FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY
2801 W. Durango
PHOENIX, AZ 85009

Anderson-Nelson, Inc.

Vol.
2 of 2

TOWN OF FOUNTAIN HILLS

DAM BREAK ANALYSES

for

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

Golden Eagle Park Dam
Hesperus Wash Dam
Aspen Dam
North Heights Dam
SunRidge Canyon Dam

APPENDICES

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17928
GEORGE V.
SABOL
Date Signed 5 Feb 96
ARIZONA, U.S.A.

George V. Sabol Consulting Engineers, Inc.
Scottsdale, Arizona

JANUARY 1996

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*                                      *
* RUN DATE  12/27/95  TIME  16:54:30   *
*                                      *
****************************************
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*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*   HYDROLOGIC ENGINEERING CENTER   *
*         609 SECOND STREET         *
*      DAVIS, CALIFORNIA 95616      *
*          (916) 551-1748           *
*                                   *
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FOUNTAIN HILLS DAM BREAK ANALYSIS
Model for the Computation of PMF for Dam 4 FILE NAME: DAM4-PM.IH1

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Analytical Considerations:

(a) Principal Spillway is clogged.

(b) Initial Condition is the higher between 100-year flood and Spillway crest elevation.

(c) The outflow hydrograph from Dam 11 is the hydrograph associated with its breaching.

(d) The inflow hydrographs defined here are all 1/2 PMF obtained from generated 5-minute PMF

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15 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        120  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1    0  ENDING DATE
                    NDTIME       0955  ENDING TIME
                     ICENT         19  CENTURY MARK

               COMPUTATION INTERVAL    0.08 HOURS
                    TOTAL TIME BASE    9.92 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT
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                **************
                *            *
17 KK           *    C536I   *
                *            *
                **************

20 KO           OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

16 IN           TIME DATA FOR INPUT TIME SERIES
                      JXMIN          5  TIME INTERVAL IN MINUTES
                     JXDATE      1   0  STARTING DATE
                     JXTIME          0  STARTING TIME

              SUBBASIN RUNOFF DATA

21 BA           SUBBASIN CHARACTERISTICS
                      TAREA       2.91  SUBBASIN AREA

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HYDROGRAPH AT STATION C536I

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	4476.	1		0500	61	899.	1		0730	91	48.
1		0005	2	1.	1		0235	32	6740.	1		0505	62	814.	1		0735	92	44.
1		0010	3	2.	1		0240	33	8795.	1		0510	63	742.	1		0740	93	40.
1		0015	4	3.	1		0245	34	9898.	1		0515	64	681.	1		0745	94	36.
1		0020	5	3.	1		0250	35	9960.	1		0520	65	623.	1		0750	95	33.
1		0025	6	4.	1		0255	36	9393.	1		0525	66	571.	1		0755	96	30.
1		0030	7	6.	1		0300	37	8537.	1		0530	67	522.	1		0800	97	28.
1		0035	8	8.	1		0305	38	7634.	1		0535	68	475.	1		0805	98	25.
1		0040	9	11.	1		0310	39	6772.	1		0540	69	432.	1		0810	99	23.
1		0045	10	14.	1		0315	40	6028.	1		0545	70	392.	1		0815	100	21.
1		0050	11	16.	1		0320	41	5360.	1		0550	71	354.	1		0820	101	19.
1		0055	12	19.	1		0325	42	4803.	1		0555	72	319.	1		0825	102	18.
1		0100	13	23.	1		0330	43	4304.	1		0600	73	287.	1		0830	103	17.
1		0105	14	29.	1		0335	44	3867.	1		0605	74	259.	1		0835	104	15.
1		0110	15	38.	1		0340	45	3492.	1		0610	75	232.	1		0840	105	14.
1		0115	16	50.	1		0345	46	3150.	1		0615	76	208.	1		0845	106	13.
1		0120	17	66.	1		0350	47	2861.	1		0620	77	188.	1		0850	107	12.
1		0125	18	82.	1		0355	48	2631.	1		0625	78	171.	1		0855	108	11.
1		0130	19	98.	1		0400	49	2420.	1		0630	79	155.	1		0900	109	10.
1		0135	20	117.	1		0405	50	2232.	1		0635	80	142.	1		0905	110	9.
1		0140	21	140.	1		0410	51	2066.	1		0640	81	130.	1		0910	111	9.
1		0145	22	163.	1		0415	52	1928.	1		0645	82	118.	1		0915	112	8.
1		0150	23	187.	1		0420	53	1801.	1		0650	83	106.	1		0920	113	7.
1		0155	24	214.	1		0425	54	1680.	1		0655	84	95.	1		0925	114	7.
1		0200	25	239.	1		0430	55	1559.	1		0700	85	85.	1		0930	115	6.
1		0205	26	446.	1		0435	56	1433.	1		0705	86	76.	1		0935	116	6.
1		0210	27	929.	1		0440	57	1318.	1		0710	87	68.	1		0940	117	5.
1		0215	28	1590.	1		0445	58	1204.	1		0715	88	62.	1		0945	118	5.
1		0220	29	2261.	1		0450	59	1097.	1		0720	89	57.	1		0950	119	5.

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  1     0225   30     2992.   *   1     0455   60      999.   *   1     0725   90       52.   *   1     0955  120        5.
                              *                                *                                *
*****************************************************************************************************************************

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
  (CFS)       (HR)                  6-HR       24-HR       72-HR      9.92-HR
   9960.      2.83        (CFS)     2044.      1244.       1244.       1244.
                        (INCHES)    6.530      6.568       6.568       6.568
                         (AC-FT)    1013.      1019.       1019.       1019.

                       CUMULATIVE AREA =    2.91 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **


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          *            *
 38 KK    *    C5360   *
          *            *
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 40 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

            HYDROGRAPH ROUTING DATA

 41 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC    1889.00  INITIAL CONDITION
                         X       0.00 WORKING R AND D COEFFICIENT

 42 SV           STORAGE        0.0      4.0      35.9      87.1     132.2     186.4     254.8     276.0     298.0     322.0
                               347.0    374.0     401.3     431.0     461.4     494.0     525.7     559.1     593.5     629.2

 44 SE          ELEVATION    1852.10  1862.00   1870.00   1876.00   1880.00   1884.00   1888.00   1889.00   1890.00   1891.00
                             1892.00  1893.00   1894.00   1895.00   1896.00   1897.00   1898.00   1899.00   1900.00   1901.00

 46 SQ          DISCHARGE        0.       0.        0.        0.        0.        0.        0.        0.      330.     1303.
                               2752.    4573.     6723.     9921.    16583.    25417.    35910.    47818.    60990.    75321.

 48 SE          ELEVATION    1852.10  1862.00   1870.00   1876.00   1880.00   1884.00   1888.00   1889.00   1890.00   1891.00
                             1892.00  1893.00   1894.00   1895.00   1896.00   1897.00   1898.00   1899.00   1900.00   1901.00

                                                          ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE      0.00      3.96     35.94     87.09    132.22    186.43    254.82    276.00    298.02    322.00
            OUTFLOW      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00    330.00   1303.00
          ELEVATION   1852.10   1862.00   1870.00   1876.00   1880.00   1884.00   1888.00   1889.00   1890.00   1891.00

            STORAGE    346.95    374.00    401.26    431.00    461.36    494.00    525.67    559.13    593.55    629.19
            OUTFLOW   2752.00   4573.00   6723.00   9921.00  16583.00  25417.00  35910.00  47818.00  60990.00  75321.00
          ELEVATION   1892.00   1893.00   1894.00   1895.00   1896.00   1897.00   1898.00   1899.00   1900.00   1901.00
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*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 25417. TO 75321.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION C5360

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	276.0	1889.0	1		0320	41	6402.	397.2	1893.9	1		0640	81	261.	293.4	1889.8
1		0005	2	0.	276.0	1889.0	1		0325	42	5838.	390.0	1893.6	1		0645	82	247.	292.5	1889.7
1		0010	3	0.	276.0	1889.0	1		0330	43	5289.	383.1	1893.3	1		0650	83	234.	291.6	1889.7
1		0015	4	0.	276.0	1889.0	1		0335	44	4775.	376.6	1893.1	1		0655	84	221.	290.7	1889.7
1		0020	5	1.	276.0	1889.0	1		0340	45	4339.	370.5	1892.9	1		0700	85	208.	289.9	1889.6
1		0025	6	1.	276.1	1889.0	1		0345	46	3956.	364.8	1892.7	1		0705	86	195.	289.0	1889.6
1		0030	7	1.	276.1	1889.0	1		0350	47	3598.	359.5	1892.5	1		0710	87	183.	288.2	1889.6
1		0035	8	2.	276.1	1889.0	1		0355	48	3277.	354.7	1892.3	1		0715	88	172.	287.5	1889.5
1		0040	9	2.	276.2	1889.0	1		0400	49	2994.	350.5	1892.1	1		0720	89	161.	286.7	1889.5
1		0045	10	3.	276.2	1889.0	1		0405	50	2744.	346.8	1892.0	1		0725	90	150.	286.0	1889.5
1		0050	11	5.	276.3	1889.0	1		0410	51	2545.	343.4	1891.9	1		0730	91	140.	285.4	1889.4
1		0055	12	6.	276.4	1889.0	1		0415	52	2363.	340.2	1891.7	1		0735	92	131.	284.7	1889.4
1		0100	13	7.	276.5	1889.0	1		0420	53	2196.	337.4	1891.6	1		0740	93	122.	284.2	1889.4
1		0105	14	9.	276.6	1889.0	1		0425	54	2044.	334.8	1891.5	1		0745	94	114.	283.6	1889.3
1		0110	15	11.	276.8	1889.0	1		0430	55	1903.	332.3	1891.4	1		0750	95	106.	283.1	1889.3
1		0115	16	15.	277.0	1889.0	1		0435	56	1767.	330.0	1891.3	1		0755	96	99.	282.6	1889.3
1		0120	17	19.	277.3	1889.1	1		0440	57	1636.	327.7	1891.2	1		0800	97	92.	282.1	1889.3
1		0125	18	24.	277.6	1889.1	1		0445	58	1511.	325.6	1891.1	1		0805	98	86.	281.7	1889.3
1		0130	19	31.	278.0	1889.1	1		0450	59	1391.	323.5	1891.1	1		0810	99	80.	281.3	1889.2
1		0135	20	38.	278.5	1889.1	1		0455	60	1284.	321.5	1891.0	1		0815	100	74.	280.9	1889.2
1		0140	21	47.	279.1	1889.1	1		0500	61	1201.	319.5	1890.9	1		0820	101	69.	280.6	1889.2
1		0145	22	57.	279.8	1889.2	1		0505	62	1117.	317.4	1890.8	1		0825	102	64.	280.2	1889.2
1		0150	23	69.	280.6	1889.2	1		0510	63	1034.	315.4	1890.7	1		0830	103	59.	279.9	1889.2
1		0155	24	82.	281.5	1889.2	1		0515	64	955.	313.4	1890.6	1		0835	104	55.	279.7	1889.2
1		0200	25	96.	282.4	1889.3	1		0520	65	880.	311.6	1890.6	1		0840	105	51.	279.4	1889.2
1		0205	26	120.	284.0	1889.4	1		0525	66	811.	309.9	1890.5	1		0845	106	47.	279.1	1889.1
1		0210	27	176.	287.7	1889.5	1		0530	67	746.	308.3	1890.4	1		0850	107	44.	278.9	1889.1
1		0215	28	282.	294.8	1889.9	1		0535	68	685.	306.8	1890.4	1		0855	108	40.	278.7	1889.1
1		0220	29	613.	305.0	1890.3	1		0540	69	628.	305.4	1890.3	1		0900	109	38.	278.5	1889.1
1		0225	30	1107.	317.2	1890.8	1		0545	70	575.	304.1	1890.3	1		0905	110	35.	278.3	1889.1
1		0230	31	1912.	332.5	1891.4	1		0550	71	526.	302.8	1890.2	1		0910	111	32.	278.2	1889.1
1		0235	32	3194.	353.5	1892.2	1		0555	72	479.	301.7	1890.2	1		0915	112	30.	278.0	1889.1
1		0240	33	4962.	378.9	1893.2	1		0600	73	436.	300.6	1890.1	1		0920	113	28.	277.8	1889.1
1		0245	34	6864.	402.6	1894.0	1		0605	74	396.	299.6	1890.1	1		0925	114	26.	277.7	1889.1
1		0250	35	8520.	418.0	1894.6	1		0610	75	359.	298.7	1890.0	1		0930	115	24.	277.6	1889.1
1		0255	36	9145.	423.8	1894.8	1		0615	76	328.	297.9	1890.0	1		0935	116	22.	277.5	1889.1
1		0300	37	9048.	422.9	1894.7	1		0620	77	315.	297.0	1890.0	1		0940	117	20.	277.4	1889.1
1		0305	38	8528.	418.0	1894.6	1		0625	78	302.	296.1	1889.9	1		0945	118	19.	277.3	1889.1
1		0310	39	7812.	411.4	1894.3	1		0630	79	288.	295.2	1889.9	1		0950	119	17.	277.2	1889.1
1		0315	40	7048.	404.3	1894.1	1		0635	80	274.	294.3	1889.8	1		0955	120	16.	277.1	1889.0

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
9145.	2.92	(CFS)	2033.	1242.	1242.	1242.

(INCHES)	6.495	6.561	6.561	6.561
(AC-FT)	1008.	1018.	1018.	1018.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	9.92-HR
424.	2.92	326.	307.	307.	307.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	9.92-HR
1894.76	2.92	1891.07	1890.29	1890.29	1890.29

CUMULATIVE AREA = 2.91 SQ MI

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              *            *
 50 KK        *     C584I  *
              *            *
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53 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

16 IN TIME DATA FOR INPUT TIME SERIES

JXMIN		5	TIME INTERVAL IN MINUTES
JXDATE	1	0	STARTING DATE
JXTIME		0	STARTING TIME

SUBBASIN RUNOFF DATA

54 BA SUBBASIN CHARACTERISTICS

TAREA	1.59	SUBBASIN AREA

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HYDROGRAPH AT STATION C584I

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0230	31	8794.	*	1		0500	61	231.	*	1		0730	91	5.
1		0005	2	1.	*	1		0235	32	7081.	*	1		0505	62	219.	*	1		0735	92	4.
1		0010	3	3.	*	1		0240	33	5516.	*	1		0510	63	203.	*	1		0740	93	3.
1		0015	4	5.	*	1		0245	34	4290.	*	1		0515	64	186.	*	1		0745	94	3.
1		0020	5	8.	*	1		0250	35	3368.	*	1		0520	65	168.	*	1		0750	95	2.
1		0025	6	13.	*	1		0255	36	2711.	*	1		0525	66	149.	*	1		0755	96	2.
1		0030	7	21.	*	1		0300	37	2253.	*	1		0530	67	132.	*	1		0800	97	2.
1		0035	8	30.	*	1		0305	38	1911.	*	1		0535	68	117.	*	1		0805	98	1.
1		0040	9	38.	*	1		0310	39	1631.	*	1		0540	69	105.	*	1		0810	99	1.
1		0045	10	44.	*	1		0315	40	1403.	*	1		0545	70	96.	*	1		0815	100	1.

1	0050	11	50.	*	1	0320	41	1216.	*	1	0550	71	90.	*	1	0820	101	1.
1	0055	12	55.	*	1	0325	42	1069.	*	1	0555	72	86.	*	1	0825	102	1.
1	0100	13	59.	*	1	0330	43	967.	*	1	0600	73	83.	*	1	0830	103	1.
1	0105	14	71.	*	1	0335	44	889.	*	1	0605	74	78.	*	1	0835	104	1.
1	0110	15	90.	*	1	0340	45	836.	*	1	0610	75	71.	*	1	0840	105	1.
1	0115	16	109.	*	1	0345	46	801.	*	1	0615	76	65.	*	1	0845	106	1.
1	0120	17	142.	*	1	0350	47	780.	*	1	0620	77	58.	*	1	0850	107	1.
1	0125	18	177.	*	1	0355	48	760.	*	1	0625	78	51.	*	1	0855	108	1.
1	0130	19	209.	*	1	0400	49	749.	*	1	0630	79	44.	*	1	0900	109	1.
1	0135	20	237.	*	1	0405	50	720.	*	1	0635	80	37.	*	1	0905	110	1.
1	0140	21	262.	*	1	0410	51	664.	*	1	0640	81	31.	*	1	0910	111	1.
1	0145	22	281.	*	1	0415	52	595.	*	1	0645	82	25.	*	1	0915	112	1.
1	0150	23	293.	*	1	0420	53	516.	*	1	0650	83	20.	*	1	0920	113	1.
1	0155	24	301.	*	1	0425	54	440.	*	1	0655	84	16.	*	1	0925	114	1.
1	0200	25	306.	*	1	0430	55	382.	*	1	0700	85	13.	*	1	0930	115	1.
1	0205	26	962.	*	1	0435	56	337.	*	1	0705	86	11.	*	1	0935	116	1.
1	0210	27	2859.	*	1	0440	57	302.	*	1	0710	87	9.	*	1	0940	117	1.
1	0215	28	6019.	*	1	0445	58	274.	*	1	0715	88	8.	*	1	0945	118	1.
1	0220	29	9255.	*	1	0450	59	254.	*	1	0720	89	7.	*	1	0950	119	1.
1	0225	30	10016.	*	1	0455	60	240.	*	1	0725	90	6.	*	1	0955	120	1.
				*					*					*				

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
10016.	2.42	(CFS)	1192.	723.	723.	723.
		(INCHES)	6.971	6.992	6.992	6.992
		(AC-FT)	591.	593.	593.	593.

