Corps of Engineers
Jacksonville District
Water Management and
Meteorology Section

Implementation of
Interagency Data Exchange Format

Guidance Document
October 20, 1994

Introduction

The Water Management and Meteorologic Section of the Corps of Engineers Jacksonville District will support the agreed upon Generalized Data Exchange Format as well as the .E format of the Standard Hydrologic Exchange Format (SHEF). This document will give guidance on the implementation of the Generalized Data Exchange Format for realtime exchange of operational (preliminary) data as well as data exchange of historical daily data. Implementation conforms to the Generalized Data Exchange Format.

Each data message, or individual line fully defines the data station identifier (site location), parameter, starting date and time of first data value and time interval of the data values.

Data Message Parameter Definitions: (Figure 1)

Generalized Rules:

- Message is field delimited by "/" character
- Position of data message parameters is fixed
- Each message starts with ".E/"
- Maximum message line 80 columns
- Four digit years used
- Midnight timestamp is at 2400 hours
- Comments start with ":" character and may be used throughout
  No plans on placing comments in data files at this time
- No embedded non-printable characters within data message

Station Identifier (site location) (Table 1)

- First field in data message following ".E/"
- Full 8 character field length used, station identifiers less than 8 characters will be followed by asterisk characters "*" to make up the remaining 8 characters
- Different station identifiers not used to internally represent different types of data from the same station

Parameter - Physical Element (PE) (Table 2)

- Second field in data message following Station Identifier
- SHEF PE codes used in most cases - extensions to SHEF PE codes required for certain parameters
- PE limited to 2-3 characters

Starting Date

- Third field in data message following Physical Element
- Four digit years used
- yyyymmdd of first data element value of message
- Preceding zeros for months and days less than 10 are used - ex. 940301

Starting Time

- Fourth field in data message following Starting Date
- Eastern standard time
- hhnn of first data element value of message
  - hh - hour, preceding zero required for hours < 10
  - nn - minutes, optional, preceding zero

Time Interval (Table 3)

- Fifth field in data message following Starting Time
- DIiii - for regular interval

Data Elements

- Data Elements follow Time Interval
- Negative numbers preceded by "-" character
- No blank spaces within data elements
- Only data quality flag for "missing data" is supported
  - Data quality flags enclosed in brackets "( )"
  - No imbedded colons
- Missing data: use data quality flag "(M)"

To be determined by agreement between COE and Data Receiver:

Naming standard for datafiles that are transferred

How much data to transfer in a file (time window)

What frequency to transfer file

How to handle periods of non availability (ie. computer is down over the weekend and it takes till Tuesday to fully recover all data before transferring data is even an option)

How to handle updates

Exchange Format for Irregular Interval Data

Default Data Types for Specific Intervals

Realtime Operational Data

Daily Values

Headwaters and Tailwaters	Instantaneous Midnight
Flows	Daily Average
Precip	Daily Cumulative
Lockages	Daily Cumulative
Chloride	Instantaneous

Hourly Values

Headwaters and Tailwaters	Instantaneous
Flows	Hourly Average
Precip	Instantaneous Cumulative

Historical Data

Daily Values

Headwaters and Tailwaters	Daily Average
Flows	Daily Average
Precip	Daily Cumulative
Lockages	Daily Cumulative
Chloride	Instantaneous

.E/Station ID/Parameter/StartDate/StartTime/TimeInterval/Data Elements/

Example 1: 15 minute interval data of S12A gate position settings

```
.E/S12A****/NA/19940810/0445/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
.E/S12A****/NA/19940810/0700/DIN15/0.5/0.5/0.5/0.5/0.5/1./1./1./1./1.
.E/S12A****/NB/19940810/0015/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
.E/S12A****/NB/19940810/0230/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
.E/S12A****/NB/19940810/0700/DIN15/0.5/0.5/0.5/0.5/0.5/1./1./1./1./1.
.E/S12A****/NB/19940812/2130/DIN15/1./1./1./1./1./1./1./1./1./1./1.
.E/S12A****/NC/19940810/0015/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
.E/S12A****/NC/19940810/0230/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
.E/S12A****/NC/19940812/2130/DIN15/1./1./1./1./1./1./1./1./1./1./1.
.E/S12A****/ND/19940810/0015/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
.E/S12A****/ND/19940810/0230/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
.E/S12A****/NE/19940810/0015/DIN15/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5/0.5
```

