ISINGLASS RIVER
COCHECO RIVER WATERSHED
NEW HAMPSHIRE

BOW LAKE DAM-BREAK FLOOD ANALYSIS

SEPTEMBER 1984

US Army Corps
of Engineers
New England Division

BOW LAKE DAM

DAM-BREAK FLOOD

ANALYSIS

SUBMITTED TO:

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION

WALTHAM, MASSACHUSETTS

SUBMITTED BY:

CLEVERDON, VARNEY & PIKE, INC.

268 SUMMER STREET

BOSTON, MASSACHUSETTS 02210

CONTRACT NUMBER:

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SEPTEMBER 1984

BOW LAKE DAM

DAM-BREAK FLOOD ANALYSIS

TABLE OF CONTENTS

PARAGRAPH	SUBJECT	PAGE
1	INTRODUCTION AND PURPOSE	1
2	DAM DESCRIPTION	1
3	PERTINENT DATA	1
4	VALLEY DESCRIPTION	3
5	MODEL DESCRIPTION	3
6	ASSUMED DAM BREAK CONDITIONS	4
7	RESULTS	5

PLATE	LIST OF PLATES
1	INDEX MAP
2	PROFILE NO. 1
3	PROFILE NO. 2
4	FLOOD DISCHARGE, STAGES AND TIMING

APPENDIX	TITLE
A	INPUT DATA FILE
B	OUTPUT DATA FILE

BOW LAKE DAM

DAM-BREAK FLOOD ANALYSIS

1. INTRODUCTION AND PURPOSE

This report presents the findings of a dam-break flood analysis performed for Bow Lake Dam. The dam is owned, operated and maintained by the New Hampshire Water Resources Board. Included in the report are a description of pertinent features of the dam, the procedure used for the analysis, the assumed dam-break conditions, and the resulting effect on downstream flooded areas. This study was not performed because of any known likelihood of a dam-break at Bow Lake Dam. Its purpose is to provide quantitative information for emergency planning use.

2. DAM DESCRIPTION

Identification No.:	NH00055
Name of Dam:	Bow Lake Dam
Town:	Strafford
County and State:	Strafford, NH
Stream:	Isinglass River

Bow Lake Dam is 24 feet high, about 40 feet wide, and 400 feet long. It is an earthen embankment placed between vertical dry masonry walls, spans the upper reach of the Isinglass River, and is located in east central New Hampshire. It has two low-level gated outlets and a stoplog spillway. Maximum storage capacity is about 14,000 acre-feet. Bow Lake is used for recreational purposes. The lake is 2.5 miles in length with a surface area of about 1,150 acres.

3. PERTINENT DATA

Data is taken from "Phase I Inspection Report" for Bow Lake Dam, dated August 1978.

a. Drainage Area The drainage area consists of 14.3 square miles (9,152 acres).

b. Discharge at Damsite

(1) Outlet works (conduits) - two low-level sluiceways estimated to be about 3' H x 4' W through the dam. Gate capacity at normal

pool elevation - 600 cfs @ 515 ft. NGVD

(2) Stoplog spillway capacity (stoplogs removed) at maximum pool elevation - 1,010 cfs @ 518.2 ft. NGVD

c. Elevation (ft. NGVD)

(1) Top of dam - 518.2 (crest varies from 518.2 to 519.9)

(2) Recreation pool - 515±

(3) Spillway crest - 510.3

(4) Upstream portal invert low-level conduit - 495.9

(5) Streambed at centerline of main dam - 495.9

d. Reservoir (miles)

(1) Length of maximum pool - 2.4

(2) Length of recreational pool - 2.4

e. Storage (acre-feet)

(1) Recreational pool - 11,500

(2) Top of dam - 14,000

f. Reservoir Surface (acres)

(1) Top of dam (embankment) - 1,300

(2) Recreational pool - 1,150

g. Dam

(1) Type - earthen fill between vertical dry masonry walls

(2) Length - 400'

(3) Height - 24' (structural height)

(4) Top width - ranges from 36 ft. to 53 ft.

(5) Side slopes - vertical except 75 feet along north abutment where downstream slope is approximately 3H:1V

(6) Impervious core - masonry core walls visible on surface, depth and full extent not determinable

h. Spillway

(1) Type - 4-sectioned stoplog concrete spillway

(2) Length of weir - 20' (four 5' lengths)

(3) Crest elevation - 510.3' NGVD

(4) Gates - none

(5) U/S Channel - Bow Lake

(6) D/S Channel - open, boulders and rocks, with sand and gravel bottom. Left side has about a 4 foot high boulder built training wall to the bridge opening approximately 150 downstream of dam face.

4. VALLEY DESCRIPTION

Bow Lake Dam spans the headwaters of the Isinglass River, a major tributary of the Cocheco River. The dam is located about 150 feet upstream of Bow Lake Village, Strafford, New Hampshire. The Isinglass River then flows approximately 16 miles to its confluence with the Cocheco River.

The river valley below Bow Lake is steep with narrow flood plains the first 4 miles below Bow Lake Dam. The river drops an average of 50 feet/mile in this reach. From mile 4 to mile 16, the confluence of Cocheco River and the limit of study, the river really becomes less steep, having an average slope of 10 feet/mile, with wide floodplains.

5. MODEL DESCRIPTION

The Bow Lake dam-break analysis was made using the HEC version, dated November 1981, 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

Spring, MD 20910. Input for the model consisted of: (a) storage characteristics of the reservoir, (b) selected geometry and duration of the breach development, (c) hydraulic inflows, (d) hydraulic roughness coefficients, and (e) active and inactive flow regions. 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: The magnitude of a flood resulting from the hypothetical failure of Bow Lake Dam is a function of many different parameters, including size of breach, initial pool level and storage, rate of breach formation, channel and over-bank roughness, and antecedent flow conditions. Engineering assumptions of conditions which could be reasonably expected to exist prior to a failure of Bow Lake Dam and were used in the analysis are presented below:

a. Initial Pool Level 519.3 feet NGVD, 4.3 feet above top of flashboards

b. Reservoir Inflow Estimated flood of record = 1790 cfs

c. Breach Invert 496 feet NGVD

d. Breach Base Width 60 feet, trapezoidal side slopes 1V: 0.5H

e. Time to Complete Formation of Breach 1 hour

f. Downstream Channel Roughness Manning's "n" = .040 to .140

g. Pre-Breach River Flow The pre-breach river flow was assumed equal to the flood of record, which was estimated by using a cfs/square miles value based upon similar drainage area. Inflow to Bow Lake was 1790 cfs and local inflow on the Isinglass River is 3780 cfs.

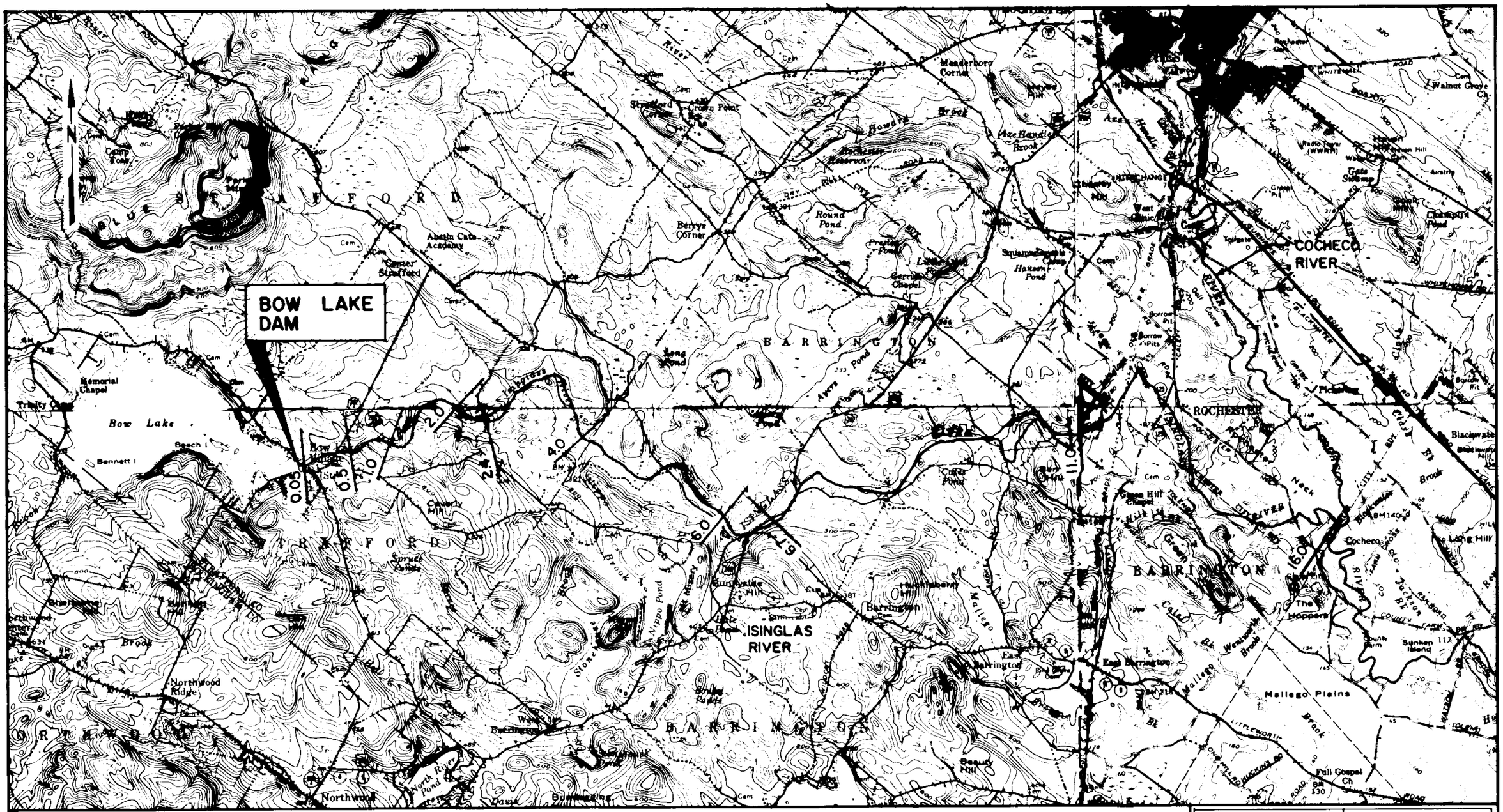
7. RESULTS

The resulting peak stage flood profiles are shown on plates 2 through 5. Because of the scarcity of good topographic mapping in the area, profiles are shown in feet above normal summertime)July-August) low water (NLW). Users of the information can establish depth of flooding at particular properties by establishing its relative elevation with respect to adjacent stream level. Variations in depth above NLW progressing downstream is attributable to changes in natural stream hydraulic capacity, as well as changes in peak discharges.

Peak discharge throughout the study reach associated with the development of the peak stage profile along with the development of discharge and stage hydrographs for three stations downstream from Bow Lake Dam are shown on plate 6. The three stations are located 0.05, 2.4, and 6.7 miles downstream of the dam.

The peak dam-break discharge from Bow Lake Dam is 25,300 cfs producing a rise of 15.8 feet above NLW stage at a point 0.05 miles downstream from the dam. The peak discharge decreases to 24,000 cfs with an attendent rise of stage of 15.6 feet at a mile 2.4 below the dam. At mile 6.7, the discharge is 21,300 cfs producing a rise of 21.4 feet over NLW stage.

Because of the large reservoir capacity of Bow Lake a large outflow is maintained from the breached Bow Lake Dam. The natural valley storage of the river valley is expended and high flows occur in the river 16.0 miles downstream.



MAP BASED UPON U.S.G.S
ALTON, DOVER, N.H., BERWICK, ME.-N.H. QUADRANGLES
1957

CROSS-SECTION LOCATION IN
MILES BELOW DAM

SCALE IN MILES

1 0 1

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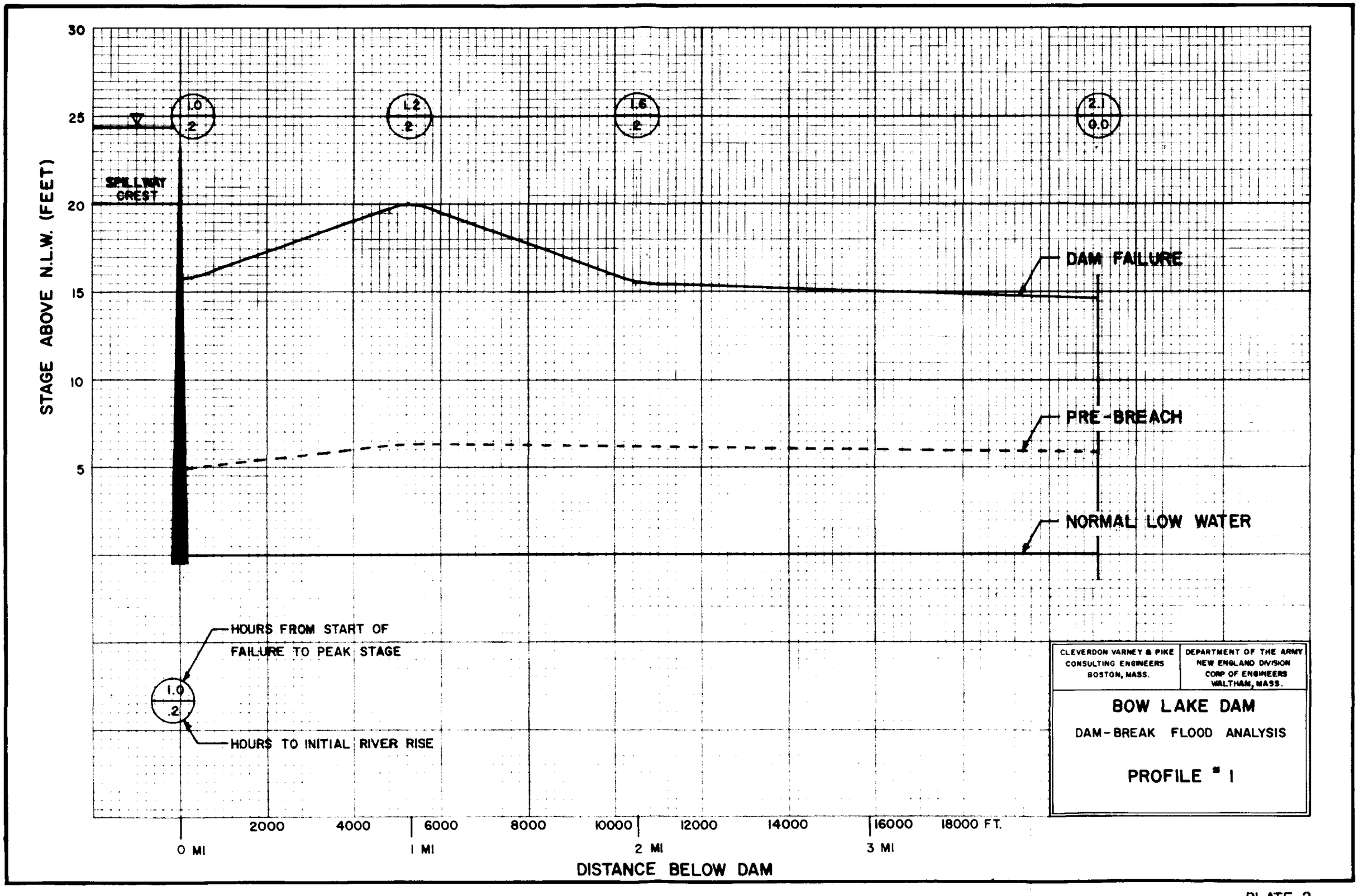
BOW LAKE

