FAY BROOK
WHITE RIVER WATERSHED
VERMONT

KRATKY POND DAM
DAM-BREAK FLOOD
ANALYSIS

AUGUST 1989

US Army Corps of Engineers
New England Division

Preface

This investigation was performed under the Corps of Engineers' Flood Plain Management Services Authority at the request of the State of Vermont. The Flood Control Act of 1960 which authorizes the U.S. Army Corps of Engineers "... to compile and disseminate information on floods and flood damages ... and to provide engineering advice to local interests for their use in planning to ameliorate the flood hazard."

The Dam-Break Analysis study presented in this report was prepared under contract by Hydraulic & Water Resources Engineers, Inc. of Waltham, Massachusetts. Any questions concerning this report should be addressed to the Chief of the Hydrology Engineering Section of the Corps of Engineers, New England Division.

KRATKY POND DAM
DAM-BREAK FLOOD ANALYSES

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KRATKY POND DAM
DAM-BREAK FLOOD ANALYSES

1. INTRODUCTION AND PURPOSE

This report presents the findings of two dam-break flood analyses performed for Kratky Pond Dam, Vermont. The dam is owned, operated and maintained by Philip Kratky, South Royalton, Vermont. Included in the report are a description of pertinent features of the dam, the procedure used in the analyses, the assumed dam-break conditions, and the resulting downstream flood depths and timing. This study was not performed because of any known likelihood of a dam-break at Kratky Dam. Its purpose was to provide quantitative information for emergency planning use.

2. DAM DESCRIPTION

Name of Dam:	Kratky Dam
Town:	Strafford
County and State:	Orange, VT
Stream:	Fay Brook

Kratky Pond is situated in Orange County in central Vermont, in the Town of Strafford, approximately 4 miles west of the town center.

Kratky Dam is an earthfill dam with a maximum height of 25 feet and a length of 360 feet, with a drop inlet spillway and a vegetated earth-cut emergency spillway in the right abutment. The dam appears to be used for irrigation and recreation. It has a drop inlet spillway with a 30-inch riser and a 24-inch barrel; the emergency spillway has a 24-foot bottom width.

3. PERTINENT DATA

This information was taken primarily from records received from the Vermont Department of Water Resources and Environmental Engineering. The information is based on inspections conducted in 1967 and 1985, design and as-built drawings of the dam (1967) and an inspection of remedial drains in 1987.

(a) Drainage Area

Plate 1 shows the location of Kratky Dam on Fay Brook. The drainage area consists of 0.33 square miles (210 acres) of hilly and mostly well-forested terrain.

(b) Elevation (N.G.V.D.)

(1) Top of Dam	Varies from 1,353.2 to 1,354.0
(2) Normal Pool Level	1,348.4
(3) Emergency Spillway	Varies from 1,349.4 to 1,349.8
(4) Crest Outlet Works	1,348.38

(c) Reservoir

(1) Length of normal pool - 0.23 mile

(d) Storage (Acre-Feet)

(1) Top of Dam	- 66.0
(2) Emergency spwy crest	- 44.2
(3) Normal water elev	- 37.7

(e) Reservoir Surface (Acres)

(1) Top of Dam (approx)	- 9.8
(2) Emergency Spwy Crest	- 7.1
(3) Normal water elev	- 6.3

(f) Dam

(1) Type	Earthfill
(2) Length	360 feet
(3) Height	25 feet maximum
(4) Top Width	12 feet
(5) Side Slopes	
(a) Upstream	1 on 3
(b) Downstream	1 on 2.5
(6) Zoning	Not indicated
(7) Impervious Core	Not indicated
(8) Cutoff trench	
(a) Width	Approximately 12 feet
(b) Depth	Approximately 3 feet

(g) Outlet Works

(1) Type	Drop inlet
(2) Diameter of vertical shaft	30 inches
(3) Diameter of barrel	24 inches
(4) Crest elevation	1348.38 feet
(5) Design capacity	27.5 cfs (under 2.8 ft head)

(h) Emergency Spillway

(1) Type	Earthcut overflow, vegetated.
(2) Length	24 feet
(3) Crest elevation	1,349.4 to 1,349.8 ft.
(4) Design Capacity	155 cfs (1.6 ft approx head)
(5) Capacity	556 cfs (at top of dam)

4. VALLEY DESCRIPTION

The Fay Brook channel is initially well-defined and quite deep. The average slope is approximately 260 feet per mile downstream of the dam. The valley is well-wooded and steep. At approximately 1.67 miles downstream of the dam there is an inflow from Day-Bruorton Pond.

Plate 1 is based on the Sharon, Vermont USGS Quadrangle Sheet. This map erroneously indicates that the flow from Day-Bruorton Pond is through a spillway at its northern banks and proceeds parallel to a small farm road to meet Fay Brook. The spillway at Day-Bruorton Pond is at its southern extreme. For the present analysis tributary inflows to Fay Brook from Day-Bruorton Pond were assumed to enter at the southern location. This is shown in Plate 1.

5. MODEL DESCRIPTION

The Kratky Dam dam-break analysis was conducted using Boss DamBrk, a June 1988 version of the "National Weather Service Dam-Break Flood Forecasting Computer Model", developed by D.L.Fread, Research Hydrologist, Office of Hydrology, National Weather Service, NOAA, Silver Springs, Maryland 20910. Boss DamBrk is copyrighted by Boss Corporation, 210 North Bassett Street, Madison, WI 53703. Input for the model consisted of: (a) storage characteristics of the reservoir, (b) selected geometry and duration of the breach development, (c) hydraulic roughness coefficients, and (d) river channel characteristics. Based on the input data,the model computes the dam-break outflow hydrograph and routes it downstream. The analysis provides output on the attenuation of the flood stages, and timing of the flood wave as it progresses downstream.

6. ASSUMED DAM BREAK CONDITIONS

General: This analysis was conducted for each of two failure scenarios. The first was the "Flood of Record" failure case, in which the initial lake water level was assumed to be 10 inches above the overflow spillway level. This level was determined based on the estimated flood of record inflow prior to a failure. Because the resulting water level in the reservoir prior to failure was below the dam crest level the failure was assumed to occur by piping.

The second failure condition was the "Maximum Surcharge Storage" case, in which the lake level was assumed to be at the dam crest elevation at the start of a forty-five-minute dam-breach.

The magnitude of a flood resulting from the hypothetical failure of Kratky Dam is a function of many different parameters including size of breach, initial pool level and

storage, rate of breach formation, channel and overbank roughness and antecedent flow conditions. Engineering assumptions used in the analyses for the two cases are presented below.

PARAMETER	FLOOD OF RECORD	MAXIMUM SURCHARGE
(1) Initial Pool Level	1,350.24 ft	1,353.2 ft NGVD
(2) Reservoir Inflow	58 cfs	556 cfs
(3) Breach Invert	1,333.5 ft	1,333.5 ft NGVD
(4) Breach Base Width	75 feet	75 feet

(5) Time to Complete Formation of Breach : 45 minutes

(6) Downstream Channel Roughness: Manning n = 0.025 to 0.038

(7) Pre-Breach River Flows:

The Flood of Record was estimated for sub-basins in the White River watershed at 175 cfs per square mile of drainage area. This is the estimated runoff rate for the November 1927 flood. Inflow to Kratky Dam was assumed to be 58 cfs. The lateral inflow from Day-Bruorton Pond was taken as 54 cfs.

The Maximum Surcharge Storage failure required an initial flow through the spillway and outlet works of 556 cfs. The initial inflow from the Day-Bruorton Pond dam was increased proportionately to 518 cfs.

7. RESULTS

The results of the Flood of Record analysis are presented in Appendices A and B and these form the basis of the hazard classification rating. Computer input and output data files, with graphical summaries, for the Maximum Surcharge Storage case, are presented in Appendix C.

Peak stage and flood flow profiles are shown on Plates 2 and 3 for the Flood of Record failure case. Stage profiles are shown in feet above the stream-bed elevation as measured by the Hydraulic and Water Resources Engineers survey team. Peak water elevations can be determined by adding these depths of flow to the slope profile elevations. In an attempt to determine normal flow depths, estimated average flow conditions were input to the Dam Break model and routed downstream. Depths of flow so obtained were of the order of a few inches. Due to the extremely small depths of flow, the resulting water elevations are not presented here but they are summarised along with the input data file in Appendix D.

Peak flows resulting from the 45-minute formation of a piping failure dam breach varied from 1,265 cubic feet per second at the dam, river mile 0.0, to 1,118 cfs at river mile 2.12 (2,000 feet south of the Orange County/Windsor County line). This final peak flow includes the initial 54 cfs inflow from Day-Bruorton Dam.

Peak flows occurred at times ranging from 0.40 to 0.70 hour after the start of breach formation. Peak depths along the study reach varied from 2.3 feet at river mile 0.68 to a maximum value of 5.05 at river mile 0.49. In general, however, peak depths were in the range 3.0 to 4.5 feet.

Maximum velocities generally ranged from 5 to 15 feet per second.

Dam failure stage and discharge hydrographs at river miles 0.00, 0.49, and 2.12 (surveyed cross-sections) are presented for the Flood of Record failure case shown on Plate 3. These are based on flow hydrographs included in Appendix B.

8. DAM SAFETY HAZARD CLASSIFICATION

The categories and criteria for the hazard classification of dams, as reported in "Recommended Guidelines For Safety Inspection of Dams", Department of the Army, Nov. 1976, are listed in the following table. The hazard classification pertains to the potential loss of human life or property damage in the area downstream of the dam in the event of the failure of the dam.

DAM HAZARD CLASSIFICATION

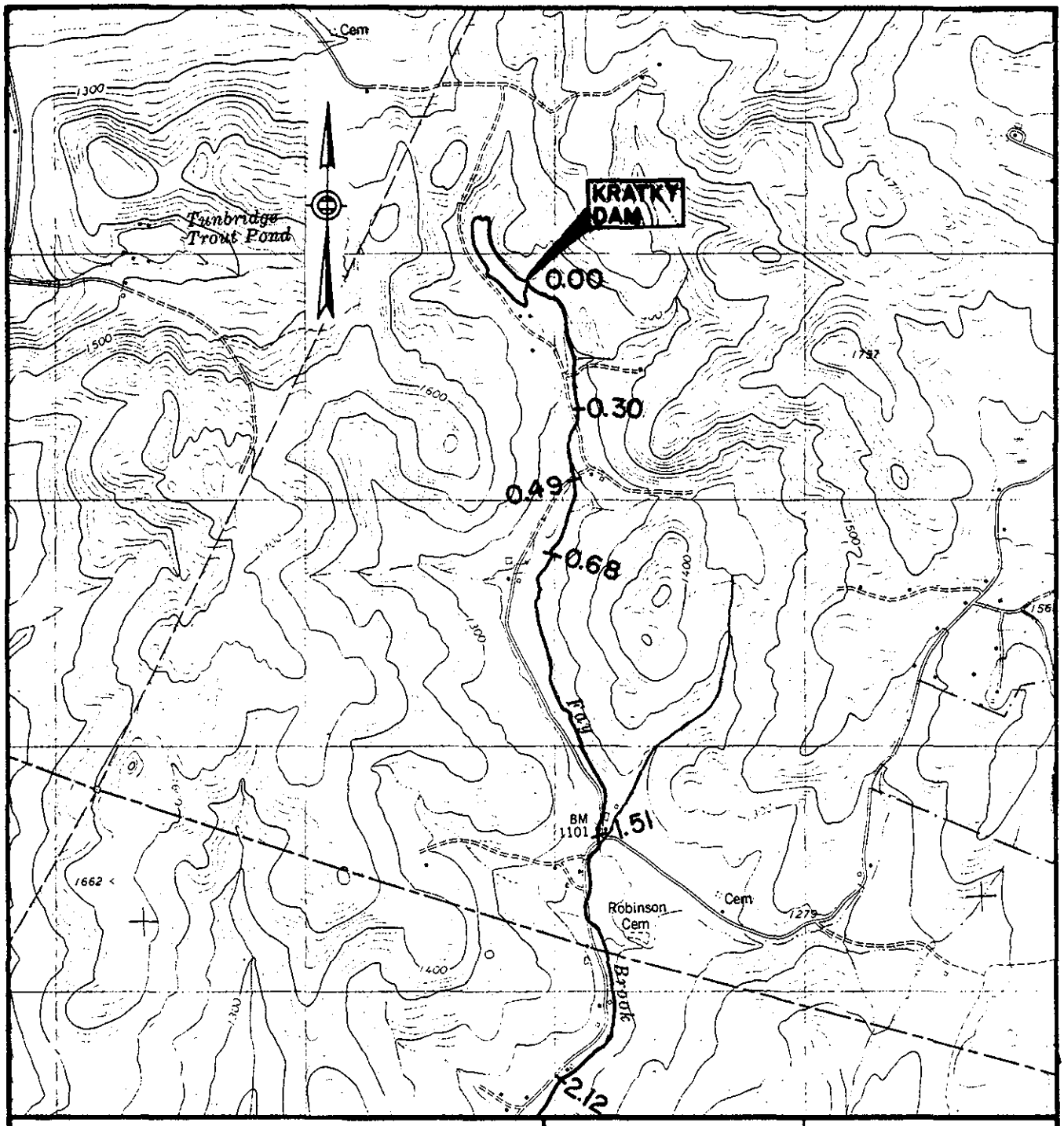
Category	Loss of Life (Extent of Development)	Economic Loss (Extent of Development)
Low	None expected (No permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
High	More than few	Excessive (Extensive community, industry or agriculture)

The inundated region consisted of an area with a width perpendicular to the direction of flow of: about 50 feet immediately downstream of the dam; 30 feet at river mile 0.30; 60 feet at river mile 0.49; 150 feet at river mile 0.68; 130 feet at river mile 1.51; and 70 feet at the final surveyed cross-section. These top-widths provide no more than a rough guide to the extent of the potentially inundated area. They do not take into account possible wave action or any more detailed information than can be interpolated from the surveyed cross-sections.

Two abandoned buildings immediately upstream of the Day-Bruorton inflow are situated within this region, and one further abandoned building south of the county border, are within the region indicated by these topwidths. The analysis discounted the effects of ponding behind small road crossings. The washouts of these roads would probably constitute the greatest property damage.

Despite the low peak flooding depths, the high associated speeds and expected wave action during the failure would present a real danger to anyone exposed. The prospect of a few deaths cannot be ruled out.

The dam therefore falls into the "significant" hazard rating category.



MAP BASED UPON U.S.G.S.
SHARON, V.T. QUADRANGLE
1973
CHECKED 1975 EDITED 1981

CROSS SECTION LOCATION IN MILES BELOW DAM

SCALE IN FEET

2,000 0 2,000

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KRATKY DAM

DAM BREAK FLOOD ANALYSIS

INDEX MAP

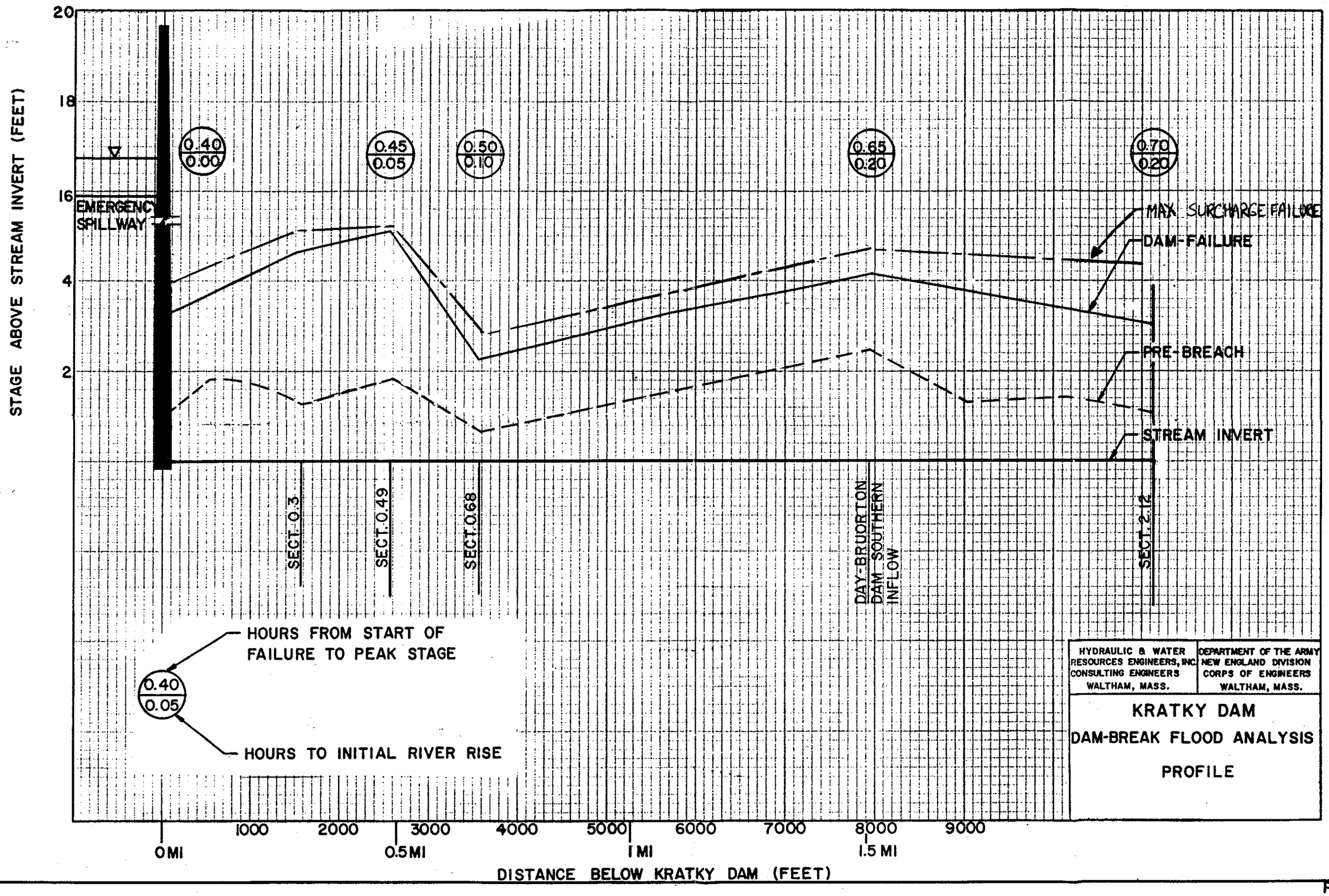
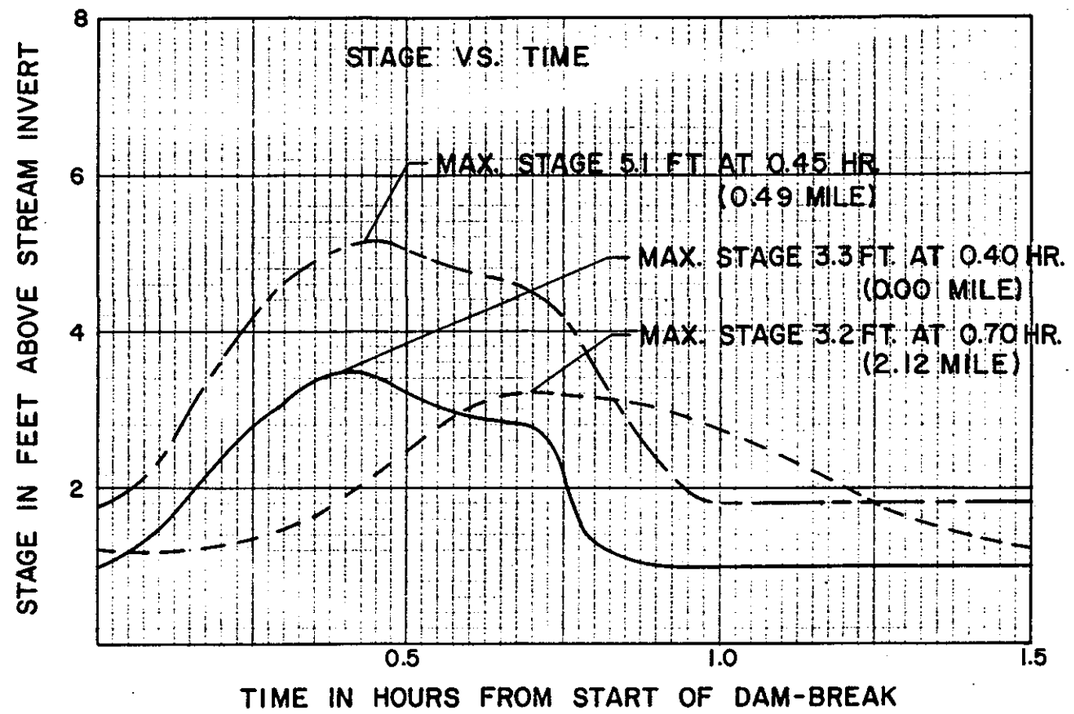
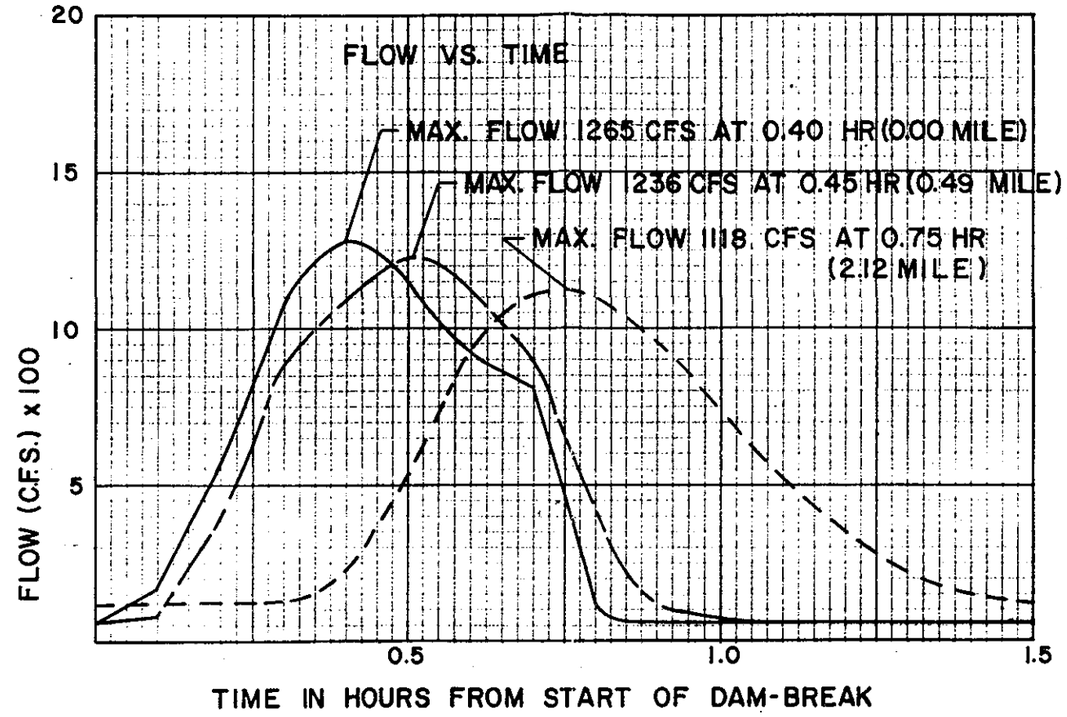
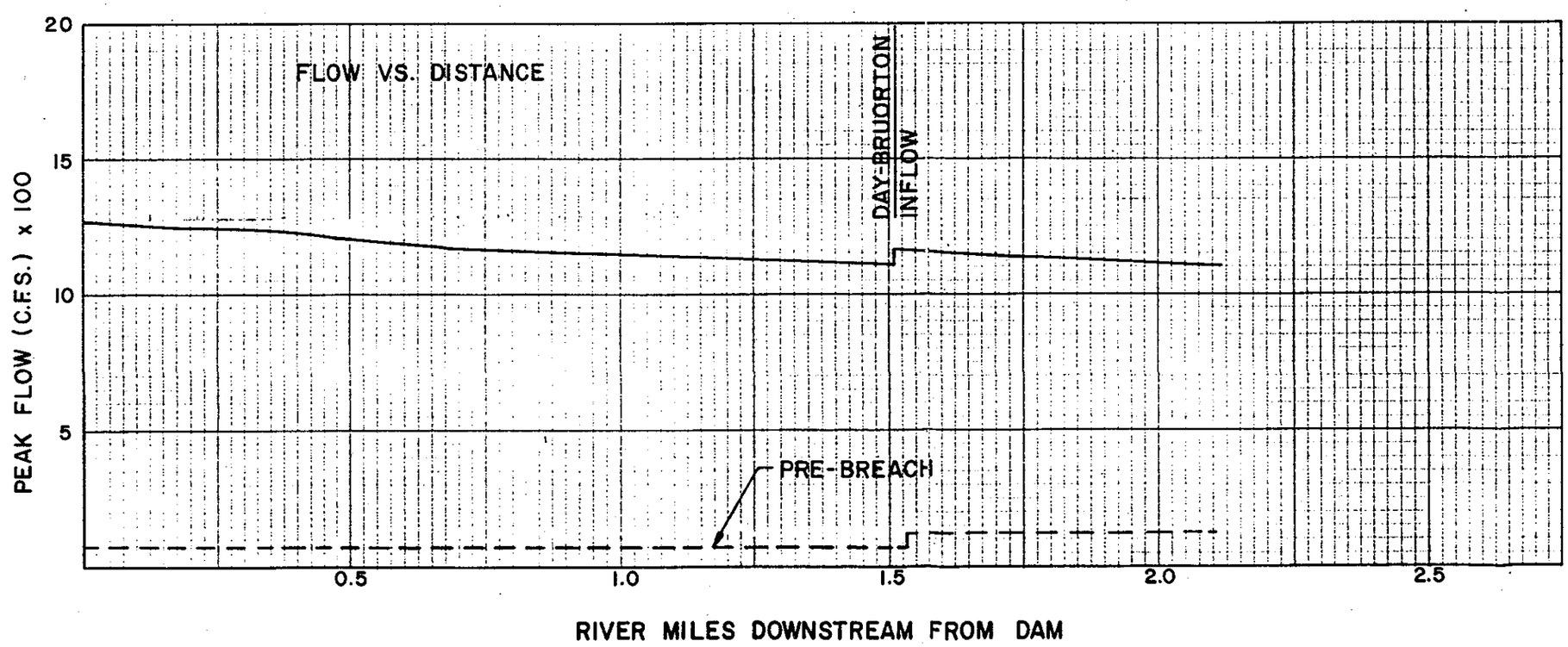