CUMULATIVE AREA = 1.59 SQ MI

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          *            *
66 KK     *     C5840  *
          *            *
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68 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

69 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	1926.31	INITIAL CONDITION
X	0.00	WORKING R AND D COEFFICIENT

70 SV	STORAGE	0.0	0.6	4.3	11.3	23.7	46.3	86.7	96.0	104.9	126.3
		151.1	165.0	179.5	195.0	211.2	229.0	246.6	266.0	285.6	306.1
72 SE	ELEVATION	1884.80	1894.00	1900.00	1906.00	1912.00	1918.00	1924.00	1925.00	1926.00	1928.00

		1930.00	1931.00	1932.00	1933.00	1934.00	1935.00	1936.00	1937.00	1938.00	1939.00
74 SQ	DISCHARGE	0.	0.	0.	0.	0.	0.	0.	4.	328.	2553.
		6277.	8638.	11325.	14517.	19390.	25613.	32928.	41229.	50456.	60573.
76 SE	ELEVATION	1884.80	1894.00	1900.00	1906.00	1912.00	1918.00	1924.00	1925.00	1926.00	1928.00
		1930.00	1931.00	1932.00	1933.00	1934.00	1935.00	1936.00	1937.00	1938.00	1939.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.60	4.30	11.27	23.74	46.29	86.65	96.00	104.90	126.25
OUTFLOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	328.00	2553.00
ELEVATION	1884.80	1894.00	1900.00	1906.00	1912.00	1918.00	1924.00	1925.00	1926.00	1928.00
STORAGE	151.07	165.00	179.50	195.00	211.23	229.00	246.62	266.00	285.59	306.14
OUTFLOW	6277.00	8638.00	11325.00	14517.00	19390.00	25613.00	32928.00	41229.00	50456.00	60573.00
ELEVATION	1930.00	1931.00	1932.00	1933.00	1934.00	1935.00	1936.00	1937.00	1938.00	1939.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 14517. TO 60573.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION C5840

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	673.	108.2	1926.3	*	1		0320	41	1526.	116.4	1927.1	*	1		0640	81	58.	97.5	1925.2
1		0005	2	324.	104.8	1926.0	*	1		0325	42	1323.	114.5	1926.9	*	1		0645	82	51.	97.3	1925.1
1		0010	3	252.	102.8	1925.8	*	1		0330	43	1162.	112.9	1926.7	*	1		0650	83	45.	97.1	1925.1
1		0015	4	197.	101.3	1925.6	*	1		0335	44	1038.	111.7	1926.6	*	1		0655	84	39.	97.0	1925.1
1		0020	5	154.	100.1	1925.5	*	1		0340	45	945.	110.8	1926.6	*	1		0700	85	33.	96.8	1925.1
1		0025	6	122.	99.3	1925.4	*	1		0345	46	878.	110.2	1926.5	*	1		0705	86	29.	96.7	1925.1
1		0030	7	99.	98.6	1925.3	*	1		0350	47	832.	109.7	1926.5	*	1		0710	87	24.	96.6	1925.1
1		0035	8	83.	98.2	1925.2	*	1		0355	48	799.	109.4	1926.4	*	1		0715	88	21.	96.5	1925.1
1		0040	9	72.	97.9	1925.2	*	1		0400	49	775.	109.2	1926.4	*	1		0720	89	18.	96.4	1925.0
1		0045	10	65.	97.7	1925.2	*	1		0405	50	754.	109.0	1926.4	*	1		0725	90	15.	96.3	1925.0
1		0050	11	61.	97.6	1925.2	*	1		0410	51	721.	108.7	1926.4	*	1		0730	91	13.	96.2	1925.0
1		0055	12	59.	97.5	1925.2	*	1		0415	52	673.	108.2	1926.3	*	1		0735	92	11.	96.2	1925.0
1		0100	13	59.	97.5	1925.2	*	1		0420	53	611.	107.6	1926.3	*	1		0740	93	9.	96.1	1925.0
1		0105	14	60.	97.5	1925.2	*	1		0425	54	541.	106.9	1926.2	*	1		0745	94	8.	96.1	1925.0
1		0110	15	65.	97.7	1925.2	*	1		0430	55	472.	106.3	1926.1	*	1		0750	95	7.	96.1	1925.0
1		0115	16	72.	97.9	1925.2	*	1		0435	56	413.	105.7	1926.1	*	1		0755	96	6.	96.0	1925.0
1		0120	17	84.	98.2	1925.2	*	1		0440	57	363.	105.2	1926.0	*	1		0800	97	5.	96.0	1925.0
1		0125	18	101.	98.7	1925.3	*	1		0445	58	326.	104.8	1926.0	*	1		0805	98	4.	96.0	1925.0
1		0130	19	121.	99.2	1925.4	*	1		0450	59	312.	104.5	1926.0	*	1		0810	99	4.	96.0	1925.0
1		0135	20	144.	99.8	1925.4	*	1		0455	60	298.	104.1	1925.9	*	1		0815	100	4.	96.0	1925.0
1		0140	21	167.	100.5	1925.5	*	1		0500	61	284.	103.7	1925.9	*	1		0820	101	4.	95.9	1925.0
1		0145	22	191.	101.1	1925.6	*	1		0505	62	270.	103.3	1925.8	*	1		0825	102	4.	95.9	1925.0
1		0150	23	212.	101.7	1925.6	*	1		0510	63	257.	103.0	1925.8	*	1		0830	103	4.	95.9	1925.0
1		0155	24	231.	102.2	1925.7	*	1		0515	64	243.	102.6	1925.7	*	1		0835	104	4.	95.9	1925.0
1		0200	25	247.	102.7	1925.8	*	1		0520	65	228.	102.2	1925.7	*	1		0840	105	4.	95.8	1925.0
1		0205	26	341.	105.0	1926.0	*	1		0525	66	213.	101.7	1925.6	*	1		0845	106	4.	95.8	1925.0
1		0210	27	1170.	113.0	1926.8	*	1		0530	67	197.	101.3	1925.6	*	1		0850	107	4.	95.8	1925.0

1	0215	28	2996.	129.2	1928.2	*	1	0535	68	181.	100.8	1925.5	*	1	0855	108	4.	95.8	1925.0
1	0220	29	6158.	150.3	1929.9	*	1	0540	69	165.	100.4	1925.5	*	1	0900	109	4.	95.7	1925.0
1	0225	30	8715.	165.4	1931.0	*	1	0545	70	151.	100.0	1925.5	*	1	0905	110	4.	95.7	1925.0
1	0230	31	9252.	168.3	1931.2	*	1	0550	71	138.	99.7	1925.4	*	1	0910	111	4.	95.7	1925.0
1	0235	32	8250.	162.7	1930.8	*	1	0555	72	127.	99.4	1925.4	*	1	0915	112	4.	95.7	1925.0
1	0240	33	6811.	154.2	1930.2	*	1	0600	73	117.	99.1	1925.3	*	1	0920	113	4.	95.6	1925.0
1	0245	34	5471.	145.7	1929.6	*	1	0605	74	109.	98.9	1925.3	*	1	0925	114	4.	95.6	1925.0
1	0250	35	4352.	138.2	1929.0	*	1	0610	75	101.	98.7	1925.3	*	1	0930	115	4.	95.6	1925.0
1	0255	36	3458.	132.3	1928.5	*	1	0615	76	94.	98.5	1925.3	*	1	0935	116	4.	95.6	1925.0
1	0300	37	2793.	127.8	1928.1	*	1	0620	77	86.	98.3	1925.3	*	1	0940	117	4.	95.6	1925.0
1	0305	38	2363.	124.4	1927.8	*	1	0625	78	79.	98.1	1925.2	*	1	0945	118	4.	95.5	1925.0
1	0310	39	2050.	121.4	1927.5	*	1	0630	79	72.	97.9	1925.2	*	1	0950	119	4.	95.5	1924.9
1	0315	40	1769.	118.7	1927.3	*	1	0635	80	65.	97.7	1925.2	*	1	0955	120	4.	95.5	1924.9
						*							*						

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
9252.	2.50	(CFS)	1206.	739.	739.	739.
		(INCHES)	7.049	7.142	7.142	7.142
		(AC-FT)	598.	606.	606.	606.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	9.92-HR
168.	2.50	110.	105.	105.	105.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	9.92-HR
1931.23	2.50	1926.42	1925.88	1925.88	1925.88

CUMULATIVE AREA = 1.59 SQ MI

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86 KK     *    C5780   *
          *            *
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88 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

16 IN TIME DATA FOR INPUT TIME SERIES

JXMIN		5	TIME INTERVAL IN MINUTES
JXDATE	1	0	STARTING DATE
JXTIME		0	STARTING TIME

SUBBASIN RUNOFF DATA

89 BA SUBBASIN CHARACTERISTICS

TAREA	2.02	SUBBASIN AREA

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HYDROGRAPH AT STATION C578O

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	781.	1		0230	31	29206.	1		0500	61	399.	1		0730	91	34.
1		0005	2	493.	1		0235	32	13111.	1		0505	62	384.	1		0735	92	30.
1		0010	3	408.	1		0240	33	7068.	1		0510	63	369.	1		0740	93	27.
1		0015	4	353.	1		0245	34	6196.	1		0515	64	352.	1		0745	94	23.
1		0020	5	306.	1		0250	35	5139.	1		0520	65	334.	1		0750	95	21.
1		0025	6	267.	1		0255	36	4067.	1		0525	66	314.	1		0755	96	18.
1		0030	7	235.	1		0300	37	3128.	1		0530	67	294.	1		0800	97	16.
1		0035	8	210.	1		0305	38	2412.	1		0535	68	275.	1		0805	98	14.
1		0040	9	189.	1		0310	39	2076.	1		0540	69	257.	1		0810	99	12.
1		0045	10	172.	1		0315	40	1801.	1		0545	70	241.	1		0815	100	11.
1		0050	11	159.	1		0320	41	1569.	1		0550	71	226.	1		0820	101	10.
1		0055	12	148.	1		0325	42	1410.	1		0555	72	212.	1		0825	102	8.
1		0100	13	140.	1		0330	43	1275.	1		0600	73	199.	1		0830	103	7.
1		0105	14	134.	1		0335	44	1172.	1		0605	74	187.	1		0835	104	6.
1		0110	15	131.	1		0340	45	1092.	1		0610	75	175.	1		0840	105	6.
1		0115	16	133.	1		0345	46	1029.	1		0615	76	163.	1		0845	106	5.
1		0120	17	140.	1		0350	47	983.	1		0620	77	150.	1		0850	107	4.
1		0125	18	153.	1		0355	48	951.	1		0625	78	138.	1		0855	108	4.
1		0130	19	170.	1		0400	49	922.	1		0630	79	126.	1		0900	109	3.
1		0135	20	190.	1		0405	50	887.	1		0635	80	115.	1		0905	110	3.
1		0140	21	212.	1		0410	51	841.	1		0640	81	104.	1		0910	111	3.
1		0145	22	234.	1		0415	52	779.	1		0645	82	94.	1		0915	112	2.
1		0150	23	254.	1		0420	53	707.	1		0650	83	84.	1		0920	113	2.
1		0155	24	274.	1		0425	54	631.	1		0655	84	75.	1		0925	114	2.
1		0200	25	292.	1		0430	55	560.	1		0700	85	68.	1		0930	115	2.
1		0205	26	415.	1		0435	56	499.	1		0705	86	60.	1		0935	116	1.
1		0210	27	1175.	1		0440	57	460.	1		0710	87	54.	1		0940	117	1.
1		0215	28	3086.	1		0445	58	444.	1		0715	88	48.	1		0945	118	1.
1		0220	29	6860.	1		0450	59	429.	1		0720	89	43.	1		0950	119	1.
1		0225	30	21574.	1		0455	60	414.	1		0725	90	38.	1		0955	120	1.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
29206.	2.50	(CFS)	1860.	1143.	1143.	1143.
		(INCHES)	8.561	8.695	8.695	8.695
		(AC-FT)	922.	937.	937.	937.

CUMULATIVE AREA = 2.02 SQ MI

112 KK C560I

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115 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

 16 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN          5  TIME INTERVAL IN MINUTES
                    JXDATE      1   0  STARTING DATE
                    JXTIME          0  STARTING TIME

            SUBBASIN RUNOFF DATA

116 BA          SUBBASIN CHARACTERISTICS
                     TAREA       2.16  SUBBASIN AREA

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HYDROGRAPH AT STATION C560I

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	7802.	1		0500	61	433.	1		0730	91	23.
1		0005	2	1.	1		0235	32	7999.	1		0505	62	392.	1		0735	92	20.
1		0010	3	4.	1		0240	33	7713.	1		0510	63	351.	1		0740	93	17.
1		0015	4	6.	1		0245	34	7044.	1		0515	64	316.	1		0745	94	15.
1		0020	5	9.	1		0250	35	6195.	1		0520	65	287.	1		0750	95	13.
1		0025	6	14.	1		0255	36	5366.	1		0525	66	265.	1		0755	96	11.
1		0030	7	20.	1		0300	37	4650.	1		0530	67	244.	1		0800	97	10.
1		0035	8	26.	1		0305	38	4053.	1		0535	68	223.	1		0805	98	9.
1		0040	9	32.	1		0310	39	3522.	1		0540	69	204.	1		0810	99	8.
1		0045	10	39.	1		0315	40	3098.	1		0545	70	189.	1		0815	100	7.
1		0050	11	45.	1		0320	41	2744.	1		0550	71	174.	1		0820	101	6.
1		0055	12	51.	1		0325	42	2445.	1		0555	72	162.	1		0825	102	5.
1		0100	13	60.	1		0330	43	2196.	1		0600	73	150.	1		0830	103	5.
1		0105	14	74.	1		0335	44	1979.	1		0605	74	138.	1		0835	104	4.
1		0110	15	92.	1		0340	45	1813.	1		0610	75	124.	1		0840	105	3.
1		0115	16	112.	1		0345	46	1676.	1		0615	76	111.	1		0845	106	3.
1		0120	17	130.	1		0350	47	1562.	1		0620	77	100.	1		0850	107	3.
1		0125	18	148.	1		0355	48	1468.	1		0625	78	90.	1		0855	108	2.
1		0130	19	166.	1		0400	49	1396.	1		0630	79	82.	1		0900	109	2.
1		0135	20	186.	1		0405	50	1316.	1		0635	80	74.	1		0905	110	2.
1		0140	21	207.	1		0410	51	1213.	1		0640	81	67.	1		0910	111	1.
1		0145	22	231.	1		0415	52	1107.	1		0645	82	60.	1		0915	112	1.
1		0150	23	258.	1		0420	53	1005.	1		0650	83	55.	1		0920	113	1.
1		0155	24	285.	1		0425	54	907.	1		0655	84	49.	1		0925	114	1.
1		0200	25	309.	1		0430	55	812.	1		0700	85	44.	1		0930	115	1.
1		0205	26	825.	1		0435	56	728.	1		0705	86	39.	1		0935	116	1.
1		0210	27	2183.	1		0440	57	664.	1		0710	87	36.	1		0940	117	1.
1		0215	28	4085.	1		0445	58	597.	1		0715	88	33.	1		0945	118	1.
1		0220	29	5805.	1		0450	59	535.	1		0720	89	29.	1		0950	119	1.
1		0225	30	7101.	1		0455	60	479.	1		0725	90	26.	1		0955	120	1.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
7999.	2.58	(CFS)	1537.	935.	935.	935.
		(INCHES)	6.616	6.653	6.653	6.653
		(AC-FT)	762.	766.	766.	766.

CUMULATIVE AREA = 2.16 SQ MI

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129 KK    *     C5600  *
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131 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

132 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	1835.36	INITIAL CONDITION
X	0.00	WORKING R AND D COEFFICIENT

133 SV	STORAGE	0.0	7.1	34.7	76.0	135.6	191.4	208.3	226.5	246.0	266.3
		289.0	310.8	336.0	360.9	389.0	416.3	446.0	476.4	509.0	540.8
135 SE	ELEVATION	1808.80	1814.00	1820.00	1826.00	1832.00	1836.00	1837.00	1838.00	1839.00	1840.00
		1841.00	1842.00	1843.00	1844.00	1845.00	1846.00	1847.00	1848.00	1849.00	1850.00
137 SQ	DISCHARGE	0.	0.	0.	0.	0.	122.	926.	2241.	3942.	5983.
		8342.	11004.	13952.	18097.	24860.	33293.	43118.	54205.	66475.	79878.

