card images on tape. A blocking factor of 9 is suggested since this will accommodate machines of any word-length.

When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way. A maximum of 2000 cards can be provided; the sequence of the cards cannot be guaranteed.

### 6.1 Format Description

Col. 1	type of data and units, coded as follows: 7 for daily mean suspended sediment concentration in mg/l
Col. 2-8	station number, e.g. 08AA023
Col. 9-11	year, e.g. "968" for 1968
Col. 12-13	month, e.g. "b7" for July
Col. 14	time interval, coded as follows: 1 for daily figures from day 1 to day 10 2 for daily figures from day 11 to day 20 3 for daily figures from day 21 to day 31
Col. 15-80	eleven 6-digit data fields.

#### 6.1.1 Description of Data Fields

Each data field has six positions. The first five positions contain daily suspended sediment concentration data right justified with no decimal point; the sixth position contains a symbol: E for estimated; S for sample (or samples) taken on that day; blank for no symbol.

When using Fortran the data may be read under I5, A1 format. The data shown on the card applies to the first data field (Col. 15-20). The successive fields are for consecutive days. The value "-99999" is entered whenever data are missing.

### 6.2 Daily Figures

Three cards per month are required. The first card (1 in col. 14) contains 10 days from day 1 to 10; col. 75-78 are not used; the number of days in the month is punched in col. 79-80. The second card (2 in col. 14) contains 10 days from day 11 to 20; col. 75-80 are not used. The third card (3 in col. 14) contains 11 days from day 21 to 31; however, the figure "-11111" is punched in the appropriate field for days that do not apply to the month in question, e.g. 30 and 31 for February 1968.

## 7. CARD FORMAT 72-102 (MONTHLY AND ANNUAL MEAN DISCHARGES)

Monthly and annual mean discharge data can be supplied in card format 72-102 either on punched cards or magnetic tape.

When these data are requested on magnetic tape, the tapes are usually written in BCD (even parity) on 7-track at a density of 800 bpi. They do not contain tape labels. The first record on tape is the first data record (card image). The last data record is followed by an end-of-file mark without an "end of data" record or a padding record. Unless otherwise specified the data will be supplied as unblocked card images on tape. A blocking factor of 9 is suggested since this will accommodate machines of any word-length. When data are requested on cards, they will be sent to the user as punched by the computer, i.e. they are not interpreted or marked in any way. A maximum of 2000 cards can be provided; the sequence of the cards cannot be guaranteed.

### 7.1 Format Description

Col. 1	type of data and units, coded as follows: 1 for mean discharges in cfs
Col. 2-8	station number, e.g. 08AA023
Col. 9-11	year, e.g. "968" for 1968
Col. 12-13	month, e.g. "b7" for July
Col. 14	time interval, coded as follows: 4 for monthly figures
Col. 15-50	six 6-digit data fields (for monthly figures only)
Col. 51-80	refer to item 7.2.

#### 7.1.1 Description of the Data Fields

Each data field has six positions. Discharges are punched right justified with a decimal point if necessary. A negative value is entered with a minus sign just to the left of the most significant figure. The data fields are in Fortran F-type format; discharges are read as F6.0. The month shown on the card applies to the first data field (Col. 15-20). The successive fields are for consecutive months. The value "-99999" is entered whenever a figure is missing in a field that would normally contain a figure.

### 7.2 Monthly and Annual Figures

Monthly mean discharges for each year are entered on two cards. The digit 1 is entered in col. 1 to indicate that the unit is cfs and the digit 4 is entered in col. 14 to indicate monthly means. The mean discharge for the year or for a selected period within the year, e.g. March to October, is also given. On the first card, col. 13 contains the digit 1 to indicate that the first data field refers to January. Col. 15-50 contain six 6-digit data fields. Col. 51-76 are blank. Col. 77-78 contain the beginning month for the year or selected period. Col. 79-80 contain the ending month. On the second card, col. 13 contains the digit 7 to indicate that the first data field refers to July. Col. 15-50 contain six 6-digit data fields. Col. 51-74 are blank. Col. 75-80 contain the mean for the year or selected period, right justified.