STAGE ABOVE STREAM INVERT (FEET)
20
18
16
4
2
EMERGENCY SPILLWAY
0.40 / 0.00
0.45 / 0.05
0.50 / 0.10
0.65 / 0.20
0.70 / 0.20
MAX. SURCHARGE FAILURE
DAM-FAILURE
PRE-BREACH
STREAM INVERT
SECT. 0.3
SECT. 0.49
SECT. 0.68
DAY-BRUORTON
DAM SOUTHERN INFLOW
SECT. 2.12
HOURS FROM START OF FAILURE TO PEAK STAGE
0.40 / 0.05
HOURS TO INITIAL RIVER RISE
HYDRAULIC & WATER RESOURCES ENGINEERS, INC. CONSULTING ENGINEERS WALTHAM, MASS.
DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS WALTHAM, MASS.
KRATKY DAM
DAM-BREAK FLOOD ANALYSIS
PROFILE
1000
2000
3000
4000
5000
6000
7000
8000
9000
0 MI
0.5 MI
1 MI
1.5 MI
DISTANCE BELOW KRATKY DAM (FEET)

PLATE 2







STREAM INVERT DATUM (FT. NGVD)

STA. 1 RM. 0.00 = 1,333.50 ———

STA. 2 RM. 0.49 = 1,189.70 — — —

STA. 3 RM. 2.12 = 1,020.20 — — — —

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KRATKY DAM

DAM-BREAK FLOOD ANALYSIS

BASE FLOOD DISCHARGES STAGES & TIMING

```
KRATKY DAM VERMONT  FLOOD OF RECORD  DAM FAILURE
         1          0          0          5          2          0          0          0
0111110100 0 2
      66.0       37.7        0.0
    1353.6     1348.4     1333.5
       0.0   1350.243        1.0     1333.5       75.       0.75     1333.5        1.0
  1350.243     1353.2     1349.4     1345.0       75.       0.01      1080.        0.0
       0.0        2.0
      58.0       58.0
       0.0        2.0
         6          4          6          9          0          1          1          0
         1          2          3          4          5          6
       0.0        0.0
    1333.5     1342.5     1349.5   1353.82        0.0        0.0        0.0        0.0
       0.0      145.0       280.      470.        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
       0.3        0.0
    1218.6     1223.2     1225.0     1237.2        0.0        0.0        0.0        0.0
       0.0        25.       52.5       225.        0.0        0.0        0.0        0.0
       0.0        0.0       25.0       25.0        0.0        0.0        0.0        0.0
      0.49        0.0
    1189.7     1191.7     1196.0     1203.9        0.0        0.0        0.0        0.0
       0.0       15.0       80.0      175.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      0.68        0.0
    1176.9     1179.3     1181.1     1191.7        0.0        0.0        0.0        0.0
       0.0      160.0      380.0      550.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      1.51        0.0
   1089.35    1091.40    1105.00    1995.60        0.0        0.0        0.0        0.0
       0.0       12.0      768.0      572.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      2.12        0.0
   1020.20    1023.00    1030.20    1033.00        0.0        0.0        0.0        0.0
       0.0       66.0      198.0      240.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.025      0.035      0.038      0.038        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
     0.025       0.03       0.03       0.03        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
       0.1       0.10       0.19        0.2        0.2
       0.0        0.0        0.0        0.0        0.0
       0.0        0.0       0.05        0.0      367.0        0.5       0.01        0.0
         5
      54.0       54.0
```


INPUT DATA FILE
APPENDIX A

==========
B O S S D A M B R K (tm)
==========

Copyright (C) 1988 Boss Corporation
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Version : 1.30
Serial Number : 0001058.130

PROGRAM ORIGIN :

Boss DamBrk (tm) is an enhanced version of Professor D. L. Fread's 1984 NWS DAMBRK program.

DISCLAIMER :

Boss DamBrk (tm) is a complex program which requires engineering expertise to use correctly. Boss Corporation assumes absolutely no responsibility for the correct use of this program. All results obtained should be carefully examined by an experienced professional engineer to determine if they are reasonable and accurate.

Although Boss Corporation has endeavored to make Boss DamBrk error free, the program is not and cannot be certified as infallible. Therefore, Boss Corporation makes no warranty, either implicit or explicit, as to the correct performance or accuracy of this software.

In no event shall Boss Corporation be liable to anyone for special, collateral, incidental, or consequential damages in connection with or arising out of purchase or use of this software. The sole and exclusive liability to Boss Corporation, regardless of the form of action, shall not exceed the purchase price of this software.

PROJECT DESCRIPTION :

PROJECT TITLE : Kratky Dam Piping Failure 1 Reach
PROJECT NUMBER : JC-127-3 Overtopping
DESCRIPTION : Dynamic Routing Ops 2; supercritical
ENGINEER : Patrick Blumeris
DATE OF RUN : 6/08/1989
TIME OF RUN : 2:58 pm

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Number of Dynamic Routing Reaches (KKW)	1	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	2	
No. of Informational Cross-Sections (NPRT)	0	
Flood-Plain Routing (KFLP)	0	(no)
Landslide Simulation (KSL)	0	(no)

RESERVOIR DESCRIPTION :

Elevation vs. Volume Table

Elevation HSA(K) (ft MSL)	Volume SA(K) (acre-ft)
1353.60	66.0
1348.40	37.7
1333.50	.0
.00	.0
.00	.0
.00	.0
.00	.0
.00	.0

RESERVOIR VOLUME DESCRIPTION :

Elevation vs. Surface Area Table

Elevation HSA(K) (ft MSL)	Surface Area SA(K) (acres)
1353.60	6.8
1348.40	4.1
1333.50	1.0
.00	.0
.00	.0
.00	.0
.00	.0
.00	.0

RESERVOIR and BREACH DESCRIPTION :

Initial Elevation of Reservoir Surface (YO, ft MSL)		1350.24
Bottom of Dam Elevation (DATUM, ft MSL)		1333.50
Top of Dam Elevation (HD, ft MSL)		1353.20
Water Surface Elevation at Time of Breach (HF, ft MSL)		1350.24
Breach Side Slope (Z)	1:	1.00
Breach Bottom Elevation (YBMIN, ft MSL)		1333.50
Breach Base Width (BB, ft)		75.00
Time of Breach Formation (TFH, hr)		.75
Uncontrolled Spillway Crest Elevation (HSP, ft MSL)		1349.40
Uncontrolled Spillway Discharge Coefficient (CS)		75.00
Spillway Gate Center Elevation (HGT, ft MSL)		1345.00
Spillway Gate Discharge Coefficient (CG)		.01
Dam Overtopping Discharge Coefficient (CDO)		1080.00
Turbine Discharge (QT, cfs)		.00

INFLOW HYDROGRAPH DESCRIPTION :

Hydrograph Time Intervals (DHF, hr)	.00
Routing Period (TEH, hr)	2.00

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
.00	58.0
2.00	58.0

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Number of Cross-Sections Entered (NS)	6	
Number of Top Widths Entered (NCS)	4	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Cross-Sectional Smoothing Parameter (KSA)	0	
Downstream Supercritical Parameter (KSUPC)	1	(supercritical)
Number of Lateral Inflow Hydrographs (LQ)	1	
Number of Points in Gate Control Curve (KCG)	0	

CROSS-SECTIONS WHERE HYDROGRAPH REQUESTED :
(maximum allowed = 6)

1 2 3 4 5 6

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	.0
Initial Time-Step Size (DTHM, hr)	.05
Time at which Dam Starts to Fail (TFI, hr)	.00
Theta Weighting Factor (F1I)	.500
Stage Convergence Criterion (EPSY, ft)	.01
Initial Downstream Water Surface Elevation (YDN, ft MSL)	.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	367.000

LATERAL INFLOW REACH NUMBERS (LQX) :

5

(QL(L, 1),L=1,ITEH)

54. 54.

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi)	.000
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.100

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1333.50	.0	.0250	.0	.0	.0000	.0	.0000
1342.50	145.0	.0350	.0	.0	.0000	.0	.0000
1349.50	280.0	.0380	.0	.0	.0000	.0	.0000
1353.82	470.0	.0380	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi)	.300
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.100

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1218.60	.0	.0250	.0	.0	.0000	.0	.0000
1223.20	25.0	.0350	.0	.0	.0000	.0	.0000
1225.00	52.5	.0350	25.0	.0	.0000	.0	.0000
1237.20	225.0	.0350	25.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi)	.490
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.190

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1189.70	.0	.0250	.0	.0	.0000	.0	.0000
1191.70	15.0	.0300	.0	.0	.0000	.0	.0000
1196.00	80.0	.0300	.0	.0	.0000	.0	.0000
1203.90	175.0	.0300	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi)	.680
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.200

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1176.90	.0	.0250	.0	.0	.0000	.0	.0000
1179.30	160.0	.0350	.0	.0	.0000	.0	.0000
1181.10	380.0	.0350	.0	.0	.0000	.0	.0000
1191.70	550.0	.0350	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi)	1.510
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.200

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1089.35	.0	.0250	.0	.0	.0000	.0	.0000
1091.40	12.0	.0350	.0	.0	.0000	.0	.0000
1105.00	768.0	.0350	.0	.0	.0000	.0	.0000
1995.60	572.0	.0350	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi)	2.120
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

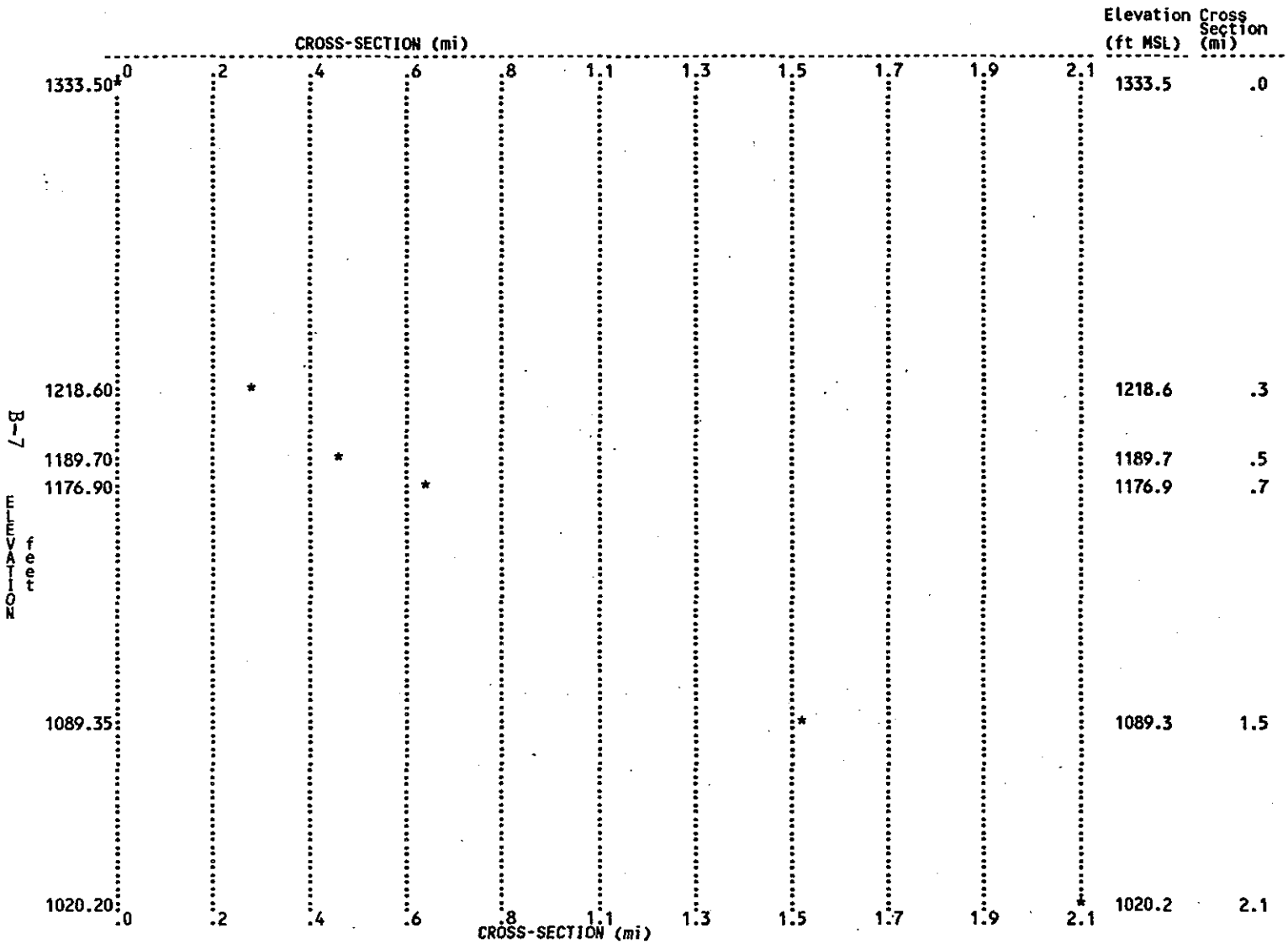
CROSS-SECTION DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Right Top Width BSR(K,I) (ft)
1020.20	.0	.0	.0	.0
1023.00	66.0	.0	.0	.0
1030.20	198.0	.0	.0	.0
1033.00	240.0	.0	.0	.0

Total number of cross-sections (original+interpolated)	13
Maximum number of cross-sections allowed	200

OUTPUT DATA SUMMARY :

SLOPE PROFILE PLOT :



Elevation (ft MSL)	Cross Section (mi)
1333.5	.0
1218.6	.3
1189.7	.5
1176.9	.7
1089.3	1.5
1020.2	2.1

RESERVOIR DEPLETION SUMMARY :

Total Volume in Reservoir (acre-ft) 46.1

DEFINITION OF RESERVOIR DEPLETION TABLE VARIABLES :

PARAMETER	UNITS	VARIABLE
Time step from start of analysis		I
Iterations necessary to solve flow equations		K
Elapsed time from start of analysis	hr	TTP(I)
Total outflow from dam	cfs	Q(I)
Elevation of water surface at dam	ft	H2
Elevation of breach bottom	ft	YB
Estimated depth of downstream flow	ft	D
Submergence coefficient		SUB
Velocity correction		VCOR
Total volume discharged from time of breach	ac-ft	OUTVOL
Breach width	ft	BB
Rectangular breach discharge coefficient		COFR
Inflow to reservoir	cfs	QI(I)
Breach outflow	cfs	QBRECH
Spillway outflow	cfs	QSPIL

RESERVOIR DEPLETION TABLE :