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*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 24860. TO 79878.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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HYDROGRAPH AT STATION C5600

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	102.	182.5	1835.4	*	1		0320	41	3412.	239.9	1838.7	*	1		0640	81	120.	190.6	1835.9
1		0005	2	101.	181.8	1835.3	*	1		0325	42	3034.	235.6	1838.5	*	1		0645	82	119.	190.3	1835.9
1		0010	3	99.	181.1	1835.3	*	1		0330	43	2704.	231.8	1838.3	*	1		0650	83	118.	189.8	1835.9
1		0015	4	98.	180.5	1835.2	*	1		0335	44	2419.	228.6	1838.1	*	1		0655	84	117.	189.4	1835.9

1	0020	5	97.	179.9	1835.2	*	1	0340	45	2186.	225.8	1838.0	*	1	0700	85	116.	188.9	1835.8
1	0025	6	95.	179.3	1835.1	*	1	0345	46	2010.	223.3	1837.8	*	1	0705	86	115.	188.4	1835.8
1	0030	7	94.	178.7	1835.1	*	1	0350	47	1854.	221.2	1837.7	*	1	0710	87	114.	187.8	1835.7
1	0035	8	93.	178.3	1835.1	*	1	0355	48	1719.	219.3	1837.6	*	1	0715	88	113.	187.3	1835.7
1	0040	9	92.	177.8	1835.0	*	1	0400	49	1605.	217.7	1837.5	*	1	0720	89	112.	186.7	1835.7
1	0045	10	91.	177.4	1835.0	*	1	0405	50	1505.	216.3	1837.4	*	1	0725	90	110.	186.2	1835.6
1	0050	11	91.	177.1	1835.0	*	1	0410	51	1409.	215.0	1837.4	*	1	0730	91	109.	185.6	1835.6
1	0055	12	90.	176.8	1835.0	*	1	0415	52	1310.	213.6	1837.3	*	1	0735	92	108.	185.0	1835.5
1	0100	13	89.	176.6	1834.9	*	1	0420	53	1209.	212.2	1837.2	*	1	0740	93	106.	184.3	1835.5
1	0105	14	89.	176.4	1834.9	*	1	0425	54	1108.	210.8	1837.1	*	1	0745	94	105.	183.7	1835.4
1	0110	15	89.	176.4	1834.9	*	1	0430	55	1009.	209.5	1837.1	*	1	0750	95	104.	183.1	1835.4
1	0115	16	89.	176.5	1834.9	*	1	0435	56	917.	208.1	1837.0	*	1	0755	96	102.	182.5	1835.4
1	0120	17	90.	176.7	1834.9	*	1	0440	57	855.	206.8	1836.9	*	1	0800	97	101.	181.8	1835.3
1	0125	18	90.	177.0	1835.0	*	1	0445	58	792.	205.5	1836.8	*	1	0805	98	100.	181.2	1835.3
1	0130	19	91.	177.5	1835.0	*	1	0450	59	728.	204.2	1836.8	*	1	0810	99	98.	180.6	1835.2
1	0135	20	93.	178.0	1835.0	*	1	0455	60	666.	202.8	1836.7	*	1	0815	100	97.	180.0	1835.2
1	0140	21	94.	178.7	1835.1	*	1	0500	61	606.	201.6	1836.6	*	1	0820	101	96.	179.3	1835.1
1	0145	22	96.	179.6	1835.2	*	1	0505	62	552.	200.5	1836.5	*	1	0825	102	94.	178.7	1835.1
1	0150	23	98.	180.6	1835.2	*	1	0510	63	501.	199.4	1836.5	*	1	0830	103	93.	178.1	1835.0
1	0155	24	101.	181.8	1835.3	*	1	0515	64	454.	198.4	1836.4	*	1	0835	104	92.	177.5	1835.0
1	0200	25	104.	183.1	1835.4	*	1	0520	65	411.	197.5	1836.4	*	1	0840	105	90.	176.9	1835.0
1	0205	26	111.	186.3	1835.6	*	1	0525	66	373.	196.7	1836.3	*	1	0845	106	89.	176.3	1834.9
1	0210	27	302.	195.2	1836.2	*	1	0530	67	339.	196.0	1836.3	*	1	0850	107	88.	175.7	1834.9
1	0215	28	1172.	211.7	1837.2	*	1	0535	68	309.	195.4	1836.2	*	1	0855	108	86.	175.1	1834.8
1	0220	29	2744.	232.3	1838.3	*	1	0540	69	282.	194.8	1836.2	*	1	0900	109	85.	174.5	1834.8
1	0225	30	4518.	251.7	1839.3	*	1	0545	70	258.	194.3	1836.2	*	1	0905	110	84.	174.0	1834.7
1	0230	31	6029.	266.7	1840.0	*	1	0550	71	236.	193.8	1836.1	*	1	0910	111	83.	173.4	1834.7
1	0235	32	7014.	276.2	1840.4	*	1	0555	72	217.	193.4	1836.1	*	1	0915	112	81.	172.9	1834.7
1	0240	33	7458.	280.5	1840.6	*	1	0600	73	200.	193.1	1836.1	*	1	0920	113	80.	172.3	1834.6
1	0245	34	7416.	280.1	1840.6	*	1	0605	74	184.	192.7	1836.1	*	1	0925	114	79.	171.8	1834.6
1	0250	35	6996.	276.0	1840.4	*	1	0610	75	169.	192.4	1836.1	*	1	0930	115	78.	171.2	1834.6
1	0255	36	6356.	269.9	1840.2	*	1	0615	76	154.	192.1	1836.0	*	1	0935	116	77.	170.7	1834.5
1	0300	37	5653.	263.0	1839.8	*	1	0620	77	141.	191.8	1836.0	*	1	0940	117	76.	170.2	1834.5
1	0305	38	4983.	256.3	1839.5	*	1	0625	78	128.	191.6	1836.0	*	1	0945	118	74.	169.7	1834.4
1	0310	39	4368.	250.2	1839.2	*	1	0630	79	122.	191.3	1836.0	*	1	0950	119	73.	169.2	1834.4
1	0315	40	3835.	244.8	1838.9	*	1	0635	80	121.	191.0	1836.0	*	1	0955	120	72.	168.7	1834.4
						*							*						

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
7458.	2.67	(CFS)	1515.	952.	952.	952.
		(INCHES)	6.520	6.773	6.773	6.773
		(AC-FT)	751.	780.	780.	780.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	9.92-HR
280.	2.67	211.	197.	197.	197.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	9.92-HR
1840.63	2.67	1837.03	1836.21	1836.21	1836.21

CUMULATIVE AREA = 2.16 SQ MI

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                **************
                *            *
146 KK          *     C599   *
                *            *
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149 KO          OUTPUT CONTROL VARIABLES
                      IFRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

 16 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN          5  TIME INTERVAL IN MINUTES
                     JXDATE      1   0  STARTING DATE
                     JXTIME          0  STARTING TIME

              SUBBASIN RUNOFF DATA

150 BA          SUBBASIN CHARACTERISTICS
                      TAREA       1.38  SUBBASIN AREA

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HYDROGRAPH AT STATION C599

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0230	31	6644.	1		0500	61	158.	1		0730	91	1.
1		0005	2	2.	1		0235	32	4812.	1		0505	62	149.	1		0735	92	1.
1		0010	3	7.	1		0240	33	3478.	1		0510	63	133.	1		0740	93	1.
1		0015	4	12.	1		0245	34	2598.	1		0515	64	118.	1		0745	94	1.
1		0020	5	23.	1		0250	35	2005.	1		0520	65	105.	1		0750	95	1.
1		0025	6	38.	1		0255	36	1606.	1		0525	66	94.	1		0755	96	1.
1		0030	7	52.	1		0300	37	1382.	1		0530	67	85.	1		0800	97	1.
1		0035	8	67.	1		0305	38	1220.	1		0535	68	79.	1		0805	98	1.
1		0040	9	82.	1		0310	39	1092.	1		0540	69	75.	1		0810	99	1.
1		0045	10	93.	1		0315	40	996.	1		0545	70	72.	1		0815	100	1.
1		0050	11	100.	1		0320	41	913.	1		0550	71	70.	1		0820	101	1.
1		0055	12	104.	1		0325	42	823.	1		0555	72	70.	1		0825	102	1.
1		0100	13	107.	1		0330	43	775.	1		0600	73	70.	1		0830	103	1.
1		0105	14	124.	1		0335	44	737.	1		0605	74	64.	1		0835	104	1.
1		0110	15	156.	1		0340	45	703.	1		0610	75	54.	1		0840	105	1.
1		0115	16	187.	1		0345	46	675.	1		0615	76	44.	1		0845	106	1.
1		0120	17	215.	1		0350	47	657.	1		0620	77	36.	1		0850	107	1.
1		0125	18	239.	1		0355	48	648.	1		0625	78	28.	1		0855	108	1.
1		0130	19	252.	1		0400	49	645.	1		0630	79	22.	1		0900	109	1.
1		0135	20	269.	1		0405	50	599.	1		0635	80	17.	1		0905	110	1.
1		0140	21	276.	1		0410	51	506.	1		0640	81	13.	1		0910	111	1.
1		0145	22	281.	1		0415	52	417.	1		0645	82	10.	1		0915	112	1.
1		0150	23	284.	1		0420	53	345.	1		0650	83	8.	1		0920	113	1.
1		0155	24	286.	1		0425	54	289.	1		0655	84	6.	1		0925	114	1.
1		0200	25	287.	1		0430	55	245.	1		0700	85	4.	1		0930	115	1.
1		0205	26	1604.	1		0435	56	212.	1		0705	86	3.	1		0935	116	1.
1		0210	27	4540.	1		0440	57	188.	1		0710	87	2.	1		0940	117	1.
1		0215	28	8672.	1		0445	58	172.	1		0715	88	2.	1		0945	118	1.

1	0220	29	10443.	*	1	0450	59	164.	*	1	0720	89	2.	*	1	0950	119	1.
1	0225	30	8846.	*	1	0455	60	160.	*	1	0725	90	1.	*	1	0955	120	1.
				*					*					*				

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
10443.	2.33	(CFS)	1038.	630.	630.	630.
		(INCHES)	6.996	7.013	7.013	7.013
		(AC-FT)	515.	516.	516.	516.

CUMULATIVE AREA = 1.38 SQ MI

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          **************
          *            *
161 KK    *     C599I  *
          *            *
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163 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

164 HC HYDROGRAPH COMBINATION

ICOMP	4	NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION C599I
SUM OF 4 HYDROGRAPHS

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	1556.	*	1		0230	31	45090.	*	1		0500	61	1545.	*	1		0730	91	179.
1		0005	2	1382.	*	1		0235	32	40808.	*	1		0505	62	1446.	*	1		0735	92	170.
1		0010	3	1092.	*	1		0240	33	29098.	*	1		0510	63	1346.	*	1		0740	93	162.
1		0015	4	905.	*	1		0245	34	24018.	*	1		0515	64	1251.	*	1		0745	94	154.
1		0020	5	772.	*	1		0250	35	20813.	*	1		0520	65	1161.	*	1		0750	95	147.
1		0025	6	674.	*	1		0255	36	17732.	*	1		0525	66	1075.	*	1		0755	96	141.
1		0030	7	601.	*	1		0300	37	14958.	*	1		0530	67	995.	*	1		0800	97	135.
1		0035	8	547.	*	1		0305	38	12615.	*	1		0535	68	923.	*	1		0805	98	130.
1		0040	9	509.	*	1		0310	39	10784.	*	1		0540	69	860.	*	1		0810	99	125.
1		0045	10	481.	*	1		0315	40	9367.	*	1		0545	70	799.	*	1		0815	100	121.
1		0050	11	463.	*	1		0320	41	8225.	*	1		0550	71	742.	*	1		0820	101	118.
1		0055	12	447.	*	1		0325	42	7274.	*	1		0555	72	691.	*	1		0825	102	114.
1		0100	13	432.	*	1		0330	43	6485.	*	1		0600	73	645.	*	1		0830	103	111.
1		0105	14	437.	*	1		0335	44	5838.	*	1		0605	74	602.	*	1		0835	104	109.
1		0110	15	460.	*	1		0340	45	5299.	*	1		0610	75	556.	*	1		0840	105	106.
1		0115	16	489.	*	1		0345	46	4878.	*	1		0615	76	513.	*	1		0845	106	104.

1	0120	17	521.	*	1	0350	47	4563.	*	1	0620	77	471.	*	1	0850	107	102.
1	0125	18	558.	*	1	0355	48	4308.	*	1	0625	78	430.	*	1	0855	108	100.
1	0130	19	592.	*	1	0400	49	4100.	*	1	0630	79	394.	*	1	0900	109	98.
1	0135	20	637.	*	1	0405	50	3881.	*	1	0635	80	364.	*	1	0905	110	96.
1	0140	21	680.	*	1	0410	51	3624.	*	1	0640	81	339.	*	1	0910	111	94.
1	0145	22	724.	*	1	0415	52	3356.	*	1	0645	82	316.	*	1	0915	112	93.
1	0150	23	768.	*	1	0420	53	3084.	*	1	0650	83	295.	*	1	0920	113	91.
1	0155	24	811.	*	1	0425	54	2807.	*	1	0655	84	275.	*	1	0925	114	89.
1	0200	25	860.	*	1	0430	55	2528.	*	1	0700	85	257.	*	1	0930	115	88.
1	0205	26	2267.	*	1	0435	56	2268.	*	1	0705	86	240.	*	1	0935	116	87.
1	0210	27	5765.	*	1	0440	57	2057.	*	1	0710	87	224.	*	1	0940	117	85.
1	0215	28	12042.	*	1	0445	58	1888.	*	1	0715	88	211.	*	1	0945	118	84.
1	0220	29	19255.	*	1	0450	59	1751.	*	1	0720	89	200.	*	1	0950	119	83.
1	0225	30	30866.	*	1	0455	60	1644.	*	1	0725	90	189.	*	1	0955	120	81.
				*					*					*				

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	9.92-HR
45090.	2.50	(CFS)	5627.	3485.	3485.	3485.
		(INCHES)	7.317	7.489	7.489	7.489
		(AC-FT)	2790.	2856.	2856.	2856.

CUMULATIVE AREA = 7.15 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	C536I	9960.	2.83	2044.	1244.	1244.	2.91		
ROUTED TO	C536O	9145.	2.92	2033.	1242.	1242.	2.91	1894.76	2.92
HYDROGRAPH AT	C584I	10016.	2.42	1192.	723.	723.	1.59		
ROUTED TO	C584O	9252.	2.50	1206.	739.	739.	1.59	1931.23	2.50
ROUTED TO	584598	8253.	2.58	1215.	746.	746.	1.59	1789.03	2.58
HYDROGRAPH AT	C578O	29206.	2.50	1860.	1143.	1143.	2.02		
ROUTED TO	578596	25366.	2.50	1873.	1157.	1157.	2.02	1755.25	2.50
HYDROGRAPH AT	C560I	7999.	2.58	1537.	935.	935.	2.16		
ROUTED TO	C560O	7458.	2.67	1515.	952.	952.	2.16	1840.63	2.67
ROUTED TO	560585	7456.	2.75	1515.	952.	952.	2.16	1769.59	2.75
HYDROGRAPH AT	C599	10443.	2.33	1038.	630.	630.	1.38		
4 COMBINED AT	C599I	45090.	2.50	5627.	3485.	3485.	7.15		

*** NORMAL END OF HEC-1 ***

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*            VERSION 4.0.1E            *
*                                      *
* RUN DATE  12/27/95  TIME  17:02:38   *
*                                      *
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****************************************
*
*    U.S. ARMY CORPS OF ENGINEERS
*    HYDROLOGIC ENGINEERING CENTER
*          609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*          (916) 551-1748
*
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X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X               X
XXXXXXX  XXXX    X       XXXXX   X
X     X  X       X               X
X     X  X       X     X         X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        FOUNTAIN HILLS DAM BREAK ANALYSIS
  2           ID        RESERVOIR ROUTING WITH OVERTOPPING ANALYSIS.    File Name:DAM4-RT.IH1
  3           ID        PRINCIPAL SPILLWAY IS CLOGGED
              *DIAGRAM
  4           IT       5       0       0     200
  5           IN       5
              *
              *

  6           KK   C599I
  7           KM        BASIN INFLOWS ABOVE DAM NO. 4 (DAM4-PM.IH1)
  8           KM        Basin Inflows for Dam 4 (Golden Eagle Park Dam)
  9           KM        50% PMF
 10           BA    7.15
 11           QI    1556    1382    1092     905     772     674     601     547     509     481
 12           QI     463     447     432     437     460     489     521     558     592     637
 13           QI     680     724     768     811     860    2267    5765   12042   19255   30866
 14           QI   45090   40808   29098   24018   20813   17732   14958   12615   10784    9367
 15           QI    8225    7274    6485    5838    5299    4878    4563    4308    4100    3881
 16           QI    3624    3356    3084    2807    2528    2268    2057    1888    1751    1644
 17           QI    1545    1446    1346    1251    1161    1075     995     923     860     799
 18           QI     742     691     645     602     556     513     471     430     394     364
 19           QI     339     316     295     275     257     240     224     211     200     189
 20           QI     179     170     162     154     147     141     135     130     125     121
 21           QI     118     114     111     109     106     104     102     100      98      96
 22           QI      94      93      91      89      88      87      85      84      83      81
 23           QI      80      79      77      76      75      74      73      72      71      70
 24           QI      69      68      67      66      65      64      63      62      61      61
 25           QI      60      59      58      57      57      56      55      54      53      53
 26           QI      52      51      51      50      49      49      48      47      47      46
 27           QI      45      45      44      44      43      42      42      41      41      40
 28           QI      40      39      39      38      38      37      37      36      36      35
 29           QI      35      34
              *
              *