DAM BREAK FLOOD ANALYSIS

INDEX MAP

PLATE I


STAGE ABOVE N.L.W. (FEET)
30
25
20
15
10
5
SPILLWAY CREST
1.0
.2
1.2
.2
1.6
.2
2.1
0.0
DAM FAILURE
PRE-BREACH
NORMAL LOW WATER
HOURS FROM START OF FAILURE TO PEAK STAGE
HOURS TO INITIAL RIVER RISE
2000
4000
6000
8000
10000
12000
14000
16000
18000 FT.
0 MI
1 MI
2 MI
3 MI
DISTANCE BELOW DAM
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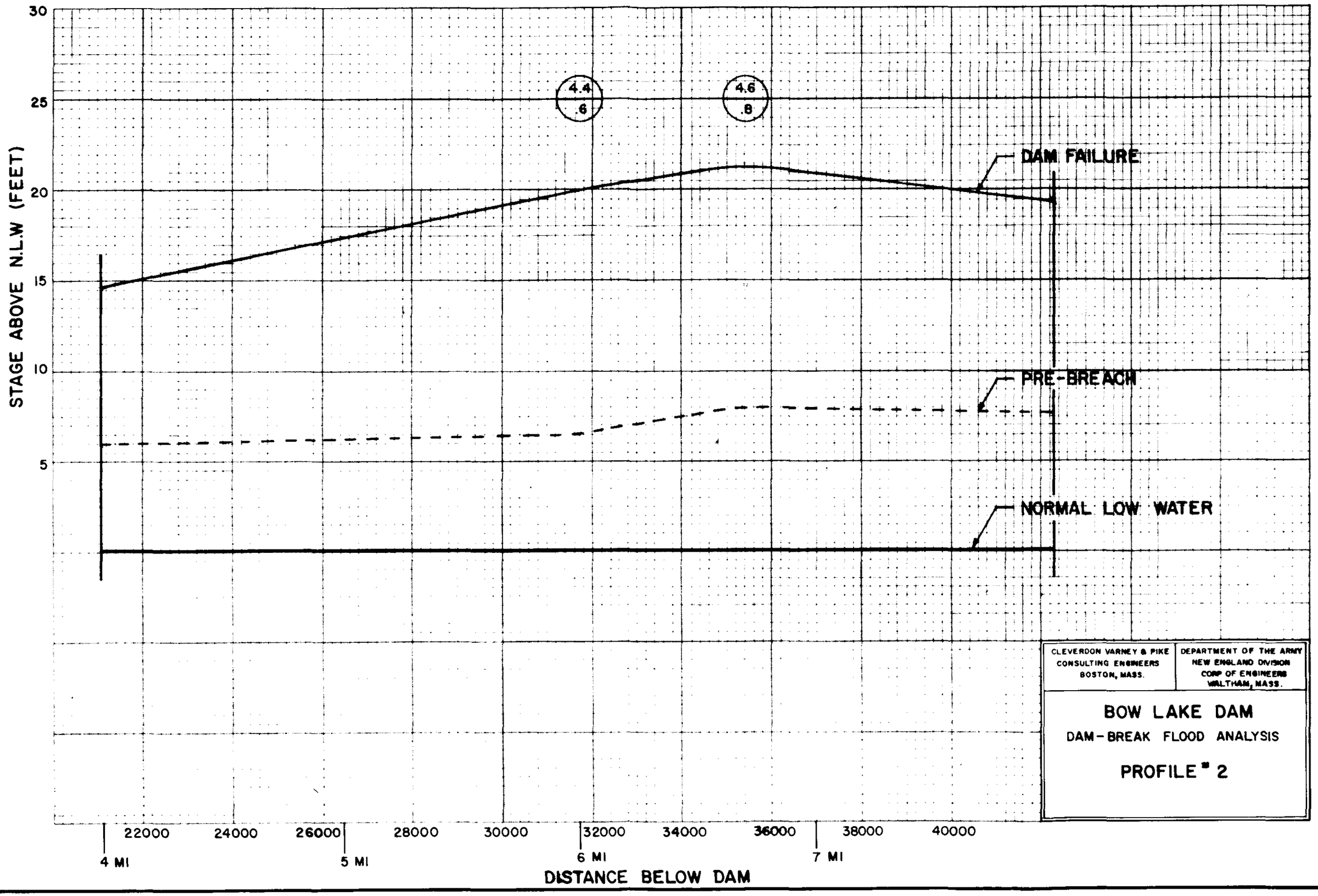
CONSULTING ENGINEERS
BOSTON, MASS.
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORP OF ENGINEERS
WALTHAM, MASS.
BOW LAKE DAM
DAM-BREAK FLOOD ANALYSIS
PROFILE # 1

PLATE 2


STAGE ABOVE N.L.W (FEET)
30
25
20
15
10
5
4.4
.6
4.6
.8
DAM FAILURE
PRE-BREACH
NORMAL LOW WATER
22000
24000
26000
28000
30000
32000
34000
36000
38000
40000
4 MI
5 MI
6 MI
7 MI
DISTANCE BELOW DAM
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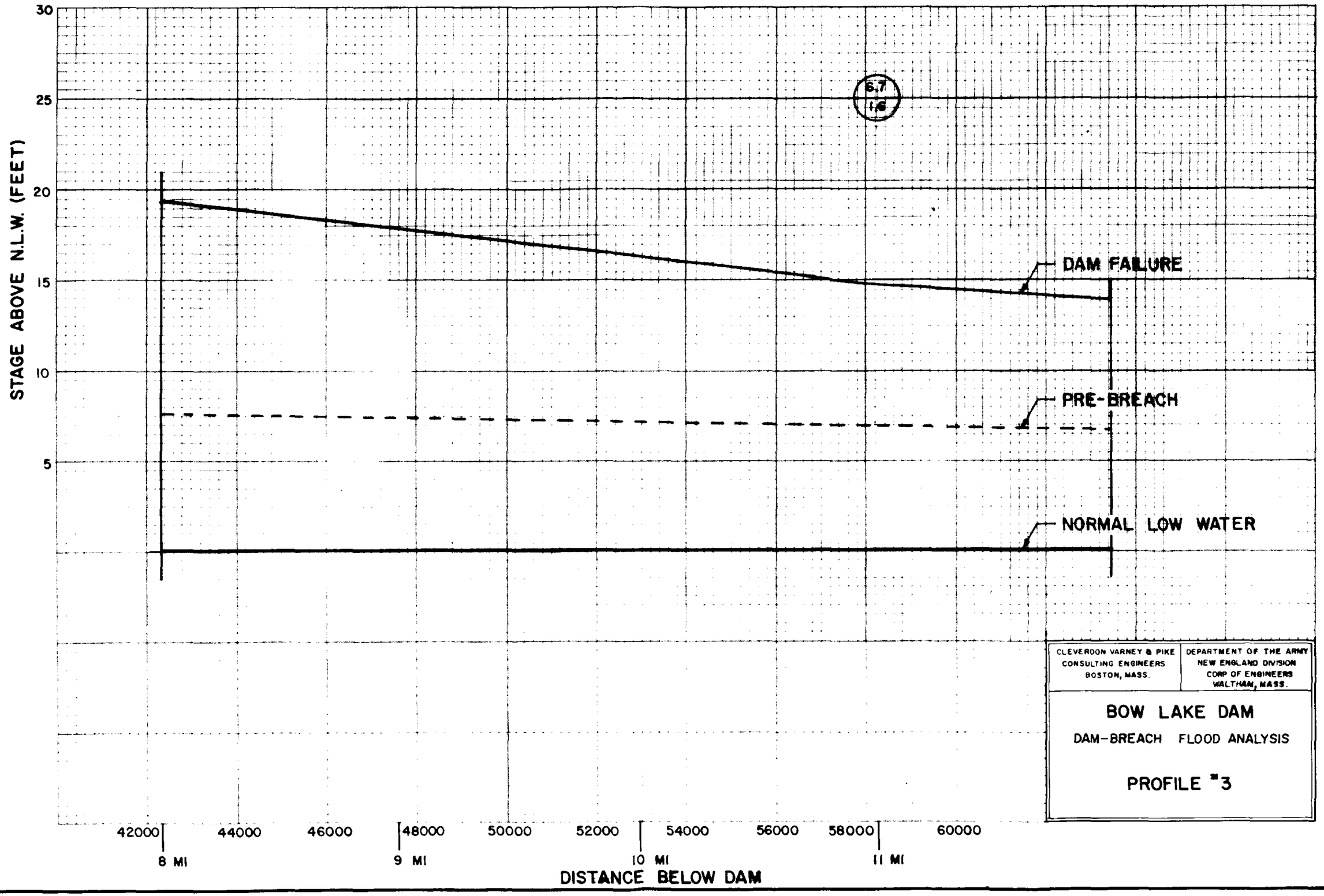
WALTHAM, MASS.
BOW LAKE DAM
DAM-BREAK FLOOD ANALYSIS
PROFILE # 2


STAGE ABOVE N.L.W. (FEET)
30
25
20
15
10
5
6.7
1.6
DAM FAILURE
PRE-BREACH
NORMAL LOW WATER
42000
44000
46000
48000
50000
52000
54000
56000
58000
60000
8 MI
9 MI
10 MI
11 MI
DISTANCE BELOW DAM
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CONSULTING ENGINEERS
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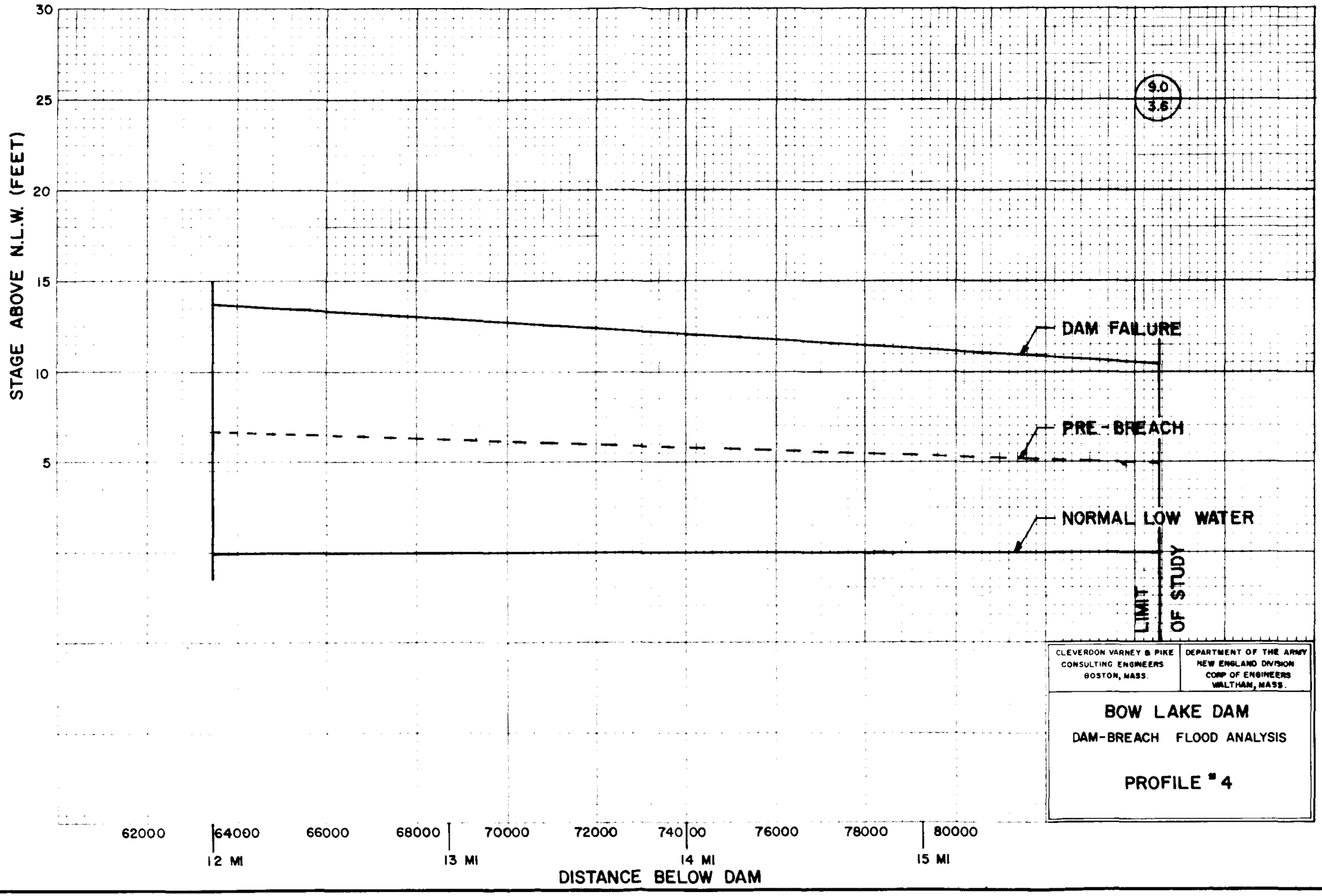
WALTHAM, MASS.
BOW LAKE DAM
DAM-BREACH FLOOD ANALYSIS
PROFILE #3

PLATE 4


STAGE ABOVE N.L.W. (FEET)
30
25
20
15
10
5
9.0
3.6
DAM FAILURE
PRE-BREACH
NORMAL LOW WATER
LIMIT OF STUDY
62000
64000
66000
68000
70000
72000
74000
76000
78000
80000
12 MI
13 MI
14 MI
15 MI
DISTANCE BELOW DAM
CLEVEROON VARNEY & PIKE
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BOW LAKE DAM
DAM-BREACH FLOOD ANALYSIS
PROFILE # 4

PLATE 5

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*HECFORMAT
*ECHO
*FORMATTED
*10FIELDS
*COMPOSITE
ID BOW LAKE DAM
ID ISINGLASS RIVER
ID G.MERCER
ID C.V&P ENGS
ID BOSTON,MA.
IO      3       10       10
IP      3        0
QI   1790
SN BOW LAKE
SE 518.2      515    510.3      496
SA  1300     1150      850        0
DN BOW LAKE DAM
DD 518.2      515        0    519.3       50      .05      496
DB      1    519.3       60      496       .5
DO      0      200        0       10
RN REACH 1
RG      1        3        4        6
RC    0.0        0      0.0      0.0
XI   0.05
XE 493.5      501      509      513      517      521      530      540
XC     20      112      387      473      517      732      890      991
NC   .035     .045     .050     .060     .070     .080     .090     .100
XI    0.5
XE    462      470      479      487      495      503      512      520
XC     50      174      224      209      757      944     1034     1464
XO      0      200      515      700      300      345      674      616
NC   .035     .045     .050     .060     .070     .080     .090     .100
XI    1.0                                                   .50
XE    430      440      450      460      470      480      490      500
XC     50      120      183      200      440      780     1040     1300
NC   .035     .045     .050     .060     .070     .080     .090     .100
XI    2.0
XE    357      363      369      375      382      388      394      400
XC     50      140      156      250     1100     1564     2452     2860
XO      0      170      678      900      536      480        0        0
NC   .035     .045     .050     .060     .070     .080     .090     .100
XI    2.4                                                   .50
XE 315.8      322      329      336    341.2      349      356    362.6
XC     20      145      313      529      936     1172     1238     1321
NC   .035     .045     .050     .060     .070     .080     .090     .100
QN    2.4              LOCAL  INFLOW
QL   2000
XI    4.0
XE    252      259      266      273      279      286      293      300
XC     50      191      626      890     1100     1397     1770     2000
XO            550      430      414      424      475      466      600
NC   .035     .045     .050     .060     .070     .080     .090     .100
RN REACH 2
RG      2        3        4        5
RC    0.0        0      0.0      0.0
```