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
1	0	.000	58	1350.24	1350.24	1334.24	1.00	1.00	.0	.0	3.10	58.	0.	58.
2	1	.015	59	1350.24	1349.91	1334.55	1.00	1.00	.1	1.5	3.10	58.	1.	58.
3	1	.030	64	1350.24	1349.57	1334.58	1.00	1.00	.1	3.0	3.10	58.	6.	58.
4	1	.045	74	1350.24	1349.24	1334.65	1.00	1.00	.2	4.5	3.10	58.	16.	58.
5	1	.060	90	1350.23	1348.90	1334.74	1.00	1.00	.3	6.0	3.10	58.	32.	57.
6	1	.075	114	1350.22	1348.57	1334.84	1.00	1.00	.3	7.5	3.10	58.	56.	56.
7	1	.090	144	1350.20	1348.23	1334.98	1.00	1.00	.6	9.0	3.10	58.	91.	54.
8	1	.105	182	1350.18	1347.90	1335.12	1.00	1.00	.8	10.5	3.10	58.	131.	52.
9	2	.120	228	1350.14	1347.56	1335.24	1.00	1.00	1.1	12.0	3.10	58.	180.	48.
10	2	.135	280	1350.09	1347.23	1335.38	1.00	1.00	1.4	13.5	3.10	58.	237.	43.
11	2	.150	338	1350.03	1346.89	1335.51	1.00	1.00	1.8	15.0	3.10	58.	301.	38.
12	2	.165	402	1349.95	1346.56	1335.65	1.00	1.00	2.2	16.5	3.10	58.	371.	31.
13	2	.180	470	1349.85	1346.22	1335.78	1.00	1.00	2.8	18.0	3.10	58.	447.	23.
14	2	.195	542	1349.74	1345.89	1335.90	1.00	1.00	3.4	19.5	3.10	58.	528.	15.
15	2	.210	617	1349.60	1345.55	1336.02	1.00	1.00	4.1	21.0	3.10	58.	611.	7.
16	2	.225	696	1349.44	1345.22	1336.14	1.00	1.00	4.9	22.5	3.10	58.	695.	1.
17	2	.240	778	1349.27	1344.86	1336.25	1.00	1.00	5.8	24.0	3.10	58.	779.	0.
18	2	.255	858	1349.09	1344.55	1336.35	1.00	1.00	6.9	25.5	3.10	58.	859.	0.
19	2	.270	935	1348.81	1344.22	1336.45	1.00	1.00	8.0	27.0	3.10	58.	935.	0.
20	2	.285	1003	1348.54	1343.88	1336.52	1.00	1.00	9.2	28.5	3.10	58.	1004.	0.
21	2	.300	1064	1348.24	1343.55	1336.59	1.00	1.00	10.5	30.0	3.10	58.	1065.	0.
22	2	.315	1118	1347.92	1343.21	1336.65	1.00	1.00	11.8	31.5	3.10	58.	1118.	0.
23	2	.330	1163	1347.58	1342.88	1336.70	1.00	1.00	13.2	33.0	3.10	58.	1163.	0.
24	2	.345	1200	1347.22	1342.54	1336.73	1.00	1.00	14.7	34.5	3.10	58.	1200.	0.
25	2	.360	1229	1346.84	1342.21	1336.76	1.00	1.00	16.2	36.0	3.10	58.	1229.	0.
26	2	.375	1249	1346.44	1341.87	1336.78	1.00	1.00	17.7	37.5	3.10	58.	1250.	0.
27	2	.390	1262	1346.03	1341.54	1336.80	1.00	1.00	19.3	39.0	3.10	58.	1262.	0.
28	2	.405	1267	1345.61	1341.20	1336.80	1.00	1.01	20.9	40.5	3.10	58.	1267.	0.
29	2	.420	1264	1345.17	1340.87	1336.80	1.00	1.01	22.4	42.0	3.10	58.	1265.	0.
30	1	.435	1255	1344.73	1340.53	1336.79	1.00	1.01	24.0	43.5	3.10	58.	1256.	0.
31	1	.450	1241	1344.28	1340.20	1336.78	1.00	1.01	25.5	45.0	3.10	58.	1241.	0.
32	1	.465	1221	1343.82	1339.86	1336.76	1.00	1.01	27.1	46.5	3.10	58.	1221.	0.
33	1	.480	1196	1343.35	1339.53	1336.73	1.00	1.01	28.6	48.0	3.10	58.	1196.	0.
34	1	.495	1167	1342.88	1339.19	1336.70	1.00	1.02	30.0	49.5	3.10	58.	1168.	0.
35	1	.510	1136	1342.41	1338.86	1336.67	1.00	1.02	31.5	51.0	3.10	58.	1136.	0.
36	1	.525	1102	1341.94	1338.52	1336.63	1.00	1.02	32.9	52.5	3.10	58.	1102.	0.
37	1	.540	1066	1341.46	1338.19	1336.60	1.00	1.03	34.2	54.0	3.10	58.	1066.	0.
38	1	.555	1029	1340.99	1337.85	1336.55	1.00	1.04	35.5	55.5	3.10	58.	1029.	0.
39	1	.570	991	1340.52	1337.52	1336.51	1.00	1.05	36.8	57.0	3.10	58.	992.	0.
40	1	.585	954	1340.04	1337.18	1336.47	1.00	1.06	38.0	58.5	3.10	58.	954.	0.
41	1	.600	917	1339.57	1336.85	1336.42	1.00	1.08	39.1	60.0	3.10	58.	917.	0.
42	1	.615	882	1339.09	1336.51	1336.38	1.00	1.11	40.2	61.5	3.10	58.	882.	0.
43	1	.630	849	1338.62	1336.18	1336.34	1.00	1.15	41.3	63.0	3.10	58.	850.	0.
44	1	.645	821	1338.15	1335.84	1336.31	1.00	1.23	42.3	64.5	3.10	58.	822.	0.
45	1	.660	802	1337.64	1335.51	1336.29	1.00	1.36	43.3	66.0	3.10	58.	802.	0.
46	2	.675	798	1337.13	1335.17	1336.28	1.00	1.66	44.3	67.5	3.10	58.	799.	0.
47	2	.690	830	1336.58	1334.84	1336.32	1.00	2.00	45.3	69.0	3.10	58.	831.	0.
48	2	.705	796	1335.98	1334.50	1336.27	1.00	2.00	46.4	70.5	3.10	58.	797.	0.
49	2	.720	632	1335.42	1334.17	1336.04	1.00	2.00	47.2	72.0	3.10	58.	629.	0.
50	2	.735	532	1334.94	1333.83	1335.89	1.00	2.00	48.0	73.5	3.10	58.	533.	0.

RESERVOIR DEPLETION TABLE :

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
51	2	.750	467	1334.50	1333.50	1335.77	1.00	2.00	48.6	75.0	3.10	58.	468.	0.
52	2	.765	259	1334.17	1333.50	1335.32	1.00	2.00	49.0	75.0	3.10	58.	259.	0.
53	2	.780	166	1334.00	1333.50	1335.06	1.00	2.00	49.3	75.0	3.10	58.	167.	0.
54	2	.795	120	1333.91	1333.50	1334.87	1.00	2.00	49.5	75.0	3.10	58.	121.	0.
55	2	.810	95	1333.85	1333.50	1334.76	1.00	2.00	49.6	75.0	3.10	58.	96.	0.
56	2	.825	81	1333.81	1333.50	1334.68	1.00	2.00	49.7	75.0	3.10	58.	81.	0.
57	2	.840	72	1333.79	1333.50	1334.63	1.00	2.00	49.8	75.0	3.10	58.	73.	0.
58	1	.855	67	1333.78	1333.50	1334.58	1.00	2.00	49.9	75.0	3.10	58.	68.	0.
59	1	.870	64	1333.77	1333.50	1334.57	1.00	2.00	50.0	75.0	3.10	58.	64.	0.
60	1	.885	62	1333.76	1333.50	1334.56	1.00	2.00	50.1	75.0	3.10	58.	62.	0.
61	1	.900	60	1333.76	1333.50	1334.55	1.00	2.00	50.1	75.0	3.10	58.	61.	0.
62	1	.915	59	1333.75	1333.50	1334.55	1.00	2.00	50.2	75.0	3.10	58.	60.	0.
63	1	.930	59	1333.75	1333.50	1334.54	1.00	2.00	50.3	75.0	3.10	58.	59.	0.
64	1	.945	58	1333.75	1333.50	1334.54	1.00	2.00	50.4	75.0	3.10	58.	59.	0.
65	1	.960	58	1333.75	1333.50	1334.54	1.00	2.00	50.4	75.0	3.10	58.	58.	0.
66	1	.975	58	1333.75	1333.50	1334.54	1.00	2.00	50.5	75.0	3.10	58.	58.	0.
67	1	.990	58	1333.75	1333.50	1334.54	1.00	2.00	50.6	75.0	3.10	58.	58.	0.
68	1	1.005	58	1333.75	1333.50	1334.54	1.00	2.00	50.7	75.0	3.10	58.	58.	0.
69	1	1.020	58	1333.75	1333.50	1334.54	1.00	2.00	50.7	75.0	3.10	58.	58.	0.
70	1	1.035	58	1333.75	1333.50	1334.54	1.00	2.00	50.8	75.0	3.10	58.	58.	0.
71	1	1.050	58	1333.75	1333.50	1334.54	1.00	2.00	50.9	75.0	3.10	58.	58.	0.
72	1	1.065	58	1333.75	1333.50	1334.54	1.00	2.00	50.9	75.0	3.10	58.	58.	0.
73	1	1.080	58	1333.75	1333.50	1334.54	1.00	2.00	51.0	75.0	3.10	58.	58.	0.
74	1	1.095	58	1333.75	1333.50	1334.54	1.00	2.00	51.1	75.0	3.10	58.	58.	0.
75	1	1.110	58	1333.75	1333.50	1334.54	1.00	2.00	51.2	75.0	3.10	58.	58.	0.
76	1	1.125	58	1333.75	1333.50	1334.54	1.00	2.00	51.2	75.0	3.10	58.	58.	0.
77	1	1.140	58	1333.75	1333.50	1334.54	1.00	2.00	51.3	75.0	3.10	58.	58.	0.
78	1	1.155	58	1333.75	1333.50	1334.54	1.00	2.00	51.4	75.0	3.10	58.	58.	0.
79	1	1.170	58	1333.75	1333.50	1334.54	1.00	2.00	51.4	75.0	3.10	58.	58.	0.
80	1	1.185	58	1333.75	1333.50	1334.54	1.00	2.00	51.5	75.0	3.10	58.	58.	0.
81	1	1.200	58	1333.75	1333.50	1334.54	1.00	2.00	51.6	75.0	3.10	58.	58.	0.
82	1	1.215	58	1333.75	1333.50	1334.54	1.00	2.00	51.7	75.0	3.10	58.	58.	0.
83	1	1.230	58	1333.75	1333.50	1334.54	1.00	2.00	51.7	75.0	3.10	58.	58.	0.
84	1	1.245	58	1333.75	1333.50	1334.54	1.00	2.00	51.8	75.0	3.10	58.	58.	0.
85	1	1.260	58	1333.75	1333.50	1334.54	1.00	2.00	51.9	75.0	3.10	58.	58.	0.
86	1	1.275	58	1333.75	1333.50	1334.54	1.00	2.00	51.9	75.0	3.10	58.	58.	0.
87	1	1.290	58	1333.75	1333.50	1334.54	1.00	2.00	52.0	75.0	3.10	58.	58.	0.
88	1	1.305	58	1333.75	1333.50	1334.54	1.00	2.00	52.1	75.0	3.10	58.	58.	0.
89	1	1.320	58	1333.75	1333.50	1334.54	1.00	2.00	52.2	75.0	3.10	58.	58.	0.
90	1	1.335	58	1333.75	1333.50	1334.54	1.00	2.00	52.2	75.0	3.10	58.	58.	0.
91	1	1.350	58	1333.75	1333.50	1334.54	1.00	2.00	52.3	75.0	3.10	58.	58.	0.
92	1	1.365	58	1333.75	1333.50	1334.54	1.00	2.00	52.4	75.0	3.10	58.	58.	0.
93	1	1.380	58	1333.75	1333.50	1334.54	1.00	2.00	52.4	75.0	3.10	58.	58.	0.
94	1	1.395	58	1333.75	1333.50	1334.54	1.00	2.00	52.5	75.0	3.10	58.	58.	0.
95	1	1.410	58	1333.75	1333.50	1334.54	1.00	2.00	52.6	75.0	3.10	58.	58.	0.
96	1	1.425	58	1333.75	1333.50	1334.54	1.00	2.00	52.7	75.0	3.10	58.	58.	0.
97	1	1.440	58	1333.75	1333.50	1334.54	1.00	2.00	52.7	75.0	3.10	58.	58.	0.
98	1	1.455	58	1333.75	1333.50	1334.54	1.00	2.00	52.8	75.0	3.10	58.	58.	0.
99	1	1.470	58	1333.75	1333.50	1334.54	1.00	2.00	52.9	75.0	3.10	58.	58.	0.
100	1	1.485	58	1333.75	1333.50	1334.54	1.00	2.00	53.0	75.0	3.10	58.	58.	0.

RESERVOIR DEPLETION TABLE :

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
101	1	1.500	58	1333.75	1333.50	1334.54	1.00	2.00	53.0	75.0	3.10	58.	58.	0.
102	1	1.515	58	1333.75	1333.50	1334.54	1.00	2.00	53.1	75.0	3.10	58.	58.	0.
103	1	1.531	58	1333.75	1333.50	1334.54	1.00	2.00	53.2	75.0	3.10	58.	58.	0.
104	1	1.550	58	1333.75	1333.50	1334.54	1.00	2.00	53.3	75.0	3.10	58.	58.	0.
105	1	1.570	58	1333.75	1333.50	1334.54	1.00	2.00	53.4	75.0	3.10	58.	58.	0.
106	1	1.592	58	1333.75	1333.50	1334.54	1.00	2.00	53.5	75.0	3.10	58.	58.	0.
107	1	1.616	58	1333.75	1333.50	1334.54	1.00	2.00	53.6	75.0	3.10	58.	58.	0.
108	1	1.642	58	1333.75	1333.50	1334.54	1.00	2.00	53.7	75.0	3.10	58.	58.	0.
109	1	1.672	58	1333.75	1333.50	1334.54	1.00	2.00	53.8	75.0	3.10	58.	58.	0.
110	1	1.704	58	1333.75	1333.50	1334.54	1.00	2.00	54.0	75.0	3.10	58.	58.	0.
111	1	1.739	58	1333.75	1333.50	1334.54	1.00	2.00	54.2	75.0	3.10	58.	58.	0.
112	1	1.778	58	1333.75	1333.50	1334.54	1.00	2.00	54.4	75.0	3.10	58.	58.	0.
113	1	1.821	58	1333.75	1333.50	1334.54	1.00	2.00	54.6	75.0	3.10	58.	58.	0.
114	1	1.868	58	1333.75	1333.50	1334.54	1.00	2.00	54.8	75.0	3.10	58.	58.	0.
115	1	1.920	57	1333.75	1333.50	1334.54	1.00	2.00	55.0	75.0	3.10	58.	58.	0.
116	1	1.977	58	1333.75	1333.50	1334.54	1.00	2.00	55.3	75.0	3.10	58.	58.	0.
117	1	2.039	57	1333.75	1333.50	1334.54	1.00	2.00	55.6	75.0	3.10	58.	58.	0.

RESERVOIR FLOW SUMMARY :

Initial Flow (Q(1), cfs)	58.
Maximum Flow (Qmax, cfs)	1267.
Final Flow (Q(NU), cfs)	58.
Time to Maximum Flow (TP, hr)	.40
Number of Time Steps or Number of Hydrograph Ordinates (NNU)	117
Total Volume Discharged from Reservoir (DISVOL, acre-ft)	56.
Number of Intermediate Cross-Sections (NN(NS))	13
Number of Time Steps (NNU)	117

Interp. Cross Section I	Water Elevation YD(I) (ft MSL)	Initial Flow QDI(I) (cfs)
1	1334.53	58.2
2	1296.29	58.2
3	1258.11	58.2
4	1220.07	58.2
5	1191.34	58.2
6	1177.79	58.2
7	1155.62	58.2
8	1134.23	58.2
9	1112.03	58.2
10	1091.82	58.2
11	1067.70	112.2
12	1044.99	112.2
13	1021.36	112.2

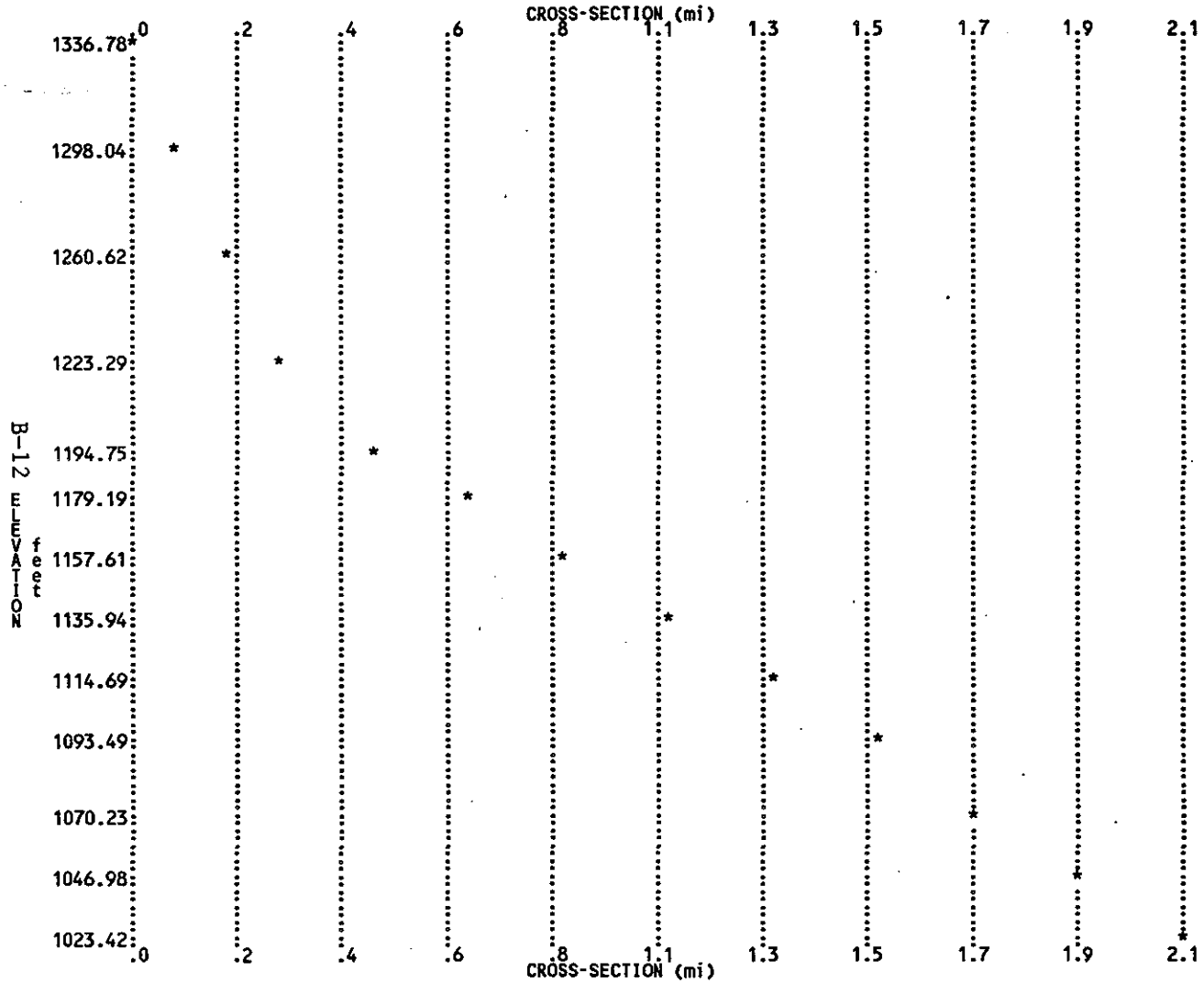
ROUTING COMPLETED :

Number of Time Steps Used (KTIME)	41
Maximum Number of Time Steps Allowed	698
Total Time of Flood Routing (TT, hr)	2.0

FLOOD CREST SUMMARY :