 30           KK   C599O
 31           KM      Reservoir route at C599 (Dam 4).
 32           KO       1
 33           RS       1    ELEV 1716.60
 34           SV    0.00    0.03    0.47   16.85   80.85     107  116.14  136.00  156.22  179.00
 35           SV  200.89  214.00  226.00  252.10  281.00  310.47  344.00  376.60  413.00  450.02
 36           SE  1694.7  1700.0 1702.00 1708.00 1714.00 1715.50 1716.00 1717.00 1718.00  1719.0
 37           SE  1720.0 1720.50 1721.00 1722.00 1723.00 1724.00 1725.00 1726.00 1727.00  1728.0
 38           SQ       0       0       0       0       0     140     423    1499    3242    5537
 39           SQ    8182    9633   11151   14762   20877   28946   38754   49808   61727   74675
 40           SE  1694.7  1698.0  1700.0 1708.00 1714.00 1715.50 1716.00 1717.00 1718.00  1719.0
 41           SE  1720.0 1720.50 1721.00 1722.00 1723.00 1724.00 1725.00 1726.00 1727.00  1728.0
 42           ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    6       C599I
                V
                V
   30       C599O
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*                                      *
*  RUN DATE  12/27/95  TIME  17:02:38  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

FOUNTAIN HILLS DAM BREAK ANALYSIS
RESERVOIR ROUTING WITH OVERTOPPING ANALYSIS. File Name:DAM4-RT.IH1
PRINCIPAL SPILLWAY IS CLOGGED

```
  IT          HYDROGRAPH TIME DATA
                    NMIN          5  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1    0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      1    0  ENDING DATE
                  NDTIME       1635  ENDING TIME
                  ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL    0.08 HOURS
                   TOTAL TIME BASE   16.58 HOURS

        ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT
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          **************
          *            *
  6 KK    *     C599I  *
          *            *
          **************
```

BASIN INFLOWS ABOVE DAM NO. 4 (DAM4-PM.IH1)
Basin Inflows for Dam 4 (Golden Eagle Park Dam)
50% PMF

```
  5 IN        TIME DATA FOR INPUT TIME SERIES
                   JXMIN          5  TIME INTERVAL IN MINUTES
                  JXDATE      1    0  STARTING DATE
                  JXTIME          0  STARTING TIME

            SUBBASIN RUNOFF DATA
```

10 BA SUBBASIN CHARACTERISTICS

TAREA 7.15 SUBBASIN AREA

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HYDROGRAPH AT STATION C599I

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	1556.	1		0410	51	3624.	1		0820	101	118.	1		1230	151	52.
1		0005	2	1382.	1		0415	52	3356.	1		0825	102	114.	1		1235	152	51.
1		0010	3	1092.	1		0420	53	3084.	1		0830	103	111.	1		1240	153	51.
1		0015	4	905.	1		0425	54	2807.	1		0835	104	109.	1		1245	154	50.
1		0020	5	772.	1		0430	55	2528.	1		0840	105	106.	1		1250	155	49.
1		0025	6	674.	1		0435	56	2268.	1		0845	106	104.	1		1255	156	49.
1		0030	7	601.	1		0440	57	2057.	1		0850	107	102.	1		1300	157	48.
1		0035	8	547.	1		0445	58	1888.	1		0855	108	100.	1		1305	158	47.
1		0040	9	509.	1		0450	59	1751.	1		0900	109	98.	1		1310	159	47.
1		0045	10	481.	1		0455	60	1644.	1		0905	110	96.	1		1315	160	46.
1		0050	11	463.	1		0500	61	1545.	1		0910	111	94.	1		1320	161	45.
1		0055	12	447.	1		0505	62	1446.	1		0915	112	93.	1		1325	162	45.
1		0100	13	432.	1		0510	63	1346.	1		0920	113	91.	1		1330	163	44.
1		0105	14	437.	1		0515	64	1251.	1		0925	114	89.	1		1335	164	44.
1		0110	15	460.	1		0520	65	1161.	1		0930	115	88.	1		1340	165	43.
1		0115	16	489.	1		0525	66	1075.	1		0935	116	87.	1		1345	166	42.
1		0120	17	521.	1		0530	67	995.	1		0940	117	85.	1		1350	167	42.
1		0125	18	558.	1		0535	68	923.	1		0945	118	84.	1		1355	168	41.
1		0130	19	592.	1		0540	69	860.	1		0950	119	83.	1		1400	169	41.
1		0135	20	637.	1		0545	70	799.	1		0955	120	81.	1		1405	170	40.
1		0140	21	680.	1		0550	71	742.	1		1000	121	80.	1		1410	171	40.
1		0145	22	724.	1		0555	72	691.	1		1005	122	79.	1		1415	172	39.
1		0150	23	768.	1		0600	73	645.	1		1010	123	77.	1		1420	173	39.
1		0155	24	811.	1		0605	74	602.	1		1015	124	76.	1		1425	174	38.
1		0200	25	860.	1		0610	75	556.	1		1020	125	75.	1		1430	175	38.
1		0205	26	2267.	1		0615	76	513.	1		1025	126	74.	1		1435	176	37.
1		0210	27	5765.	1		0620	77	471.	1		1030	127	73.	1		1440	177	37.
1		0215	28	12042.	1		0625	78	430.	1		1035	128	72.	1		1445	178	36.
1		0220	29	19255.	1		0630	79	394.	1		1040	129	71.	1		1450	179	36.
1		0225	30	30866.	1		0635	80	364.	1		1045	130	70.	1		1455	180	35.
1		0230	31	45090.	1		0640	81	339.	1		1050	131	69.	1		1500	181	35.
1		0235	32	40808.	1		0645	82	316.	1		1055	132	68.	1		1505	182	34.
1		0240	33	29098.	1		0650	83	295.	1		1100	133	67.	1		1510	183	34.
1		0245	34	24018.	1		0655	84	275.	1		1105	134	66.	1		1515	184	34.
1		0250	35	20813.	1		0700	85	257.	1		1110	135	65.	1		1520	185	34.
1		0255	36	17732.	1		0705	86	240.	1		1115	136	64.	1		1525	186	34.
1		0300	37	14958.	1		0710	87	224.	1		1120	137	63.	1		1530	187	34.
1		0305	38	12615.	1		0715	88	211.	1		1125	138	62.	1		1535	188	34.
1		0310	39	10784.	1		0720	89	200.	1		1130	139	61.	1		1540	189	34.
1		0315	40	9367.	1		0725	90	189.	1		1135	140	61.	1		1545	190	34.
1		0320	41	8225.	1		0730	91	179.	1		1140	141	60.	1		1550	191	34.
1		0325	42	7274.	1		0735	92	170.	1		1145	142	59.	1		1555	192	34.
1		0330	43	6485.	1		0740	93	162.	1		1150	143	58.	1		1600	193	34.
1		0335	44	5838.	1		0745	94	154.	1		1155	144	57.	1		1605	194	34.
1		0340	45	5299.	1		0750	95	147.	1		1200	145	57.	1		1610	195	34.
1		0345	46	4878.	1		0755	96	141.	1		1205	146	56.	1		1615	196	34.

1	0350	47	4563.	*	1	0800	97	135.	*	1	1210	147	55.	*	1	1620	197	34.
1	0355	48	4308.	*	1	0805	98	130.	*	1	1215	148	54.	*	1	1625	198	34.
1	0400	49	4100.	*	1	0810	99	125.	*	1	1220	149	53.	*	1	1630	199	34.
1	0405	50	3881.	*	1	0815	100	121.	*	1	1225	150	53.	*	1	1635	200	34.
				*					*					*				

****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	16.58-HR
45090.	2.50	(CFS)	5627.	2104.	2104.	2104.
		(INCHES)	7.317	7.560	7.560	7.560
		(AC-FT)	2790.	2883.	2883.	2883.

CUMULATIVE AREA = 7.15 SQ MI

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          **************
          *            *
30 KK     *     C5990  *
          *            *
          **************
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Reservoir route at C599 (Dam 4).

32 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

33 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	1716.60	INITIAL CONDITION
X	0.00	WORKING R AND D COEFFICIENT

34 SV STORAGE	0.0	0.0	0.5	16.9	80.8	107.0	116.1	136.0	156.2	179.0
	200.9	214.0	226.0	252.1	281.0	310.5	344.0	376.6	413.0	450.0
36 SE ELEVATION	1694.70	1700.00	1702.00	1708.00	1714.00	1715.50	1716.00	1717.00	1718.00	1719.00
	1720.00	1720.50	1721.00	1722.00	1723.00	1724.00	1725.00	1726.00	1727.00	1728.00
38 SQ DISCHARGE	0.	0.	0.	0.	0.	140.	423.	1499.	3242.	5537.
	8182.	9633.	11151.	14762.	20877.	28946.	38754.	49808.	61727.	74675.
40 SE ELEVATION	1694.70	1698.00	1700.00	1708.00	1714.00	1715.50	1716.00	1717.00	1718.00	1719.00
	1720.00	1720.50	1721.00	1722.00	1723.00	1724.00	1725.00	1726.00	1727.00	1728.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.02	0.03	0.47	16.85	80.85	107.00	116.14	136.00	156.22
OUTFLOW	0.00	0.00	0.00	0.00	0.00	0.00	140.00	423.00	1499.00	3242.00
ELEVATION	1694.70	1698.00	1700.00	1702.00	1708.00	1714.00	1715.50	1716.00	1717.00	1718.00

STORAGE	179.00	200.89	214.00	226.00	252.10	281.00	310.47	344.00	376.60	413.00
OUTFLOW	5537.00	8182.00	9633.00	11151.00	14762.00	20877.00	28946.00	38754.00	49808.00	61727.00
ELEVATION	1719.00	1720.00	1720.50	1721.00	1722.00	1723.00	1724.00	1725.00	1726.00	1727.00

STORAGE	450.02
OUTFLOW	74675.00
ELEVATION	1728.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 28946. TO 74675.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

****

HYDROGRAPH AT STATION C5990

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	1069.	128.1	1716.6	*	1		0535	68	1131.	129.2	1716.7	*	1		1110	135	98.	99.2	1715.1
1		0005	2	1194.	130.4	1716.7	*	1		0540	69	1056.	127.8	1716.6	*	1		1115	136	97.	99.0	1715.0
1		0010	3	1208.	130.6	1716.7	*	1		0545	70	985.	126.5	1716.5	*	1		1120	137	96.	98.7	1715.0
1		0015	4	1142.	129.4	1716.7	*	1		0550	71	917.	125.3	1716.5	*	1		1125	138	95.	98.5	1715.0
1		0020	5	1047.	127.6	1716.6	*	1		0555	72	854.	124.1	1716.4	*	1		1130	139	93.	98.3	1715.0
1		0025	6	945.	125.8	1716.5	*	1		0600	73	796.	123.0	1716.3	*	1		1135	140	92.	98.1	1715.0
1		0030	7	848.	124.0	1716.4	*	1		0605	74	742.	122.0	1716.3	*	1		1140	141	91.	97.9	1715.0
1		0035	8	762.	122.4	1716.3	*	1		0610	75	690.	121.1	1716.2	*	1		1145	142	90.	97.6	1715.0
1		0040	9	688.	121.0	1716.2	*	1		0615	76	641.	120.2	1716.2	*	1		1150	143	89.	97.4	1715.0
1		0045	10	628.	119.9	1716.2	*	1		0620	77	594.	119.3	1716.2	*	1		1155	144	88.	97.2	1714.9
1		0050	11	579.	119.0	1716.1	*	1		0625	78	549.	118.5	1716.1	*	1		1200	145	87.	97.0	1714.9
1		0055	12	540.	118.3	1716.1	*	1		0630	79	506.	117.7	1716.1	*	1		1205	146	85.	96.8	1714.9
1		0100	13	508.	117.7	1716.1	*	1		0635	80	466.	116.9	1716.0	*	1		1210	147	84.	96.6	1714.9
1		0105	14	485.	117.3	1716.1	*	1		0640	81	430.	116.3	1716.0	*	1		1215	148	83.	96.4	1714.9
1		0110	15	474.	117.1	1716.0	*	1		0645	82	408.	115.6	1716.0	*	1		1220	149	82.	96.2	1714.9
1		0115	16	474.	117.1	1716.0	*	1		0650	83	388.	115.0	1715.9	*	1		1225	150	81.	96.0	1714.9
1		0120	17	484.	117.3	1716.1	*	1		0655	84	368.	114.4	1715.9	*	1		1230	151	80.	95.8	1714.9
1		0125	18	501.	117.6	1716.1	*	1		0700	85	348.	113.7	1715.9	*	1		1235	152	79.	95.6	1714.8
1		0130	19	524.	118.0	1716.1	*	1		0705	86	329.	113.1	1715.8	*	1		1240	153	78.	95.4	1714.8
1		0135	20	553.	118.5	1716.1	*	1		0710	87	310.	112.5	1715.8	*	1		1245	154	77.	95.2	1714.8
1		0140	21	586.	119.1	1716.2	*	1		0715	88	293.	111.9	1715.8	*	1		1250	155	76.	95.1	1714.8
1		0145	22	622.	119.8	1716.2	*	1		0720	89	276.	111.4	1715.7	*	1		1255	156	75.	94.9	1714.8
1		0150	23	661.	120.5	1716.2	*	1		0725	90	260.	110.9	1715.7	*	1		1300	157	74.	94.7	1714.8
1		0155	24	702.	121.3	1716.3	*	1		0730	91	245.	110.4	1715.7	*	1		1305	158	73.	94.5	1714.8
1		0200	25	744.	122.1	1716.3	*	1		0735	92	232.	110.0	1715.7	*	1		1310	159	72.	94.3	1714.8
1		0205	26	1002.	126.8	1716.5	*	1		0740	93	219.	109.6	1715.6	*	1		1315	160	71.	94.2	1714.8
1		0210	27	2155.	143.6	1717.4	*	1		0745	94	207.	109.2	1715.6	*	1		1320	161	70.	94.0	1714.8
1		0215	28	5495.	178.6	1719.0	*	1		0750	95	196.	108.8	1715.6	*	1		1325	162	69.	93.8	1714.7
1		0220	29	11435.	228.1	1721.1	*	1		0755	96	186.	108.5	1715.6	*	1		1330	163	69.	93.6	1714.7
1		0225	30	22058.	285.3	1723.1	*	1		0800	97	177.	108.2	1715.6	*	1		1335	164	68.	93.5	1714.7
1		0230	31	37801.	340.7	1724.9	*	1		0805	98	168.	107.9	1715.6	*	1		1340	165	67.	93.3	1714.7
1		0235	32	43277.	357.3	1725.4	*	1		0810	99	161.	107.7	1715.5	*	1		1345	166	66.	93.2	1714.7
1		0240	33	34613.	329.8	1724.6	*	1		0815	100	153.	107.4	1715.5	*	1		1350	167	65.	93.0	1714.7
1		0245	34	26608.	301.9	1723.7	*	1		0820	101	147.	107.2	1715.5	*	1		1355	168	64.	92.8	1714.7
1		0250	35	22539.	287.1	1723.2	*	1		0825	102	141.	107.0	1715.5	*	1		1400	169	63.	92.7	1714.7
1		0255	36	19567.	274.8	1722.8	*	1		0830	103	139.	106.8	1715.5	*	1		1405	170	63.	92.5	1714.7
1		0300	37	16851.	262.0	1722.3	*	1		0835	104	138.	106.6	1715.5	*	1		1410	171	62.	92.4	1714.7
1		0305	38	14383.	249.4	1721.9	*	1		0840	105	137.	106.4	1715.5	*	1		1415	172	61.	92.2	1714.7
1		0310	39	12651.	236.8	1721.4	*	1		0845	106	136.	106.2	1715.5	*	1		1420	173	60.	92.1	1714.6

1	0315	40	10999.	224.8	1720.9	*	1	0850	107	135.	106.0	1715.4	*	1	1425	174	59.	91.9	1714.6
1	0320	41	9662.	214.2	1720.5	*	1	0855	108	133.	105.8	1715.4	*	1	1430	175	59.	91.8	1714.6
1	0325	42	8604.	204.7	1720.1	*	1	0900	109	132.	105.5	1715.4	*	1	1435	176	58.	91.6	1714.6
1	0330	43	7618.	196.2	1719.8	*	1	0905	110	131.	105.3	1715.4	*	1	1440	177	57.	91.5	1714.6
1	0335	44	6762.	189.1	1719.5	*	1	0910	111	130.	105.1	1715.4	*	1	1445	178	56.	91.4	1714.6
1	0340	45	6061.	183.3	1719.2	*	1	0915	112	128.	104.8	1715.4	*	1	1450	179	56.	91.2	1714.6
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1	0515	64	1446.	135.0	1717.0	*	1	1050	131	103.	100.1	1715.1	*	1	1625	198	45.	89.2	1714.5
1	0520	65	1370.	133.6	1716.9	*	1	1055	132	102.	99.9	1715.1	*	1	1630	199	44.	89.1	1714.5
1	0525	66	1291.	132.2	1716.8	*	1	1100	133	101.	99.7	1715.1	*	1	1635	200	44.	89.1	1714.5
1	0530	67	1211.	130.7	1716.7	*	1	1105	134	99.	99.4	1715.1	*						
						*							*						

****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	16.58-HR
43277.	2.58	(CFS)	5637.	2132.	2132.	2132.
		(INCHES)	7.330	7.663	7.663	7.663
		(AC-FT)	2795.	2922.	2922.	2922.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	16.58-HR
357.	2.58	164.	123.	123.	123.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	16.58-HR
1725.41	2.58	1718.15	1716.21	1716.21	1716.21

CUMULATIVE AREA = 7.15 SQ MI

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	C599I	45090.	2.50	5627.	2104.	2104.	7.15		
ROUTED TO	C599O	43277.	2.58	5637.	2132.	2132.	7.15	1725.41	2.58

*** NORMAL END OF HEC-1 ***

APPENDIX Q

Breach Program output for Golden Eagle Park Dam (piping)

B O S S B R E A C H (tm)

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Version : 1.10
Serial Number : 2111

PROGRAM ORIGIN :

Boss Breach (tm) is an enhanced version of Professor D. L. Fread's July 1988 NWS BREACH program.