```
XI    4.0                                                  .20
XE    252     259     266     273     279     286     293     300
XC     50     191     626     890    1100    1397    1770    2000
XO      0     550     430     414     424     475     466     600
NC   .035    .045    .050    .060    .070    .080    .090    .100
XI    6.0                                                  .25
XE    235     241     248     254     261     267     274     280
XC     50     237     296     356     440     559     708     800
XO      0     200     400     560     747     920    1040    1280
NC   .035    .045    .050    .060    .070    .080    .090    .100
XI    6.7                                                  .30
XE    228     232     236     239   242.5     247     250   255.4
XC     28     115     155     178     221     274     352     434
NC   .035    .045    .050    .060    .070    .080    .090    .100
QN    6.7            LOCAL  INFLOW
QL   1750
XI   11.0                                                  .20
XE    155     161     168     174     181     187     194     200
XC     50     242     316     358     442     546     697     860
XO      0      70     360     630     870     845     785     700
NC   .035    .045    .050    .060    .070    .080    .090    .100
XI   16.0
XE    110     117     124     131     139     146     153     160
XC    100     505     790    1120    1105    1475    1377    2150
XO      0     435     770     895    1430    1365    1742    1250
NC   .035    .045    .050    .060    .070    .080    .090    .100
ZZ
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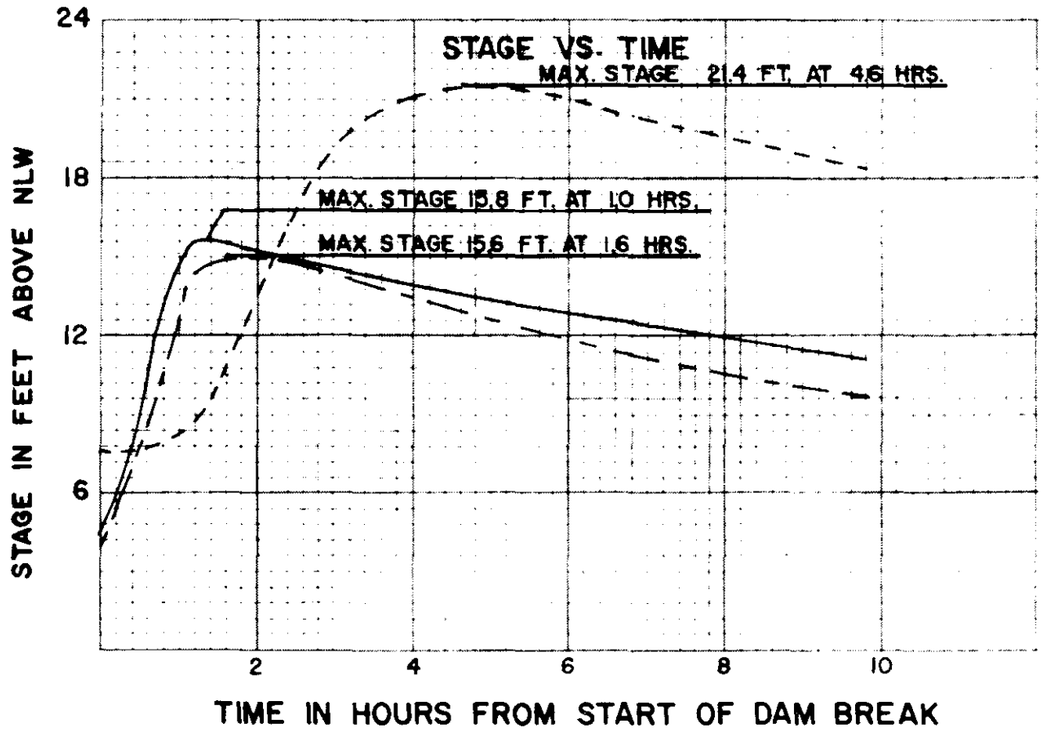

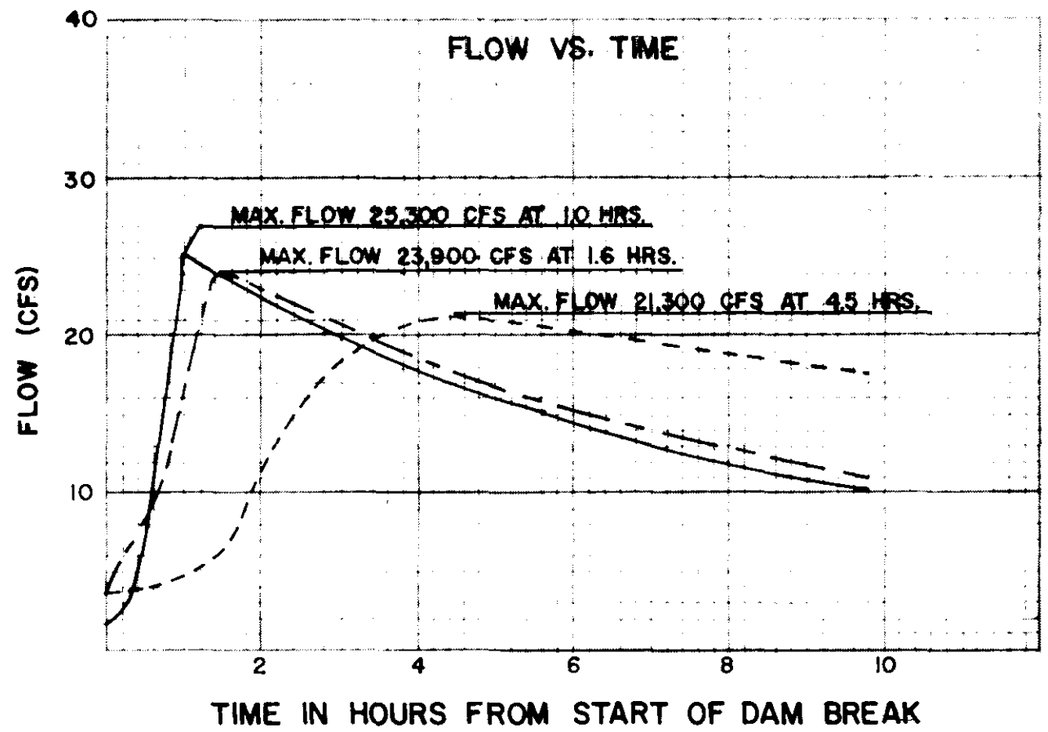

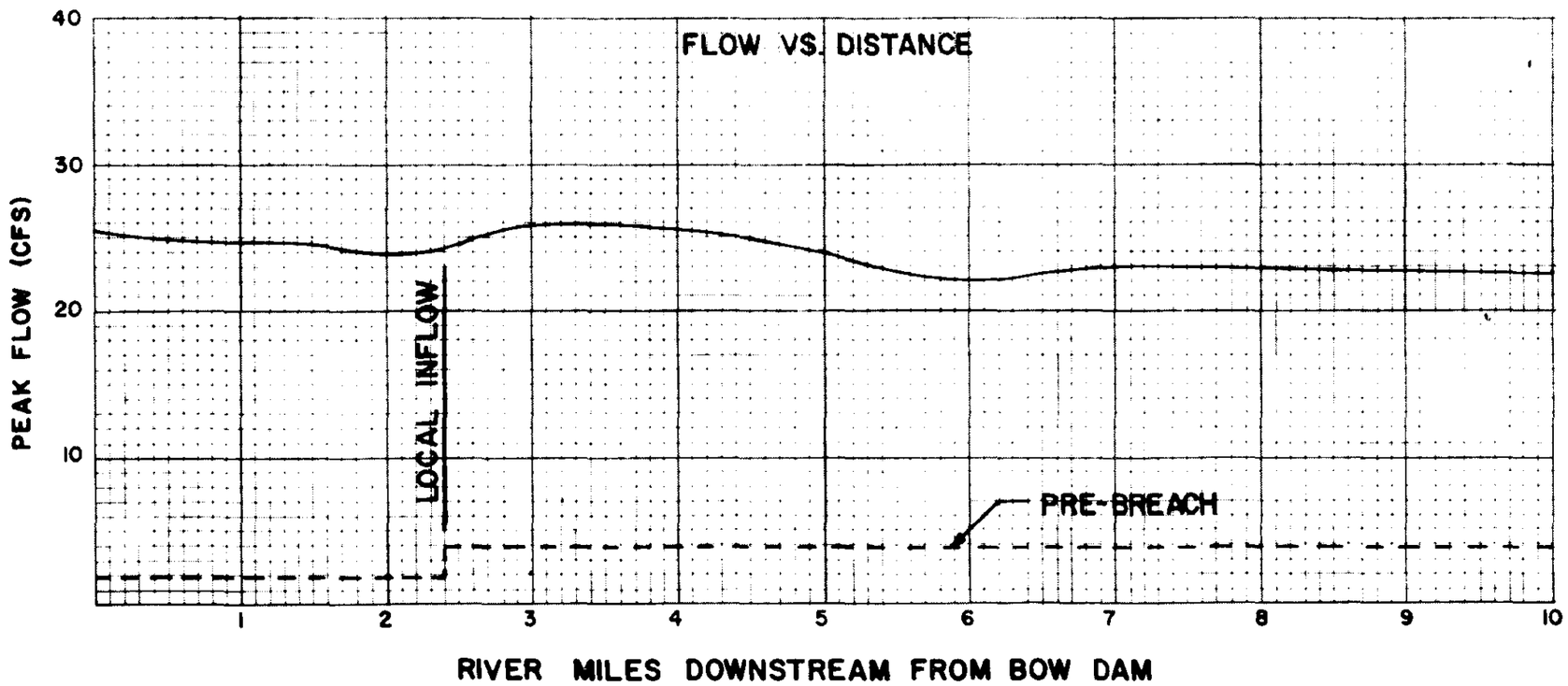

NLW DATUM (FT. NGVD)

STA. 1 RM. 0.05 = 495 ———
STA. 2 RM. 2.00 = 358 — · —
STA. 3 RM. 6.70 = 229 - - - - -
(RM. 2.40 = 316)

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BOW DAM

DAM-BREAK FLOOD ANALYSIS

BASE FLOOD DISCHARGES STAGES & TIMING

SECT NO.	XS(I)	RIVRMI	FSTG(I)	XSL(I)	XSR(I)	YD(I)	DXM(I)	FKC(I)	
3	6.7						.30		
HS	...	228	232	236	239	242.5	247	250	255.4
BS	...	28	115	155	178	221	274	352	434
BSS	...								
CM	...	.035	.045	.050	.060	.070	.080	.090	.100

LATERAL INFLOW ENTERED BELOW CROSS-SECTION LOCATION 6.7 SECTION NUMBER 3

LOCAL INFLOW

NO	FLOW	TIME	NO	FLOW	TIME	NO	FLOW	TIME	NO	FLOW	TIME
1	1750										

SECT NO.	XS(I)	RIVRMI	FSTG(I)	XSL(I)	XSR(I)	YD(I)	DXM(I)	FKC(I)	
4	11.0						.20		
HS	...	155	161	168	174	181	187	194	200
BS	...	50	242	316	358	442	546	697	860
BSS	...	0	70	360	630	870	845	785	700
CM	...	.035	.045	.050	.060	.070	.080	.090	.100

SECT NO.	XS(I)	RIVRMI	FSTG(I)	XSL(I)	XSR(I)	YD(I)	DXM(I)	FKC(I)	
5	16.0						1000000		
HS	...	110	117	124	131	139	146	153	160
BS	...	100	505	790	1120	1105	1475	1377	2150
BSS	...	0	435	770	895	1430	1365	1742	1250

PROGRAM DAMBRK---VERSION-A-01/30/82

ANALYSIS OF THE DOWNSTREAM FLOOD HYDROGRAPH

PRODUCED BY THE DAM BREAK OF

BOW LAKE DAM

ON

ISINGLASS RIVER

ANALYSIS BY

G.MERCER
C.V&P ENGS
BOSTON.MA.

BASED ON PROCEDURE DEVELOPED BY

DANNY L. FREAD, PH.D., RESEARCH HYDROLOGIST
HYDROLOGIC RESEARCH LABORATORY
W23, OFFICE OF HYDROLOGY
NOAA, NATIONAL WEATHER SERVICE
SILVER SPRING, MARYLAND 20910