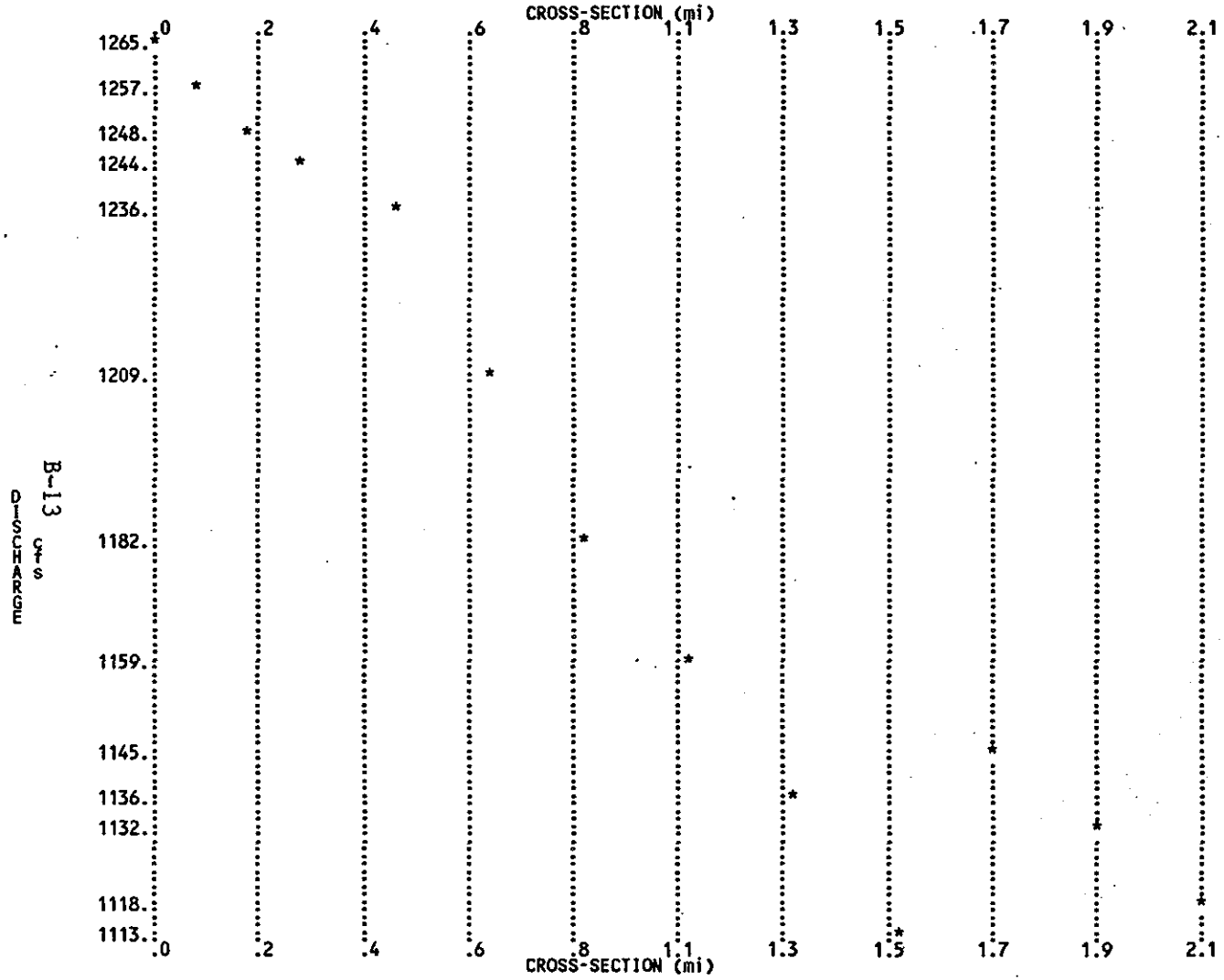
Cross Section Location (mi)	Maximum Stage Elevation (ft MSL)	Maximum Flow (cfs)	Time To Maximum Stage (hr)	Maximum Flow Velocity (ft/sec)	Flood Elevation (ft MSL)	Time To Flood Elevation (hr)
.000	1336.78	1265	.400	14.63	.00	.00
.100	1298.04	1257	.400	22.38	.00	.00
.200	1260.62	1248	.400	16.86	.00	.00
.300	1223.29	1244	.450	20.93	.00	.00
.490	1194.75	1235	.450	9.42	.00	.00
.680	1179.19	1209	.500	6.90	.00	.00
.887	1157.61	1182	.500	6.57	.00	.00
1.095	1135.94	1159	.550	7.38	.00	.00
1.303	1114.69	1135	.600	8.10	.00	.00
1.510	1093.49	1113	.650	7.11	.00	.00
1.713	1070.23	1144	.650	8.77	.00	.00
1.917	1046.98	1132	.800	8.18	.00	.00
2.120	1023.42	1118	.700	9.61	.00	.00

FLOOD CREST SUMMARY (Peak Water Surface Elevation) :



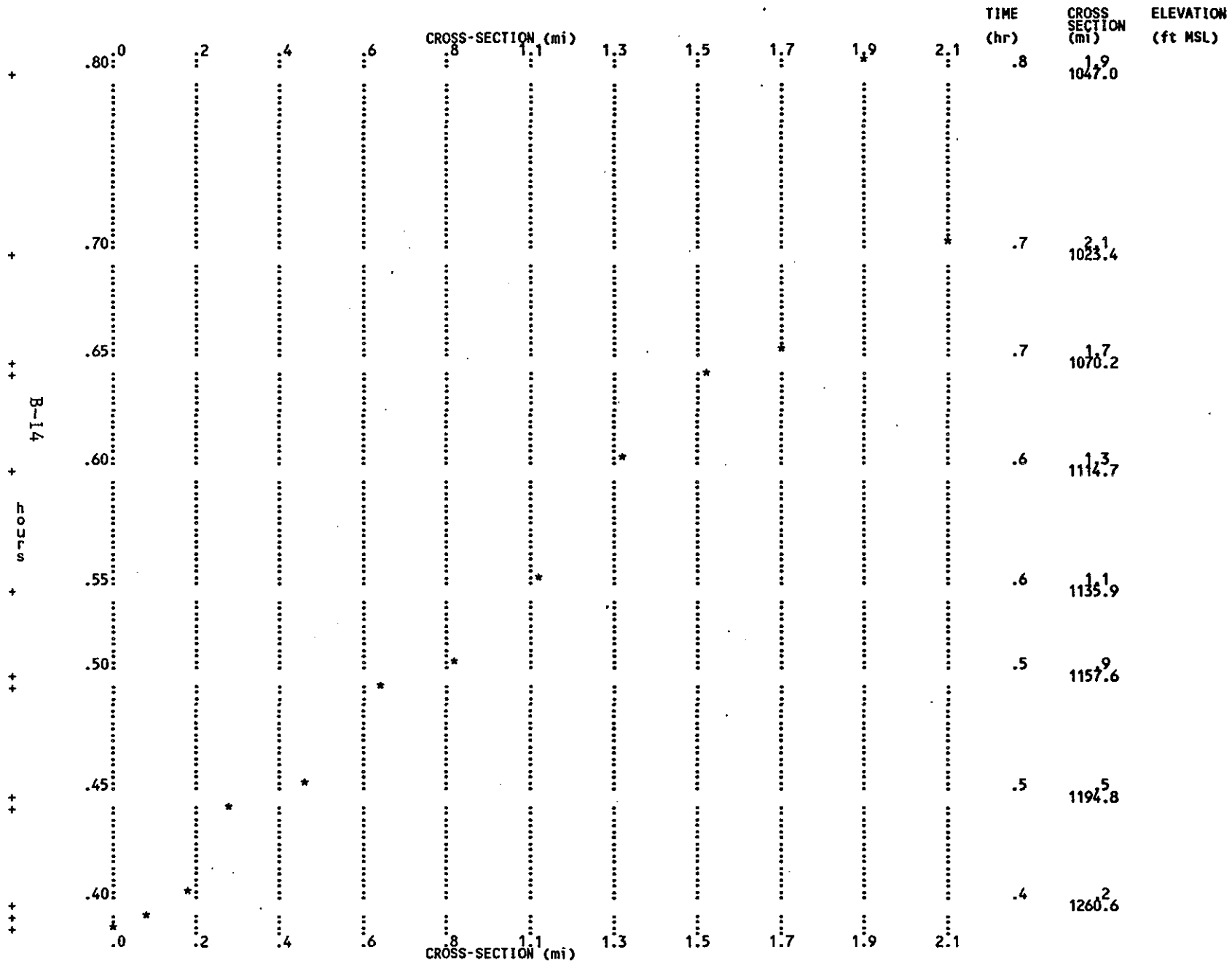
ELEVATION (ft)	CROSS SECTION (mi)
1336.8	.0
1298.0	.1
1260.6	.2
1223.3	.3
1194.8	.5
1179.2	.7
1157.6	.9
1135.9	1.1
1114.7	1.3
1093.5	1.5
1070.2	1.7
1047.0	1.9
1023.4	2.1

FLOOD DISCHARGE SUMMARY (Peak Water Flow) :



DISCHARGE (cfs)	CROSS SECTION (mi)
1265.5	.0
1257.3	.1
1248.2	.2
1244.1	.3
1235.8	.5
1209.0	.7
1182.2	.9
1159.1	1.1
1144.6	1.7
1136.0	1.3
1132.2	1.9
1118.4	2.1
1113.1	1.5

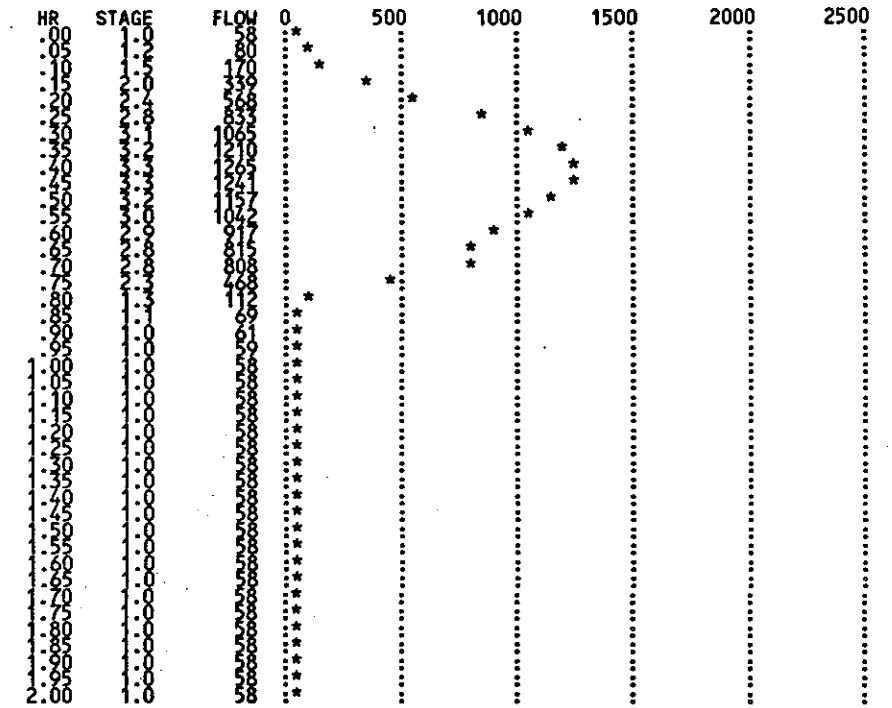
TIME TO PEAK ELEVATION PROFILE :



DISCHARGE HYDROGRAPH :

Cross-Section Number	1
Cross-Section Location (mi)	.000
Gage Zero (ft MSL)	1333.500
Max Elevation Reached by Flood Wave (ft MSL)	1336.777
Flood Stage (ft)	(not available)
Maximum Stage (ft)	3.277
at Time (hr)	.400
Maximum Flow (cfs)	1265
at Time (hr)	.400

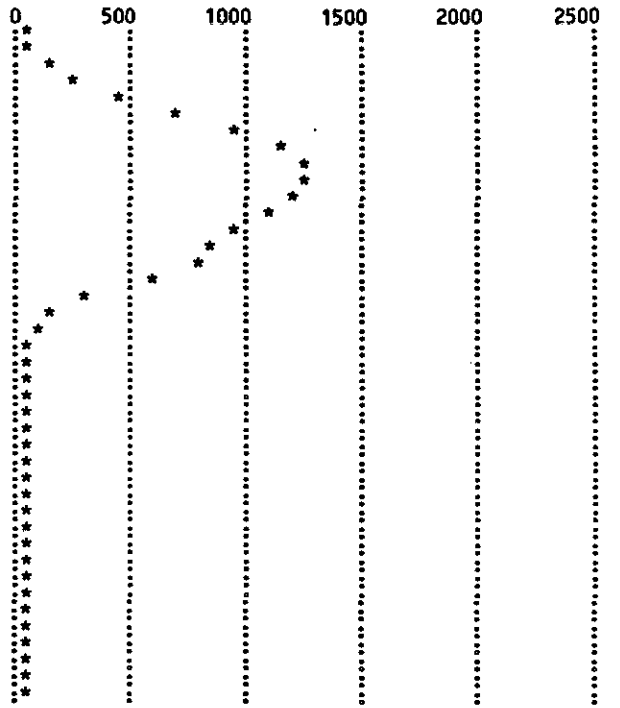
HR	STAGE	FLOW
.00	1.0	58
.05	1.2	80
.10	1.5	170
.15	2.0	338
.20	2.4	568
.25	2.8	833
.30	3.1	1065
.35	3.2	1210
.40	3.3	1265
.45	3.3	1241
.50	3.2	1157
.55	3.0	1042
.60	2.9	917
.65	2.8	815
.70	2.8	808
.75	2.3	468
.80	1.3	112
.85	1.1	69
.90	1.0	61
.95	1.0	59
1.00	1.0	58
1.05	1.0	58
1.10	1.0	58
1.15	1.0	58
1.20	1.0	58
1.25	1.0	58
1.30	1.0	58
1.35	1.0	58
1.40	1.0	58
1.45	1.0	58
1.50	1.0	58
1.55	1.0	58
1.60	1.0	58
1.65	1.0	58
1.70	1.0	58
1.75	1.0	58
1.80	1.0	58
1.85	1.0	58
1.90	1.0	58
1.95	1.0	58
2.00	1.0	58



DISCHARGE HYDROGRAPH :

Cross-Section Number	4
Cross-Section Location (mi)	.300
Gage Zero (ft MSL)	1218.600
Max Elevation Reached by Flood Wave (ft MSL)	1223.294
Flood Stage (ft)	(not available)
Maximum Stage (ft)	4.694
at Time (hr)	.450
Maximum Flow (cfs)	1244
at Time (hr)	.450

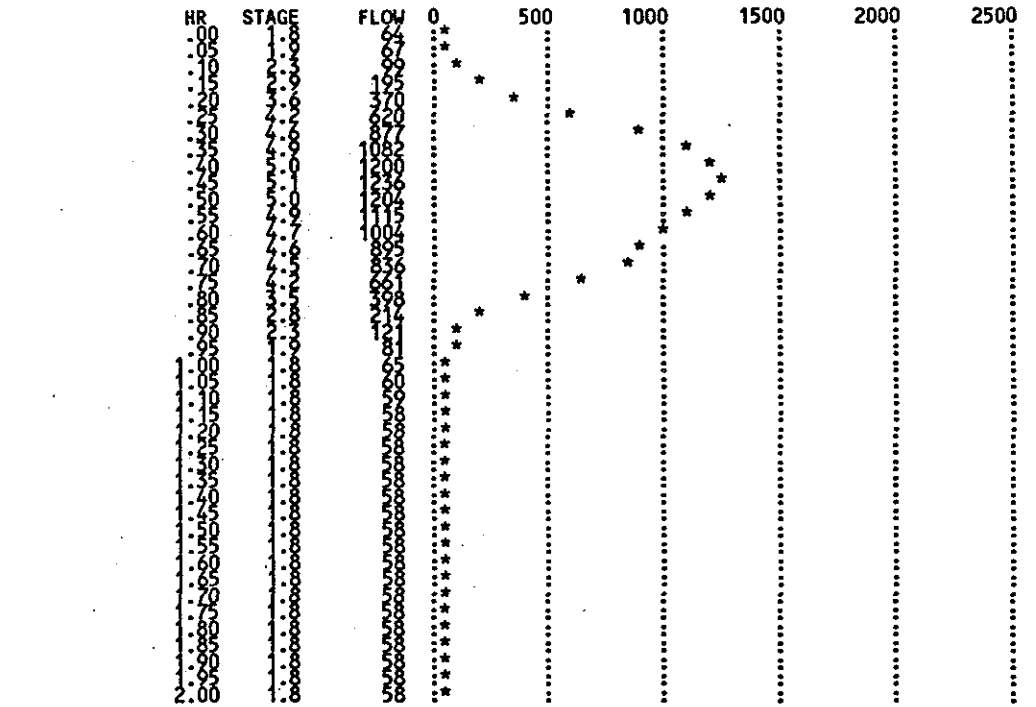
HR	STAGE	FLOW
.00	1.2	62
.05	1.3	70
.10	1.6	128
.15	2.2	258
.20	3.0	465
.25	3.6	720
.30	4.2	967
.35	4.5	1146
.40	4.7	1236
.45	4.7	1244
.50	4.6	1186
.55	4.4	1084
.60	4.3	967
.65	4.0	858
.70	3.9	818
.75	3.4	588
.80	2.5	276
.85	1.8	128
.90	1.4	78
.95	1.3	64
1.00	1.2	59
1.05	1.2	58
1.10	1.2	58
1.15	1.2	58
1.20	1.2	58
1.25	1.2	58
1.30	1.2	58
1.35	1.2	58
1.40	1.2	58
1.45	1.2	58
1.50	1.2	58
1.55	1.2	58
1.60	1.2	58
1.65	1.2	58
1.70	1.2	58
1.75	1.2	58
1.80	1.2	58
1.85	1.2	58
1.90	1.2	58
1.95	1.2	58
2.00	1.2	58



DISCHARGE HYDROGRAPH :

Cross-Section Number	5
Cross-Section Location (mi)	.490
Gage Zero (ft MSL)	1189.700
Max Elevation Reached by Flood Wave (ft MSL)	1194.752
Flood Stage (ft)	(not available)
Maximum Stage (ft)	5.052
at Time (hr)	.450
Maximum Flow (cfs)	1236
at Time (hr)	.450

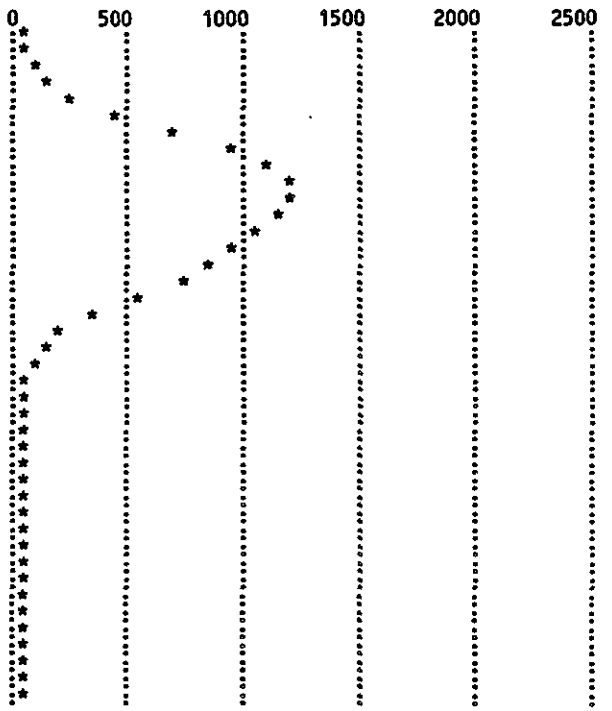
HR	STAGE	FLOW
.00	1.8	64
.05	1.9	67
.10	2.3	99
.15	2.9	195
.20	3.6	370
.25	4.2	620
.30	4.8	877
.35	4.9	1082
.40	5.0	1200
.45	5.1	1236
.50	5.0	1204
.55	4.9	1115
.60	4.7	1004
.65	4.6	895
.70	4.5	836
.75	4.2	661
.80	3.5	398
.85	2.8	214
.90	2.3	121
.95	1.9	81
1.00	1.8	65
1.05	1.8	60
1.10	1.8	59
1.15	1.8	58
1.20	1.8	58
1.25	1.8	58
1.30	1.8	58
1.35	1.8	58
1.40	1.8	58
1.45	1.8	58
1.50	1.8	58
1.55	1.8	58
1.60	1.8	58
1.65	1.8	58
1.70	1.8	58
1.75	1.8	58
1.80	1.8	58
1.85	1.8	58
1.90	1.8	58
1.95	1.8	58
2.00	1.8	58



DISCHARGE HYDROGRAPH :

Cross-Section Number	6
Cross-Section Location (mi)	.680
Gage Zero (ft MSL)	1176.900
Max Elevation Reached by Flood Wave (ft MSL)	1179.194
Flood Stage (ft)	(not available)
Maximum Stage (ft)	2.294
at Time (hr)	.500
Maximum Flow (cfs)	1209
at Time (hr)	.500

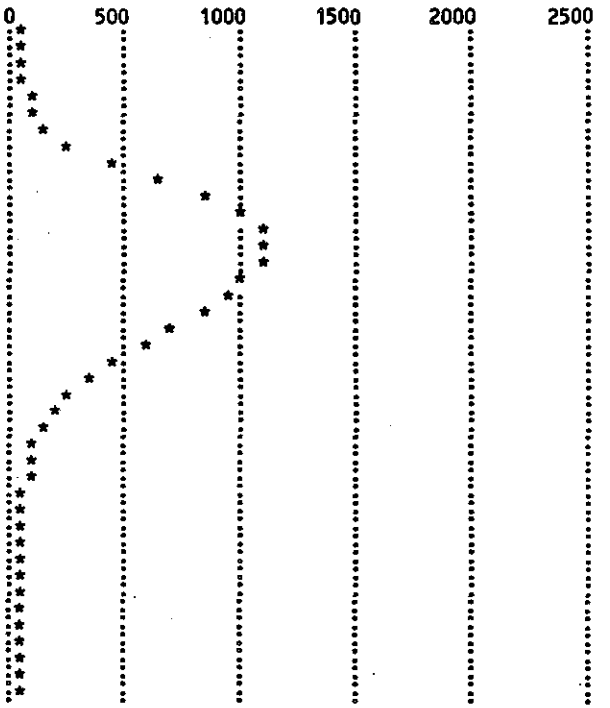
HR	STAGE	FLOW
.00	.8	67
.05	.8	66
.10	.8	77
.15	.9	127
.20	1.2	250
.25	1.6	462
.30	1.9	720
.35	2.1	957
.40	2.2	1133
.45	2.3	1204
.50	2.3	1209
.55	2.3	1152
.60	2.2	1057
.65	2.1	953
.70	2.0	875
.75	1.9	747
.80	1.7	542
.85	1.5	376
.90	1.3	218
.95	1.0	139
1.00	.9	96
1.05	.8	75
1.10	.8	65
1.15	.8	61
1.20	.7	59
1.25	.7	58
1.30	.7	58
1.35	.7	58
1.40	.7	58
1.45	.7	58
1.50	.7	58
1.55	.7	58
1.60	.7	58
1.65	.7	58
1.70	.7	58
1.75	.7	58
1.80	.7	58
1.85	.7	58
1.90	.7	58
1.95	.7	58
2.00	.7	58



DISCHARGE HYDROGRAPH :