DISCLAIMER :

Boss Breach (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 Breach 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 : Fountain Hills Dambreak Analysis
PROJECT NUMBER : #83
DESCRIPTION : Breaching Analysis of Golden Eagle Dam
ENGINEER : CCC
DATE OF RUN : 12/20/1995
TIME OF RUN : 2:38 pm

PROJECT TITLE : Fountain Hills Dambreak Analysis

PROJECT NUMBER : #83 12/20/1995

INPUT DATA :

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TIN(I) (hr)	Upstream Inflow QIN(I) (cfs)
.00	18604.0
.03	20506.0
.12	31826.0
.20	45092.0
.28	38351.0
.62	18763.0
1.28	8069.0
2.12	3609.0

RESERVOIR VOLUME DESCRIPTION :

Elevation HSA(I) (ft MSL)	Surface Area RSA(I) (acres)
1726.00	35.0
1724.00	31.1
1722.00	27.3
1720.00	24.0
1716.00	19.4
1712.00	12.2
1702.00	.4
1694.70	.0

TAILWATER CROSS-SECTION DESCRIPTION :

Elevation HSTW(I) (ft MSL)	Tailwater Top Width BSTW(I) (ft)	Tailwater Manning n CMTW(I)
1690.30	.0	.0500
1693.00	85.3	.0500
1696.00	128.0	.0500
1699.00	154.4	.0500
1700.50	226.7	.0500
1702.00	657.5	.0500
1708.00	808.2	.0500
1711.00	835.5	.0500

PROJECT TITLE : Fountain Hills Dambreak Analysis

PROJECT NUMBER : #83 12/20/1995

RESERVOIR AND PIPING BREACH DESCRIPTION :

Initial Reservoir Water Surface Elevation (ft MSL, HI)	1721.50
Dam Bottom Elevation (ft MSL, HL)	1694.70
Dam Top Elevation (ft MSL, HU)	1721.50
Spillway Crest Elevation (ft MSL, HSP)	1714.90
Dam Crest Length (ft, CRL)	660.00
Dam Crest Width (ft, WC)	12.00
Ratio of Breach Width to Flow Depth (BR)	1.000
Initial Piping Failure Width (ft, H)	.10
Initial Piping Failure Elevation (ft MSL, HPI)	1694.70

DAM INNER CORE DESCRIPTION :

D50 Grain Size (mm, D50C)		.700
Ratio of D90 to D30 Grain Sizes (UNFCC)		118.000
Porosity Ratio (PORC)		.250
Unit Weight (lb/cu ft, UWC)		125.00
Manning n of Core Material (CNC)		1.0000
Internal Friction Angle (degrees, AFRC)		38.00
Cohesive Strength (lb/sq ft, COHC)		200.00
Average Upstream & Downstream Inner Core Slope (ZC)	1 :	.50

DAM OUTER CORE DESCRIPTION :

D50 Grain Size (mm, D50S)	7.100
Ratio of D90 to D30 Grain Sizes (UNFCS)	22.100
Porosity Ratio (PORS)	.300
Unit Weight (lb/cu ft, UWS)	120.00
Manning n of Core Material (CNS)	1.0000
Internal Friction Angle (degrees, AFRS)	40.00
Cohesive Strength (lb/sq ft, COHS)	.00
Average Clay Plasticity Index (PI)	7.00
CA Clay Critical Shear Stress Coefficient (CA)	.000
CB Clay Critical Shear Stress Coefficient (CB)	.000

DAM FACE DESCRIPTION :

Upstream Face Slope (ZU)	1 (vertical) :	2.00
Downstream Face Slope (ZD)	1 (vertical) :	2.00
Downstream Face D50 Grain Size (mm, D50DF)		16.100
Downstream Face D90 to D30 Grain Size Ratio (UNFCDF)		10.900
Average Grass Length (inches, GL)		4.00
Grass Condition Factor (1=good, 0=none, GS)		.25
Maximum Grass-Lined Channel Velocity (ft/sec, VMP)		.00

BOUNDARY CONDITIONS :

Simulation Duration (hr, TEH)	2.12
Basic Time-Step Size (hr, DTH)	.001
Iteration Error Tolerance (%, ERR)	.01
Downstream River Bottom Slope (ft/mi, SM)	110.000
Maximum Allowable Breach Bottom Width (ft, BMX)	400.000
Discharge Plot Time-Step Interval (FPT)	10.00
Time-step at which Plotting Starts (TPR)	.00

INPUT DATA :

SPILLWAY RATING CURVE :

Head SPH(I) (ft)	Spillway Flow SPQ(I) (cfs)
.00	.0
1.10	431.0
2.10	1499.0
3.60	4336.0
5.10	8182.0
7.10	14434.0
9.10	21870.0
11.10	30367.0

INTERNAL COMPUTATION CHECKS :

Avg. inner & outer matl. internal friction angle (rad, AFRA)	39.00
Equation 21 Theta1' (radians, TH1)	65.00
Equation 13 Critical Depth H1' (ft, H1)	.07
Equation 21 Theta2' (radians, TH2)	52.00
Equation 13 Critical Depth H2' (ft, H2)	22.84
Equation 21 Theta3' (radians, TH3)	45.00
Equation 13 Critical Depth H3' (ft, H3)	133.79

SUMMARY OF OUTPUT RESULTS :

GENERAL RESULTS :

Total Number of Iterations	0
Time of Breach Failure (hr, TFHI)	.15
Total Time-Steps Used (I)	3999
Total Elapsed Time (hr, T)	1.000
Outflow Hydrograph Rising Limb Duration (hr, TRS)	.217
Time at which Significant Rise in Outflow Begins (hr, TB)	.000
Dam Top Elevation (ft MSL, HU)	1721.50
Outflow at Time Zero (cfs, QO)	.0
Simplified Time of Breach Failure (hr, TFH)	-.924

TFH - Time of failure (hr) which is a linear equivalent of the outflow hydrograph rising limb duration (TRS) obtained by using the simplified dam-break discharge equation.

TFHI - Time of failure (hr) which is a linear equivalent of the outflow hydrograph rising limb duration (TRS) obtained by integrating breach outflow (QB) versus time from T=0 to T=Peak Outflow (TP).

OUTPUT RESULTS AT TIME OF PEAK OUTFLOW :

Elapsed Time (hr, TP)	.217
Spillway Outflow (cfs)	23127.
Breach Outflow (cfs, QBP)	23260.
Total Outflow (cfs, QP)	46387.
Breach Top Width (ft, BRW)	26.8
Breach Bottom Width (ft, BO)	26.8
Breach Side Slope Relative to Vertical (degrees, Z)	.00

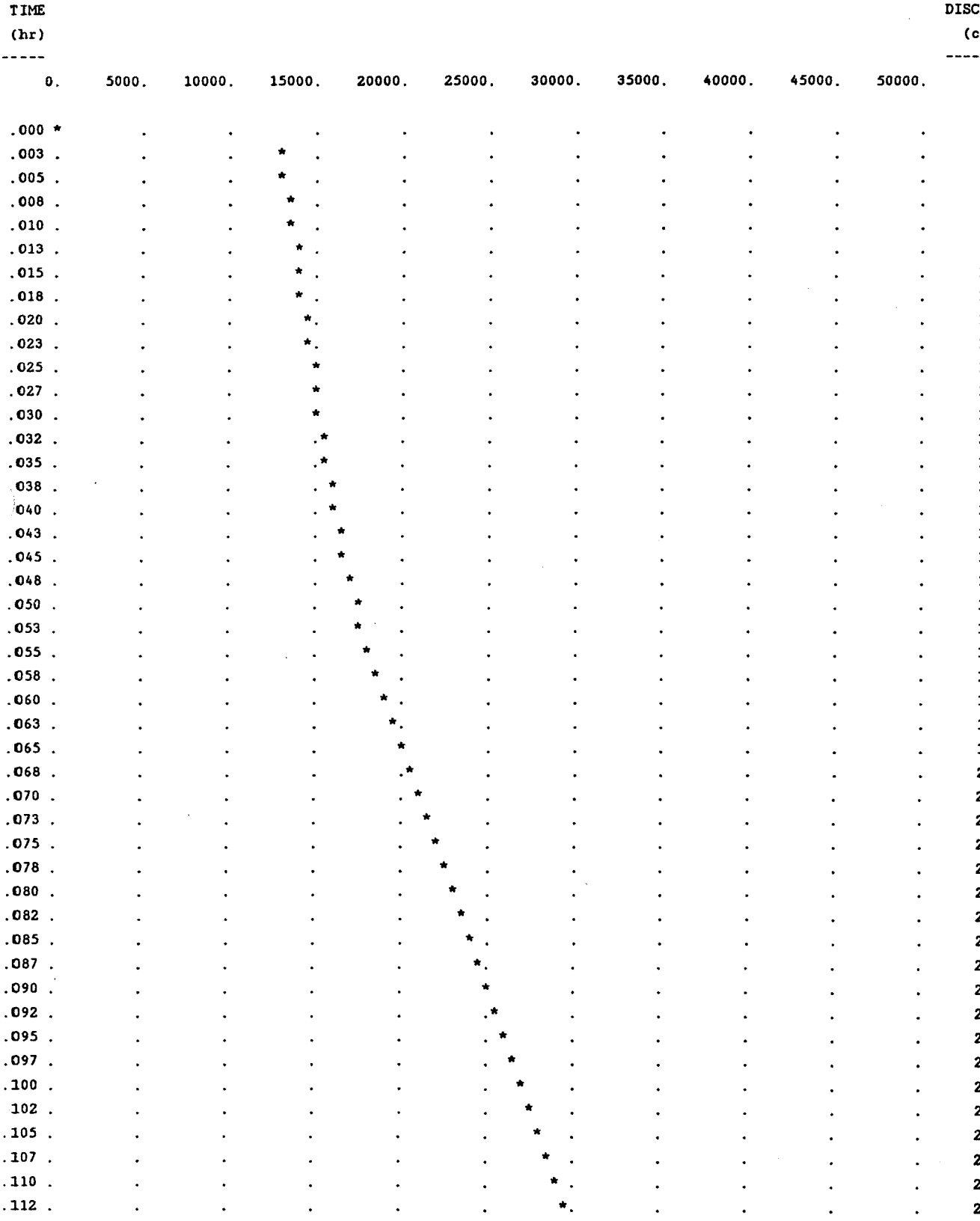
OUTPUT RESULTS AT END OF BREACH ANALYSIS :

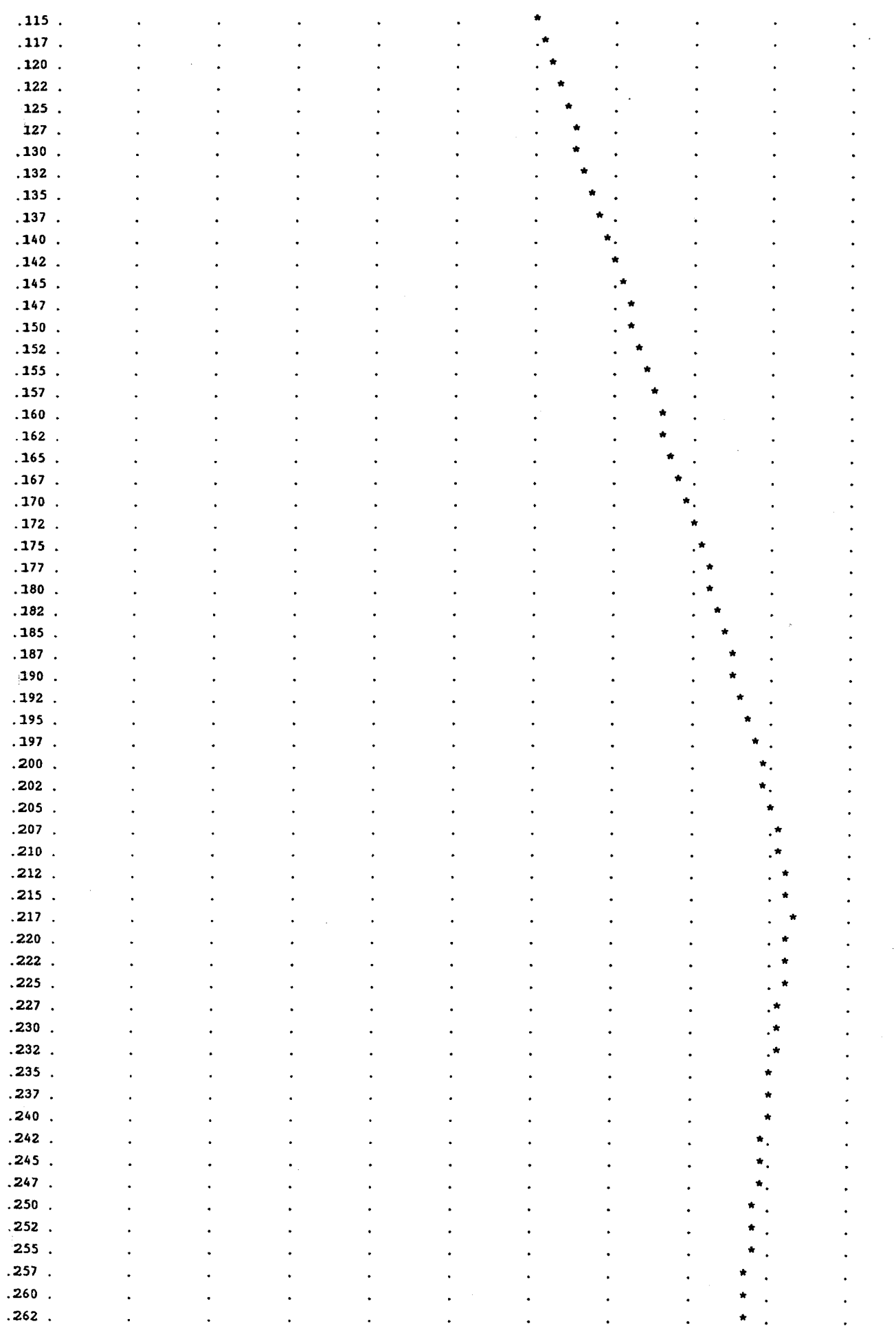
Breach Depth (ft, BRD)	26.8
Breach Bottom Elevation (ft MSL, HC)	1694.7
Breach Side Slope Relative to Vertical (degrees, AGL)	38.00
Reservoir Water Surface Elevation (ft MSL, HY)	1711.2

PROJECT TITLE : Fountain Hills Dambreak Analysis

PROJECT NUMBER : #83 12/20/1995

OUTPUT HYDROGRAPH PLOT :