1

B-2

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*****************************
*****************************
***                       ***
***  SUMMARY OF INPUT DATA  ***
***                       ***
*****************************
*****************************
```

INPUT CONTROL PARAMETERS FOR BOW LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF DYNAMIC ROUTING REACHES	KRN	2
TYPE OF RESERVOIR ROUTING	KUI	0
MULTIPLE DAM INDICATOR	MULDAM	0
PRINTING INSTRUCTIONS FOR INPUT SUMMARY	KDMP	3
NO. OF RESERVOIR INFLOW HYDROGRAPH POINTS	ITEH	1

INTERVAL OF CROSS-SECTION INFO PRINTED OUT WHEN JNK=9	NPRT	0
FLOOD-PLAIN MODEL PARAMETER	KFLP	0
LANDSLIDE PARAMETER	KSL	0

BOW LAKE DAM RESERVOIR

TABLE OF ELEVATION VS SURFACE AREA

SURFACE AREA (ACRES) SA(K).	ELEVATION (FT) HSA(K)
1300.0	516.20
1150.0	515.00
850.0	510.30
0.0	496.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00

1

BOW LAKE DAM RESERVOIR AND BREACH PARAMETERS

PARAMETER	UNITS	VARIABLE	VALUE
LENGTH OF RESERVOIR	MI	RLM	0.00
ELEVATION OF WATER SURFACE	FT	YO	515.30
SIDE SLOPE OF BREACH		Z	.50
ELEVATION OF BOTTOM OF BREACH	FT	YBMIN	496.00
WIDTH OF BASE OF BREACH	FT	BF	50.00
TIME TO MAXIMUM BREACH SIZE	HR	TFH	1.00
ELEVATION (MSL) OF BOTTOM OF DAM	FT	DATUM	496.00
VOLUME-SURFACE AREA PARAMETER		VOL	0.00
ELEVATION OF WATER WHEN BREACHED	FT	HF	515.30
ELEVATION OF TOP OF DAM	FT	HD	516.20
ELEVATION OF UNCONTROLLED SPILLWAY CREST	FT	HSP	515.00
ELEVATION OF CENTER OF GATE OPENINGS	FT	HGT	0.00

DISCHARGE COEF. FOR UNCONTROLLED SPILLWAY		CS	200.00
DISCHARGE COEF. FOR GATE FLOW		CG	0.00
DISCHARGE COEF. FOR UNCONTROLLED WEIR FLOW		CDO	10.00
DISCHARGE THRU TURBINES	CFS	QT	0.00

DHF(INTERVAL BETWEEN INPUT HYDROGRAPH ORDINATES) = 10.00 HRS.

TEH(TIME AT WHICH COMPUTATIONS TERMINATE) = 10.0000 HRS.

INFLOW HYDROGRAPH TO BOW LAKE DAM
****

1700.00

TIME OF INFLOW HYDROGRAPH ORDINATES

0.0000

CROSS-SECTIONAL PARAMETERS FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF CROSS-SECTIONS	NS	5
MAXIMUM NUMBER OF TOP WIDTHS	NCS	8
NUMBER OF CROSS-SECTIONAL HYDROGRAPHS TO PLOT	NTT	4
TYPE OF OUTPUT OTHER THAN HYDROGRAPH PLOTS	JNP	0
CROSS-SECTIONAL SMOOTHING PARAMETER	KSA	0
DOWNSTREAM SUPERCRITICAL OR NOT	KSUPC	1
NO. OF LATERAL INFLOW HYDROGRAPHS	LQ	1
NO. OF POINTS IN GATE CONTROL CURVE	KCG	0

NUMBER OF CROSS-SECTION WHERE HYDROGRAPH DESIRED
(MAX NUMBER OF HYDROGRAPHS = 6)
****

1 3 4 6

CROSS-SECTIONAL VARIABLES FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	UNITS	VARIABLE
LOCATION OF CROSS-SECTION	MI	XS(I)
ELEVATION (MSL) OF FLOODING AT CROSS-SECTION	FT	FSTG(I)
ELEV CORRESPONDING TO EACH TOP WIDTH	FT	HS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	FT	BS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	FT	BSS(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	ACRES	DSA(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	ACRES	SSA(K,I)
NUMBER OF CROSS-SECTION		I
NUMBER OF ELEVATION LEVEL		K

CROSS-SECTION NUMBER 1
****

XS(I) = .050 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	493.5	501.0	509.0	513.0	517.0	521.0	530.0	540.0
BS ...	20.0	112.0	357.0	473.0	517.0	731.0	890.0	991.0
BSS ...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS-SECTION NUMBER 2

****

HS ...	462.0	470.0	479.0	487.0	495.0	503.0	512.0	520.0
BS ...	50.0	174.0	224.0	209.0	757.0	944.0	1034.0	1464.0
BSS ...	0.0	200.0	515.0	700.0	300.0	345.0	674.0	616.0

CROSS-SECTION NUMBER 3
****

XS(I) = 1.000 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	430.0	440.0	450.0	460.0	470.0	480.0	490.0	500.0
BS ...	50.0	120.0	183.0	200.0	440.0	780.0	1040.0	1300.0
BSS ...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS-SECTION NUMBER 4
****

XS(I) = 2.000 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	357.0	363.0	369.0	375.0	382.0	388.0	394.0	400.0
BS ...	50.0	140.0	156.0	250.0	1100.0	1564.0	2452.0	2860.0
BSS ...	0.0	170.0	678.0	900.0	536.0	480.0	0.0	0.0

CROSS-SECTION NUMBER 5
****

XS(I) = 2.400 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	315.8	322.0	329.0	336.0	341.2	349.0	356.0	362.6
BS ...	20.0	145.0	313.0	529.0	936.0	1172.0	1238.0	1321.0
BSS ...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS-SECTION NUMBER 6
****

XS(I) = 4.000 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	252.0	259.0	266.0	273.0	279.0	286.0	293.0	300.0
BS ...	50.0	191.0	626.0	890.0	1100.0	1397.0	1770.0	2000.0
BSS ...	0.0	550.0	430.0	414.0	424.0	475.0	466.0	600.0

MANNING N ROUGHNESS COEFFICIENTS FOR THE GIVEN REACHES
(CM(K,I),K=1,NCS) WHERE I = REACH NUMBER
****

REACH 1 ...	.035	.045	.050	.060	.070	.080	.090	.100
REACH 2 ...	.035	.045	.050	.060	.070	.080	.090	.100
REACH 3 ...	.035	.045	.050	.060	.070	.080	.090	.100
REACH 4 ...	.035	.045	.050	.060	.070	.080	.090	.100
REACH 5 ...	.035	.045	.050	.060	.070	.080	.090	.100

CROSS-SECTIONAL VARIABLES FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	UNITS	VARIABLE
MINIMUM COMPUTATIONAL DISTANCE USED BETWEEN CROSS-SECTIONS	MI	DXM(I)
CONTRACTION - EXPANSION COEFFICIENTS BETWEEN CROSS-SECTIONS		EKC(I)

REACH NUMBER	DXM(I)	FKC(I)
1	******	0.000
2	******	0.000
3	.500	0.000
4	******	0.000
5	.500	0.000

1

DOWNSTREAM FLOW PARAMETERS FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	UNITS	VARIABLE	VALUE
MAX DISCHARGE AT DOWNSTREAM EXTREMITY	CFS	QMAXD	0.0
MAX LATERAL OUTFLOW PRODUCING LOSSES	CFS/FT	QLL	0.000
INITIAL SIZE OF TIME STEP	HR	DTHM	0.0000
INITIAL WATER SURFACE ELEVATION DOWNSTREAM	FT	YDN	0.00
SLOPE OF CHANNEL DOWNSTREAM OF DAM	FT/MI	SOM	50.00
THETA WEIGHTING FACTOR		THETA	0.00
CONVERGENCE CRITERION FOR STAGE	FT	EPSY	0.000
TIME AT WHICH DAM STARTS TO FAIL	HR	TFI	0.00

LATERAL INFLOW REACH NUMBER

LOX(I)

5

(QL(L, 1),L=1,ITEH)
2000.

TOTAL VOLUME IN RESERVOIR BEHIND
BOW LAKE DAM = 14697.5 ACRE-FEET

DEFINITION OF VARIABLES IN RESERVOIR DEPLETION TABLE

PARAMETER	UNITS	VARIABLE
TIME STEP FROM START OF ANALYSIS		I
ITERATIONS NECESSARY TO SOLVE FLOW EQUATIONS		K
ELAPSED TIME FROM START OF ANALYSIS	HRS	TTP(I)
TOTAL OUTFLOW FROM DAM	CFS	Q(I)
ELEVATION OF WATER SURFACE AT DAM	FT	H2
ELEVATION OF BOTTOM OF BREACH	FT	YB
EST DEPTH OF FLOW IMMEDIATELY DOWNSTREAM	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	0.000	1794	519.30	518.20	499.23	1.00	1.00	0.0	0.0	3.10	1790.	0.	1795.
2	1	.020	1799	519.30	517.76	499.23	1.00	1.00	3.0	1.2	3.10	1790.	11.	1789.
3	1	.040	1811	519.30	517.31	499.25	1.00	1.00	6.0	2.4	3.10	1790.	28.	1783.
4	1	.060	1836	519.30	516.87	499.29	1.00	1.00	9.0	3.6	3.10	1790.	54.	1783.
5	1	.080	1873	519.30	516.42	499.34	1.00	1.00	12.0	4.8	3.10	1790.	90.	1783.
6	1	.100	1920	519.30	515.98	499.42	1.00	1.00	15.2	6.0	3.10	1790.	137.	1783.
7	1	.120	1979	519.30	515.54	499.50	1.00	1.00	18.4	7.2	3.10	1790.	197.	1783.
8	1	.140	2052	519.30	515.09	499.61	1.00	1.00	21.7	8.4	3.10	1790.	269.	1783.
9	1	.160	2138	519.30	514.65	499.74	1.00	1.00	25.2	9.6	3.10	1790.	356.	1783.
10	1	.180	2239	519.30	514.20	499.88	1.00	1.00	28.8	10.8	3.10	1790.	457.	1782.
11	1	.200	2355	519.30	513.76	500.04	1.00	1.00	32.6	12.0	3.10	1790.	574.	1782.
12	1	.220	2487	519.30	513.32	500.21	1.00	1.00	36.6	13.2	3.10	1790.	706.	1781.
13	1	.240	2636	519.30	512.87	500.40	1.00	1.00	40.8	14.4	3.10	1790.	856.	1781.

14	1	.260	2802	519.29	512.43	500.61	1.00	1.00	45.3	15.6	3.10	1790.	1022.	1780.
15	1	.280	2986	519.29	511.98	500.83	1.00	1.00	50.1	16.8	3.10	1790.	1207.	1779.
16	1	.300	3188	519.29	511.54	501.07	1.00	1.00	55.2	18.0	3.10	1790.	1410.	1778.
17	1	.320	3410	519.29	511.10	501.63	1.00	1.00	60.7	19.2	3.10	1790.	1633.	1777.
18	1	.340	3650	519.29	510.65	501.88	1.00	1.00	66.5	20.4	3.10	1790.	1875.	1776.
19	1	.360	3911	519.29	510.21	502.23	1.00	1.00	72.8	21.6	3.10	1790.	2138.	1774.
20	1	.380	4193	519.28	509.76	502.53	1.00	1.00	79.5	22.8	3.10	1790.	2421.	1773.
21	1	.400	4495	519.28	509.32	502.84	1.00	1.00	86.6	24.0	3.10	1790.	2725.	1771.
22	1	.420	4819	519.28	508.88	503.14	1.00	1.00	94.2	25.2	3.10	1790.	3051.	1769.
23	1	.440	5165	519.27	508.43	503.44	1.00	1.00	102.6	26.4	3.10	1790.	3400.	1766.
24	1	.460	5534	519.27	507.99	503.73	1.00	1.00	111.4	27.6	3.10	1790.	3771.	1763.
25	1	.480	5925	519.26	507.54	504.02	1.00	1.00	120.9	28.8	3.10	1790.	4165.	1760.
26	1	.500	6339	519.26	507.10	504.31	1.00	1.00	131.0	30.0	3.10	1790.	4582.	1757.
27	1	.520	6777	519.25	506.66	504.60	1.00	1.00	141.9	31.2	3.10	1790.	5024.	1753.
28	1	.540	7239	519.25	506.21	504.89	1.00	1.00	153.5	32.4	3.10	1790.	5490.	1750.
29	1	.560	7725	519.24	505.77	505.18	1.00	1.00	165.8	33.6	3.10	1790.	5981.	1745.
30	1	.580	8236	519.23	505.32	505.47	1.00	1.00	179.0	34.8	3.10	1790.	6496.	1741.
31	1	.600	8773	519.22	504.88	505.76	1.00	1.00	193.1	36.0	3.10	1790.	7038.	1735.
32	1	.620	9335	519.21	504.44	506.05	1.00	1.00	208.1	37.2	3.10	1790.	7605.	1730.
33	1	.640	9922	519.20	503.99	506.33	1.00	1.00	224.0	38.4	3.10	1790.	8199.	1724.
34	1	.660	10536	519.19	503.55	506.62	1.00	1.00	240.9	39.6	3.10	1790.	8819.	1718.
35	1	.680	11177	519.18	503.10	506.91	1.00	1.00	258.8	40.8	3.10	1790.	9467.	1711.
36	1	.700	11845	519.17	502.66	507.20	1.00	1.01	277.9	42.0	3.10	1790.	10142.	1704.
37	1	.720	12539	519.16	502.22	507.48	1.00	1.01	298.0	43.2	3.10	1790.	10844.	1696.
38	1	.740	13262	519.14	501.77	507.77	1.00	1.01	319.3	44.4	3.10	1790.	11575.	1687.
39	1	.760	14012	519.13	501.33	508.06	1.00	1.01	341.9	45.6	3.10	1790.	12334.	1678.
40	1	.780	14791	519.11	500.88	508.35	1.00	1.01	365.7	46.8	3.10	1790.	13123.	1669.
41	1	.800	15599	519.10	500.44	508.64	1.00	1.01	390.8	48.0	3.10	1790.	13940.	1659.
42	1	.820	16435	519.08	500.00	508.93	1.00	1.01	417.3	49.2	3.10	1790.	14787.	1648.
43	1	.840	17301	519.06	499.55	509.22	1.00	1.01	445.1	50.4	3.10	1790.	15665.	1637.
44	1	.860	18197	519.04	499.11	509.45	1.00	1.01	474.5	51.6	3.10	1790.	16572.	1625.
45	1	.880	19123	519.02	498.66	509.72	1.00	1.01	505.3	52.8	3.10	1790.	17511.	1613.
46	1	.900	20080	519.00	498.22	509.99	1.00	1.01	537.7	54.0	3.10	1790.	18481.	1599.
47	1	.920	21067	518.98	497.78	510.26	1.00	1.01	571.7	55.2	3.10	1790.	19482.	1586.
48	1	.940	22086	518.95	497.33	510.54	1.00	1.01	607.4	56.4	3.10	1790.	20516.	1571.
49	1	.960	23137	518.93	496.89	510.81	1.00	1.02	644.8	57.6	3.10	1790.	21582.	1556.
50	1	.980	24220	518.90	496.44	511.09	1.00	1.02	683.9	58.8	3.10	1790.	22681.	1539.

RESERVOIR DEPLETION TABLE

I	N	TTP(I)	Q(I)	H2	YP	D	SUB	VCOR	OUTVOL	BB	COFR	QI(I)	QBRECH	QSPIL
***	**	******	********	*******	*******	*******	****	****	********	****	****	*****	******	*****
51	1	1.000	25335	518.87	496.00	511.38	1.00	1.02	724.9	60.0	3.10	1790.	23813.	1523.
52	1	1.020	25301	518.84	496.00	511.36	1.00	1.02	766.7	60.0	3.10	1790.	23796.	1505.
53	1	1.040	25236	518.81	496.00	511.35	1.00	1.02	808.5	60.0	3.10	1790.	23748.	1488.
54	1	1.060	25170	518.78	496.00	511.33	1.00	1.02	850.1	60.0	3.10	1790.	23699.	1471.
55	1	1.080	25104	518.75	496.00	511.31	1.00	1.02	891.7	60.0	3.10	1790.	23650.	1454.
56	1	1.100	25039	518.72	496.00	511.30	1.00	1.02	933.1	60.0	3.10	1790.	23602.	1437.
57	1	1.120	24973	518.70	496.00	511.28	1.00	1.02	974.5	60.0	3.10	1790.	23553.	1421.
58	1	1.140	24908	518.67	496.00	511.26	1.00	1.02	1015.7	60.0	3.10	1790.	23505.	1404.
59	1	1.160	24843	518.64	496.00	511.25	1.00	1.02	1056.8	60.0	3.10	1790.	23456.	1387.
60	1	1.180	24779	518.61	496.00	511.23	1.00	1.02	1097.8	60.0	3.10	1790.	23408.	1371.
61	1	1.200	24714	518.58	496.00	511.21	1.00	1.02	1138.7	60.0	3.10	1790.	23360.	1355.
62	1	1.220	24650	518.55	496.00	511.20	1.00	1.02	1179.5	60.0	3.10	1790.	23312.	1338.
63	1	1.240	24586	518.52	496.00	511.18	1.00	1.02	1220.2	60.0	3.10	1790.	23265.	1322.

64	1	1.260	24522	518.49	496.00	511.17	1.00	1.02	1260.8	60.0	3.10	1790.	23217.	1306.
65	1	1.280	24459	518.47	496.00	511.15	1.00	1.02	1301.3	60.0	3.10	1790.	23169.	1290.
66	1	1.300	24396	518.44	496.00	511.13	1.00	1.02	1341.7	60.0	3.10	1790.	23122.	1274.
67	1	1.320	24333	518.41	496.00	511.12	1.00	1.02	1381.9	60.0	3.10	1790.	23075.	1258.
68	1	1.340	24270	518.38	496.00	511.10	1.00	1.02	1422.1	60.0	3.10	1790.	23028.	1243.
69	1	1.360	24207	518.35	496.00	511.08	1.00	1.02	1462.2	60.0	3.10	1790.	22981.	1227.
70	1	1.380	24145	518.32	496.00	511.07	1.00	1.02	1502.1	60.0	3.10	1790.	22934.	1212.
71	1	1.400	24083	518.29	496.00	511.05	1.00	1.02	1542.0	60.0	3.10	1790.	22887.	1196.
72	1	1.420	24021	518.27	496.00	511.04	1.00	1.02	1581.7	60.0	3.10	1790.	22840.	1181.
73	1	1.440	23959	518.24	496.00	511.02	1.00	1.02	1621.4	60.0	3.10	1790.	22794.	1166.
74	1	1.460	23897	518.21	496.00	511.01	1.00	1.02	1660.9	60.0	3.10	1790.	22747.	1150.
75	1	1.480	23836	518.18	496.00	510.99	1.00	1.02	1700.4	60.0	3.10	1790.	22701.	1135.
76	1	1.500	23775	518.15	496.00	510.97	1.00	1.02	1739.7	60.0	3.10	1790.	22655.	1120.
77	1	1.520	23714	518.13	496.00	510.96	1.00	1.02	1779.0	60.0	3.10	1790.	22609.	1106.
78	1	1.540	23653	518.10	496.00	510.94	1.00	1.02	1818.1	60.0	3.10	1790.	22563.	1091.
79	1	1.560	23593	518.07	496.00	510.93	1.00	1.02	1857.2	60.0	3.10	1790.	22517.	1076.
80	1	1.580	23533	518.04	496.00	510.91	1.00	1.02	1896.1	60.0	3.10	1790.	22472.	1061.
81	1	1.600	23473	518.01	496.00	510.89	1.00	1.02	1935.0	60.0	3.10	1790.	22426.	1047.
82	1	1.620	23413	517.99	496.00	510.88	1.00	1.02	1973.7	60.0	3.10	1790.	22381.	1033.
83	1	1.640	23353	517.96	496.00	510.86	1.00	1.02	2012.4	60.0	3.10	1790.	22336.	1018.
84	1	1.660	23294	517.93	496.00	510.85	1.00	1.02	2050.9	60.0	3.10	1790.	22291.	1004.
85	1	1.680	23235	517.90	496.00	510.83	1.00	1.02	2089.4	60.0	3.10	1790.	22245.	990.
86	1	1.700	23176	517.88	496.00	510.81	1.00	1.02	2127.7	60.0	3.10	1790.	22201.	976.
87	1	1.720	23117	517.85	496.00	510.80	1.00	1.02	2166.0	60.0	3.10	1790.	22156.	962.
88	1	1.740	23059	517.82	496.00	510.78	1.00	1.02	2204.2	60.0	3.10	1790.	22111.	948.
89	1	1.760	23000	517.79	496.00	510.77	1.00	1.02	2242.2	60.0	3.10	1790.	22067.	934.
90	1	1.780	22942	517.77	496.00	510.76	1.00	1.02	2280.2	60.0	3.10	1790.	22022.	921.
91	1	1.800	22884	517.74	496.00	510.74	1.00	1.02	2318.1	60.0	3.10	1790.	21978.	907.
92	1	1.820	22827	517.71	496.00	510.73	1.00	1.02	2355.9	60.0	3.10	1790.	21934.	893.
93	1	1.840	22769	517.69	496.00	510.71	1.00	1.02	2393.5	60.0	3.10	1790.	21890.	880.
94	1	1.860	22712	517.66	496.00	510.70	1.00	1.02	2431.1	60.0	3.10	1790.	21846.	867.
95	1	1.880	22655	517.63	496.00	510.68	1.00	1.02	2468.6	60.0	3.10	1790.	21802.	854.
96	1	1.900	22598	517.60	496.00	510.67	1.00	1.02	2506.0	60.0	3.10	1790.	21758.	840.
97	1	1.920	22541	517.58	496.00	510.65	1.00	1.02	2543.3	60.0	3.10	1790.	21714.	827.
98	1	1.940	22485	517.55	496.00	510.64	1.00	1.02	2580.5	60.0	3.10	1790.	21671.	814.
99	1	1.960	22429	517.52	496.00	510.62	1.00	1.02	2617.7	60.0	3.10	1790.	21628.	802.
100	1	1.980	22373	517.50	496.00	510.61	1.00	1.02	2654.7	60.0	3.10	1790.	21584.	789.

RESERVOIR DEPLETION TABLE

I	K	TTP(I	Q(I)	HD	YB	D	SUB	VCOF	OUTVOL	BB	COFF	QI(I)	QBRECH	QSPIL
***	**	******	********	*******	*******	*******	****	****	*********	****	****	*****	******	*****
101	1	2.000	22317	517.47	496.00	510.59	1.00	1.02	2691.6	60.0	3.10	1790.	21541.	776.
102	1	2.020	22261	517.44	496.00	510.58	1.00	1.02	2728.5	60.0	3.10	1790.	21498.	763.
103	1	2.042	22200	517.41	496.00	510.56	1.00	1.02	2768.9	60.0	3.10	1790.	21451.	750.
104	1	2.066	22133	517.38	496.00	510.54	1.00	1.02	2813.2	60.0	3.10	1790.	21399.	735.
105	1	2.093	22060	517.35	496.00	510.52	1.00	1.02	2861.9	60.0	3.10	1790.	21342.	718.
106	1	2.122	21980	517.31	496.00	510.50	1.00	1.02	2915.1	60.0	3.10	1790.	21280.	701.
107	1	2.154	21892	517.26	496.00	510.48	1.00	1.02	2973.5	60.0	3.10	1790.	21212.	681.
108	1	2.190	21797	517.22	496.00	510.45	1.00	1.02	3037.5	60.0	3.10	1790.	21137.	660.
109	1	2.229	21692	517.17	496.00	510.43	1.00	1.02	3107.5	60.0	3.10	1790.	21055.	637.
110	1	2.272	21578	517.11	496.00	510.40	1.00	1.02	3184.2	60.0	3.10	1790.	20966.	613.
111	1	2.319	21453	517.05	496.00	510.36	1.00	1.02	3268.0	60.0	3.10	1790.	20868.	586.
112	1	2.371	21318	516.98	496.00	510.33	1.00	1.02	3359.7	60.0	3.10	1790.	20761.	557.
113	1	2.429	21170	516.91	496.00	510.29	1.00	1.02	3459.9	60.0	3.10	1790.	20644.	526.

114	1	2.490	21009	516.83	496.00	510.24	1.00	1.02	3569.3	60.0	3.10	1790.	20516.	493.
115	1	2.559	20835	516.74	496.00	510.20	1.00	1.02	3688.7	60.0	3.10	1790.	20377.	458.
116	1	2.635	20645	516.64	496.00	510.14	1.00	1.02	3818.9	60.0	3.10	1790.	20226.	420.
117	1	2.719	20440	516.53	496.00	510.09	1.00	1.02	3960.7	60.0	3.10	1790.	20061.	380.
118	1	2.811	20219	516.42	496.00	510.03	1.00	1.02	4115.1	60.0	3.10	1790.	19881.	338.
119	2	2.912	19980	516.29	496.00	509.96	1.00	1.02	4283.1	60.0	3.10	1790.	19686.	294.
120	2	3.023	19722	516.16	496.00	509.88	1.00	1.02	4465.5	60.0	3.10	1790.	19474.	248.
121	2	3.145	19446	516.01	496.00	509.81	1.00	1.02	4663.5	60.0	3.10	1790.	19245.	202.
122	2	3.280	19151	515.84	496.00	509.72	1.00	1.02	4876.1	60.0	3.10	1790.	18997.	155.
123	2	3.428	18836	515.66	496.00	509.63	1.00	1.02	5110.4	60.0	3.10	1790.	18728.	108.
124	2	3.591	18503	515.47	496.00	509.54	1.00	1.02	5361.6	60.0	3.10	1790.	18438.	65.
125	2	3.770	18152	515.26	496.00	509.44	1.00	1.02	5632.9	60.0	3.10	1790.	18126.	27.
126	2	3.967	17791	515.03	496.00	509.33	1.00	1.02	5925.5	60.0	3.10	1790.	17790.	1.
127	2	4.184	17428	514.79	496.00	509.22	1.00	1.02	6240.8	60.0	3.10	1790.	17428.	0.
128	2	4.422	17039	514.52	496.00	509.11	1.00	1.03	6580.3	60.0	3.10	1790.	17039.	0.
129	2	4.684	16620	514.22	496.00	508.98	1.00	1.03	6945.0	60.0	3.10	1790.	16621.	0.
130	2	4.973	16170	513.90	496.00	508.83	1.00	1.03	7335.8	60.0	3.10	1790.	16171.	0.
131	2	5.290	15688	513.56	496.00	508.66	1.00	1.03	7753.5	60.0	3.10	1790.	15688.	0.
132	2	5.639	15173	513.18	496.00	508.48	1.00	1.03	8198.6	60.0	3.10	1790.	15173.	0.
133	2	6.023	14624	512.77	496.00	508.28	1.00	1.03	8671.2	60.0	3.10	1790.	14624.	0.
134	2	6.445	14041	512.33	496.00	508.06	1.00	1.03	9171.4	60.0	3.10	1790.	14041.	0.
135	2	6.910	13425	511.86	496.00	507.83	1.00	1.04	9696.6	60.0	3.10	1790.	13425.	0.
136	2	7.420	12776	511.35	496.00	507.57	1.00	1.04	10251.9	60.0	3.10	1790.	12777.	0.
137	2	7.983	12098	510.80	496.00	507.29	1.00	1.05	10829.6	60.0	3.10	1790.	12098.	0.
138	2	8.601	11391	510.21	496.00	506.99	1.00	1.05	11429.7	60.0	3.10	1790.	11392.	0.
139	2	9.281	10660	509.58	496.00	506.66	1.00	1.06	12049.4	60.0	3.10	1790.	10661.	0.
140	2	10.029	9912	508.91	496.00	506.32	1.00	1.07	12685.4	60.0	3.10	1790.	9912.	0.

PARAMETER	UNITS	VARIABLE	VALUE
INITIAL FLOW	CFS	Q(1)	1795.
MAX FLOW	CFS	QM	25336.
FINAL FLOW	CFS	Q(NU)	9912.
TIME TO MAX FLOW	HRS	TF	1.00
NUMBER OF TIME STEPS		NNU	140
TOTAL VOLUME DISCHARGED FROM RESERVOIR	AC-FT	DISVOL	12685.
NUMBER OF INTERMEDIATE STATIONS		NN(NS)	5
NUMBER OF TIME STEPS		NNU	140

TIME PARAMETERS OF OUTFLOW HYDROGRAPH IMMEDIATELY DOWNSTREAM OF DAM

PARAMETER	UNITS	VARIABLE	VALUE
TIME TO FAILURE	HR	TFH	1.000
TIME TO START OF RISING LIMB OF HYDROGRAPH	HR	TFO	0.000
TIME TO PEAK	HR	TP	1.000
TIME STEP SIZE	HR	DTHI	.025

ROUTING COMPLETED.

KTIME=172 ALLOWABLE KTIME= 698 TT= 10.1

PROFILE OF CRESTS AND TIMES FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

RVR MILE FROM DA	MAX ELEV (FT)	MAX FLOW (CFS)	TIME MAX ELEV(HR)	MAX VEL (FT/SEC)	MAX VEL (MI/HR)	FLOOD ELEV (FT)	TIME FLOOD ELEV (HR)
.050	510.30	25335	1.000	8.41	5.73	0.00	0.00
.500	470.07	24785	1.225	27.36	18.65	0.00	0.00
1.000	451.14	24667	1.250	9.58	6.53	0.00	0.00
1.500	399.58	24617	1.350	50.51	34.44	0.00	0.00
2.000	373.64	23974	1.575	10.20	6.95	0.00	0.00
2.400	333.27	24025	1.750	33.75	23.01	0.00	0.00
2.933	312.17	25611	1.800	5.56	3.79	0.00	0.00
3.461	279.07	25816	2.082	45.77	31.21	0.00	0.00
4.000	267.56	25598	2.082	5.42	3.69	0.00	0.00

PEAK ELEVATION PROFILE

MILES

ELEV FEET MILE

