Appendix D: Data Records for Sediment Transport Functions

GENERAL NOTES

The following are conventions used in the record descriptions in this appendix.

a1.@!	These characters in the "value" column means that any alpha or numeric characters can go in that field; generally it is a comment field.
b	This character in the "value" column indicates a blank field.

Records that are not available in SAMwin are still useable -- use an editor to insert the record into a data file and execute the program from the "RUN" dropdown menu of the SAMwin main menu

T1 RECORDS

Up to 10 title records are permitted. These records are for the user's information only and are therefore optional. TI is also an acceptable record identification for title records.

Example:

```
T1    Use these title cards to define the job, the date, the investigator, the
T1    model #, the data source, the purpose for this run, and changes from
T1    previous runs.
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678
```

Field	Variable	Value	Description
0		T1	Record Identification in columns 1 and 2. TI is also accepted.

F# RECORDS

Marks each data field by column numbers, each field being 8 columns wide. There can be only 1 F# record. This record is for the user's information only and is therefore optional. This record is not always printed to the output file.

Example:

```
TI    Title cards
TI    Title cards
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678
```

Field	Variable	Value	Description
0		F#	Record Identification in columns 1 and 2.

TR RECORD

Not available in SAMwin.

The TR record controls the printout. There is only one TR record.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678
TRKSW(1)  KSW(2)  KSW(3) KSW(..)

TR    -1                                                                    2
```

Field	Variable	Value	Description
0	-	TR	Record Identification - TRace printout.
1	KSW(1)	-1	Causes only the Summary Table to be sent to the default output file.
10	KSW(14)	b,0	Normal operation -- the regular output goes to the default output file.
		1	Causes extra output from many transport functions to be printed to the default output file.
		2	Causes an extreme amount of output from all transport functions to be printed to the default output file -- used for debugging the code as most of the output is in terms of code variables.

TF RECORD

There are a series of TF records, each representing a transport function option. Each TF record in the data set has either a YES or a NO in a column after the function names. The YES signals the program to calculate the sediment transport using that function; a NO leaves that function turned off. Only those functions being used are required in the data set. "Laursen(Madden),1985" defaults to YES when the SAM.sed input file is written by SAM.hyd. There can be up to 20 TF records, as follows. Be sure that the "Y" of YES is in column 25, and that the "N" of NO is in column 26, and that the function names are spelled and punctuated exactly as given below.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678

TF TOFFALETI.           YES
TF YANG.                YES
TF EINSTEIN(TOTAL-LOAD)  NO
TF ACKERS-WHITE.         NO
TF COLBY                 NO
TF TOFFALETI-SCHOKLITSC  NO
TF MPM(1948).            NO
TF BROWNLIE,D50          NO
TF TOFFALETI-MPM         NO
TF LAURSEN(MADDEN),1985  NO
TF LAURSEN(COPELAND)     NO
TF YANG,D50              NO
TF ACKERS-WHITE,D50      NO
TF MPM(1948),D50         NO
TF PARKER                NO
TF EINSTEIN(BED-LOAD)    NO
TF PROFITT(SUTHERLAND)   NO
TF ENGELUND-HANSEN       NO
TF SCHOKLITSCH           NO
TF VAN.RIJN              NO
```

Field	Variable	Value	Description
0	-	TF	Record Identification - Transport Function [This name is 21 columns long and must match one in the above example in every detail-- spelling, parentheses, dashes, periods and spaces.]
	YANG	YES	Transport function turned on
		NO	Transport function turned off

NOTES

Parker: Finer sizes, less than 2 mm, must be excluded from the specified surface size distribution; there must be a size for which 0% of the material is finer; the bed material sizes used must be representative of the coarse upper layer of the bed.

Van Rijn Recommended use is for grain sizes between 0.1 and 0.5 mm.

ME RECORD

Not available in SAMwin.