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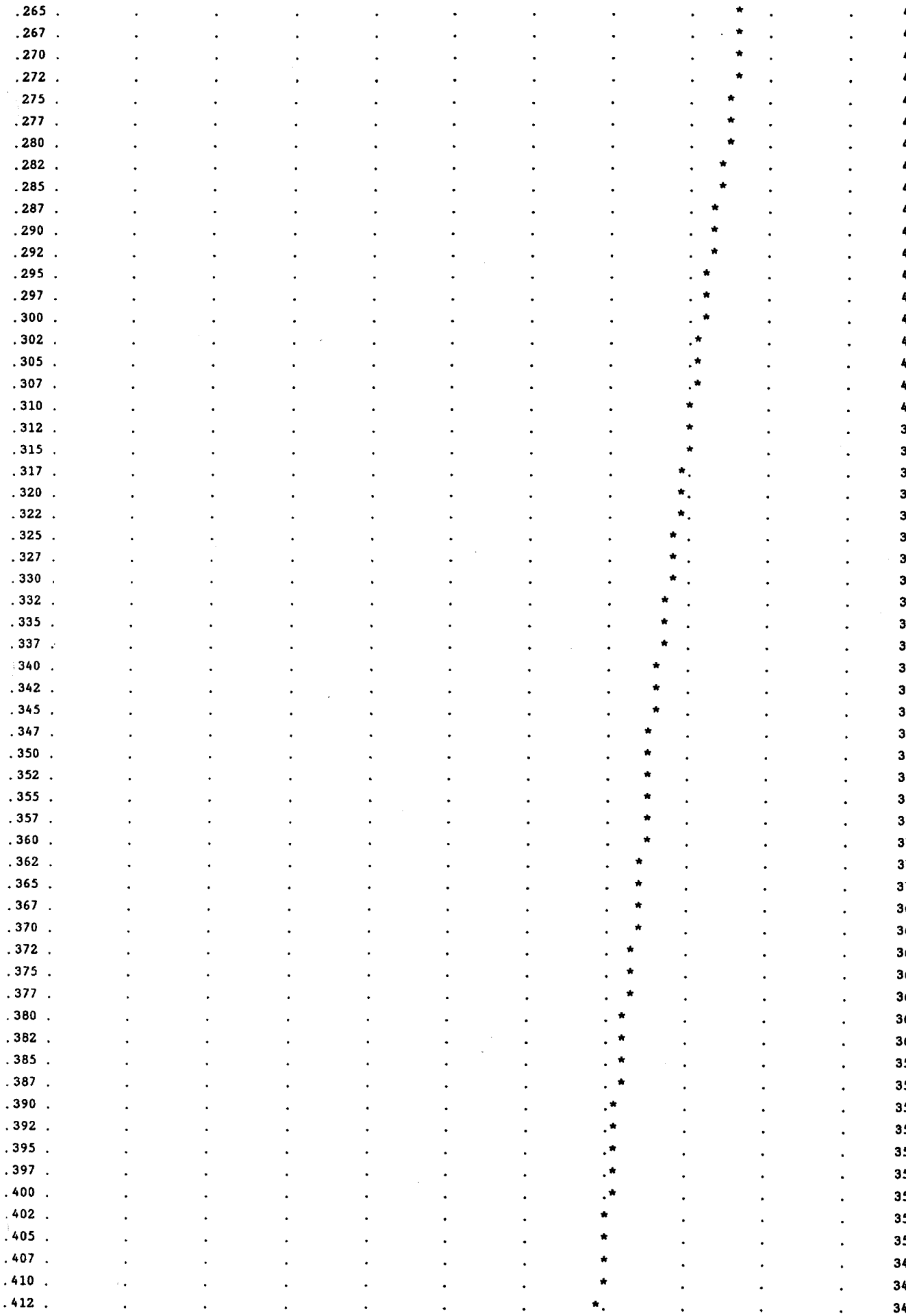
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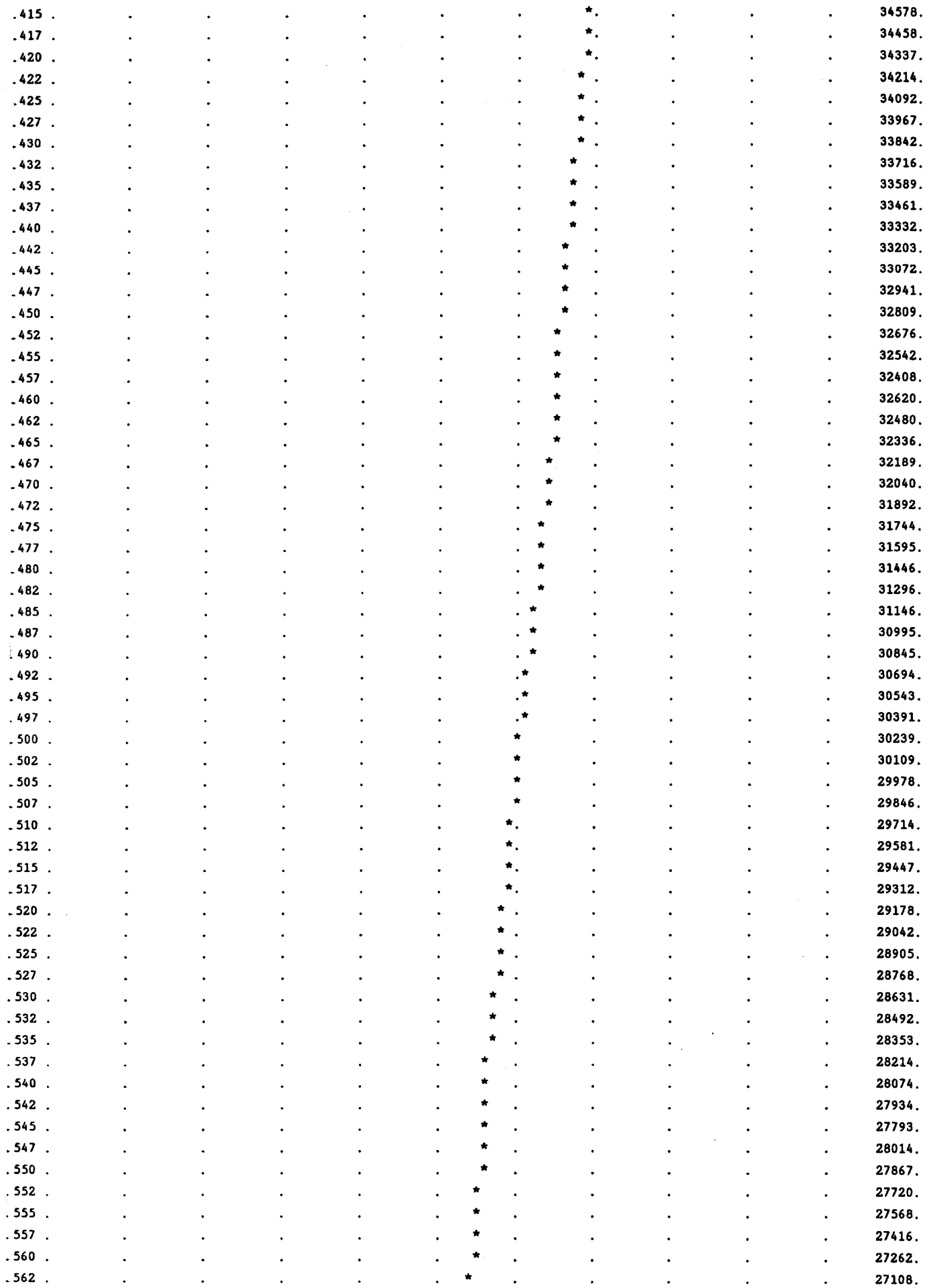
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END OF OUTPUT

APPENDIX R

Breach Program output for Golden Eagle Park Dam (overtopping)

B O S S B R E A C H (tm)

Copyright (C) 1988 Boss Corporation
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Version : 1.10
Serial Number : 2111

PROGRAM ORIGIN :

Boss Breach (tm) is an enhanced version of Professor D. L. Fread's July 1988 NWS BREACH program.

DISCLAIMER :

Boss Breach (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 Breach 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 : Fountain Hills Dambreak Analysis
PROJECT NUMBER : #83
DESCRIPTION : Breaching Analysis of Golden Eagle Dam
ENGINEER : CCC
DATE OF RUN : 12/20/1995
TIME OF RUN : 2:36 pm

INPUT DATA :

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TIN(I) (hr)	Upstream Inflow QIN(I) (cfs)
.00	18604.0
.03	20506.0
.12	31826.0
.20	45092.0
.28	38351.0
.62	18763.0
1.28	8069.0
2.12	3609.0

RESERVOIR VOLUME DESCRIPTION :

Elevation HSA(I) (ft MSL)	Surface Area RSA(I) (acres)
1726.00	35.0
1724.00	31.1
1722.00	27.3
1720.00	24.0
1716.00	19.4
1712.00	12.2
1702.00	.4
1694.70	.0

TAILWATER CROSS-SECTION DESCRIPTION :

Elevation HSTW(I) (ft MSL)	Tailwater Top Width BSTW(I) (ft)	Tailwater Manning n CMTW(I)
1690.30	.0	.0500
1693.00	85.3	.0500
1696.00	128.0	.0500
1699.00	154.4	.0500
1700.50	226.7	.0500
1702.00	657.5	.0500
1708.00	808.2	.0500
1711.00	835.5	.0500

RESERVOIR AND OVERTOPPING BREACH DESCRIPTION :

Initial Reservoir Water Surface Elevation (ft MSL, HI)	1721.50
Dam Bottom Elevation (ft MSL, HL)	1694.70
Dam Top Elevation (ft MSL, HU)	1721.50
Spillway Crest Elevation (ft MSL, HSP)	1714.90
Dam Crest Length (ft, CRL)	660.00
Dam Crest Width (ft, WC)	12.00
Ratio of Breach Width to Flow Depth (BR)	2.000
Initial Breach Depth on Downstream Face (ft, H)	1.0000

DAM INNER CORE DESCRIPTION :

D50 Grain Size (mm, D50C)		.700
Ratio of D90 to D30 Grain Sizes (UNFCC)		118.000
Porosity Ratio (PORC)		.250
Unit Weight (lb/cu ft, UWC)		125.00
Manning n of Core Material (CNC)		1.0000
Internal Friction Angle (degrees, AFRC)		38.00
Cohesive Strength (lb/sq ft, COHC)		200.00
Average Upstream & Downstream Inner Core Slope (ZC)	1 :	.50

DAM OUTER CORE DESCRIPTION :

D50 Grain Size (mm, D50S)	7.100
Ratio of D90 to D30 Grain Sizes (UNFCS)	22.100
Porosity Ratio (PORS)	.300
Unit Weight (lb/cu ft, UWS)	120.00
Manning n of Core Material (CNS)	1.0000
Internal Friction Angle (degrees, AFRS)	40.00
Cohesive Strength (lb/sq ft, COHS)	.00
Average Clay Plasticity Index (PI)	7.00
CA Clay Critical Shear Stress Coefficient (CA)	.000
CB Clay Critical Shear Stress Coefficient (CB)	.000

DAM FACE DESCRIPTION :

Upstream Face Slope (ZU)	1 (vertical) :	2.00
Downstream Face Slope (ZD)	1 (vertical) :	2.00
Downstream Face D50 Grain Size (mm, D50DF)		16.100
Downstream Face D90 to D30 Grain Size Ratio (UNFCDF)		10.900
Average Grass Length (inches, GL)		4.00
Grass Condition Factor (1=good, 0=none, GS)		.25
Maximum Grass-Lined Channel Velocity (ft/sec, VMP)		.00

BOUNDARY CONDITIONS :

Simulation Duration (hr, TEH)	2.12
Basic Time-Step Size (hr, DTH)	.001
Iteration Error Tolerance (%, ERR)	.01
Downstream River Bottom Slope (ft/mi, SM)	110.000
Maximum Allowable Breach Bottom Width (ft, BMX)	400.000
Discharge Plot Time-Step Interval (FPT)	10.00
Time-step at which Plotting Starts (TPR)	.00

INPUT DATA :

SPILLWAY RATING CURVE :

Head SPH(I) (ft)	Spillway Flow SPQ(I) (cfs)
.00	.0
1.10	431.0
2.10	1499.0
3.60	4336.0
5.10	8182.0
7.10	14434.0
9.10	21870.0
11.10	30367.0

INTERNAL COMPUTATION CHECKS :

Avg. inner & outer matl. internal friction angle (rad, AFRA)	39.00
Equation 21 Theta1' (radians, TH1)	65.00
Equation 13 Critical Depth H1' (ft, H1)	.07
Equation 21 Theta2' (radians, TH2)	52.00
Equation 13 Critical Depth H2' (ft, H2)	22.84
Equation 21 Theta3' (radians, TH3)	45.00
Equation 13 Critical Depth H3' (ft, H3)	133.79

SUMMARY OF OUTPUT RESULTS :

GENERAL RESULTS :

Total Number of Iterations	0
Time of Breach Failure (hr, TFHI)	.70
Total Time-Steps Used (I)	2131
Total Elapsed Time (hr, T)	2.118
Outflow Hydrograph Rising Limb Duration (hr, TRS)	.245
Time at which Significant Rise in Outflow Begins (hr, TB)	.089
Dam Top Elevation (ft MSL, HU)	1721.50
Outflow at Time Zero (cfs, QO)	.0
Simplified Time of Breach Failure (hr, TFH)	.226

TFH - Time of failure (hr) which is a linear equivalent of the outflow hydrograph rising limb duration (TRS) obtained by using the simplified dam-break discharge equation.

TFHI - Time of failure (hr) which is a linear equivalent of the outflow hydrograph rising limb duration (TRS) obtained by integrating breach outflow (QB) versus time from T=0 to T=Peak Outflow (TP).

OUTPUT RESULTS AT TIME OF PEAK OUTFLOW :

Elapsed Time (hr, TP)	.246
Spillway Outflow (cfs)	16985.
Breach Outflow (cfs, QBP)	26448.
Total Outflow (cfs, QP)	43434.
Breach Top Width (ft, BRW)	98.5
Breach Bottom Width (ft, BO)	73.5
Breach Side Slope Relative to Vertical (degrees, Z)	25.00

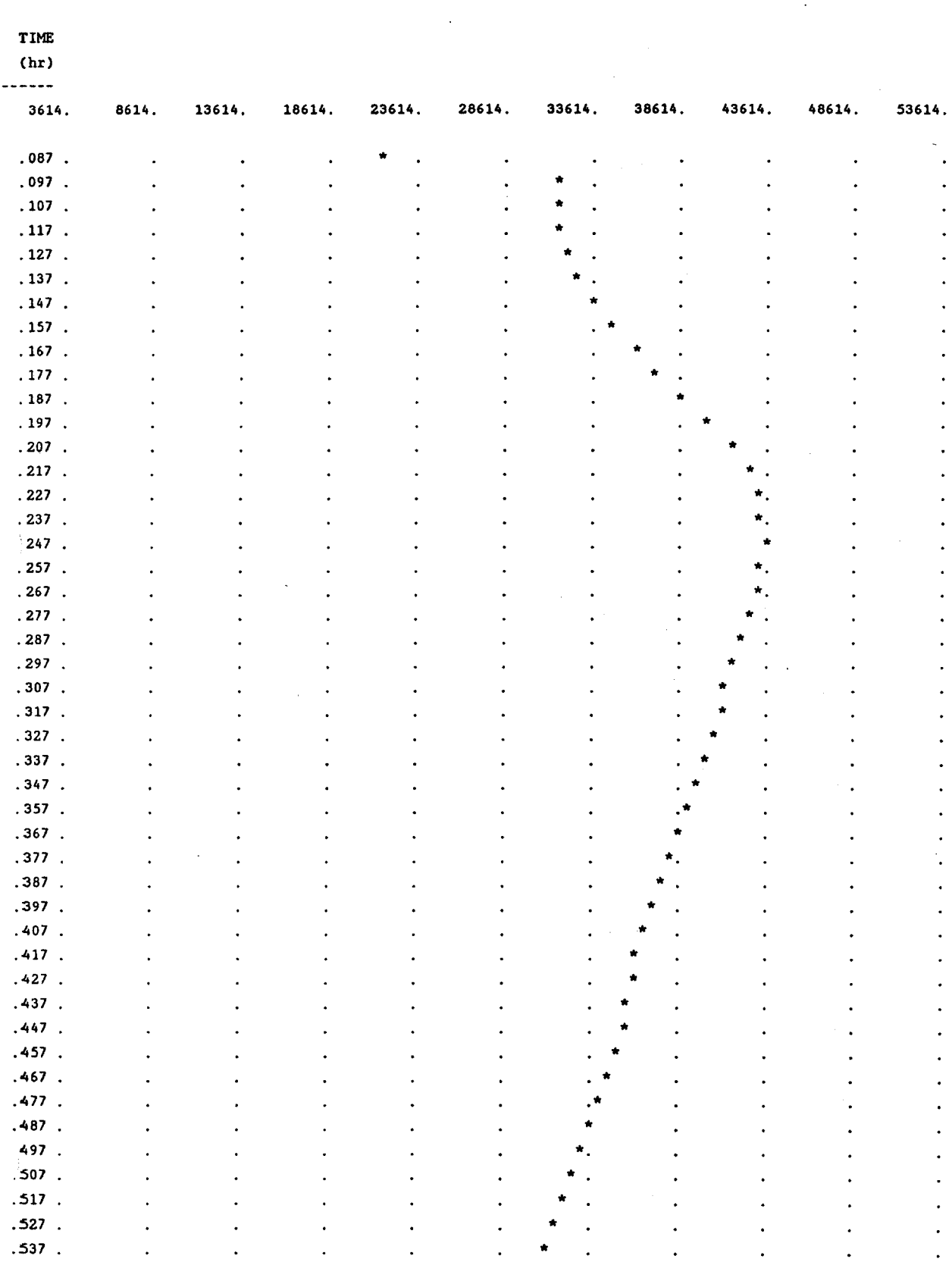
OUTPUT RESULTS AT END OF BREACH ANALYSIS :