Cross-Section Number	10
Cross-Section Location (mi)	1.510
Gage Zero (ft MSL)	1089.350
Max Elevation Reached by Flood Wave (ft MSL)	1093.488
Flood Stage (ft)	(not available)
Maximum Stage (ft)	4.138
at Time (hr)	.650
Maximum Flow (cfs)	1113
at Time (hr)	.650

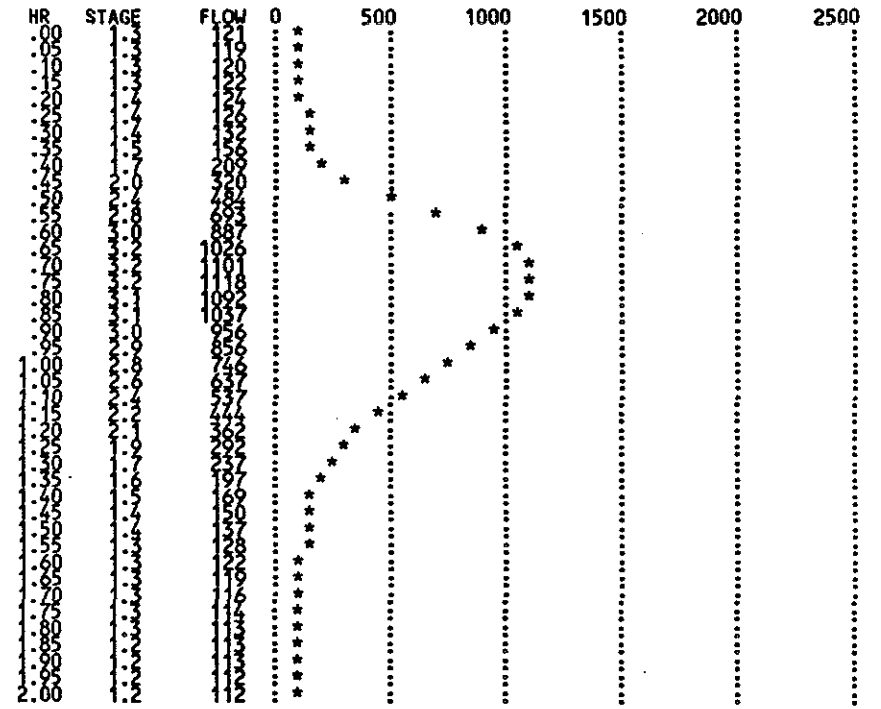
HR	STAGE	FLOW
.00	2.4	67
.05	2.4	69
.10	2.4	70
.15	2.3	71
.20	2.3	75
.25	2.5	88
.30	2.7	144
.35	3.0	259
.40	3.3	437
.45	3.6	656
.50	3.9	863
.55	4.0	1016
.60	4.1	1097
.65	4.1	1113
.70	4.1	1082
.75	4.1	1021
.80	4.1	938
.85	4.0	833
.90	3.8	708
.95	3.6	576
1.00	3.5	456
1.05	3.3	372
1.10	3.1	312
1.15	3.0	267
1.20	2.8	223
1.25	2.7	113
1.30	2.6	93
1.35	2.5	79
1.40	2.4	71
1.45	2.4	66
1.50	2.3	63
1.55	2.3	61
1.60	2.3	60
1.65	2.3	59
1.70	2.3	58
1.75	2.3	58
1.80	2.3	58
1.85	2.3	58
1.90	2.3	58
1.95	2.3	58
2.00	2.3	58



DISCHARGE HYDROGRAPH :

Cross-Section Number	13
Cross-Section Location (mi)	2.120
Gage Zero (ft MSL)	1020.200
Max Elevation Reached by Flood Wave (ft MSL)	1023.423
Flood Stage (ft)	(not available)
Maximum Stage (ft)	3.223
at Time (hr)	.700
Maximum Flow (cfs)	1118
at Time (hr)	.750

HR	STAGE	FLOW
.00	1.3	121
.05	1.3	119
.10	1.3	120
.15	1.3	122
.20	1.4	124
.25	1.4	126
.30	1.4	132
.35	1.5	152
.40	1.7	208
.45	2.0	320
.50	2.4	482
.55	2.8	693
.60	3.0	887
.65	3.2	1026
.70	3.2	1101
.75	3.2	1118
.80	3.1	1092
.85	3.1	1037
.90	3.0	956
.95	2.9	856
1.00	2.8	746
1.05	2.6	637
1.10	2.4	537
1.15	2.2	444
1.20	2.1	363
1.25	1.9	295
1.30	1.7	237
1.35	1.6	197
1.40	1.5	169
1.45	1.4	150
1.50	1.4	137
1.55	1.3	128
1.60	1.3	122
1.65	1.3	119
1.70	1.3	116
1.75	1.3	114
1.80	1.3	113
1.85	1.2	113
1.90	1.2	113
1.95	1.2	113
2.00	1.2	112