```
        .1        .4        .8       1.2       1.6       2.0       2.4       2.8       3.2       3.6       4.0
510.30+         I         I         I         I         I         I         I         I         I         I 510.3    .1
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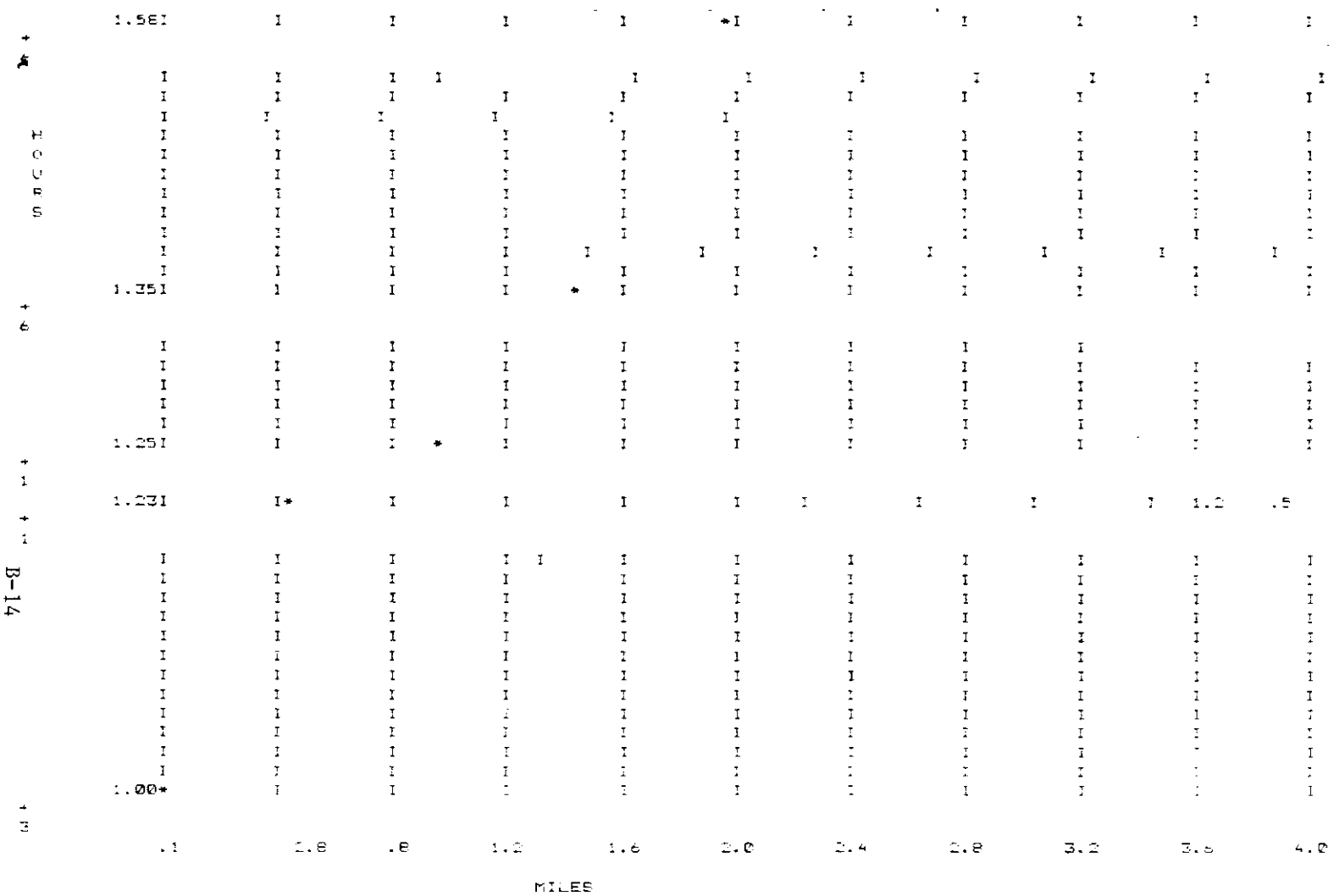


DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 1
BELOW BOW LAKE DAM AT MILE .05

GAGE ZERO = 493.50 MAX ELEVATION REACHED BY FLOOD WAVE = 510.30
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 16.80 AT TIME = 1.000 HOURS
MAX FLOW = 25336 AT TIME = 1.000 HOURS

HP	STAGE	FLOW	0	10000	20000	30000	40000	50000
0.0	5.3	1795	I *	I	I	I	I	I

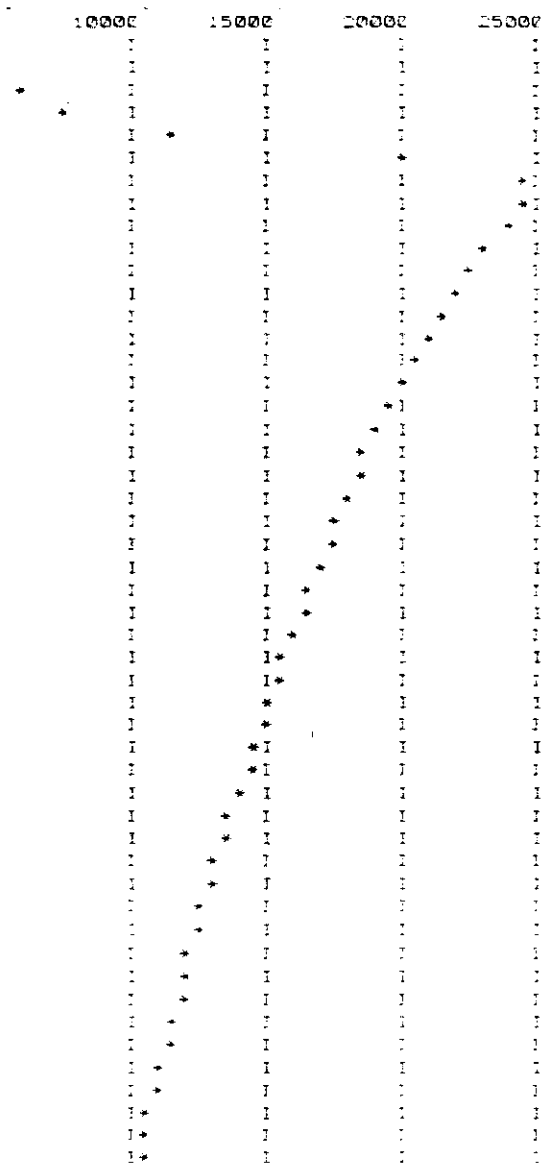
.2	6.0	2355	449
.4	8.5	4496	
.6	11.4	8773	
.8	14.2	15598	
1.0	16.8	25336	
1.2	16.7	24715	
1.4	16.5	24083	
1.6	16.4	23473	
1.8	16.2	22885	
2.0	16.1	22317	
2.2	16.0	21770	
2.4	15.8	21242	
2.6	15.7	20734	
2.8	15.6	20246	
3.0	15.5	19777	
3.2	15.3	19327	
3.4	15.2	18896	
3.6	15.1	18486	
3.8	15.0	18098	
4.0	14.9	17736	
4.2	14.8	17402	
4.4	14.7	17075	
4.6	14.6	16755	
4.8	14.5	16440	
5.0	14.4	16129	
5.2	14.3	15825	
5.4	14.2	15526	
5.6	14.1	15231	
5.8	14.0	14943	
6.0	13.9	14657	14380
6.4	13.7	14104	
6.6	13.6	13836	
6.8	13.5	13571	
7.0	13.4	13311	
7.2	13.3	13057	
7.4	13.2	12803	
7.6	13.1	12560	
7.8	13.0	12319	
8.0	12.9	12079	
8.2	12.8	11850	
8.4	12.7	11621	
8.6	12.6	11394	
8.8	12.5	11177	
9.0	12.5	10963	
9.2	12.4	10748	
9.4	12.3	10542	
9.6	12.2	10341	
9.8	12.1	10141	

DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 3
BELOW BOW LAKE DAM AT MILE 1.00

GAGE ZERO = 430.00 MAX ELEVATION REACHED BY FLOOD WAVE = 451.14
FLOOD STAGE NOT AVAILABLE

MAX STAGE = 21.14 AT TIME = 1.250 HOURS
MAX FLOW = 24668 AT TIME = 1.250 HOURS

HR	STAGE	FLOW
0.0	4.8	1795
.2	7.6	5181
.4	8.8	5764
.6	10.9	7374
.8	14.6	11656
1.0	19.4	19944
1.2	21.1	24587
1.4	21.0	24363
1.6	20.8	23779
1.8	20.5	23184
2.0	20.2	22607
2.2	20.0	22052
2.4	19.7	21526
2.6	19.4	21009
2.8	19.2	20511
3.0	18.9	20030
3.2	18.7	19572
3.4	18.4	19133
3.6	18.2	18712
3.8	18.0	18313
4.0	17.8	17937
4.2	17.6	17589
4.4	17.4	17257
4.6	17.2	16934
4.8	17.0	16616
5.0	16.8	16303
5.2	16.6	15996
5.4	16.5	15694
5.6	16.3	15397
5.8	16.1	15106
6.0	15.9	14819
6.2	15.8	14538
6.4	15.6	14261
6.6	15.4	13990
6.8	15.3	13723
7.0	15.1	13460
7.2	14.9	13204
7.4	14.8	12950
7.6	14.6	12702
7.8	14.4	12460
8.0	14.3	12219
8.2	14.1	11985
8.4	14.0	11756
8.6	13.8	11528
8.8	13.7	11307
9.0	13.5	11090
9.2	13.4	10876
9.4	13.2	10666
9.6	13.1	10462
9.8	12.9	10262

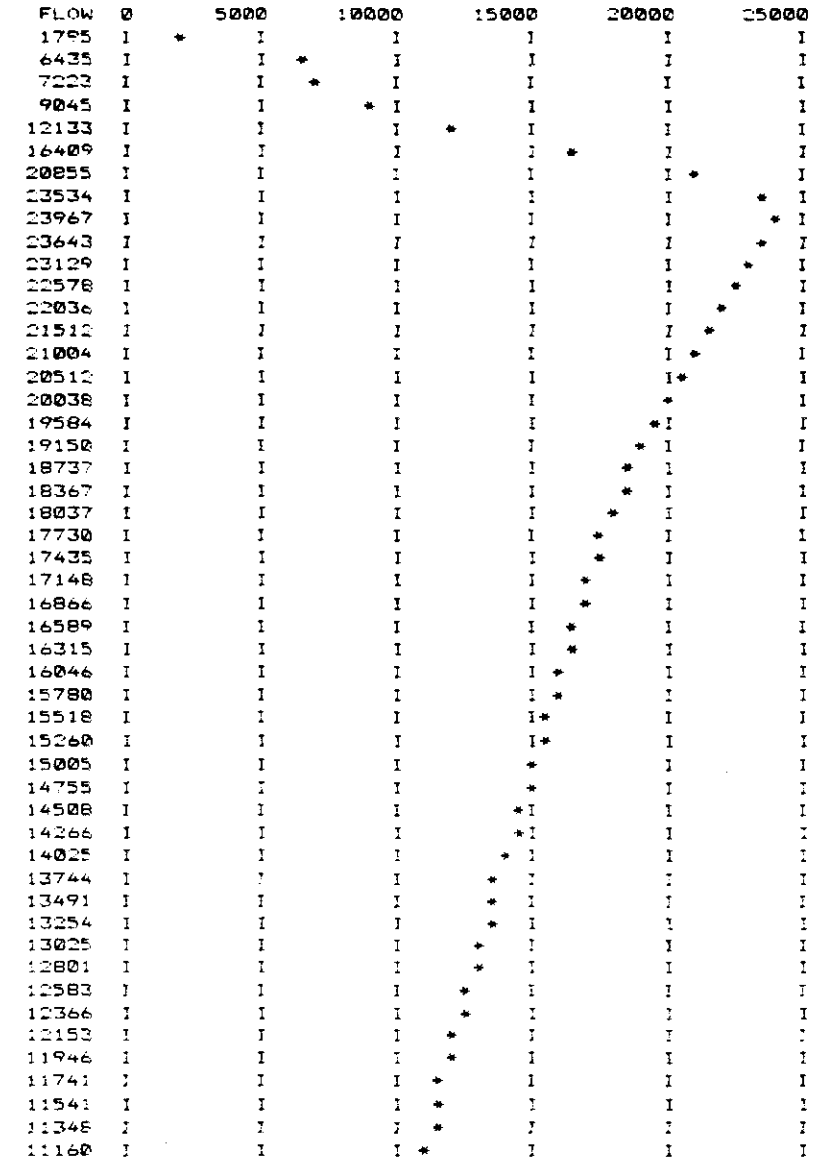


DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 5
BELOW BOW LAKE DAM AT MILE 2.00

GAGE ZERO = 357.00 MAX ELEVATION REACHED BY FLOOD WAVE = 373.64
FLOOD STAGE NOT AVAILABLE

MAX STAGE = 16.64 AT TIME = 1.575 HOURS
MAX FLOW = 23974 AT TIME = 1.575 HOURS

HR	STAGE	FLOW
0.0	4.9	1795
.2	7.3	6435
.4	8.0	7223
.6	9.5	9045
.8	11.3	12133
1.0	13.5	16409
1.2	15.5	20855
1.4	16.5	23534
1.6	16.6	23967
1.8	16.5	23643
2.0	16.3	23129
2.2	16.1	22578
2.4	15.9	22036
2.6	15.7	21512
2.8	15.5	21004
3.0	15.3	20512
3.2	15.1	20038
3.4	14.9	19584
3.6	14.7	19150
3.8	14.6	18737
4.0	14.4	18367
4.2	14.2	18037
4.4	14.1	17730
4.6	14.0	17435
4.8	13.8	17148
5.0	13.7	16866
5.2	13.5	16589
5.4	13.4	16315
5.6	13.2	16046
5.8	13.1	15780
6.0	12.9	15518
6.2	12.8	15260
6.4	12.6	15005
6.6	12.5	14755
6.8	12.3	14508
7.0	12.2	14266
7.2	12.0	14025
7.4	11.9	13744
7.6	11.8	13491
7.8	11.7	13254
8.0	11.5	13025
8.2	11.4	12801
8.4	11.3	12583
8.6	11.2	12366
8.8	11.1	12153
9.0	11.0	11946
9.2	10.9	11741
9.4	10.8	11541
9.6	10.7	11348
9.8	10.6	11160



DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 9
BELOW BOW LAKE DAM AT MILE 4.00

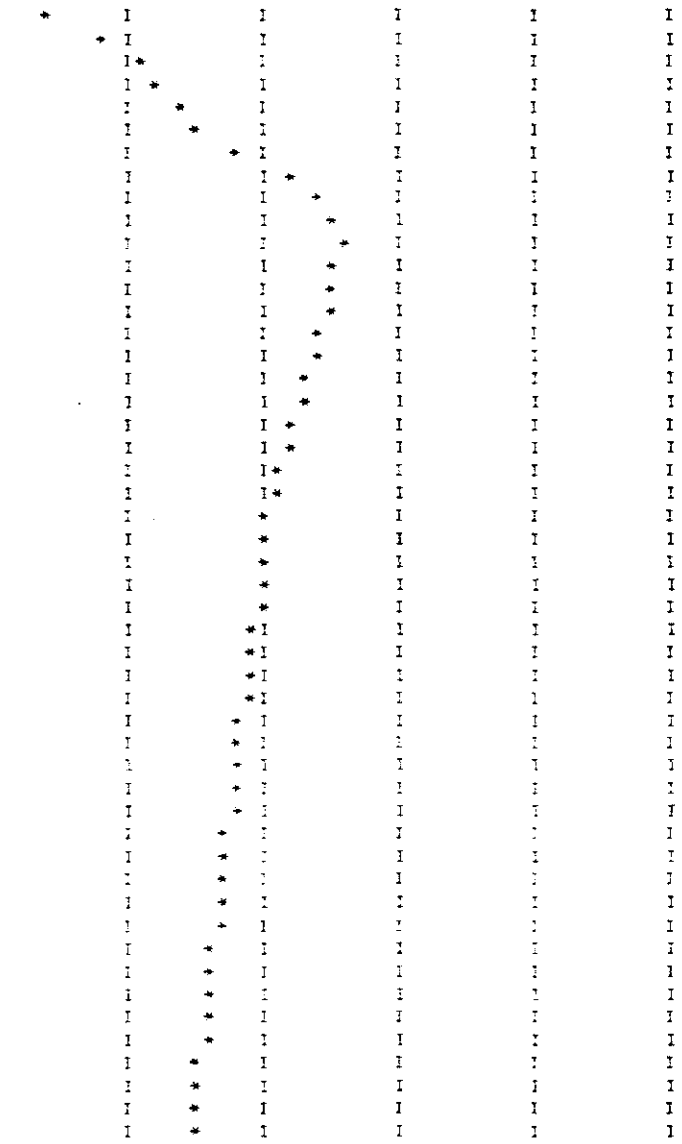
GAGE ZERO = 252.00 MAX ELEVATION REACHED BY FLOOD WAVE = 267.56

FLOOD STAGE NOT AVAILABLE

MAX STAGE = 15.56 AT TIME = 2.082 HOURS

MAX FLOW = 25599 AT TIME = 2.025 HOURS

HR	STAGE	FLOW
0.0	6.6	3795
.2	10.6	8077
.4	11.7	10691
.6	12.4	12467
.8	12.9	13832
1.0	13.3	14880
1.2	14.1	17855
1.4	14.8	21971
1.6	15.2	23982
1.8	15.4	24977
2.0	15.6	25579
2.2	15.5	25473
2.4	15.5	25065
2.6	15.4	24567
2.8	15.3	24047
3.0	15.2	23534
3.2	15.1	23034
3.4	15.0	22551
3.6	14.9	22086
3.8	14.8	21637
4.0	14.7	21208
4.2	14.7	20811
4.4	14.6	20484
4.6	14.5	20224
4.8	14.5	19985
5.0	14.4	19755
5.2	14.4	19529
5.4	14.4	19306
5.6	14.3	19089
5.8	14.3	18876
6.0	14.2	18665
6.2	14.2	18456
6.4	14.1	18249
6.6	14.1	18043
6.8	14.0	17839
7.0	14.0	17640
7.2	13.9	17448
7.4	13.9	17225
7.6	13.8	16991
7.8	13.8	16766
8.0	13.7	16554
8.2	13.6	16350
8.4	13.6	16153
8.6	13.5	15960
8.8	13.5	15769
9.0	13.4	15581
9.2	13.4	15395
9.4	13.3	15212
9.6	13.3	15032
9.8	13.2	14856