The ME record controls whether the calculations are made in English or in metric units. There is only one ME record. If this record is omitted, the calculations are made in English. All input must be in the same system of units as selected for the calculations, except that PF record data is input in percent and millimeters for both systems.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678
ME METRIC

ME     1
```

Field	Variable	Value	Description
0		ME	Record Identification - Metric or English flag.
1	METRIC	0	Calculations made in English units. This is the default.
		1	Calculations made in metric units.

SP RECORD

The SP record allows user to prescribe the specific gravity of sediment particles. Some functions do not permit changing the specific gravity. Inserting this record is optional if the default value is used. There can be only one SP record.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
SP  SPGS

SP   2.0
```

Field	Variable	Value	Description
0		SP	Record Identification = Specific Gravity
1	SPGS	+	Specific Gravity of Inflowing Sediment
		b	Default = 2.65.

VE RECORD

The VE record prescribes the water velocity for up to 10 discharges. There can be only one VE record.

For the VE, DE, WI, QW, ES, and WT records, each field represents one set of test conditions. For example, the data in the first field of these 6 records contains the hydraulic input for the first discharge; the data in the 2nd field for the second discharge, etc., up to a maximum of 10 discharges. Missing data will be filled in by the program at execution time, using the rule VELA(N) = VELA(N-1).

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
VE VELA1   VELA2   VELA3   VELA4   VELA5    ... up to 10 ...

VE  1.19    2.89    5.17    6.55    8.42
```

Field	Variable	Value	Description
0		VE	Record Description - VElocity, Water
1	VELA(1)	+	Enter Water Velocity: in fps for English calculations; in cms for metric.
2-10	VELA(2) -	+	Up to 10 Velocities may be entered
.			
.			
.			
	VELA(10)		

DE RECORD

The DE record prescribes the effective depth. There can be only one DE record. The depths will be paired with data on the VE, WI, QW, ES, and WT records. Missing data will be filled in by the program at execution time using the rule, EFDA(N) = EFDA(N-1).

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
DE EFDA1   EFDA2   EDFA3   EDFA4   EDFA5  ... up to 10

DE   .82    3.11    7.50   10.71   15.66
```

Field	Variable	Value	Description
0		DE	Record Identification = DEpth, hydraulic
1	EFDA(1)	+	Effective depth, ft for English calculations; m for metric.
2-10	EFDA(2)	+	Up to 10 depths may be entered
.			
.			
.			
	EFDA(10)		

WI RECORD

The WI record prescribes the effective width. The width will be paired with data on the VE, DE, QW, ES, and WT records. Missing data will be filled in by the program at execution time using the rule, EFWA(N) = EFWA(N-1).

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
WI EFWA1   EFWA2   EFWA3   EFWA4   EFWA5  ... up to 10

WT  103.    111.    129.    143.    152.
```

Field	Variable	Value	Description
0		WI	Record Identification - top WIdth
1	EFWA(1)	+	Top Width, in ft for English calculations; m for metric.
2-10	EFWA(2)	+	Up to 10 Top widths may be entered
.			
.			
.			
	EFWA(10)		

QW RECORD

The QW record prescribes the discharge. There can be only one QW record. The discharges will be paired with data on the VE, WI, DE, ES and WT records. Missing data will be filled in by the program at execution time using the rule, Q(N) = Q(N-1).

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
QW    Q1       Q2       Q3       Q4       Q5  ... up to 10

QW   100    1000    5000   10000   20000
```

Field	Variable	Value	Description
0		QW	Record Identification - Water Discharge
1	Q(1)	+	Discharge, in cfs for English calculations; cms for metric.
2-10	Q(2)	+	Up to 10 discharges may be entered
.			
.			
.			
	Q(10)		

ES RECORD

This record prescribes the energy slope. A slope is needed for each Q(i) on the QW record, but the program will fill in missing values using the rule, S(N) = S(N-1). There can be only 1 ES record.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
ES  S(1)    S(2)    S(3)  S(...)