END OF OUTPUT

KRATKY DAM VERMONT MAXIMUM SURCHARGE CASE DAM FAILURE

```
         1          0          0          5          2          0          0          0
0111110100 0 2
      66.0       37.7        0.0
    1353.6     1348.4     1333.5
       0.0     1352.5        1.0     1333.5       75.       0.75     1333.5        1.0
    1353.2     1353.2     1349.4     1345.0       75.       0.01      1080.        0.0
       0.0        5.0
     556.0      556.0
       0.0        5.0
         6          4          6          9          0          1          1          0
         1          2          3          4          5          6
       0.0        0.0
    1333.5     1342.5     1349.5    1353.82        0.0        0.0        0.0        0.0
       0.0      145.0       280.       470.        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
       0.3        0.0
    1218.6     1223.2     1225.0     1237.2        0.0        0.0        0.0        0.0
       0.0        25.       52.5       225.        0.0        0.0        0.0        0.0
       0.0        0.0       25.0       25.0        0.0        0.0        0.0        0.0
      0.49        0.0
    1189.7     1191.7     1196.0     1203.9        0.0        0.0        0.0        0.0
       0.0       15.0       80.0      175.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      0.68        0.0
    1176.9     1179.3     1181.1     1191.7        0.0        0.0        0.0        0.0
       0.0      160.0      380.0      550.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      1.51        0.0
   1089.35    1091.40    1105.00    1995.60        0.0        0.0        0.0        0.0
       0.0       12.0      768.0      572.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      2.12        0.0
   1020.20    1023.00    1030.20    1033.00        0.0        0.0        0.0        0.0
       0.0       66.0      198.0      240.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.025      0.035      0.038      0.038        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
     0.025       0.03       0.03       0.03        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
       0.1       0.10       0.19        0.2        0.2
       0.0        0.0        0.0        0.0        0.0
       0.0        0.0       0.05        0.0      367.0        0.5       0.01        0.0
         5
     518.0      518.0
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B O S S D A M B R K (tm)
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Version : 1.30
Serial Number : 0001058.130

PROGRAM ORIGIN :

Boss DamBrk (tm) is an enhanced version of Professor D. L. Fread's 1984 NWS DAMBRK program.

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PROJECT DESCRIPTION :

PROJECT TITLE : Kratky Topping Failure
PROJECT NUMBER : JC-127-3 Overtopping
DESCRIPTION : Failure from WL at top of dam; Option 2
ENGINEER : Patrick Blumeris
DATE OF RUN : 6/08/1989
TIME OF RUN : 3:28 pm

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Number of Dynamic Routing Reaches (KKN)	1	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	2	
No. of Informational Cross-Sections (NPRT)	0	
Flood-Plain Routing (KFLP)	0	(no)
Landslide Simulation (KSL)	0	(no)

RESERVOIR DESCRIPTION :

Elevation vs. Volume Table

Elevation HSA(K) (ft MSL)	Volume SA(K) (acre-ft)
1353.60	66.0
1348.40	37.7
1333.50	.0
.00	.0
.00	.0
.00	.0
.00	.0
.00	.0

RESERVOIR VOLUME DESCRIPTION :

Elevation vs. Surface Area Table

Elevation HSA(K) (ft MSL)	Surface Area SA(K) (acres)
1353.60	6.8
1348.40	4.1
1333.50	1.0
.00	.0
.00	.0
.00	.0
.00	.0
.00	.0

RESERVOIR and BREACH DESCRIPTION :

Initial Elevation of Reservoir Surface (YO, ft MSL)		1352.50
Bottom of Dam Elevation (DATUM, ft MSL)		1333.50
Top of Dam Elevation (HD, ft MSL)		1353.20
Water Surface Elevation at Time of Breach (HF, ft MSL)		1353.20
Breach Side Slope (Z)	1:	1.00
Breach Bottom Elevation (YBMIN, ft MSL)		1333.50
Breach Base Width (BB, ft)		75.00
Time of Breach Formation (TFH, hr)		.75
Uncontrolled Spillway Crest Elevation (HSP, ft MSL)		1349.40
Uncontrolled Spillway Discharge Coefficient (CS)		75.00
Spillway Gate Center Elevation (HGT, ft MSL)		1345.00
Spillway Gate Discharge Coefficient (CG)		.01
Dam Overtopping Discharge Coefficient (CDO)		1080.00
Turbine Discharge (QT, cfs)		.00

INFLOW HYDROGRAPH DESCRIPTION :

Hydrograph Time Intervals (DHF, hr)	.00
Routing Period (TEH, hr)	5.00

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
.00	556.0
5.00	556.0

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Number of Cross-Sections Entered (NS)	6	
Number of Top Widths Entered (NCS)	4	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Cross-Sectional Smoothing Parameter (KSA)	0	
Downstream Supercritical Parameter (KSUPC)	1	(supercritical)
Number of Lateral Inflow Hydrographs (LQ)	1	
Number of Points in Gate Control Curve (KCG)	0	

CROSS-SECTIONS WHERE HYDROGRAPH REQUESTED :
(maximum allowed = 6)

1 2 3 4 5 6

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	.0
Initial Time-Step Size (DTHM, hr)	.05
Time at which Dam Starts to Fail (TFI, hr)	.00
Theta Weighting Factor (F1I)	.500
Stage Convergence Criterion (EPSY, ft)	.01
Initial Downstream Water Surface Elevation (YDN, ft MSL)	.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	367.000

LATERAL INFLOW REACH NUMBERS (LQX) :

5

(QL(L, 1),L=1,ITEH)

518. 518.

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi)	.000
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.100

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1333.50	.0	.0250	.0	.0	.0000	.0	.0000
1342.50	145.0	.0350	.0	.0	.0000	.0	.0000
1349.50	280.0	.0380	.0	.0	.0000	.0	.0000
1353.82	470.0	.0380	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi)	.300
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.100

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1218.60	.0	.0250	.0	.0	.0000	.0	.0000
1223.20	25.0	.0350	.0	.0	.0000	.0	.0000
1225.00	52.5	.0350	25.0	.0	.0000	.0	.0000
1237.20	225.0	.0350	25.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi)	.490
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.190

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1189.70	.0	.0250	.0	.0	.0000	.0	.0000
1191.70	15.0	.0300	.0	.0	.0000	.0	.0000
1196.00	80.0	.0300	.0	.0	.0000	.0	.0000
1203.90	175.0	.0300	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi)	.680
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.200

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1176.90	.0	.0250	.0	.0	.0000	.0	.0000
1179.30	160.0	.0350	.0	.0	.0000	.0	.0000
1181.10	380.0	.0350	.0	.0	.0000	.0	.0000
1191.70	550.0	.0350	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi)	1.510
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC)	.000
Minimum Distance Between Interpolated Cross-Sections (DXM, mi)	.200

CROSS-SECTION and REACH DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Left Manning n CML(K,I)	Right Top Width BSR(K,I) (ft)	Right Manning n CMR(K,I)
1089.35	.0	.0250	.0	.0	.0000	.0	.0000
1091.20	12.0	.0350	.0	.0	.0000	.0	.0000
1105.00	768.0	.0350	.0	.0	.0000	.0	.0000
1995.60	572.0	.0350	.0	.0	.0000	.0	.0000

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi)	2.120
Left Flood-Plain Cross-Section Location (XSL(I), mi)	.000
Right Flood-Plain Cross-Section Location (XSR(I), mi)	.000
Flooding Elevation (FSTG(I), ft MSL)	.000
Initial Water Surface Elevation (YD, ft MSL)	.000

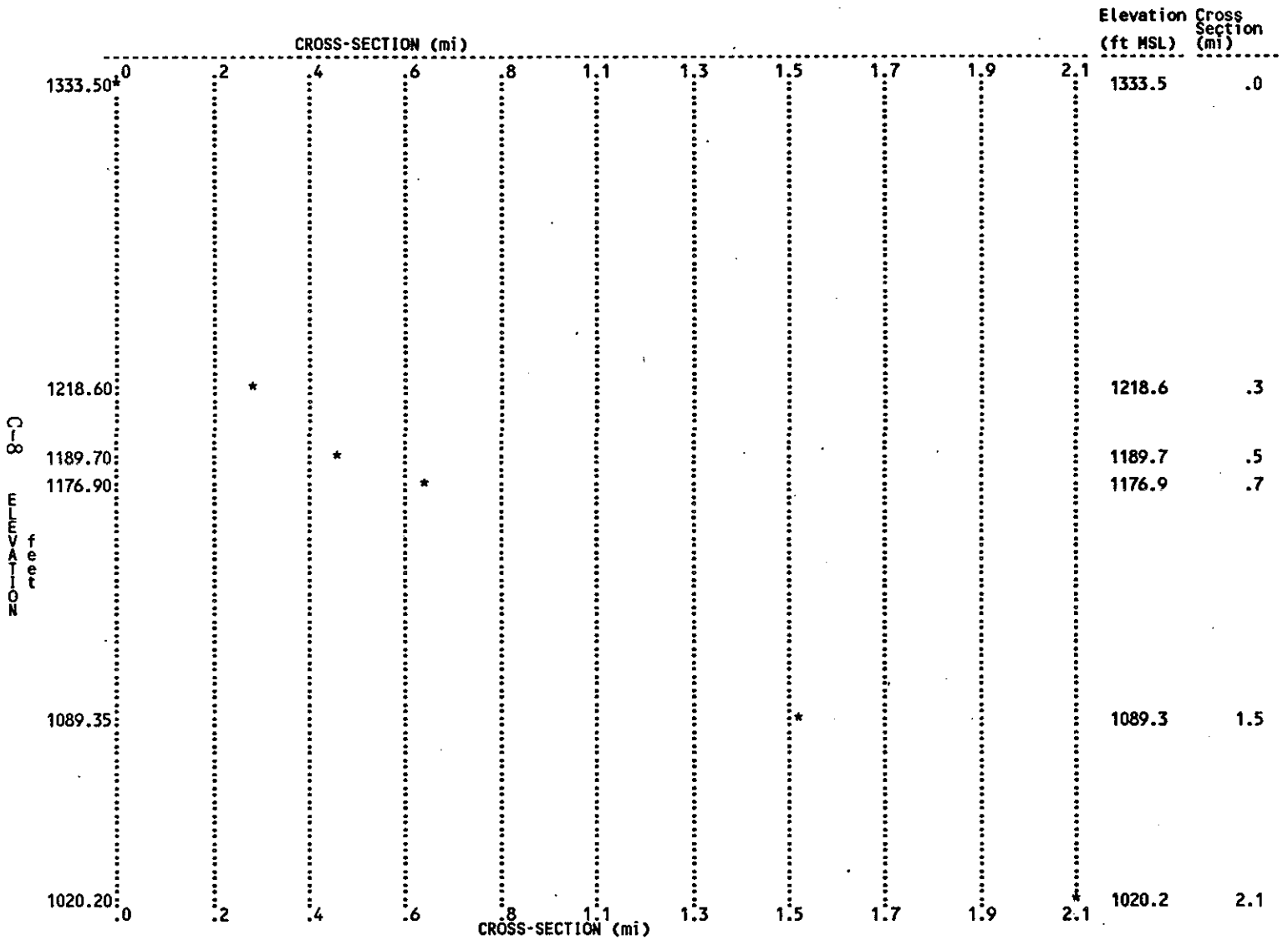
CROSS-SECTION DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)	Left Top Width BSL(K,I) (ft)	Right Top Width BSR(K,I) (ft)
1020.20	.0	.0	.0	.0
1023.00	66.0	.0	.0	.0
1030.20	198.0	.0	.0	.0
1033.00	240.0	.0	.0	.0

Total number of cross-sections (original+interpolated)	13
Maximum number of cross-sections allowed	200

OUTPUT DATA SUMMARY :

SLOPE PROFILE PLOT :



Elevation (ft MSL)	Cross Section (mi)
1333.5	.0
1218.6	.3
1189.7	.5
1176.9	.7
1089.3	1.5
1020.2	2.1

RESERVOIR DEPLETION SUMMARY :

Total Volume in Reservoir (acre-ft) 63.3

DEFINITION OF RESERVOIR DEPLETION TABLE VARIABLES :

PARAMETER	UNITS	VARIABLE
Time step from start of analysis		I
Iterations necessary to solve flow equations		K
Elapsed time from start of analysis	hr	TTP(I)
Total outflow from dam	cfs	Q(I)
Elevation of water surface at dam	ft	H2
Elevation of breach bottom	ft	YB
Estimated depth of downstream flow	ft	D
Submergence coefficient		SUB
Velocity correction		VCOR
Total volume discharged from time of breach	ac-ft	OUTVOL
Breach width	ft	BB
Rectangular breach discharge coefficient		COFR
Inflow to reservoir	cfs	QI(I)
Breach outflow	cfs	QBRECH
Spillway outflow	cfs	QSPIL

RESERVOIR DEPLETION TABLE :

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
1	0	.000	409	1352.50	1353.20	1335.66	1.00	1.00	.0	.0	3.10	556.	0.	410.
2	2	.100	443	1352.67	1353.20	1335.73	1.00	1.00	.0	.0	3.10	556.	0.	444.
3	2	.200	470	1352.80	1353.20	1335.78	1.00	1.00	.0	.0	3.10	556.	0.	470.
4	2	.300	490	1352.90	1353.20	1335.81	1.00	1.00	.0	.0	3.10	556.	0.	490.
5	2	.400	506	1352.97	1353.20	1335.84	1.00	1.00	.0	.0	3.10	556.	0.	506.
6	2	.500	517	1353.03	1353.20	1335.86	1.00	1.00	.0	.0	3.10	556.	0.	518.
7	2	.600	527	1353.07	1353.20	1335.88	1.00	1.00	.0	.0	3.10	556.	0.	527.
8	2	.100	550	1353.18	1353.20	1335.92	1.00	1.00	.0	.0	3.10	556.	0.	551.
9	2	.600	554	1353.20	1353.20	1335.92	1.00	1.00	.0	.0	3.10	556.	0.	555.
10	1	.615	556	1353.20	1352.81	1335.92	1.00	1.00	.7	1.5	3.10	556.	1.	555.
11	1	.630	559	1353.20	1352.41	1335.93	1.00	1.00	1.4	3.0	3.10	556.	3.	556.
12	1	.645	562	1353.20	1352.41	1335.93	1.00	1.00	1.4	3.0	3.10	556.	6.	557.
13	1	.660	565	1353.19	1352.02	1335.96	1.00	1.00	2.1	4.5	3.10	556.	21.	554.
14	1	.675	596	1353.19	1351.62	1335.99	1.00	1.00	2.8	6.0	3.10	556.	44.	553.
15	1	.690	626	1353.18	1351.23	1336.04	1.00	1.00	3.6	7.5	3.10	556.	76.	551.
16	1	.705	666	1353.16	1350.84	1336.10	1.00	1.00	4.4	9.0	3.10	556.	118.	547.
17	1	.720	714	1353.13	1350.44	1336.17	1.00	1.00	5.2	10.5	3.10	556.	172.	542.
18	2	.735	772	1353.10	1350.05	1336.24	1.00	1.00	6.2	12.0	3.10	556.	238.	534.
19	2	.750	838	1353.05	1349.65	1336.33	1.00	1.00	7.2	13.5	3.10	556.	314.	524.
20	2	.765	911	1352.99	1349.26	1336.42	1.00	1.00	8.2	15.0	3.10	556.	401.	511.
21	2	.780	992	1352.92	1348.87	1336.51	1.00	1.00	9.4	16.5	3.10	556.	498.	495.
22	2	.795	1078	1352.85	1348.47	1336.61	1.00	1.00	10.7	18.0	3.10	556.	604.	478.
23	2	.810	1169	1352.77	1348.08	1336.70	1.00	1.00	12.1	19.5	3.10	556.	717.	452.
24	2	.825	1262	1352.68	1347.68	1336.80	1.00	1.00	13.6	21.0	3.10	556.	837.	426.
25	2	.840	1357	1352.43	1347.29	1336.89	1.00	1.00	15.2	22.5	3.10	556.	961.	397.
26	2	.855	1452	1352.26	1346.90	1336.97	1.00	1.00	17.0	24.0	3.10	556.	1089.	363.
27	2	.870	1546	1352.07	1346.50	1337.06	1.00	1.00	18.8	25.5	3.10	556.	1219.	327.
28	2	.885	1636	1351.85	1346.11	1337.13	1.00	1.00	20.8	27.0	3.10	556.	1348.	286.
29	2	.900	1723	1351.62	1345.71	1337.20	1.00	1.00	22.9	28.5	3.10	556.	1476.	242.
30	2	.915	1804	1351.35	1345.32	1337.27	1.00	1.00	25.1	30.0	3.10	556.	1599.	205.
31	2	.930	1878	1351.07	1344.93	1337.33	1.00	1.00	27.4	31.5	3.10	556.	1717.	161.
32	2	.945	1946	1350.75	1344.53	1337.38	1.00	1.00	29.7	33.0	3.10	556.	1828.	118.
33	2	.960	2006	1350.42	1344.14	1337.42	1.00	1.00	32.2	34.5	3.10	556.	1928.	77.
34	2	.975	2058	1350.05	1343.74	1337.46	1.00	1.00	34.7	36.0	3.10	556.	2016.	40.
35	2	.990	2105	1349.66	1343.35	1337.49	1.00	1.00	37.3	37.5	3.10	556.	2095.	10.
36	2	1.005	2154	1349.24	1342.96	1337.53	1.00	1.00	39.9	39.0	3.10	556.	2154.	0.
37	2	2.005	2193	1348.78	1342.56	1337.55	1.00	1.00	42.6	40.5	3.10	556.	2193.	0.
38	2	2.020	2210	1348.29	1342.17	1337.57	1.00	1.01	45.3	42.0	3.10	556.	2210.	0.
39	2	2.035	2211	1347.78	1341.77	1337.57	1.00	1.01	48.1	43.5	3.10	556.	2211.	0.
40	2	2.050	2202	1347.28	1341.38	1337.57	1.00	1.01	50.8	45.0	3.10	556.	2202.	0.
41	1	2.065	2183	1346.71	1340.99	1337.55	1.00	1.01	53.5	46.5	3.10	556.	2183.	0.
42	1	2.080	2156	1346.16	1340.59	1337.53	1.00	1.01	56.2	48.0	3.10	556.	2156.	0.
43	1	2.095	2121	1345.61	1340.20	1337.51	1.00	1.01	58.9	49.5	3.10	556.	2122.	0.
44	1	2.110	2081	1345.05	1339.80	1337.48	1.00	1.02	61.5	51.0	3.10	556.	2085.	0.
45	1	2.125	2037	1344.49	1339.41	1337.45	1.00	1.05	64.0	52.5	3.10	556.	2037.	0.
46	1	2.140	1988	1343.92	1339.02	1337.41	1.00	1.02	66.5	54.0	3.10	556.	1989.	0.
47	1	2.155	1938	1343.36	1338.62	1337.37	1.00	1.03	69.0	55.5	3.10	556.	1938.	0.
48	1	2.170	1885	1342.79	1338.23	1337.33	1.00	1.04	71.3	57.0	3.10	556.	1886.	0.
49	1	2.185	1832	1342.22	1337.83	1337.29	1.00	1.05	73.7	58.5	3.10	556.	1833.	0.
50	1	2.200	1779	1341.66	1337.44	1337.25	1.00	1.06	75.9	60.0	3.10	556.	1780.	0.
51	1	2.215	1728	1341.09	1337.05	1337.21	1.00	1.08	78.0	61.5	3.10	556.	1729.	0.

RESERVOIR DEPLETION TABLE :

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
51	1	2.230	1680	1340.52	1336.65	1337.17	1.00	1.11	80.2	63.0	3.10	556.	1681.	0.
52	1	2.245	1637	1339.95	1336.26	1337.14	1.00	1.15	82.2	64.5	3.10	556.	1638.	0.
53	1	2.260	1603	1339.36	1335.86	1337.11	1.00	1.22	84.2	66.0	3.10	556.	1604.	0.
54	2	2.275	1584	1338.76	1335.47	1337.09	1.00	1.35	86.5	67.5	3.10	556.	1584.	0.
55	2	2.290	1585	1338.19	1335.08	1337.10	1.00	1.65	88.5	69.0	3.10	556.	1585.	0.
56	2	2.290	1595	1339.13	1335.08	1337.10	1.00	1.65	88.5	69.0	3.10	556.	1595.	0.
57	2	2.305	1673	1337.41	1334.68	1337.17	1.00	2.00	90.2	70.5	3.10	556.	1674.	0.
58	2	2.320	1634	1336.62	1334.29	1337.13	1.00	2.00	92.3	72.0	3.10	556.	1635.	0.
59	2	2.335	1318	1335.90	1333.89	1336.85	1.00	2.00	94.1	73.5	3.10	556.	1318.	0.
60	2	2.350	1151	1335.31	1333.50	1336.69	1.00	2.00	95.6	75.0	3.10	556.	1152.	0.
61	2	2.365	797	1334.82	1333.50	1336.28	1.00	2.00	96.8	75.0	3.10	556.	797.	0.
62	2	2.380	659	1334.75	1333.50	1336.11	1.00	2.00	97.7	75.0	3.10	556.	659.	0.
63	2	2.395	601	1334.68	1333.50	1336.00	1.00	2.00	98.5	75.0	3.10	556.	601.	0.
64	2	2.410	576	1334.64	1333.50	1335.96	1.00	2.00	99.2	75.0	3.10	556.	576.	0.
65	2	2.425	565	1334.63	1333.50	1335.94	1.00	2.00	99.9	75.0	3.10	556.	565.	0.