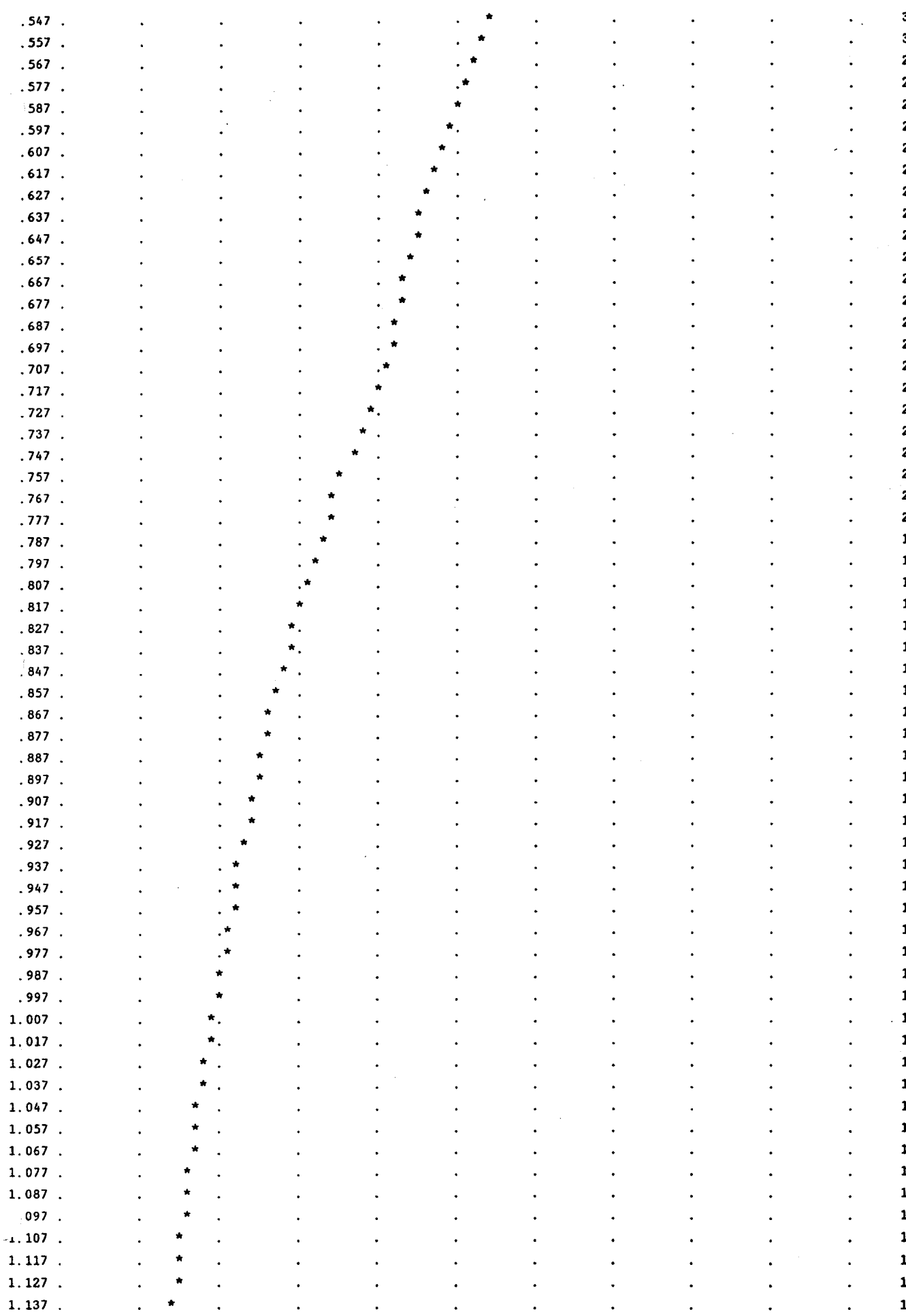
Breach Depth (ft, BRD)	26.8
Breach Bottom Elevation (ft MSL, HC)	1694.7
Breach Side Slope Relative to Vertical (degrees, AGL)	38.00
Reservoir Water Surface Elevation (ft MSL, HY)	1702.4

PROJECT TITLE : Fountain Hills Dambreak Analysis

PROJECT NUMBER : #83 12/20/1995

OUTPUT HYDROGRAPH PLOT :

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```

END OF OUTPUT

APPENDIX S

Dam Break output for Hesperus Wash Dam

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

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Version : 3.00
Serial Number : 20568

Licensed to George V. Sabol Consulting Engineers

PROGRAM ORIGIN :

Boss Dambrk (tm) is an enhanced version of Professor D. L. Fread's 1991 NWS DAMBRK program.

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PROJECT DESCRIPTION :

PROJECT TITLE : Fountain Hills Dam Break Analysis
PROJECT NUMBER : # 83
DESCRIPTION : Hesperus Dam (Dam 36)
ENGINEER : CCC
DATE OF RUN : 1/03/1996
TIME OF RUN : 9:27 am

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Problem Specification Option	7	
Number of Dynamic Routing Reaches (KKN)	9	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	14	
No. of Informational Cross-Sections (NPRT)	24	
Flood-Plain Routing (KFLP)	0	(no)

SEQUENTIAL CROSS-SECTION NUMBERS (NPT) :

1	4	16	19	20	21	22	23
27	30	31	32	33	39	56	57
73	75	78	82	85	104	109	117

BOUNDARY CONDITIONS :

Hydrograph Time Intervals (DHF, hr)	0.00
Routing Period (TEH, hr)	2.00
Breach Development Exponent (BREX)	1.00
Mud/Debris Flow Parameter (MUD)	0
Dry Bed Routing Parameter (IWF)	0
Hydraulic Radius Computation Parameter (KPRES)	1 (R=A/P)
Landslide Simulation (KSL)	0 (none)
Critical Flow Froude Number (DFR)	0.950

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
0.00	19168.0
0.05	19168.0
0.10	19168.0
0.15	19168.0
0.20	25064.0
0.25	28908.0
0.29	30151.0
0.30	29942.0
0.35	26505.0
0.40	15323.0
0.45	15323.0
0.50	15323.0
0.55	15323.0
1.00	15323.0

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Problem Specification Option (KKN, KUI, MULDAM, IDAM)	7	
Number of Cross-Sections Entered (NS)	24	
Number of Top Widths Entered (NCS)	8	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Flow Type Parameter (KSUPC)	3	(mixed flow)
Number of Lateral Inflow Hydrographs (LQ)	0	
Number of Points in Gate Control Curve (KCG)	0	

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

1 3 6 9 18 24

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	0.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	0.0000
Initial Time-Step Size (DTHM, hr)	0.0100
Time at which Dam Starts to Fail (TFI, hr)	0.0000
Theta Weighting Factor (F1I)	1.000
Stage Convergence Criterion (EPSY, ft)	0.000
Downstream Boundary Type Paramter (YDN)	0.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	120.0000

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi) 0.000

Flooding Elevation (FSTG(I), ft MSL) 1894.200 = Top of dam

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.010

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)
1852.00	0.0	0.0730	0.0
1852.10	38.9	0.0730	0.0
1860.00	51.6	0.0730	0.0
1870.00	67.7	0.0730	0.0
1880.00	83.7	0.0730	0.0
1890.00	99.8	0.0730	0.0
1894.20	106.7	0.0730	0.0
1900.00	115.9	0.0730	0.0

approx outlet invert

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi) 0.032

Flooding Elevation (FSTG(I), ft MSL) 1854.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.010

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)
1848.40	0.0	0.0730	0.0
1850.40	41.5	0.0730	0.0
1852.40	53.9	0.0730	0.0
1854.40	64.6	0.0730	0.0
1856.40	100.3	0.0730	0.0
1859.00	289.6	0.0730	0.0
1863.00	470.0	0.0730	0.0
1866.00	490.0	0.0730	15.0

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi) 0.152

Flooding Elevation (FSTG(I), ft MSL) 1844.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.060

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)
1833.60	0.0	0.0720	0.0
1836.50	65.7	0.0720	0.0
1840.00	87.9	0.0720	0.0
1842.00	98.5	0.0720	0.0
1846.00	162.6	0.0720	0.0
1849.00	242.5	0.0720	0.0
1851.00	483.6	0.0720	0.0
1853.00	722.5	0.0720	0.0

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi) 0.388

Flooding Elevation (FSTG(I), ft MSL) 1814.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1803.20	0.0	0.0730	0.0
1806.20	50.9	0.0730	0.0
1810.20	80.4	0.0730	0.0
1814.20	107.1	0.0730	0.0
1816.20	158.1	0.0730	0.0
1819.20	187.0	0.0730	0.0
1822.00	294.0	0.0730	0.0
1824.00	303.0	0.0730	0.0

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi) 0.551

Flooding Elevation (FSTG(I), ft MSL) 1794.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1786.50	0.0	0.0710	0.0
1789.50	65.4	0.0710	0.0
1792.50	85.0	0.0710	0.0
1795.50	152.7	0.0710	0.0
1798.00	172.9	0.0710	0.0
1801.00	180.5	0.0710	0.0
1804.00	188.1	0.0710	0.0
1808.00	381.9	0.0710	0.0

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi) 0.613

Flooding Elevation (FSTG(I), ft MSL) 1792.000

DOWNSTREAM REACH NUMBER : 6

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1781.00	0.0	0.0720	0.0
1786.00	81.7	0.0720	0.0
1790.00	128.0	0.0720	0.0
1794.00	168.0	0.0720	0.0
1797.00	202.0	0.0720	0.0
1800.00	287.0	0.0720	0.0
1802.50	360.3	0.0720	0.0
1804.00	395.0	0.0720	0.0

CROSS-SECTION NUMBER : 7

Cross-Section Location (XS(I), mi) 0.646

Flooding Elevation (FSTG(I), ft MSL) 1792.000

DOWNSTREAM REACH NUMBER : 7

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1778.02	0.0	0.0730	0.0
1781.00	7.5	0.0730	0.0
1784.00	35.8	0.0730	0.0
1787.00	50.0	0.0730	0.0
1790.00	66.3	0.0730	0.0
1793.00	261.3	0.0730	0.0
1796.00	305.0	0.0730	0.0
1800.00	420.0	0.0730	0.0

CROSS-SECTION NUMBER : 8

Cross-Section Location (XS(I), mi) 0.703

Flooding Elevation (FSTG(I), ft MSL) 1780.000

DOWNSTREAM REACH NUMBER : 8

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.045

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)
1770.00	0.0	0.0730	0.0
1772.00	28.9	0.0730	0.0
1775.00	51.3	0.0730	0.0
1778.00	70.2	0.0730	0.0
1781.00	93.0	0.0730	0.0
1784.00	193.2	0.0730	0.0
1787.00	361.8	0.0730	0.0
1789.00	389.7	0.0730	0.0

CROSS-SECTION NUMBER : 9

Cross-Section Location (XS(I), mi) 0.885

Flooding Elevation (FSTG(I), ft MSL) 1774.000

DOWNSTREAM REACH NUMBER : 9

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.062

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)
1751.80	0.0	0.0720	0.0
1753.50	46.6	0.0720	0.0
1755.00	196.5	0.0720	0.0
1758.00	226.0	0.0720	0.0
1760.00	230.8	0.0720	0.0
1762.50	236.8	0.0720	0.0
1764.00	241.0	0.0720	0.0
1765.50	246.9	0.0720	0.0

CROSS-SECTION NUMBER : 10

Cross-Section Location (XS(I), mi) 1.074

Flooding Elevation (FSTG(I), ft MSL) 1752.000

DOWNSTREAM REACH NUMBER : 10

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1732.10	0.0	0.0730	0.0
1734.00	102.5	0.0730	0.0
1735.00	205.0	0.0730	0.0
1737.00	222.1	0.0730	0.0
1739.00	231.6	0.0730	0.0
1741.00	238.2	0.0730	0.0
1743.00	244.9	0.0730	0.0
1746.00	252.9	0.0730	0.0

CROSS-SECTION NUMBER : 11

Cross-Section Location (XS(I), mi) 1.159

Flooding Elevation (FSTG(I), ft MSL) 1734.000

DOWNSTREAM REACH NUMBER : 11

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1721.50	0.0	0.0630	0.0
1723.50	53.8	0.0630	0.0
1725.50	128.7	0.0630	0.0
1727.50	255.1	0.0630	0.0
1729.50	261.8	0.0630	0.0
1731.50	268.4	0.0630	0.0
1733.50	273.7	0.0630	0.0
1734.50	274.3	0.0630	0.0

CROSS-SECTION NUMBER : 12

Cross-Section Location (XS(I), mi) 1.192

Flooding Elevation (FSTG(I), ft MSL) 1730.000

DOWNSTREAM REACH NUMBER : 12

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1720.20	0.0	0.0630	0.0
1722.00	84.8	0.0630	0.0
1724.00	234.8	0.0630	0.0
1726.00	325.9	0.0630	0.0
1728.00	335.0	0.0630	0.0
1730.00	380.0	0.0630	0.0
1732.00	462.0	0.0630	0.0
1734.00	516.0	0.0630	0.0

CROSS-SECTION NUMBER : 13

Cross-Section Location (XS(I), mi) 1.230

Flooding Elevation (FSTG(I), ft MSL) 1754.000

DOWNSTREAM REACH NUMBER : 13

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.041

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)
1715.20	0.0	0.0630	0.0
1716.00	23.4	0.0630	0.0
1717.00	50.2	0.0630	0.0
1719.00	195.6	0.0630	0.0
1721.00	345.5	0.0630	0.0
1723.00	356.5	0.0630	0.0
1725.00	366.9	0.0630	0.0
1726.00	371.4	0.0630	0.0

CROSS-SECTION NUMBER : 14

Cross-Section Location (XS(I), mi) 1.479

Flooding Elevation (FSTG(I), ft MSL) 1704.000

DOWNSTREAM REACH NUMBER : 14

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.010

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)
1688.80	0.0	0.0640	0.0
1690.00	26.1	0.0640	0.0
1692.00	136.4	0.0640	0.0
1694.00	307.9	0.0640	0.0
1696.00	334.2	0.0640	0.0
1698.00	356.6	0.0640	0.0
1700.00	374.3	0.0640	0.0
1701.00	383.2	0.0640	0.0

CROSS-SECTION NUMBER : 15

Cross-Section Location (XS(I), mi) 1.651

Flooding Elevation (FSTG(I), ft MSL) 1690.000

DOWNSTREAM REACH NUMBER : 15

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1668.70	0.0	0.0630	0.0
1671.00	126.8	0.0630	0.0
1673.00	376.5	0.0630	0.0
1675.00	385.3	0.0630	0.0
1677.00	394.2	0.0630	0.0
1679.00	404.9	0.0630	0.0
1681.00	418.5	0.0630	0.0
1682.00	424.8	0.0630	0.0

CROSS-SECTION NUMBER : 16

Cross-Section Location (XS(I), mi) 1.715

Flooding Elevation (FSTG(I), ft MSL) 1662.000

DOWNSTREAM REACH NUMBER : 16

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.012

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)
1655.80	0.0	0.0620	0.0
1657.00	20.4	0.0620	0.0
1659.00	102.2	0.0620	0.0
1663.00	165.9	0.0620	0.0
1664.00	230.6	0.0620	0.0
1666.00	302.6	0.0620	0.0
1668.00	484.2	0.0620	0.0
1670.00	559.0	0.0620	0.0

CROSS-SECTION NUMBER : 17

Cross-Section Location (XS(I), mi) 1.913

Flooding Elevation (FSTG(I), ft MSL) 1644.000

DOWNSTREAM REACH NUMBER : 17

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.054

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)
1636.60	0.0	0.0580	0.0
1639.00	89.9	0.0580	0.0
1642.00	142.6	0.0580	0.0
1644.00	229.5	0.0580	0.0
1646.00	499.6	0.0580	0.0
1648.00	609.0	0.0580	0.0
1650.00	688.0	0.0580	0.0
1652.00	851.0	0.0580	0.0

CROSS-SECTION NUMBER : 18

Cross-Section Location (XS(I), mi) 2.022

Flooding Elevation (FSTG(I), ft MSL) 1634.000

DOWNSTREAM REACH NUMBER : 18

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.062

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)
1627.70	0.0	0.0600	0.0
1629.00	86.3	0.0600	0.0
1632.00	100.0	0.0600	0.0
1634.00	137.7	0.0600	0.0
1636.00	515.6	0.0600	0.0
1638.00	537.2	0.0600	0.0
1640.00	641.3	0.0600	0.0
1642.00	795.0	0.0600	0.0

CROSS-SECTION NUMBER : 19

Cross-Section Location (XS(I), mi) 2.210

Flooding Elevation (FSTG(I), ft MSL) 1618.000

DOWNSTREAM REACH NUMBER : 19

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.030

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)
1605.20	0.0	0.0600	0.0
1608.00	59.3	0.0600	0.0
1611.00	104.5	0.0600	0.0
1614.00	121.0	0.0600	0.0
1617.00	136.2	0.0600	0.0
1619.00	165.9	0.0600	0.0
1622.00	312.0	0.0600	0.0
1624.00	583.0	0.0600	0.0

CROSS-SECTION NUMBER : 20

Cross-Section Location (XS(I), mi) 2.336

Flooding Elevation (FSTG(I), ft MSL) 1608.000

DOWNSTREAM REACH NUMBER : 20

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.039

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)
1595.70	0.0	0.0730	0.0
1597.00	84.6	0.0730	0.0
1600.00	103.4	0.0730	0.0
1603.00	118.6	0.0730	0.0
1606.00	140.9	0.0730	0.0
1609.00	460.5	0.0730	0.0
1611.00	863.5	0.0730	0.0
1614.00	1055.0	0.0730	0.0

CROSS-SECTION NUMBER : 21

Cross-Section Location (XS(I), mi) 2.454

Flooding Elevation (FSTG(I), ft MSL) 1598.000

DOWNSTREAM REACH NUMBER : 21

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.006

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)
1583.00	0.0	0.0710	0.0
1586.00	91.4	0.0710	0.0
1589.00	110.3	0.0710	0.0
1591.00	121.4	0.0710	0.0
1594.00	175.5	0.0710	0.0
1596.00	247.4	0.0710	0.0
1598.00	592.0	0.0710	0.0
1600.00	1045.0	0.0710	0.0