ES284E-6 .000174 .000170
```

Field	Variable	Value	Description
0		ES	Record identification = Energy Slope
1	ESA(1)	+	Energy slope corresponding with Q(1), in ft/ft for English calculations; m/m for metric. NOTE: If field width does not permit sufficient accuracy, code in scientific notation as shown above. If 3 significant digits do not provide sufficient accuracy, code a dummy Q in the first field and begin the real problem in field 2.
2-10	ESA(2)-ESA(10)	+	The slope can change with each Q on the QW record. However, the program will fill in missing values using the rule, ES(I) = ES(I-1), so only those which change must be coded.

WT RECORD

This record is used to prescribe the water temperature. There can be only 1 WT record.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
WT WT(1)   WT(2)   WT(3) WT(...)

WT    55      60      75
```

Field	Variable	Value	Description
0		WT	Record identification = Water Temperature.
1	WT(1)	+	Water temperature for Q(1), degrees Fahrenheit for English calculations, degrees centigrade for metric.
		b	Default = 60° F, English; 15.6° C, metric.
2-10	WT(2)-WT(10)	+	A water temperature is needed for each water discharge, but only those values which change must be coded. The program will supply missing values using the rule: WT(I) = WT(I-1).

PF RECORD

This record prescribes the gradation of the bed sediment reservoir at a cross section. Code "Continuation" records as PFC records. It is not necessary that a PF-coordinate correspond to a class interval boundary although it can. If it does not, semi-log interpolation is used to calculate the percent finer at each class interval boundary, and these are subtracted to calculate the fraction of sediment in each size class. The program assigns a percent finer of 100 to the given DMAX. There can be up to 18 data points, which is 1 PF and 3 PFC records.

The data **must** be coded in decreasing order; i.e., the largest grain size (after DMAX) and corresponding percent are to be coded in fields 5 and 6, respectively.

The particle diameters are input in millimeters for both the English and the metric calculation options.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678  2345678
PF |cmt|     ASN     SAE    DMAX   DAXIS   PFXIS   DAXIS   PFXIS  DAXIS..etc

PF         308.0     1.0   18.29    9.14    95.0     1.0    94.2      .5     78.0
PFC  .25    46.7    .125    14.3   .0625     9.9    .004     4.9
```

Field	Variable	Value	Description
0	ICG,IDT	PF	Record Identification = Percent Finer
		PFC	Record Identification = Continuation record
1	ISI	1234	Comment field for PF record-- use numeric characters only.
	DAXIS	+	For PFC (continuation) records, code the particle diameter, mm.
2	RMILE	-,0,+,b	Identifier of this Cross Section (i.e., River Mile); this field is optional.
	PFXIS	+	For PFC records, code the percent finer.
3	SAE	b	SAE is not needed for this code, but it is provided for compatibility with HEC-6.
	DAXIS	+	For PFC records, code the particle diameter, mm.
4	DMAX	+	The diameter of the maximum particle size,in mm.
		b	Not allowed -- **ALWAYS code a value**.
	PFXIS	+	For PFC records, code the percent finer.

PF/PFC RECORD — continued

Field	Variable	Value	Description
5	DAXIS(2)	+	On the PF record, this is the first coordinate point down the percent finer curve from DMAX. If this particle size is larger than 64MM, choose a point that will approximate the PF curve with 2 straight line segments from DMAX to 64mm.
6	PFXIS(2)	0,+	The percent finer corresponding to DAXIS(2).Code as a percent.
7	DAXIS(3)	0,+	Continue to code points from the percent finer curve, with the DAXIS in the odd-numbered fields and the PFXIS in the even-numbered fields. Up to 18 points, including the DMAX point, are permitted. Use a continuation record when coding more than 4 points.

$JOB RECORD

Not available in SAMwin.

Jobs may be stacked one after the other by substituting the $JOB record for the $$END record at the end of each data set. Place the $$END after the last job in the stack. A stacked SAM.sed data set will create a stacked SAM.yld input data file.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678
$JOB
```

Field	Variable	Value	Description
0		$JOB	Record identification = NEW JOB

$$END RECORD

This record signifies the end of the run.

Example:

```
F# 45678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678 2345678
$$END
```

Field	Variable	Value	Description
0		$$END	Record identification = END OF RUN.