66	1	2.440	560	1334.62	1333.50	1335.93	1.00	2.00	100.6	75.0	3.10	556.	560.	0.
67	1	2.455	557	1334.62	1333.50	1335.93	1.00	2.00	101.3	75.0	3.10	556.	558.	0.
68	1	2.470	556	1334.62	1333.50	1335.92	1.00	2.00	102.0	75.0	3.10	556.	557.	0.
69	1	2.485	556	1334.62	1333.50	1335.92	1.00	2.00	102.7	75.0	3.10	556.	556.	0.
70	1	2.500	556	1334.62	1333.50	1335.92	1.00	2.00	103.4	75.0	3.10	556.	556.	0.
71	1	2.515	556	1334.62	1333.50	1335.92	1.00	2.00	104.1	75.0	3.10	556.	556.	0.
72	1	2.530	556	1334.62	1333.50	1335.92	1.00	2.00	104.8	75.0	3.10	556.	556.	0.
73	1	2.545	556	1334.62	1333.50	1335.92	1.00	2.00	105.5	75.0	3.10	556.	556.	0.
74	1	2.560	556	1334.62	1333.50	1335.92	1.00	2.00	106.2	75.0	3.10	556.	556.	0.
75	1	2.575	556	1334.62	1333.50	1335.92	1.00	2.00	106.9	75.0	3.10	556.	556.	0.
76	1	2.590	556	1334.62	1333.50	1335.92	1.00	2.00	107.5	75.0	3.10	556.	556.	0.
77	1	2.605	556	1334.62	1333.50	1335.92	1.00	2.00	108.2	75.0	3.10	556.	556.	0.
78	1	2.620	556	1334.62	1333.50	1335.92	1.00	2.00	108.8	75.0	3.10	556.	556.	0.
79	1	2.635	556	1334.62	1333.50	1335.92	1.00	2.00	109.6	75.0	3.10	556.	556.	0.
80	1	2.650	556	1334.62	1333.50	1335.92	1.00	2.00	110.3	75.0	3.10	556.	556.	0.
81	1	2.665	556	1334.62	1333.50	1335.92	1.00	2.00	111.0	75.0	3.10	556.	556.	0.
82	1	2.680	556	1334.62	1333.50	1335.92	1.00	2.00	111.7	75.0	3.10	556.	556.	0.
83	1	2.695	556	1334.62	1333.50	1335.92	1.00	2.00	112.4	75.0	3.10	556.	556.	0.
84	1	2.710	556	1334.62	1333.50	1335.92	1.00	2.00	113.1	75.0	3.10	556.	556.	0.
85	1	2.725	556	1334.62	1333.50	1335.92	1.00	2.00	113.7	75.0	3.10	556.	556.	0.
86	1	2.740	556	1334.62	1333.50	1335.92	1.00	2.00	114.4	75.0	3.10	556.	556.	0.
87	1	2.755	556	1334.62	1333.50	1335.92	1.00	2.00	115.1	75.0	3.10	556.	556.	0.
88	1	2.770	556	1334.62	1333.50	1335.92	1.00	2.00	115.8	75.0	3.10	556.	556.	0.
89	1	2.785	556	1334.62	1333.50	1335.92	1.00	2.00	116.5	75.0	3.10	556.	556.	0.
90	1	2.800	556	1334.62	1333.50	1335.92	1.00	2.00	117.2	75.0	3.10	556.	556.	0.
91	1	2.815	556	1334.62	1333.50	1335.92	1.00	2.00	117.9	75.0	3.10	556.	556.	0.
92	1	2.830	556	1334.62	1333.50	1335.92	1.00	2.00	118.6	75.0	3.10	556.	556.	0.
93	1	2.845	556	1334.62	1333.50	1335.92	1.00	2.00	119.3	75.0	3.10	556.	556.	0.
94	1	2.860	556	1334.62	1333.50	1335.92	1.00	2.00	119.9	75.0	3.10	556.	556.	0.
95	1	2.875	556	1334.62	1333.50	1335.92	1.00	2.00	120.6	75.0	3.10	556.	556.	0.
96	1	2.890	556	1334.62	1333.50	1335.92	1.00	2.00	121.3	75.0	3.10	556.	556.	0.
97	1	2.905	556	1334.62	1333.50	1335.92	1.00	2.00	122.0	75.0	3.10	556.	556.	0.
98	1	2.920	556	1334.62	1333.50	1335.92	1.00	2.00	122.7	75.0	3.10	556.	556.	0.
99	1	2.935	556	1334.62	1333.50	1335.92	1.00	2.00	123.4	75.0	3.10	556.	556.	0.
100	1	2.950	556	1334.62	1333.50	1335.92	1.00	2.00	124.1	75.0	3.10	556.	556.	0.
		2.965	556	1334.62	1333.50	1335.92	1.00	2.00	124.8	75.0	3.10	556.	556.	0.

RESERVOIR DEPLETION TABLE :

I	K	TTP(I)	Q(I)	H2	YB	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
101	1	2.980	556	1334.62	1333.50	1335.92	1.00	2.00	125.5	75.0	3.10	556.	556.	0.
102	1	2.995	556	1334.62	1333.50	1335.92	1.00	2.00	126.2	75.0	3.10	556.	556.	0.
103	1	3.010	556	1334.62	1333.50	1335.92	1.00	2.00	126.8	75.0	3.10	556.	556.	0.
104	1	3.025	556	1334.62	1333.50	1335.92	1.00	2.00	127.5	75.0	3.10	556.	556.	0.
105	1	3.040	556	1334.62	1333.50	1335.92	1.00	2.00	128.2	75.0	3.10	556.	556.	0.
106	1	3.055	556	1334.62	1333.50	1335.92	1.00	2.00	128.9	75.0	3.10	556.	556.	0.
107	1	3.070	556	1334.62	1333.50	1335.92	1.00	2.00	129.6	75.0	3.10	556.	556.	0.
108	1	3.085	556	1334.62	1333.50	1335.92	1.00	2.00	130.3	75.0	3.10	556.	556.	0.
109	1	3.100	556	1334.62	1333.50	1335.92	1.00	2.00	131.0	75.0	3.10	556.	556.	0.
110	1	3.115	556	1334.62	1333.50	1335.92	1.00	2.00	131.7	75.0	3.10	556.	556.	0.
111	1	3.132	556	1334.62	1333.50	1335.92	1.00	2.00	132.4	75.0	3.10	556.	556.	0.
112	1	3.150	556	1334.62	1333.50	1335.92	1.00	2.00	133.3	75.0	3.10	556.	556.	0.
113	1	3.170	556	1334.62	1333.50	1335.92	1.00	2.00	134.2	75.0	3.10	556.	556.	0.
114	1	3.192	556	1334.62	1333.50	1335.92	1.00	2.00	135.2	75.0	3.10	556.	556.	0.
115	1	3.216	556	1334.62	1333.50	1335.92	1.00	2.00	136.3	75.0	3.10	556.	556.	0.
116	1	3.242	556	1334.62	1333.50	1335.92	1.00	2.00	137.5	75.0	3.10	556.	556.	0.
117	1	3.272	556	1334.62	1333.50	1335.92	1.00	2.00	138.9	75.0	3.10	556.	556.	0.
118	1	3.304	556	1334.62	1333.50	1335.92	1.00	2.00	140.3	75.0	3.10	556.	556.	0.
119	1	3.339	556	1334.62	1333.50	1335.92	1.00	2.00	142.0	75.0	3.10	556.	556.	0.
120	1	3.378	556	1334.62	1333.50	1335.92	1.00	2.00	143.7	75.0	3.10	556.	556.	0.
121	1	3.421	556	1334.62	1333.50	1335.92	1.00	2.00	145.7	75.0	3.10	556.	556.	0.
122	1	3.468	556	1334.62	1333.50	1335.92	1.00	2.00	147.9	75.0	3.10	556.	556.	0.
123	1	3.520	556	1334.62	1333.50	1335.92	1.00	2.00	150.3	75.0	3.10	556.	556.	0.
124	1	3.577	556	1334.62	1333.50	1335.92	1.00	2.00	152.9	75.0	3.10	556.	556.	0.
125	1	3.639	556	1334.62	1333.50	1335.92	1.00	2.00	155.8	75.0	3.10	556.	556.	0.
126	1	3.708	556	1334.62	1333.50	1335.92	1.00	2.00	158.9	75.0	3.10	556.	556.	0.
127	1	3.784	556	1334.62	1333.50	1335.92	1.00	2.00	162.4	75.0	3.10	556.	556.	0.
128	1	3.867	556	1334.62	1333.50	1335.92	1.00	2.00	166.2	75.0	3.10	556.	556.	0.
129	1	3.959	556	1334.62	1333.50	1335.92	1.00	2.00	170.5	75.0	3.10	556.	556.	0.
130	1	4.060	556	1334.62	1333.50	1335.92	1.00	2.00	175.1	75.0	3.10	556.	556.	0.
131	1	4.171	556	1334.62	1333.50	1335.92	1.00	2.00	180.2	75.0	3.10	556.	556.	0.
132	1	4.293	556	1334.62	1333.50	1335.92	1.00	2.00	185.8	75.0	3.10	556.	556.	0.
133	1	4.427	556	1334.62	1333.50	1335.92	1.00	2.00	192.0	75.0	3.10	556.	556.	0.
134	1	4.575	556	1334.62	1333.50	1335.92	1.00	2.00	198.8	75.0	3.10	556.	556.	0.
135	1	4.738	556	1334.62	1333.50	1335.92	1.00	2.00	206.2	75.0	3.10	556.	556.	0.
136	1	4.917	556	1334.62	1333.50	1335.92	1.00	2.00	214.4	75.0	3.10	556.	556.	0.
137	1	5.113	556	1334.62	1333.50	1335.92	1.00	2.00	223.5	75.0	3.10	556.	556.	0.

RESERVOIR FLOW SUMMARY :

Initial Flow (Q(1), cfs)	410.
Maximum Flow (Qmax, cfs)	2212.
Final Flow (Q(NU), cfs)	556.
Time to Maximum Flow (TP, hr)	2.03
Number of Time Steps or Number of Hydrograph Ordinates (NNU)	137
Total Volume Discharged from Reservoir (DISVOL, acre-ft)	223.
Number of Intermediate Cross-Sections (NN(NS))	13
Number of Time Steps (NNU)	137

Interp. Cross Section I	Water Elevation YD(I) (ft MSL)	Initial Flow QDI(I) (cfs)
1	1335.65	409.6
2	1327.47	409.6
3	1259.41	409.6
4	1221.70	409.6
5	1193.02	409.6
6	1178.70	409.6
7	1156.36	409.6
8	1135.36	409.6
9	1113.06	409.6
10	1092.99	409.6
11	1069.66	927.6
12	1047.00	927.6
13	1022.88	927.6

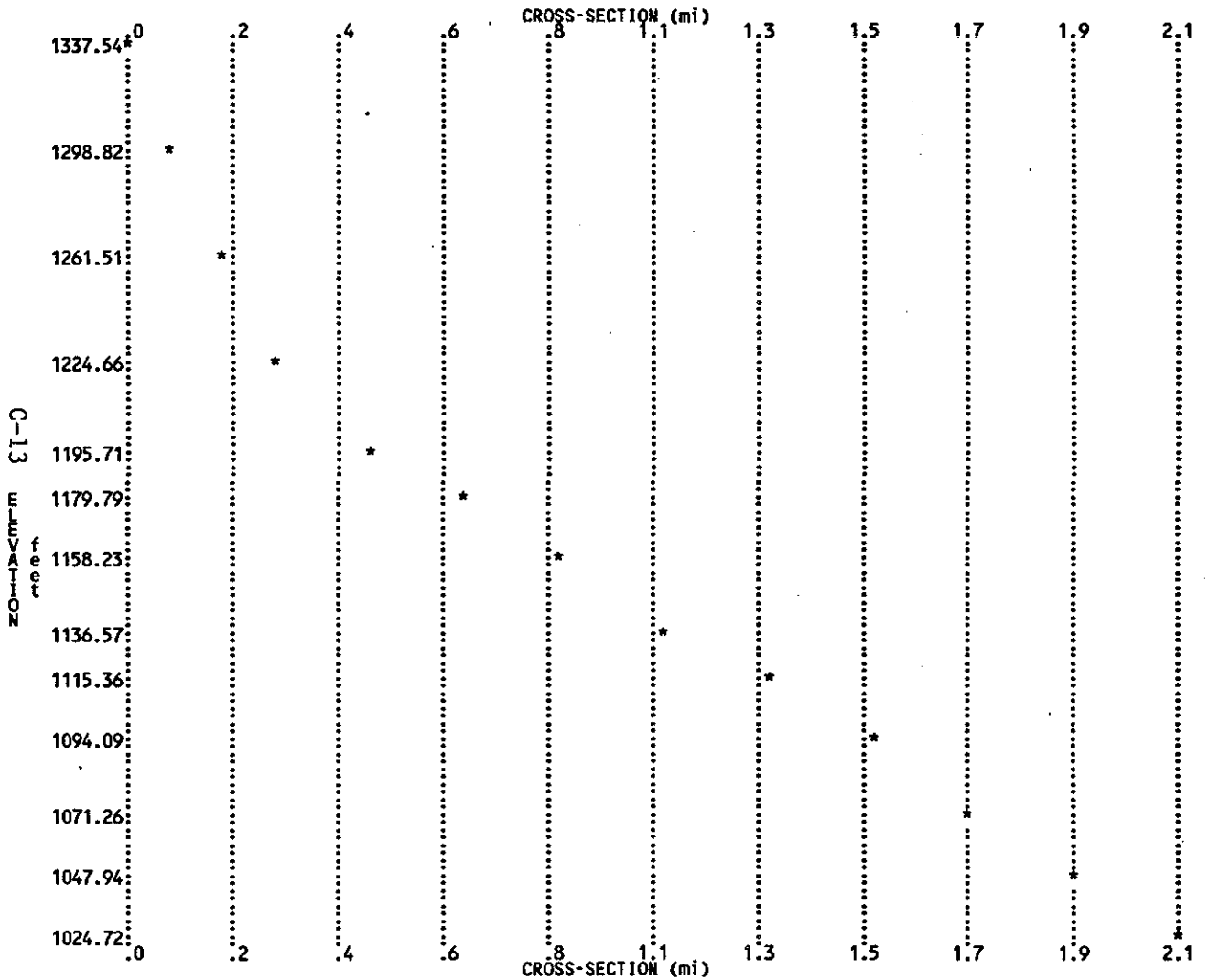
ROUTING COMPLETED :

Number of Time Steps Used (KTIME)	100
Maximum Number of Time Steps Allowed	698
Total Time of Flood Routing (TT, hr)	5.0

FLOOD CREST SUMMARY :

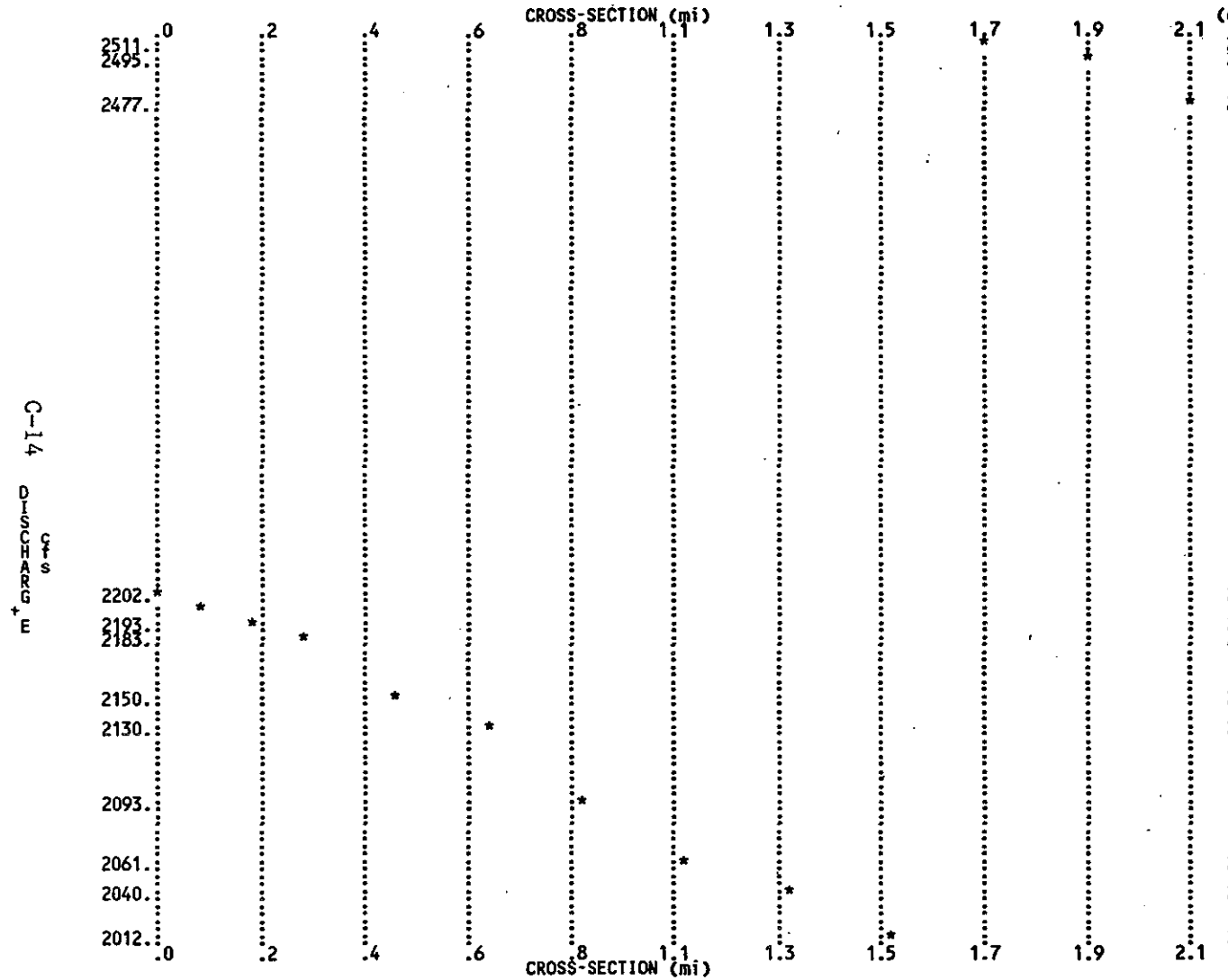
Cross Section Location (mi)	Maximum Stage Elevation (ft MSL)	Maximum Flow (cfs)	Time To Maximum Stage (hr)	Maximum Flow Velocity (ft/sec)	Flood Elevation (ft MSL)	Time To Flood Elevation (hr)
.000	1337.54	2202	2.050	16.79	.00	.00
.100	1298.82	2198	2.050	24.07	.00	.00
.200	1261.51	2193	2.050	19.29	.00	.00
.300	1224.66	2183	2.050	20.89	.00	.00
.490	1193.71	2149	2.050	10.96	.00	.00
.680	1179.79	2130	2.100	7.47	.00	.00
.887	1158.23	2092	2.150	8.43	.00	.00
1.095	1136.57	2060	2.150	8.30	.00	.00
1.303	1115.36	2040	2.200	10.74	.00	.00
1.510	1094.09	2012	2.250	8.19	.00	.00
1.713	1071.26	2510	2.250	9.98	.00	.00
1.917	1047.64	2494	2.300	10.10	.00	.00
2.120	1024.72	2477	2.300	10.96	.00	.00

FLOOD CREST SUMMARY (Peak Water Surface Elevation) :



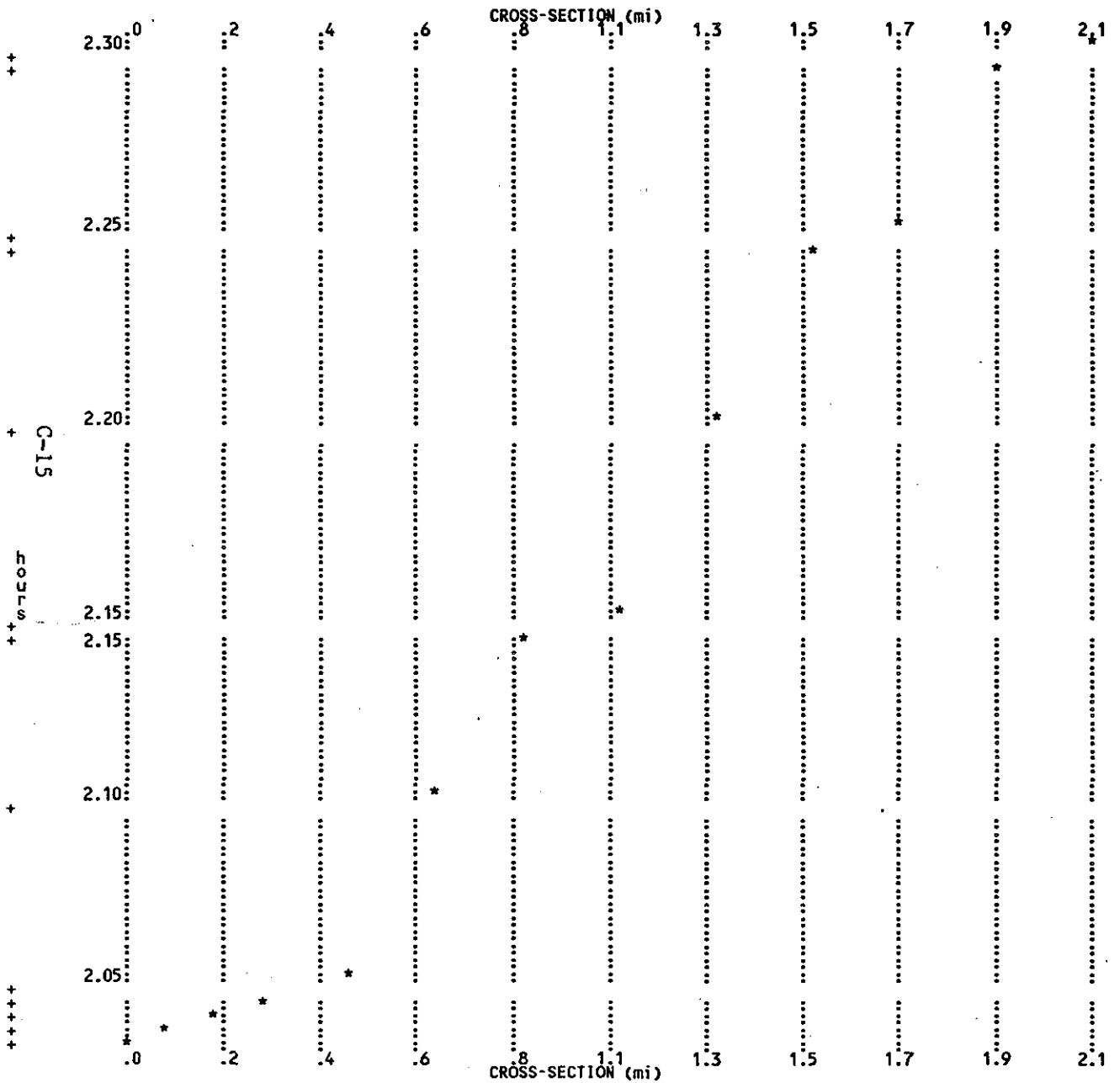
ELEVATION (ft)	CROSS SECTION (mi)
1337.5	.0
1298.8	.1
1261.5	.2
1224.7	.3
1195.7	.5
1179.8	.7
1158.2	.9
1136.6	1.1
1115.4	1.3
1094.1	1.5
1071.3	1.7
1047.9	1.9
1024.7	2.1

FLOOD DISCHARGE SUMMARY (Peak Water Flow) :



DISCHARGE (cfs)	CROSS SECTION (mi)
2510.6	1.7
2494.9	1.9
2477.3	2.1
2202.1	.0
2193.5	.2
2183.1	.3
2149.6	.5
2130.2	.7
2092.9	.9
2060.8	1.1
2040.4	1.3
2012.3	1.5

TIME TO PEAK ELEVATION PROFILE :

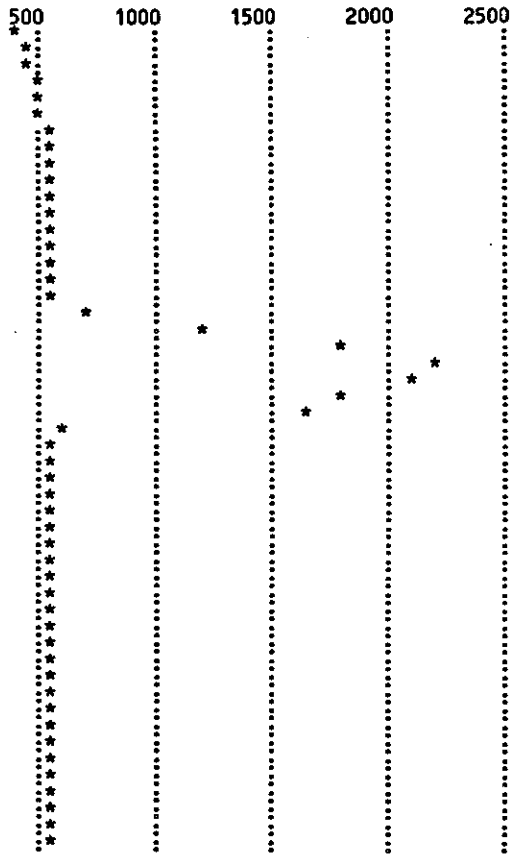


TIME (hr)	CROSS SECTION (mi)	ELEVATION (ft MSL)
2.3	2.1	1024.7
2.2	1.7	1071.3
2.2	1.3	1115.4
2.1	1.1	1136.6
2.1	.9	
2.1	.7	1179.8
2.0	.5	1195.7

DISCHARGE HYDROGRAPH :

Cross-Section Number	1
Cross-Section Location (mi)	.000
Gage Zero (ft MSL)	1333.500
Max Elevation Reached by Flood Wave (ft MSL)	1337.535
Flood Stage (ft)	(not available)
Maximum Stage (ft)	4.035
at Time (hr)	2.050
Maximum Flow (cfs)	2202
at Time (hr)	2.050

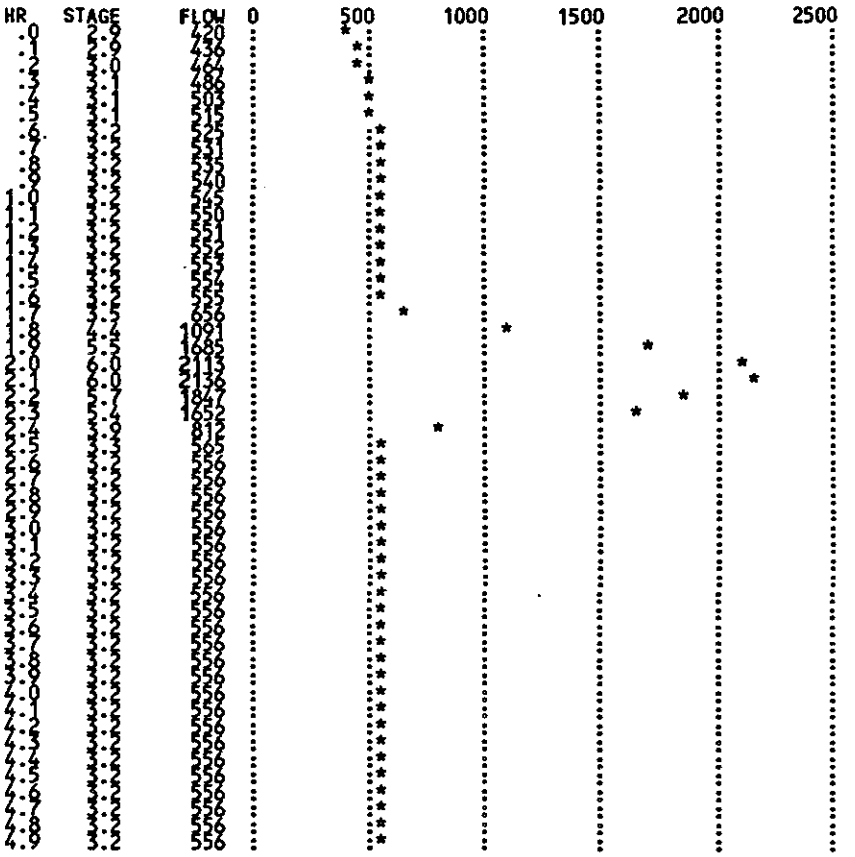
HR	STAGE	FLOW
.0	2.1	410
.1	2.2	444
.2	2.3	470
.3	2.3	490
.4	2.3	506
.5	2.3	518
.6	2.4	527
.7	2.4	532
.8	2.4	536
.9	2.4	541
1.0	2.4	546
1.1	2.4	549
1.2	2.4	551
1.3	2.4	552
1.4	2.4	553
1.5	2.4	554
1.6	2.4	555
1.7	2.6	698
1.8	3.2	1201
1.9	3.7	1804
2.0	4.0	2180
2.1	4.0	2109
2.2	3.7	1780
2.3	3.6	1648
2.4	2.5	593
2.5	2.4	556
2.6	2.4	556
2.7	2.4	556
2.8	2.4	556
2.9	2.4	556
3.0	2.4	556
3.1	2.4	556
3.2	2.4	556
3.3	2.4	556
3.4	2.4	556
3.5	2.4	556
3.6	2.4	556
3.7	2.4	556
3.8	2.4	556
3.9	2.4	556
4.0	2.4	556
4.1	2.4	556
4.2	2.4	556
4.3	2.4	556
4.4	2.4	556
4.5	2.4	556
4.6	2.4	556
4.7	2.4	556
4.8	2.4	556
4.9	2.4	556



DISCHARGE HYDROGRAPH :

Cross-Section Number	4
Cross-Section Location (mi)	.300
Gage Zero (ft MSL)	1218.600
Max Elevation Reached by Flood Wave (ft MSL)	1224.656
Flood Stage (ft)	(not available)
Maximum Stage (ft)	6.056
at Time (hr)	2.050
Maximum Flow (cfs)	2183
at Time (hr)	2.050

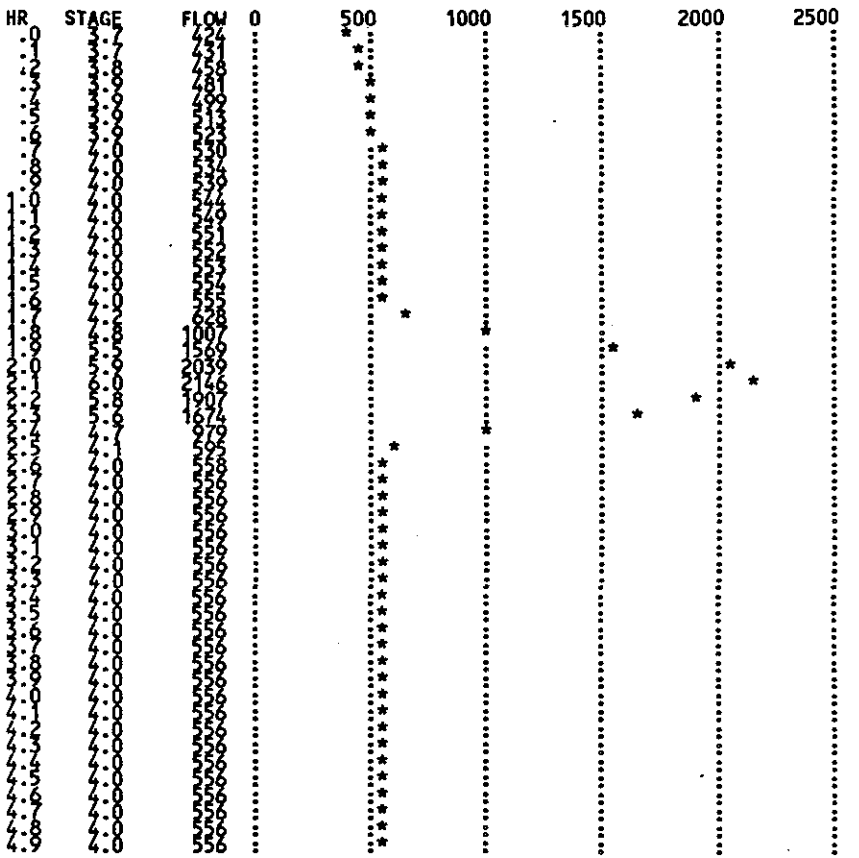
HR	STAGE	FLOW
.0	2.9	420
.1	2.9	436
.2	3.0	462
.3	3.1	486
.4	3.1	503
.5	3.1	515
.6	3.2	525
.7	3.2	531
.8	3.2	535
.9	3.2	540
1.0	3.2	545
1.1	3.2	550
1.2	3.2	551
1.3	3.2	552
1.4	3.2	553
1.5	3.2	557
1.6	3.2	565
1.7	3.5	656
1.8	4.4	1091
1.9	5.5	1685
2.0	6.0	2113
2.1	6.0	2136
2.2	5.7	1847
2.3	5.4	1652
2.4	3.9	812
2.5	3.3	575
2.6	3.2	562
2.7	3.2	559
2.8	3.2	558
2.9	3.2	556
3.0	3.2	556
3.1	3.2	556
3.2	3.2	556
3.3	3.2	556
3.4	3.2	556
3.5	3.2	556
3.6	3.2	556
3.7	3.2	556
3.8	3.2	556
3.9	3.2	556
4.0	3.2	556
4.1	3.2	556
4.2	3.2	556
4.3	3.2	556
4.4	3.2	556
4.5	3.2	556
4.6	3.2	556
4.7	3.2	556
4.8	3.2	556
4.9	3.2	556



DISCHARGE HYDROGRAPH :

Cross-Section Number	5
Cross-Section Location (mi)	.490
Gage Zero (ft MSL)	1189.700
Max Elevation Reached by Flood Wave (ft MSL)	1195.706
Flood Stage (ft)	(not available)
Maximum Stage (ft)	6.006
at Time (hr)	2.050
Maximum Flow (cfs)	2150
at Time (hr)	2.050

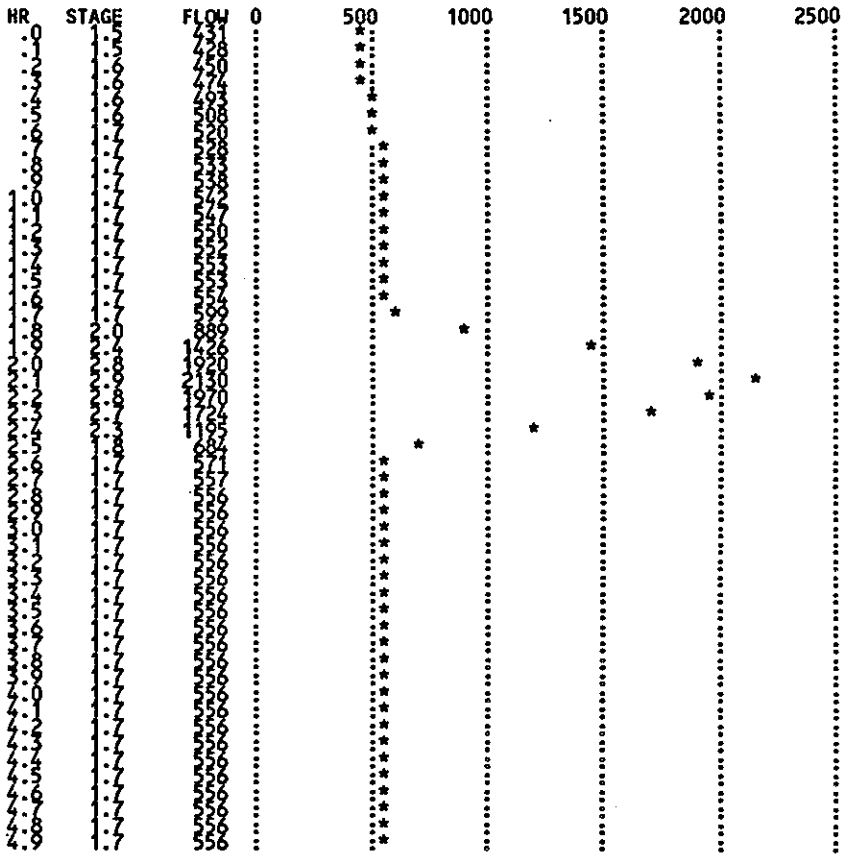
HR	STAGE	FLOW
.0	3.7	424
.1	3.7	431
.2	3.8	458
.3	3.9	481
.4	3.9	499
.5	3.9	513
.6	3.9	523
.7	4.0	530
.8	4.0	534
.9	4.0	536
1.0	4.0	537
1.1	4.0	539
1.2	4.0	541
1.3	4.0	542
1.4	4.0	543
1.5	4.0	544
1.6	4.0	545
1.7	4.2	628
1.8	4.8	1007
1.9	5.5	1569
2.0	5.9	2039
2.1	6.0	2146
2.2	5.8	1907
2.3	5.6	1674
2.4	4.7	979
2.5	4.1	595
2.6	4.0	558
2.7	4.0	556
2.8	4.0	557
2.9	4.0	559
3.0	4.0	556
3.1	4.0	556
3.2	4.0	556
3.3	4.0	556
3.4	4.0	556
3.5	4.0	556
3.6	4.0	556
3.7	4.0	556
3.8	4.0	556
3.9	4.0	556
4.0	4.0	556
4.1	4.0	556
4.2	4.0	556
4.3	4.0	556
4.4	4.0	556
4.5	4.0	556
4.6	4.0	556
4.7	4.0	556
4.8	4.0	556
4.9	4.0	556



DISCHARGE HYDROGRAPH :

Cross-Section Number	6
Cross-Section Location (mi)	.680
Gage Zero (ft MSL)	1176.900
Max Elevation Reached by Flood Wave (ft MSL)	1179.790
Flood Stage (ft)	(not available)
Maximum Stage (ft)	2.890
at Time (hr)	2.100
Maximum Flow (cfs)	2130
at Time (hr)	2.100

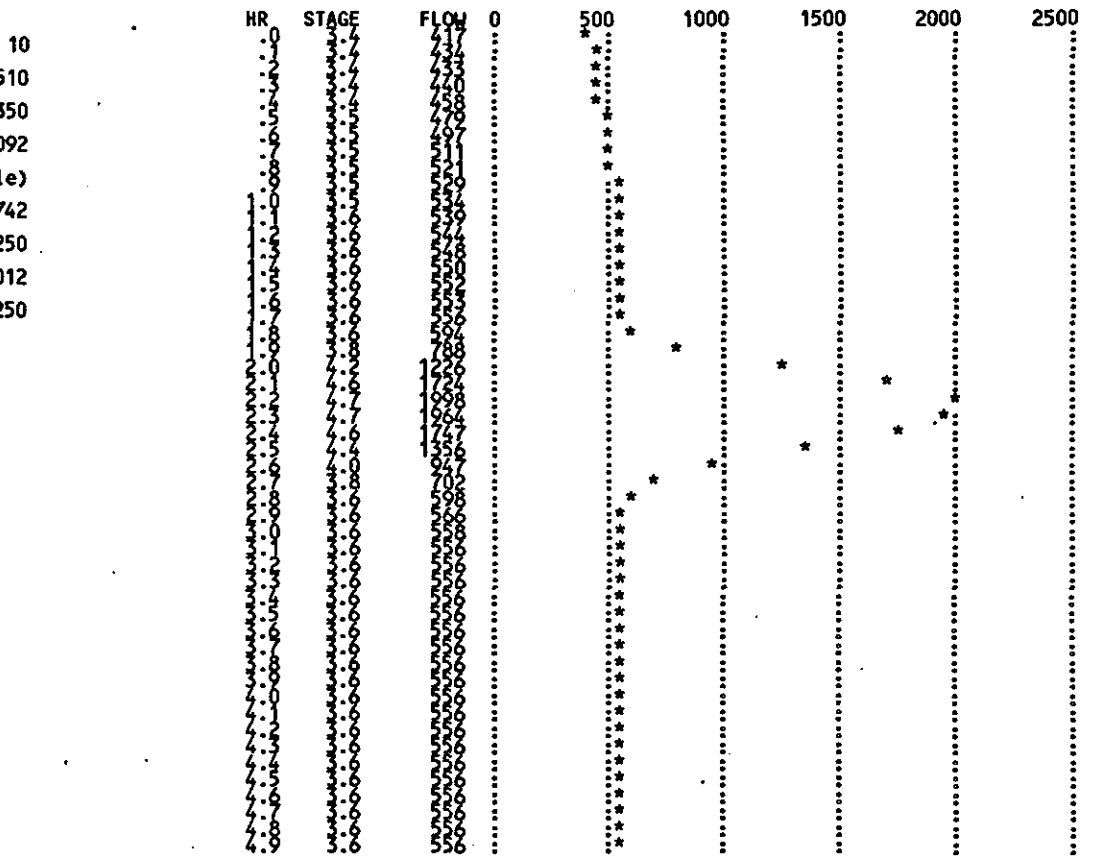
HR	STAGE	FLOW
.0	1.5	431
.1	1.5	428
.2	1.6	450
.3	1.6	474
.4	1.6	493
.5	1.6	508
.6	1.7	520
.7	1.7	528
.8	1.7	533
.9	1.7	538
1.0	1.7	542
1.1	1.7	547
1.2	1.7	550
1.3	1.7	552
1.4	1.7	553
1.5	1.7	553
1.6	1.7	554
1.7	1.7	559
1.8	2.0	889
1.9	2.4	1426
2.0	2.8	1920
2.1	2.8	2130
2.2	2.8	1970
2.3	2.7	1724
2.4	2.3	1195
2.5	1.8	684
2.6	1.7	571
2.7	1.7	557
2.8	1.7	556
2.9	1.7	556
3.0	1.7	556
3.1	1.7	556
3.2	1.7	556
3.3	1.7	556
3.4	1.7	556
3.5	1.7	556
3.6	1.7	556
3.7	1.7	556
3.8	1.7	556
3.9	1.7	556
4.0	1.7	556
4.1	1.7	556
4.2	1.7	556
4.3	1.7	556
4.4	1.7	556
4.5	1.7	556
4.6	1.7	556
4.7	1.7	556
4.8	1.7	556
4.9	1.7	556



DISCHARGE HYDROGRAPH :

Cross-Section Number	10
Cross-Section Location (mi)	1.510
Gage Zero (ft MSL)	1089.350
Max Elevation Reached by Flood Wave (ft MSL)	1094.092
Flood Stage (ft)	(not available)
Maximum Stage (ft)	4.742
at Time (hr)	2.250
Maximum Flow (cfs)	2012
at Time (hr)	2.250

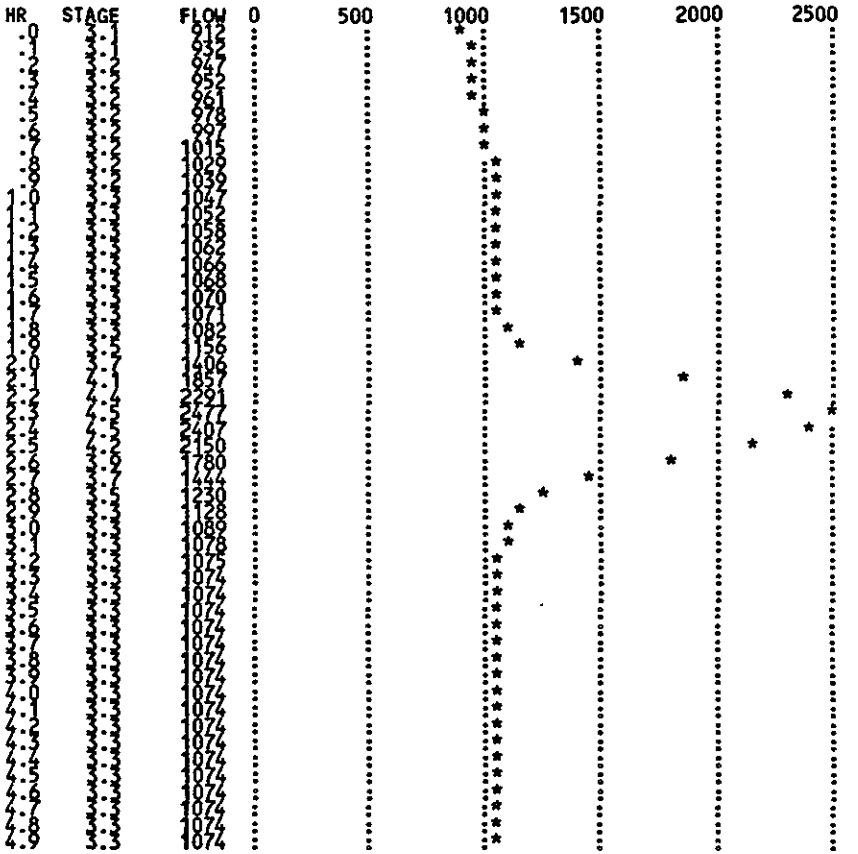
HR	STAGE	FLOW
.0	3.4	417
.1	3.4	437
.2	3.4	433
.3	3.4	440
.4	3.4	458
.5	3.5	479
.6	3.5	497
.7	3.5	511
.8	3.5	521
.9	3.5	529
1.0	3.5	532
1.1	3.6	539
1.2	3.6	544
1.3	3.6	548
1.4	3.6	550
1.5	3.6	552
1.6	3.6	553
1.7	3.6	552
1.8	3.8	594
1.9	3.8	788
2.0	4.2	1226
2.1	4.6	1724
2.2	4.7	1998
2.3	4.7	1964
2.4	4.6	1747
2.5	4.4	1356
2.6	4.0	947
2.7	3.8	702
2.8	3.6	598
2.9	3.6	566
3.0	3.6	558
3.1	3.6	556
3.2	3.6	556
3.3	3.6	556
3.4	3.6	556
3.5	3.6	556
3.6	3.6	556
3.7	3.6	556
3.8	3.6	556
3.9	3.6	556
4.0	3.6	556
4.1	3.6	556
4.2	3.6	556
4.3	3.6	556
4.4	3.6	556
4.5	3.6	556
4.6	3.6	556
4.7	3.6	556
4.8	3.6	556
4.9	3.6	556



DISCHARGE HYDROGRAPH :

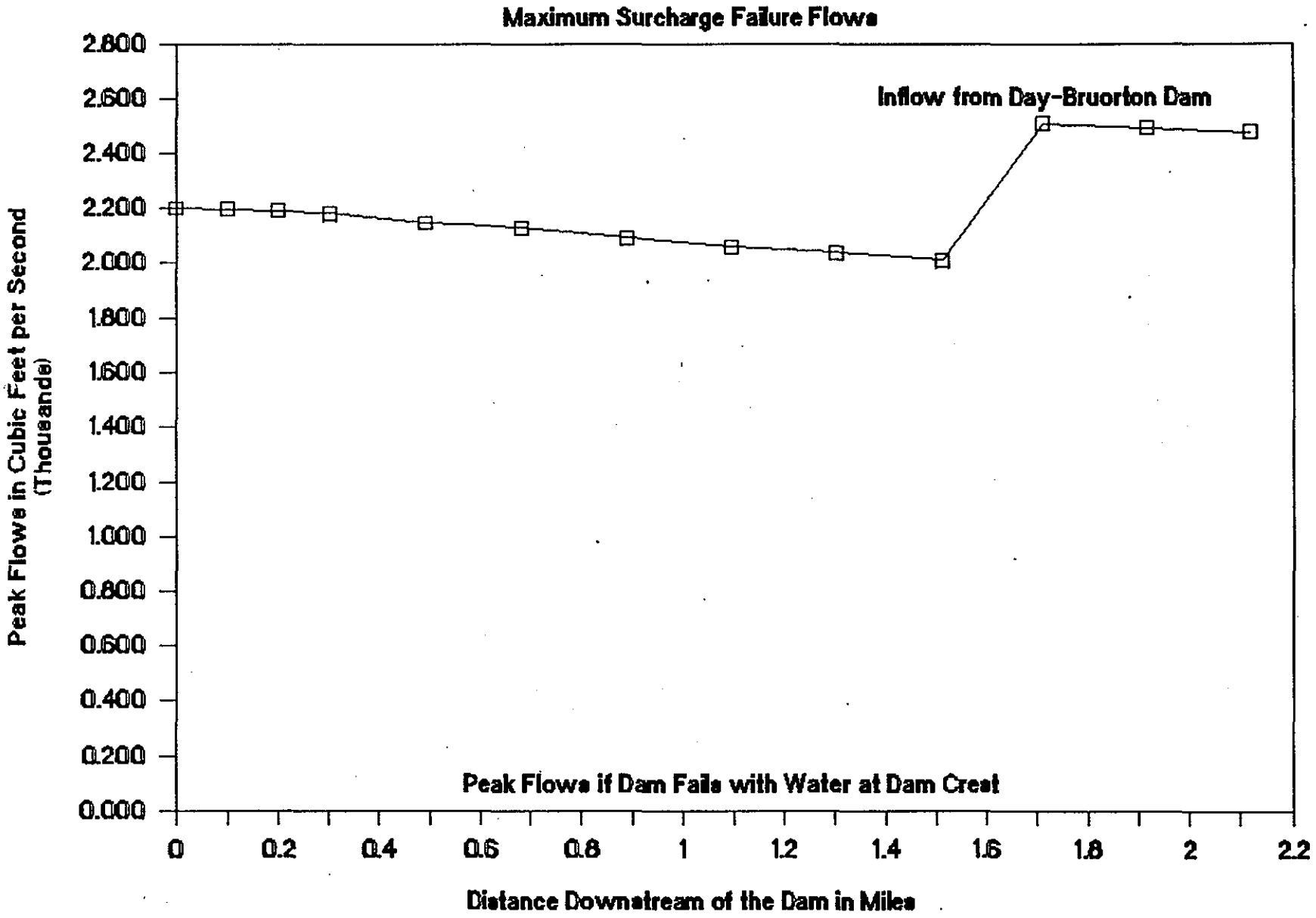
Cross-Section Number	13
Cross-Section Location (mi)	2.120
Gage Zero (ft MSL)	1020.200
Max Elevation Reached by Flood Wave (ft MSL)	1024.719
Flood Stage (ft)	(not available)
Maximum Stage (ft)	4.519
at Time (hr)	2.300
Maximum Flow (cfs)	2477
at Time (hr)	2.300

HR	STAGE	FLOW
.0	3.1	912
.1	3.1	932
.2	3.2	947
.3	3.5	952
.4	3.5	961
.5	3.5	978
.6	3.2	997
.7	3.2	1015
.8	3.5	1029
.9	3.5	1039
1.0	3.3	1047
1.1	3.3	1052
1.2	3.3	1058
1.3	3.3	1062
1.4	3.3	1066
1.5	3.3	1068
1.6	3.3	1070
1.7	3.3	1071
1.8	3.3	1082
1.9	3.5	1156
2.0	3.7	1406
2.1	4.1	1857
2.2	4.4	2291
2.3	4.5	2477
2.4	4.5	2407
2.5	4.2	2150
2.6	3.6	1780
2.7	3.2	1444
2.8	3.5	1230
2.9	3.3	1128
3.0	3.3	1089
3.1	3.3	1078
3.2	3.3	1075
3.3	3.3	1074
3.4	3.3	1074
3.5	3.3	1074
3.6	3.3	1074
3.7	3.3	1074
3.8	3.3	1074
3.9	3.3	1074
4.0	3.3	1074
4.1	3.3	1074
4.2	3.3	1074
4.3	3.3	1074
4.4	3.3	1074
4.5	3.3	1074
4.6	3.3	1074
4.7	3.3	1074
4.8	3.3	1074
4.9	3.3	1074

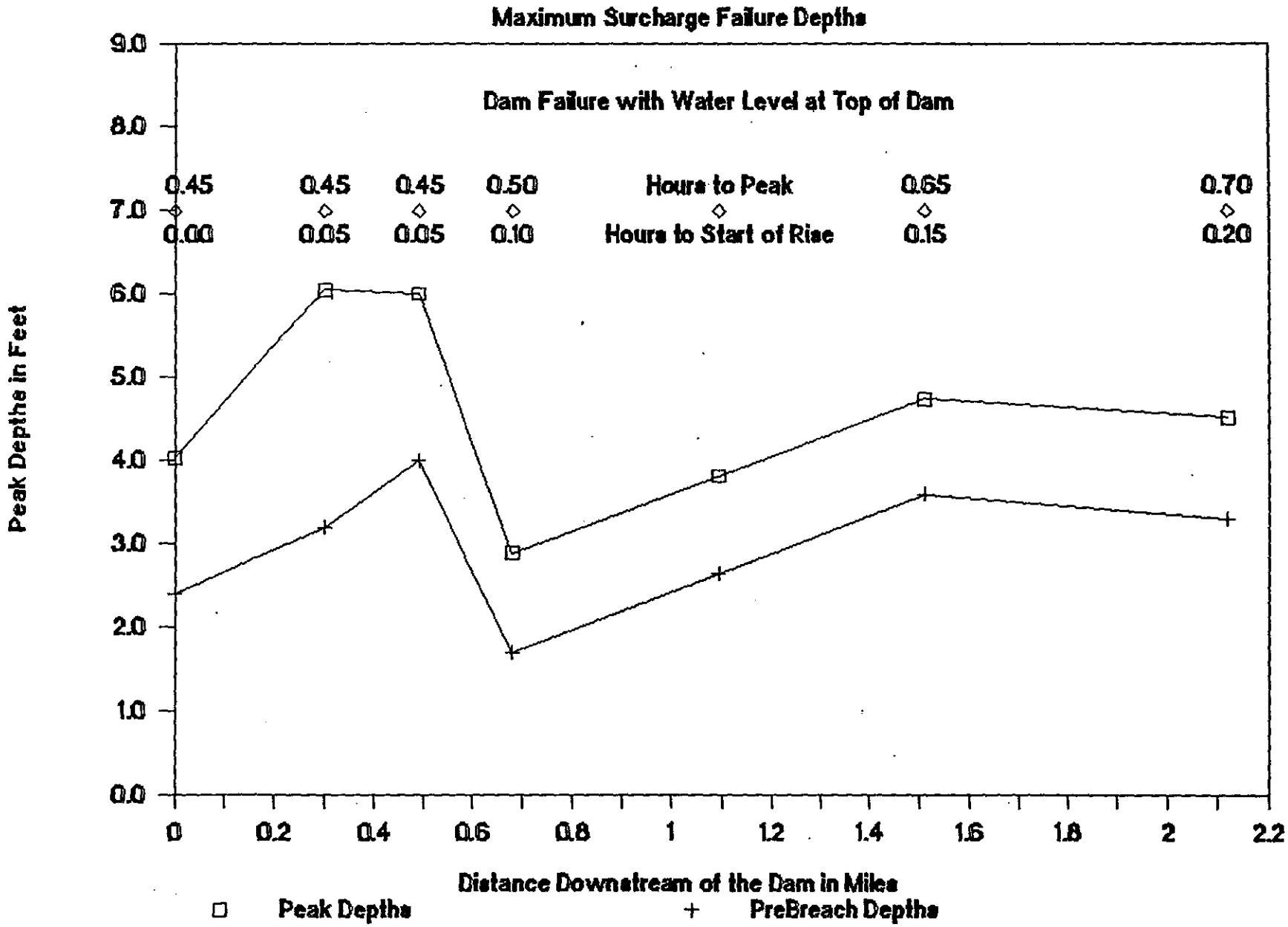


END OF OUTPUT

Kratky Dam, Vermont



Kratky Dam, Vermont



KRATKY DAM VERMONT AVERAGE FLOWS NO FAILURE