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***                       ***
***  SUMMARY OF INPUT DATA  ***
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INPUT CONTROL PARAMETERS FOR BOW LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF DYNAMIC ROUTING REACHES	KKN	2
TYPE OF RESERVOIR ROUTING	KUI	0
MULTIPLE DAM INDICATOR	MULDAM	0
PRINTING INSTRUCTIONS FOR INPUT SUMMARY	KDMP	3
NO. OF RESERVOIR INFLOW HYDROGRAPH POINTS	ITEH	1
INTERVAL OF CROSS-SECTION INFO PRINTED OUT WHEN JNK=9	NPRT	0
FLOOD-PLAIN MODEL PARAMETER	KFLP	0
LANDSLIDE PARAMETER	KSL	0

CROSS-SECTIONAL PARAMETERS FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	VARIABLE	VALUE
NUMBER OF CROSS-SECTIONS	NS	5
MAXIMUM NUMBER OF TOP WIDTHS	NCS	6
NUMBER OF CROSS-SECTIONAL HYDROGRAPHS TO PLOT	NTT	4
TYPE OF OUTPUT OTHER THAN HYDROGRAPH PLOTS	JNK	0
CROSS-SECTIONAL SMOOTHING PARAMETER	KSA	0
DOWNSTREAM SUPERCRITICAL OR NOT	KSUPC	0
NO. OF LATERAL INFLOW HYDROGRAPHS	LQ	1

NO. OF POINTS IN GATE CONTROL CURVE NCG 0

NUMBER OF CROSS-SECTION WHERE HYDROGRAPH DESIRED
(MAX NUMBER OF HYDROGRAPHS = 6)
****

2 3 4 5

CROSS-SECTIONAL VARIABLES FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	UNITS	VARIABLE
LOCATION OF CROSS-SECTION	MI	XS(I)
ELEVATION (MSL) OF FLOODING AT CROSS-SECTION	FT	FSTG(I)
ELEV CORRESPONDING TO EACH TOP WIDTH	FT	HS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	FT	BS(K,I)
TOP WIDTH CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	FT	BSS(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (ACTIVE FLOW PORTION)	ACRES	DSA(K,I)
SURFACE AREA CORRESPONDING TO EACH ELEV (OFF-CHANNEL PORTION)	ACRES	SSA(K,I)
NUMBER OF CROSS-SECTION		I
NUMBER OF ELEVATION LEVEL		K

CROSS-SECTION NUMBER 1
****

= S(I) = 4.000 FSTG(I) = 0.00 XSL(I) = XSR(I) = 0.0

HS ...	252.0	259.0	266.0	273.0	279.0	286.0	293.0	300.0
BS ...	50.0	191.0	626.0	890.0	1100.0	1397.0	1770.0	2000.0
BSS ...	0.0	550.0	430.0	414.0	424.0	475.0	466.0	600.0

****

XS(I) = 6.000 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	235.0	241.0	248.0	254.0	261.0	267.0	274.0	280.0
BS ...	50.0	237.0	296.0	356.0	440.0	559.0	708.0	800.0
BSS ...	0.0	200.0	400.0	560.0	747.0	920.0	1040.0	1280.0

CROSS-SECTION NUMBER 3

****

XS(I) = 6.700 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	228.0	232.0	236.0	239.0	242.5	247.0	250.0	255.4
BS ...	28.0	115.0	155.0	178.0	221.0	274.0	352.0	434.0
BSS ...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS-SECTION NUMBER 4

****

XS(I) = 11.000 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	155.0	161.0	168.0	174.0	181.0	187.0	194.0	200.0
BS ...	50.0	242.0	316.0	358.0	442.0	546.0	697.0	860.0
BSS ...	0.0	70.0	360.0	630.0	870.0	845.0	785.0	700.0

CROSS-SECTION NUMBER 5

****

XS(I) = 16.000 FSTG(I) = 0.00 XSL(I) = 0.0 XSR(I) = 0.0

HS ...	110.0	117.0	124.0	131.0	139.0	146.0	153.0	160.0
BS ...	100.0	505.0	790.0	1120.0	1105.0	1475.0	1377.0	2150.0
BSS ...	0.0	435.0	770.0	895.0	1430.0	1365.0	1742.0	1250.0

MANNING N ROUGHNESS COEFFICIENTS FOR THE GIVEN REACHES
(CM(K,I),K=1,NCS) WHERE I = REACH NUMBER

REACH 1 ...	.035	.045	.050	.060	.070	.080	.090	.100
REACH 2 ...	.035	.045	.050	.060	.070	.080	.090	.100
REACH 3 ...	.035	.045	.050	.060	.070	.080	.090	.100
REACH 4 ...	.035	.045	.050	.060	.070	.080	.090	.100

1

CROSS-SECTIONAL VARIABLES FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	UNITS	VARIABLE
MINIMUM COMPUTATIONAL DISTANCE USED BETWEEN CROSS-SECTIONS	MI	DXM(I)
CONTRACTION - EXPANSION COEFFICIENTS BETWEEN CROSS-SECTIONS		FKC(I)

REACH NUMBER	DXM(I)	FKC(I)
1	.200	0.000
2	.250	0.000
3	.300	0.000
4	.200	0.000

1

DOWNSTREAM FLOW PARAMETERS FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

PARAMETER	UNITS	VARIABLE	VALUE
MAX DISCHARGE AT DOWNSTREAM EXTREMITY	CFS	QMAXD	0.0
MAX LATERAL OUTFLOW PRODUCING LOSSES	CFS/FT	QLL	0.000
INITIAL SIZE OF TIME STEP	HR	DTHM	0.0000
INITIAL WATER SURFACE ELEVATION DOWNSTREAM	FT	YDN	0.00
SLOPE OF CHANNEL DOWNSTREAM OF DAM	FT/MI	SOM	50.00
THETA WEIGHTING FACTOR		THETA	0.00
CONVERGENCE CRITERION FOR STAGE	FT	EPSY	0.000
TIME AT WHICH DAM STARTS TO FAIL	HR	TFI	0.00

LATERAL INFLOW REACH NUMBER

LQX(I)

3

(QL(L, 1),L=1,ITEM)
1750.

NUMBER OF INTERMEDIATE STATIONS	NN(NS)	52
NUMBER OF TIME STEPS	NNL	170

TIME PARAMETERS OF OUTFLOW HYDROGRAPH IMMEDIATELY DOWNSTREAM OF DAM

PARAMETER	UNITS	VARIABLE	VALUE
TIME TO FAILURE	HR	TFM	1.000
TIME TO START OF RISING LIMB OF HYDROGRAPH	HR	TFO	1.025
TIME TO PEAK	HR	TP	1.025
TIME STEP SIZE	HR	DTHI	.050

ROUTING COMPLETED.

KTIME=185 ALLOWABLE KTIME= 698 TT= 10.0

1

PROFILE OF CRESTS AND TIMES FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

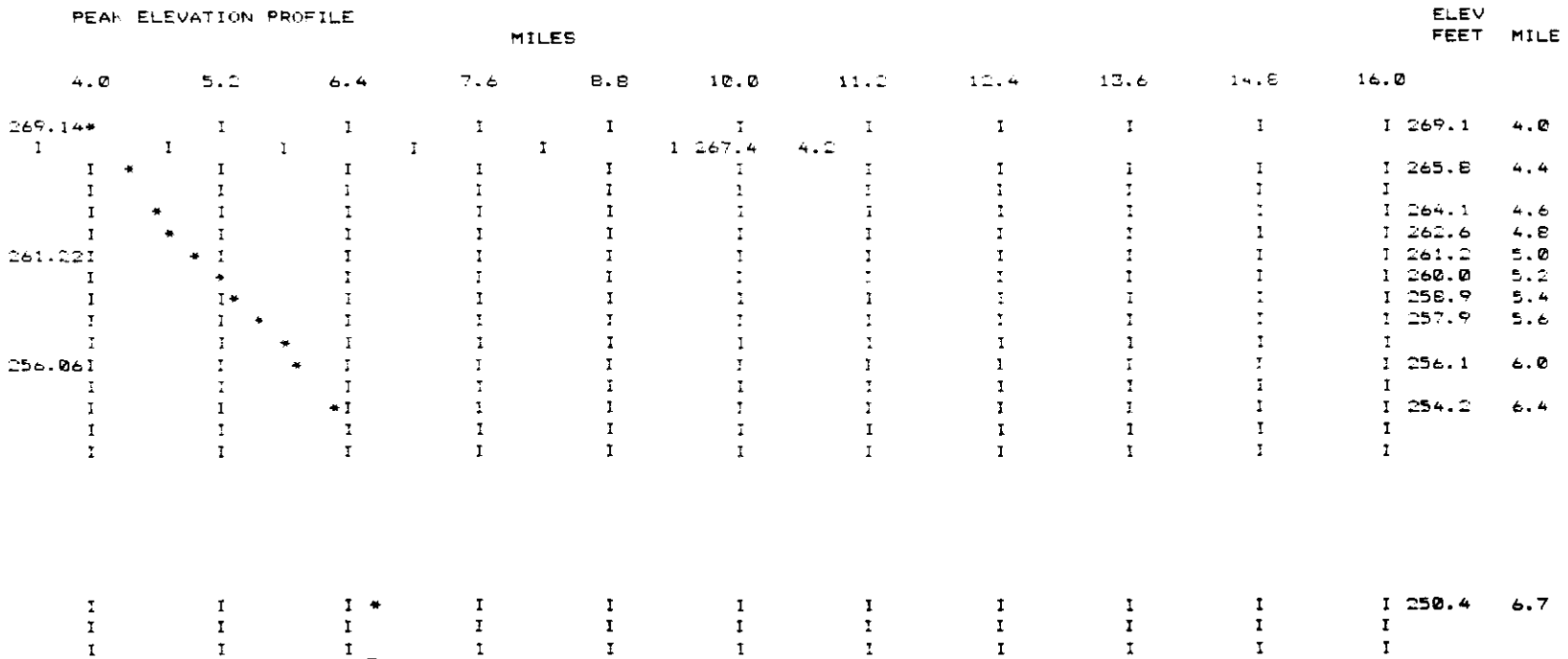
RVR MILE FROM DAM	MAX ELEV (FT)	MAX FLOW (CFS)	TIME MAX ELEV(HR)	MAX VEL (FT/SEC)	MAX VEL (MI/HR)	FLOOD ELEV (FT)	TIME FLOOD ELEV (HR)
4.000	269.14	25597	2.350	4.43	3.02	0.00	0.00
4.200	267.45	25307	2.500	4.49	3.06	0.00	0.00
4.400	265.78	25019	2.650	4.57	3.11	0.00	0.00
4.600	264.14	24730	2.950	4.62	3.15	0.00	0.00
4.800	262.60	24417	3.350	4.70	3.20	0.00	0.00
5.000	261.22	24045	3.700	4.76	3.25	0.00	0.00
5.200	259.98	23588	4.000	4.77	3.25	0.00	0.00
5.400	258.87	23053	4.200	4.62	3.15	0.00	0.00
5.600	257.86	22479	4.300	4.43	3.02	0.00	0.00
5.800	256.93	21973	4.400	4.19	2.86	0.00	0.00
6.000	256.06	21621	4.450	4.06	2.77	0.00	0.00
6.350	254.21	21365	4.550	4.14	2.82	0.00	0.00
6.700	250.37	21304	4.650	5.07	3.46	0.00	0.00
7.007	244.04	23029	4.750	5.85	3.99	0.00	0.00
7.314	237.83	23008	4.900	6.13	4.18	0.00	0.00
7.621	231.78	22983	5.050	6.34	4.32	0.00	0.00
7.929	225.75	22956	5.200	6.56	4.47	0.00	0.00
8.236	219.74	22928	5.350	6.78	4.62	0.00	0.00
8.543	213.80	22900	5.500	6.97	4.75	0.00	0.00
8.850	207.92	22874	5.650	7.13	4.86	0.00	0.00
9.157	202.13	22851	5.750	7.26	4.95	0.00	0.00
9.464	196.41	22832	5.900	7.35	5.01	0.00	0.00
9.771	190.76	22815	6.000	7.42	5.06	0.00	0.00
10.079	185.16	22799	6.150	7.46	5.09	0.00	0.00
10.386	179.64	22782	6.300	7.48	5.10	0.00	0.00
10.693	174.49	22757	6.500	7.22	4.93	0.00	0.00
11.000	170.69	22722	6.700	6.14	4.19	0.00	0.00
11.200	168.57	22699	6.800	6.01	4.10	0.00	0.00
11.400	166.46	22676	6.900	5.91	4.03	0.00	0.00