Example 2: Daily interval data of Okeechobee Waterway Structures of Headwater, Tailwater, Flow, Precip, Lockages and Chloride for 4 Days

```
.E/S77*****/HS/19941017/2400/DID1/17.48/17.43/17.35/17.33
.E/S77*****/HW/19941017/2400/DID1/10.89/10.79/11.01/11.07
.E/S78*****/HS/19941017/2400/DID1/10.78/10.69/10.83/10.92
.E/S78*****/HW/19941017/2400/DID1/3.52/3.55/3.5/3.38
.E/S79*****/HS/19941017/2400/DID1/3.11/3.14/3.06/2.91
.E/S79*****/HW/19941017/2400/DID1/0.9/0.92/1.05/0.93
.E/S308****/HS/19941017/2400/DID1/17.18/17.18/17.18/17.21
.E/S308****/HW/19941017/2400/DID1/14.09/14.37/14.51/14.38
.E/S80*****/HS/19941017/2400/DID1/13.9/14.48/14.42/13.92
.E/S80*****/HW/19941017/2400/DID1/1.21/0.8/0.85/0.69
.E/S77*****/QR/19941017/2400/DID1/1558./793./1203./2013.
.E/S78*****/QR/19941017/2400/DID1/1996./1525./1330./2250.
.E/S79*****/QR/19941017/2400/DID1/3989./2644./2516./3377.
.E/S80*****/QR/19941017/2400/DID1/645./400./405./1841.
.E/S308****/QR/19941017/2400/DID1/0./233./28./1462.
.E/S77*****/PP/19941017/2400/DID1/0./0./0./0.
.E/S78*****/PP/19941017/2400/DID1/0./0./0./0.
.E/S79*****/PP/19941017/2400/DID1/0./0./0./0.
.E/S80*****/PP/19941017/2400/DID1/0./0./0./0.
.E/S308****/PP/19941017/2400/DID1/0./0./0./0.
.E/S77*****/NL/19941017/2400/DID1/11./16./22./14.
.E/S78*****/NL/19941017/2400/DID1/11./21./17./0.
.E/S79*****/NL/19941017/2400/DID1/21./20./17./29.
.E/S80*****/NL/19941017/2400/DID1/12./11./15./25.
.E/S308****/NL/19941017/2400/DID1/24./20./23./29.
.E/S79*****/WC/19941017/2400/DID1/56./60./63./59.
```

Figure 1. Generalized Data Message - Regular Interval

Station identifier lists (not complete)

STATION IDENTIFIER	**:Location**	**Comments**
S10*****	:WCA1	S10 (use for total structure flow)
S10A****	:WCA1	S10A
S10C****	:WCA1	S10C
S10D****	:WCA1	S10D
S11*****	:WCA2A	S11 (use for total structure flow)
S11A****	:WCA2A	S11A
S11B****	:WCA2A	S11B
S11C****	:WCA2A	S11C
S12*****	:WCA3A	S12 (use for total structure flow)
S12A****	:WCA3A	S12A
S12A****	:WCA3A	S12A
S12B****	:WCA3A	S12B
S12C****	:WCA3A	S12C
S12D****	:WCA3A	S12D
S308****	:OKEECHOBEE	S308
S77*****	:OKEECHOBEE	S77
S78*****	:OKEECHOBEE	S78
S79*****	:OKEECHOBEE	S79
S80*****	:OKEECHOBEE	S80

Table 1. Station Identifier

CODES	Explanation (units) : Comments
H	Height
HD	Height, Head (ft) : use for pump head or lift distance
HG	Height, Stage (ft) : use for stages and headwater stages
HH	Elevation, of Reading (NGVD) : use for elevations in NGVD
HN	Height, Stage (ft) : use for tailwater stages
HS	Elevation, Headwater (NGVD) : use for spillway headwater elevations
HW	Elevation, Tailwater (NGVD) : use for spillway tailwater elevations
L	Lake Data
LA	Lake Surface Area (Acre) :
LC	Lake Storage Volume Change (ACFT) :
LS	Lake Storage Volume (ACFT) :
LR	Lake Storage Rule Curve (ACFT) : Allowable Storage
N	Gate Data
NA	Gate #1 Opening (ft) :
NB	Gate #2 Opening (ft) :
NC	Gate #3 Opening (ft) :
ND	Gate #4 Opening (ft) :
NE	Gate #5 Opening (ft) :
NF	Gate #6 Opening (ft) :
NG	Gate #7 Opening (ft) :
NH	Gate #8 Opening (ft) :
NT	Total of Gate Openings (ft) :
NL	Lockages (#) :
P	Pressure and Precipitation
PA	Pressure, Atmospheric (in-Hg) : use for barometric pressure
PC	Precipitation, Accumulated (in) : use for accumulating precip
PP	Precipitation, Incremental (in) : use for daily/hourly incremental precip
Q	Discharge
QD	Discharge, Canal Diversion and Lockage Discharges (CFS) :
QE	Discharge, Seepage (CFS) :
QI	Discharge, Inflow (CFS) :
QL	Discharge, Rule Curve (CFS) : Allowable
QP	Discharge, Pumping (CFS) : Total Pumping
QR	Discharge, Spillway or Structure (CFS) : Total Structure Discharge
T	Temperature Data
TA	Temperature, Air (DF) : Dry Bulb
TM	Temperature, Minimum Air (DF) :
TP	Temperature, Pan Water (DF) :
TR	Temperature, Mean Air (DF) :
TW	Temperature, Water (DF) :
TX	Temperature, Maximum Air (DF) :

Table 2. Physical Elements

U	Wind Data
UC	Wind, Accumulated Wind Travel (MI) :
UD	Wind, Direction (Degrees) :
UL	Wind, Travel Length over Specified Duration (MI) :
US	Wind, Speed (MI/HR) :
V	Voltage Data
VB	Voltage, Battery (Volt) :
W	Water Quality
WC	Water, Conductance or Chloride (UMHOS/CM) :
WT	Water, Turbidity (JTU) :
WD	Water, Turbidity Tailwater (JTU) :
WU	Water, Turbidity Headwater (JTU) :

Table 2. Physical Elements

CODE UNITS	:Definition	
DINnn	:nn Minutes	(0-99)
DIHhh	:hh Hours	(0-99)
DIDdd	:dd Days	(0-99)
DIMmm	:mm Months	(0-99)
DIEmm	:mm Months	(0-99) (use for end of month data only)
DIYyy	:yy Years	(0-99)

Table 3. Time Interval Specifier - Regular Interval Data