```
         1          0          0          5          2          0          0          0
0111110100 0 2
      66.0       37.7        0.0
    1353.6     1348.4     1333.5
       0.0     1349.4        1.0     1333.5       75.        1.0     1333.5        1.0
     1400.     1353.2     1349.4        0.0       75.        0.0      1080.        1.0
       0.0        1.1
       1.0        1.0
       0.0        1.1
         6          4          6          9          0          1          1          0
         1          2          3          4          5          6
       0.0        0.0
    1333.5     1342.5     1349.5   1353.82        0.0        0.0        0.0        0.0
       0.0      145.0       280.      470.        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
       0.3        0.0
    1218.6     1223.2     1225.0     1237.2        0.0        0.0        0.0        0.0
       0.0        25.       52.5       225.        0.0        0.0        0.0        0.0
       0.0        0.0       25.0       25.0        0.0        0.0        0.0        0.0
      0.49        0.0
    1189.7     1191.7     1196.0     1203.9        0.0        0.0        0.0        0.0
       0.0       15.0       80.0      175.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      0.68        0.0
    1176.9     1179.3     1181.1     1191.7        0.0        0.0        0.0        0.0
       0.0      160.0      380.0      550.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      1.51        0.0
   1089.35    1091.40    1105.00    1995.60        0.0        0.0        0.0        0.0
       0.0       12.0      768.0      572.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
      2.12        0.0
   1020.20    1023.00    1030.20    1033.00        0.0        0.0        0.0        0.0
       0.0       66.0      198.0      240.0        0.0        0.0        0.0        0.0
       0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.025      0.035      0.038      0.038        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
     0.025       0.03       0.03       0.03        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
     0.025      0.035      0.035      0.035        0.0        0.0        0.0        0.0
      0.10       0.19       0.19        0.2      0.203
       0.0        0.0        0.0        0.0        0.0
       0.0        0.0       0.05        0.0      367.0        0.5       0.01        0.0
         5
       0.9        0.9
```

FLOOD CREST SUMMARY :

Cross Section Location (mi)	Maximum Stage Elevation (ft MSL)	Maximum Flow (cfs)	Time To Maximum Stage (hr)	Maximum Flow Velocity (ft/sec)	Flood Elevation (ft MSL)	Time To Flood Elevation (hr)
.000	1333.72	1	.000	2.45	.00	.00
.100	1295.44	1	.000	5.58	.00	.00
.200	1257.19	1	.000	3.08	.00	.00
.300	1218.92	1	.000	7.32	.00	.00
.490	1190.11	1	.000	2.04	.00	.00
.680	1177.10	1	.000	1.31	.00	.00
.887	1155.17	1	.200	2.37	.00	.00
1.095	1133.37	1	.000	1.47	.00	.00
1.303	1111.46	1	.300	3.37	.00	.00
1.510	1089.88	1	.000	2.11	.00	.00
1.713	1066.63	2	.450	3.52	.00	.00
1.917	1043.64	2	.000	2.10	.00	.00
2.120	1020.47	2	.000	2.95	.00	.00