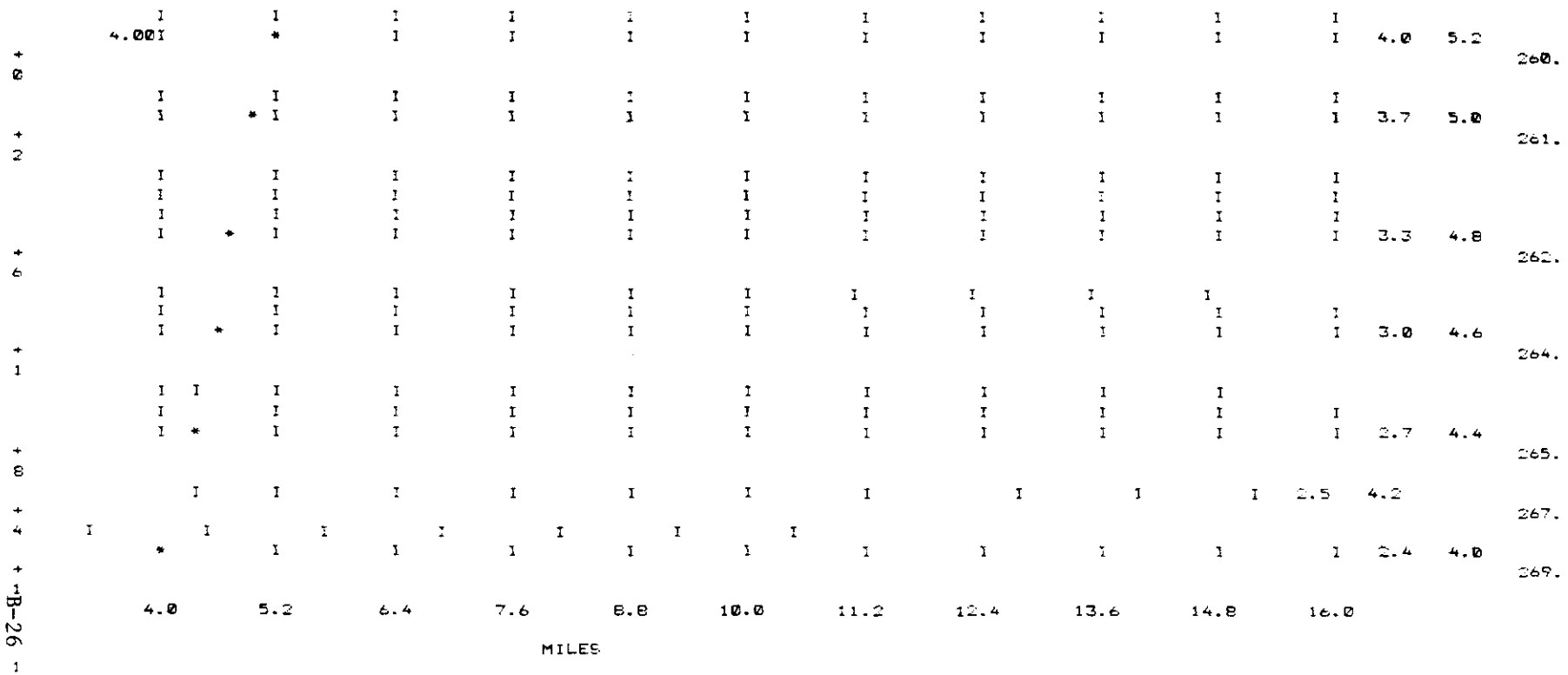
11.600	164.37	22655	7.000	5.81	3.96	0.00	0.00
11.800	162.30	22635	7.100	5.73	3.90	0.00	0.00
12.000	160.24	22616	7.200	5.65	3.85	0.00	0.00
12.200	158.20	22597	7.300	5.59	3.81	0.00	0.00
12.400	156.17	22581	7.400	5.52	3.77	0.00	0.00
12.600	154.16	22565	7.450	5.46	3.73	0.00	0.00
12.800	152.17	22551	7.550	5.40	3.68	0.00	0.00
13.000	150.20	22538	7.650	5.34	3.64	0.00	0.00
13.200	148.24	22524	7.750	5.28	3.60	0.00	0.00
13.400	146.29	22511	7.850	5.23	3.57	0.00	0.00
13.600	144.34	22498	7.950	5.18	3.53	0.00	0.00
13.800	142.40	22485	8.050	5.13	3.50	0.00	0.00
14.000	140.46	22472	8.100	5.09	3.47	0.00	0.00
14.200	138.53	22459	8.200	5.05	3.44	0.00	0.00
14.400	136.61	22446	8.300	5.01	3.41	0.00	0.00
14.600	134.69	22434	8.400	4.97	3.39	0.00	0.00
14.800	132.77	22421	8.500	4.93	3.36	0.00	0.00
15.000	130.86	22408	8.600	4.90	3.34	0.00	0.00
15.200	128.96	2.095	8.700	4.86	3.31	0.00	0.00

PROFILE OF CRESTS AND TIMES FOR ISINGLASS RIVER
BELOW BOW LAKE DAM

RVR MILE FROM DAM	MAX ELEV (FT)	MAX FLOW (CFS)	TIME MAX ELEV(HR)	MAX VEL (FT/SEC)	MAX VEL (MI/HR)	FLOOD ELEV (FT)	TIME FLOOD ELEV (HR)
15.400	127.06	22383	8.800	4.83	3.29	0.00	0.00
15.600	125.16	22370	8.900	4.80	3.27	0.00	0.00
15.800	123.27	22359	9.000	4.77	3.25	0.00	0.00
16.000	121.39	22349	9.050	4.73	3.23	0.00	0.00

PEAK ELEVATION PROFILE





DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 11
BELOW BOW LAKE DAM AT MILE 6.0
GAGE ZERO = 235.00 MAX ELEVATION REACHED BY FLOOD WAVE = 256.06
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 21.06 AT TIME = 4.450 HOURS
MAX FLOW = 21622 AT TIME = 3.750 HOURS

HR	STAGE	FLOW
0.0	7.0	3795
.2	7.1	3865
.4	7.1	3935
.6	7.3	4228
.8	7.6	4744
1.0	8.0	5260
1.2	8.6	6368
1.4	9.6	8102
1.6	10.9	10243
1.8	12.4	12737
2.0	14.0	15049
2.2	15.5	16981
2.4	16.8	18538
2.6	17.9	19712
2.8	18.7	20533

3.0	19.4	21018	I I I I I * I
3.2	19.9	21333	I I I I I * I
3.4	20.3	21519	I I I I I * I
3.6	20.6	21606	I I I I I * I
3.8	20.8	21620	I I I I I * I
4.0	20.9	21584	I I I I I * I
4.2	1.0	21510	I I I I I * I
4.4	21.1	21398	I I I I I * I
4.6	21.1	21260	I I I I I * I
4.8	21.0	21109	I I I I I * I
5.0	21.0	20953	I I I I I * I
5.2	20.9	20793	I I I I I * I
5.4	20.8	20628	I I I I I* I
5.6	20.7	20458	I I I I I* I
5.8	20.6	20282	I I I I I* I
6.0	20.5	20105	I I I I * I
6.2	20.4	19928	I I I I * I
6.4	20.3	19748	I I I I *I I
6.6	20.1	19565	I I I I *I I
6.8	20.0	19379	I I I I *I I
7.0	19.9	19191	I I I I * I I
7.2	19.7	19001	I I I I * I I
7.4	19.6	18811	I I I I * I I
7.6	19.5	18621	I I I I * I I
7.8	19.3	18426	I I I I * I I
8.0	19.2	18224	I I I I * I I
8.2	19.0	18015	I I I I * I I
8.4	18.9	17804	I I I I * I I
8.6	18.7	17594	I I I I * I I
8.8	18.5	17386	I I I I * I I
9.0	18.4	17176	I I I I * I I
9.2	18.2	16970	I I I I * I I
9.4	18.1	16762	I I I I * I I
9.6	17.9	16556	I I I I * I I
9.8	17.8	16354	I I I I * I I

DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 13
BELOW BOW LAKE DAM AT MILE 6.70

GAGE ZERO = 228.00 MAX ELEVATION REACHED BY FLOOD WAVE = 250.37
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 22.37 AT TIME = 4.650 HOURS
MAX FLOW = 21304 AT TIME = 4.500 HOURS

HR	STAGE	FLOW	0 5000 10000 15000 20000 25000
0.0	8.5	3795	I * I I I I I
.2	8.5	3821	I * I I I I I I
.4	8.6	3848	I * I I I I I I
.6	8.7	3981	I * I I I I I I
.8	8.9	4223	I * I I I I I I
1.0	9.2	4464	I *I I I I I I
1.2	9.6	4954	I * I I I I I
1.4	10.4	5806	I I * I I I I I
1.6	11.5	7107	I I * I I I I I
1.8	12.9	8786	I I * I I I I I
2.0	14.5	10797	I I I * I I I I
2.2	16.0	12825	I I I * I I I

2.4	17.3	14760	I	I	I	*	I	I
2.6	18.5	16489	I	I	I	I *	I	I
2.8	19.4	17821	I	I	I	I *	I	I
3.0	20.2	18812	I	I	I	I *	I	I
3.2	20.8	19576	I	I	I	*I	I	I
3.4	21.3	20158	I	I	I	I	*	I
3.6	21.6	20575	I	I	I	I	I*	I
3.8	21.9	20882	I	I	I	I	I *	I
4.0	22.1	21110	I	I	I	I	I *	I
4.2	22.3	21242	I	I	I	I	I *	I
4.4	22.3	21299	I	I	I	I	I *	I
4.6	22.4	21297	I	I	I	I	I *	I
4.8	22.4	21249	I	I	I	I	I *	I
5.0	22.3	21168	I	I	I	I	I *	I
5.2	22.3	21064	I	I	I	I	I *	I
5.4	22.2	20942	I	I	I	I	I *	I
5.6	22.1	20806	I	I	I	I	I *	I
5.8	22.0	20655	I	I	I	I	I*	I
6.0	21.9	20510	I	I	I	I	I*	I
6.2	21.8	20356	I	I	I	I	I*	I
6.4	21.7	20193	I	I	I	I	*	I
6.6	21.6	20024	I	I	I	I	*	I
6.8	21.4	19852	I	I	I	I	*	I
7.0	21.3	19675	I	I	I	I	*I	I
7.2	21.2	19496	I	I	I	I	*I	I
7.4	21.0	19315	I	I	I	I	*I	I
7.6	20.9	19132	I	I	I	I	* I	I
7.8	20.7	18947	I	I	I	I	* I	I
8.0	20.6	18745	I	I	I	I	* I	I
8.2	20.4	18541	I	I	I	I	* I	I
8.4	20.3	18335	I	I	I	I	* I	I
8.6	20.1	18128	I	I	I	I	* I	I
8.8	20.0	17921	I	I	I	I	* I	I
9.0	19.8	17710	I	I	I	I	* I	I
9.2	19.7	17493	I	I	I	I	* I	I
9.4	19.5	17277	I	I	I	I	* I	I
9.6	19.4	17065	I	I	I	I	* I	I
9.8	19.2	16857	I	I	I	I	* I	I

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DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 27
BELOW BOW LAKE DAM AT MILE 11.00

GAGE ZERO = 155.00 MAX ELEVATION REACHED BY FLOOD WAVE = 170.69
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 15.69 AT TIME = 6.700 HOURS
MAX FLOW = 22723 AT TIME = 6.450 HOURS

HR	STAGE	FLOW	0	5000	10000	15000	20000	25000
0.0	7.9	5545	I	I*	I	I	I	I
.2	7.9	5545	I	I*	I	I	I	I
.4	7.9	5545	I	I*	I	I	I	I
.6	7.9	5549	I	I*	I	I	I	I
.8	7.9	5559	I	I*	I	I	I	I
1.0	7.9	5568	I	I*	I	I	I	I
1.2	7.9	5590	I	I*	I	I	I	I
1.4	7.9	5628	I	I*	I	I	I	I
1.6	8.0	5696	I	I*	I	I	I	I

1.8	6.0	5818	
2.0	6.1	6027	
2.2	8.3	6385	
2.4	8.6	6963	
2.6	9.0	7806	
2.8	9.6	8907	
3.0	10.2	10211	
3.2	10.8	11637	
3.4	11.5	13108	
3.6	12.1	14549	
3.8	12.6	15901	
4.0	13.1	17124	
4.2	13.6	18177	
4.4	14.0	19080	
4.6	14.3	19883	
4.8	14.6	20567	
5.0	14.9	21140	
5.2	15.1	21607	
5.4	15.3	21976	
5.6	15.4	22259	
5.8	15.5	22466	
6.0	15.6	22606	
6.2	15.6	22688	
6.4	15.7	22721	
6.6	15.7	22713	
6.8	15.7	22671	
7.0	15.7	22600	
7.2	15.7	22507	
7.4	15.6	22396	
7.6	15.6	22267	
7.8	15.5	22126	
8.0	15.5	21975	
8.2	15.4	21817	
8.4	15.4	21651	
8.6	15.3	21479	
8.8	15.2	21300	
9.0	15.2	21116	
9.2	15.1	20927	
9.4	15.0	20733	
9.6	14.9	20535	
9.8	14.8	20333	

DISCHARGE HYDROGRAPH FOR ISINGLASS RIVER ... STATION NUMBER 52
BELOW GAGE 2M AT MILE 16.00

GAGE Z110.00 MAX ELEVATION REACHED BY FLOOD WAVE = 121.39
FLOOD STAGE NOT AVAILABLE
MAX STAGE = 11.39 AT TIME = 9.050 HOURS
MAX FLOW = 22349 AT TIME = 8.950 HOURS

HR	STAGE	FLOW	0 5000 10000 15000 20000 25000
.2	6.0	5560	
.4	6.0	5560	
.6	6.0	5560	
.8	6.0	5560	
1.0	6.0	5560	
1.2	6.0	5563	

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     1.4    6.0     5564  I          I*         I          I          I          I
     1.6    6.0     5564  I          I*         I          I          I          I
     1.8    6.0     5564  I          I*         I          I          I          I
     2.0    6.0     5564  I          I*         I          I          I          I
     2.2    6.0     5565  I          I*         I          I          I          I
     2.4    6.0     5566  I          I*         I          I          I          I
     2.6    6.0     5569  I          I*         I          I          I          I
     2.8    6.0     5573  I          I*         I          I          I          I
     3.0    6.0     5581  I          I*         I          I          I          I
     3.2    6.0     5596  I          I*         I          I          I          I
     3.4    6.0     5622  I          I*         I          I          I          I
     3.6    6.0     5670  I          I*         I          I          I          I
     3.8    6.1     5762  I          I *        I          I          I          I
     4.0    6.1     5929  I          I *        I          I          I          I
     4.2    6.3     6213  I          I *        I          I          I          I
     4.4    6.5     6672  I          I  *       I          I          I          I
     4.6    6.7     7361  I          I    *     I          I          I          I
     4.8    7.1     8309  I          I      *   I          I          I          I
     5.0    7.5     9446  I          I        *I          I          I          I
     5.2    8.0    10684  I          I          I*         I          I          I
     5.4    8.4    11971  I          I          I      13254  I        I          I
     5.6    8.8    13254  I          I          I       *  I          I          I
     5.8    9.2    14490  I          I          I         *I          I          I
     6.0    9.5    15649  I          I          I          I*         I          I
     6.2    9.8    16713  I          I          I          I  *       I          I
     6.4   10.1    17673  I          I          I          I    *     I          I
     6.6   10.3    18526  I          I          I          I      *   I          I
     6.8   10.5    19275  I          I          I          I        *I          I
     7.0   10.7    19924  I          I          I          I          *          I
     7.2   10.9    20479  I          I          I          I          I*         I
     7.4   11.0    20946  I          I          I          I          I *        I
     7.6   11.1    21332  I          I          I          I          I  *       I
     7.8   11.2    21644  I          I          I          I          I  *       I
     8.0   11.2    21890  I          I          I          I          I   *      I
     8.2   11.3    22076  I          I          I          I          I   *      I
     8.4   11.3    22209  I          I          I          I          I   *      I
     8.6   11.4    22295  I          I          I          I          I    *     I
     8.8   11.4    22340  I          I          I          I          I    *     I
     9.0   11.4    22348  I          I          I          I          I    *     I
     9.2   11.4    22325  I          I          I          I          I    *     I
     9.4   11.4    22275  I          I          I          I          I    *     I
     9.6   11.4    22201  I          I          I          I          I   *      I
     9.8   11.3    22106  I          I          I          I          I   *      I
    10.0   11.3    21995  I          I          I          I          I   *      I
1
 READY.
LOGOUT


B3846BB LOG OFF  09.49.21.
SBU =       1.812
TIO =  197499

IAF      CONNECT TIME 00.35.21.
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