CROSS-SECTION NUMBER : 22

Cross-Section Location (XS(I), mi) 2.568

Flooding Elevation (FSTG(I), ft MSL) 1584.000

DOWNSTREAM REACH NUMBER : 22

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.023

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)
1573.00	0.0	0.0720	0.0
1574.00	73.6	0.0720	0.0
1576.00	89.3	0.0720	0.0
1578.00	104.7	0.0720	0.0
1581.00	123.5	0.0720	0.0
1583.00	136.4	0.0720	0.0
1585.00	527.5	0.0720	0.0
1590.00	900.0	0.0720	0.0

CROSS-SECTION NUMBER : 23

Cross-Section Location (XS(I), mi) 2.683

Flooding Elevation (FSTG(I), ft MSL) 1574.000

DOWNSTREAM REACH NUMBER : 23

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.014

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)
1562.40	0.0	0.0710	0.0
1565.00	85.1	0.0710	0.0
1568.00	120.5	0.0710	0.0
1570.00	136.4	0.0710	0.0
1572.00	151.3	0.0710	0.0
1574.00	208.0	0.0710	0.0
1578.00	621.0	0.0710	0.0
1579.00	819.4	0.0710	0.0

CROSS-SECTION NUMBER : 24

Cross-Section Location (XS(I), mi) 2.797

Flooding Elevation (FSTG(I), ft MSL) 1554.000

CROSS-SECTION DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)
1551.90	0.0	0.0
1552.90	47.6	0.0
1554.40	152.7	0.0
1555.90	179.3	0.0
1557.40	270.3	0.0
1558.90	488.7	0.0
1560.40	704.9	0.0
1563.00	822.1	0.0

WARNING: At cross-section reach 1 the distance between
interpolated cross-sections (DXM) should be changed
to 0.001 due to expansion/contraction criteria

DISTANCE BETWEEN INTERPOLATED CROSS-SECTIONS
(DXM) THAT WILL BE USED IN COMPUTATIONS :

Down Stream Reach Number I=1,NS1	Interp. Cross Section Distance DXM(I) (mi)
1	0.0100
2	0.0100
3	0.0600
4	0.1000
5	0.1000
6	0.1000
7	0.1000
8	0.0450
9	0.0620
10	0.1000
11	0.1000
12	0.1000
13	0.0410
14	0.0100
15	0.1000
16	0.0120
17	0.0540
18	0.0620
19	0.0300
20	0.0390
21	0.0060
22	0.0230
23	0.0140

Total number of cross-sections (original+interpolated) 117

Maximum number of cross-sections allowed 2000

OUTPUT DATA SUMMARY :

CROSS-SECTION and REACH SUMMARY :

Cross Section Number	Cross Section Location (mi)	Bottom Elevation (ft MSL)	Reach Number	Reach Length (mi)	Reach Slope (ft/mi)
1	0.000	1852.000			
2	0.032	1848.400	1	0.032	112.499
3	0.152	1833.600	2	0.120	123.334
4	0.388	1803.200	3	0.236	128.814
5	0.551	1786.500	4	0.163	102.454
6	0.613	1781.000	5	0.062	88.710
7	0.646	1778.020	6	0.033	90.302
8	0.703	1770.000	7	0.057	140.702
9	0.885	1751.800	8	0.182	100.000
10	1.074	1732.100	9	0.189	104.233
11	1.159	1721.500	10	0.085	124.706
12	1.192	1720.200	11	0.033	39.395
13	1.230	1715.200	12	0.038	131.579
14	1.479	1688.800	13	0.249	106.024
15	1.651	1668.700	14	0.172	116.861
16	1.715	1655.800	15	0.064	201.561
17	1.913	1636.600	16	0.198	96.970
18	2.022	1627.700	17	0.109	81.652
19	2.210	1605.200	18	0.188	119.681
20	2.336	1595.700	19	0.126	75.397
21	2.454	1583.000	20	0.118	107.627
22	2.568	1573.000	21	0.114	87.719
23	2.683	1562.400	22	0.115	92.174
24	2.797	1551.900	23	0.114	92.105

ROUTING COMPLETED :

Number of Time Steps Used (KTIME)	200
Maximum Number of Time Steps Allowed	2999
Total Time of Flood Routing (TT, hr)	2.0
Flood Wave Arrival Time based upon a WSEL Increase of (ft)	1.00

CONSERVATION OF MASS RESULTS :

Should be close to 0.00%, a negative value denotes flow volume was lost during the routing, a positive value denotes flow volume was gained

during the routing. Normalized as a percent of inflow volume, maximum change in conservation of mass during routing was -1.26

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

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)	Flood Wave Arrival Time (hr)
0.000	1879.20	30091	0.290	19.09	1894.20	0.00	0.02
0.011	1869.03	30083	0.290	29.86	1880.80	0.00	0.00
0.021	1866.85	30077	0.290	25.14	1867.40	0.00	0.24
0.032	1864.47	30077	0.290	9.56	1854.00	0.00	0.22
0.042	1863.54	30058	0.290	9.49	1853.17	0.00	0.20
0.052	1862.60	30036	0.290	9.40	1852.33	0.00	0.20
0.062	1861.66	30011	0.300	9.31	1851.50	0.00	0.20
0.072	1860.71	29984	0.300	9.22	1850.67	0.00	0.20
0.082	1859.77	29956	0.300	9.11	1849.83	0.00	0.20
0.092	1858.81	29948	0.300	9.01	1849.00	0.00	0.18
0.102	1857.85	29936	0.300	8.89	1848.17	0.00	0.18
0.112	1856.89	29921	0.300	8.78	1847.33	0.00	0.18
0.122	1855.91	29903	0.300	8.68	1846.50	0.00	0.18
0.132	1854.91	29881	0.300	8.59	1845.67	0.00	0.18
0.142	1853.86	29857	0.300	8.97	1844.83	0.00	0.18
0.152	1852.65	29839	0.300	9.60	1844.00	0.00	0.20
0.231	1842.56	29598	0.320	12.28	1834.00	0.00	0.22
0.309	1833.00	29465	0.310	10.64	1824.00	0.00	0.02
0.388	1822.48	29342	0.340	15.02	1814.00	0.00	0.24
0.551	1805.53	28846	0.360	11.59	1794.00	0.00	0.26
0.613	1802.20	28713	0.360	8.96	1792.00	0.00	0.26
0.646	1797.25	28688	0.360	13.52	1792.00	0.00	0.30
0.703	1788.89	28620	0.370	11.25	1780.00	0.00	0.30
0.748	1782.45	28593	0.370	11.93	1778.50	0.00	0.32
0.794	1776.25	28546	0.370	12.20	1777.00	0.00	0.32
0.839	1769.36	28487	0.380	13.62	1775.50	0.00	0.36
0.885	1763.87	28454	0.380	12.80	1774.00	0.00	0.30
0.948	1757.10	28382	0.390	12.76	1766.67	0.00	0.30
1.011	1750.37	28351	0.390	12.69	1759.33	0.00	0.30
1.074	1743.59	28285	0.400	12.69	1752.00	0.00	0.32
1.159	1733.63	28243	0.400	12.58	1734.00	0.00	0.34
1.192	1729.67	28217	0.400	12.77	1730.00	0.00	0.34
1.230	1725.44	28173	0.410	11.65	1754.00	0.00	0.36
1.271	1721.13	28156	0.410	11.57	1745.67	0.00	0.34
1.313	1716.71	28122	0.410	11.69	1737.33	0.00	0.36
1.354	1712.45	28075	0.420	11.49	1729.00	0.00	0.34
1.396	1707.90	28058	0.420	11.83	1720.67	0.00	0.36
1.437	1703.82	28024	0.420	11.30	1712.33	0.00	0.34
1.479	1698.93	27979	0.430	12.22	1704.00	0.00	0.38
1.489	1697.66	27977	0.430	12.20	1703.18	0.00	0.38
1.499	1696.39	27974	0.430	12.17	1702.35	0.00	0.38
1.509	1695.12	27970	0.430	12.15	1701.53	0.00	0.38
1.519	1693.85	27966	0.430	12.13	1700.71	0.00	0.38
1.530	1692.58	27960	0.430	12.11	1699.88	0.00	0.38
1.540	1691.31	27953	0.430	12.08	1699.06	0.00	0.38
1.550	1690.04	27946	0.430	12.06	1698.24	0.00	0.38

1.560	1688.78	27938	0.430	12.03	1697.41	0.00	0.38
1.570	1687.51	27928	0.430	12.01	1696.59	0.00	0.38

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

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)	Flood Wave Arrival Time (hr)
1.580	1686.25	27918	0.430	11.98	1695.76	0.00	0.36
1.590	1684.99	27907	0.440	11.95	1694.94	0.00	0.36
1.600	1683.73	27895	0.440	11.91	1694.12	0.00	0.36
1.611	1682.47	27891	0.440	11.90	1693.29	0.00	0.36
1.621	1681.24	27889	0.440	11.80	1692.47	0.00	0.36
1.631	1679.90	27886	0.440	11.94	1691.65	0.00	0.36
1.641	1679.01	27881	0.440	11.23	1690.82	0.00	0.34
1.651	1676.91	27877	0.440	12.93	1690.00	0.00	0.40
1.715	1669.05	27817	0.450	10.23	1662.00	0.00	0.40
1.727	1667.74	27804	0.450	10.16	1660.88	0.00	0.40
1.740	1666.44	27799	0.450	10.10	1659.75	0.00	0.40
1.752	1665.13	27791	0.450	10.04	1658.63	0.00	0.42
1.764	1663.82	27781	0.450	10.00	1657.50	0.00	0.42
1.777	1662.51	27767	0.450	9.97	1656.38	0.00	0.42
1.789	1661.20	27750	0.450	9.96	1655.25	0.00	0.44
1.802	1659.88	27730	0.460	9.94	1654.13	0.00	0.44
1.814	1658.58	27710	0.460	9.91	1653.00	0.00	0.46
1.826	1657.29	27705	0.460	9.87	1651.88	0.00	0.46
1.839	1656.01	27697	0.460	9.81	1650.75	0.00	0.00
1.851	1654.73	27687	0.460	9.75	1649.63	0.00	0.00
1.863	1653.47	27675	0.460	9.68	1648.50	0.00	0.00
1.876	1652.21	27661	0.460	9.60	1647.38	0.00	0.00
1.888	1650.96	27644	0.460	9.51	1646.25	0.00	0.46
1.901	1649.72	27625	0.470	9.41	1645.13	0.00	0.46
1.913	1648.52	27619	0.470	9.24	1644.00	0.00	0.44
1.967	1643.81	27567	0.480	9.35	1639.00	0.00	0.44
2.022	1639.18	27518	0.480	9.33	1634.00	0.00	0.44
2.085	1633.16	27424	0.490	10.28	1628.67	0.00	0.46
2.147	1628.92	27199	0.510	9.54	1623.33	0.00	0.40
2.210	1622.67	27010	0.520	12.25	1618.00	0.00	0.40
2.241	1619.57	26955	0.520	10.46	1615.50	0.00	0.42
2.273	1616.73	26934	0.520	9.32	1613.00	0.00	0.44
2.304	1613.76	26901	0.530	8.84	1610.50	0.00	0.00
2.336	1611.48	26873	0.530	7.25	1608.00	0.00	0.50
2.375	1607.53	26827	0.540	7.32	1604.67	0.00	0.50
2.415	1603.76	26781	0.540	7.06	1601.33	0.00	0.48
2.454	1599.71	26722	0.550	7.21	1598.00	0.00	0.50
2.460	1599.05	26716	0.550	7.28	1597.26	0.00	0.50
2.466	1598.41	26710	0.550	7.34	1596.53	0.00	0.52
2.472	1597.76	26702	0.550	7.41	1595.79	0.00	0.52
2.478	1597.12	26694	0.550	7.46	1595.05	0.00	0.54
2.484	1596.48	26686	0.550	7.52	1594.32	0.00	0.54
2.490	1595.84	26677	0.560	7.56	1593.58	0.00	0.00
2.496	1595.20	26667	0.560	7.61	1592.84	0.00	0.00
2.502	1594.57	26658	0.560	7.65	1592.11	0.00	0.00
2.508	1593.93	26655	0.560	7.69	1591.37	0.00	0.00

2.514	1593.30	26652	0.560	7.73	1590.63	0.00	0.00
2.520	1592.67	26648	0.560	7.77	1589.89	0.00	0.00

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

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)	Flood Wave Arrival Time (hr)
2.526	1592.04	26643	0.560	7.80	1589.16	0.00	0.00
2.532	1591.41	26638	0.560	7.83	1588.42	0.00	0.00
2.538	1590.79	26632	0.560	7.84	1587.68	0.00	0.00
2.544	1590.18	26625	0.560	7.84	1586.95	0.00	0.00
2.550	1589.60	26618	0.570	7.81	1586.21	0.00	0.00
2.556	1589.05	26609	0.570	7.71	1585.47	0.00	0.00
2.562	1588.56	26600	0.570	7.51	1584.74	0.00	0.00
2.568	1588.15	26590	0.570	7.21	1584.00	0.00	0.54
2.591	1586.34	26574	0.570	7.20	1582.00	0.00	0.48
2.614	1584.51	26546	0.580	7.20	1580.00	0.00	0.46
2.637	1582.66	26514	0.580	7.23	1578.00	0.00	0.40
2.660	1580.63	26492	0.580	7.51	1576.00	0.00	0.02
2.683	1577.50	26465	0.590	9.86	1574.00	0.00	0.52
2.697	1575.46	26453	0.590	9.65	1571.50	0.00	0.52
2.712	1573.45	26448	0.590	9.43	1569.00	0.00	0.54
2.726	1571.45	26441	0.590	9.22	1566.50	0.00	0.56
2.740	1569.45	26431	0.590	9.05	1564.00	0.00	0.58
2.754	1567.46	26420	0.590	8.92	1561.50	0.00	0.00
2.769	1565.48	26407	0.600	8.80	1559.00	0.00	0.00
2.783	1563.51	26402	0.600	8.69	1556.50	0.00	0.00
2.797	1561.54	26398	0.600	8.63	1554.00	0.00	0.00

APPENDIX T

Dam Break output for Golden Eagle Park Dam

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

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Version : 3.00
Serial Number : 20568

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PROGRAM ORIGIN :

Boss Dambrk (tm) is an enhanced version of Professor D. L. Fread's 1991 NWS DAMBRK program.

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PROJECT DESCRIPTION :

PROJECT TITLE : Fountain Hills Dam Break Analysis
PROJECT NUMBER : # 83
DESCRIPTION : Golden Eagle Park (Dam 4)
ENGINEER : CCC
DATE OF RUN : 1/03/1996
TIME OF RUN : 10:13 am

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Problem Specification Option	7	
Number of Dynamic Routing Reaches (KKN)	9	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	22	
No. of Informational Cross-Sections (NPRT)	11	
Flood-Plain Routing (KFLP)	0	(no)

SEQUENTIAL CROSS-SECTION NUMBERS (NPT) :

1	52	59	63	66	70	74	79
84	87	90					

BOUNDARY CONDITIONS :

Hydrograph Time Intervals (DHF, hr)	0.00
Routing Period (TEH, hr)	2.00
Breach Development Exponent (BREX)	1.00
Mud/Debris Flow Parameter (MUD)	0
Dry Bed Routing Parameter (IWF)	0
Hydraulic Radius Computation Parameter (KPRES)	1 (R=A/P)
Landslide Simulation (KSL)	0 (none)
Critical Flow Froude Number (DFR)	0.950

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
0.00	12871.2
0.05	17311.2
0.10	27169.5
0.15	36309.5
0.20	44354.6
0.22	46386.9
0.25	44207.7
0.30	40781.8
0.35	37563.7
0.40	35262.1
0.45	32795.2
0.50	30238.4
0.55	27851.9
0.60	24936.5
0.65	22744.2
0.70	21050.4
0.75	19897.4
0.80	19005.0
0.85	18551.7
0.90	17642.9
0.95	16416.3
1.00	15058.5

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Problem Specification Option (KKN, KUI, MULDAM, IDAM)	7	
Number of Cross-Sections Entered (NS)	11	
Number of Top Widths Entered (NCS)	8	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Flow Type Parameter (KSUPC)	3	(mixed flow)
Number of Lateral Inflow Hydrographs (LQ)	0	
Number of Points in Gate Control Curve (KCG)	0	

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

1 2 4 6 8 11

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	0.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	0.0000
Initial Time-Step Size (DTHM, hr)	0.0100
Time at which Dam Starts to Fail (TFI, hr)	0.0000
Theta Weighting Factor (F1I)	1.000
Stage Convergence Criterion (EPSY, ft)	0.000
Downstream Boundary Type Paramter (YDN)	0.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	0.0000

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi) 0.000

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.002

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)
1694.70	0.0	0.0550	0.0
1694.80	38.0	0.0550	0.0
1698.00	43.2	0.0550	0.0
1705.00	54.1	0.0550	0.0
1710.00	62.0	0.0550	0.0
1715.00	69.8	0.0550	0.0
1721.50	80.0	0.0550	0.0
1726.00	87.1	0.0550	0.0

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi) 0.102

Flooding Elevation (FSTG(I), ft MSL) 1690.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC) -0.070

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.020

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)
1684.80	0.0	0.0500	0.0
1687.00	31.9	0.0500	0.0
1689.00	84.7	0.0500	0.0
1691.00	100.5	0.0500	0.0
1693.00	158.5	0.0500	0.0
1695.00	271.8	0.0500	0.0
1699.00	311.0	0.0500	0.0
1702.00	460.0	0.0500	0.0

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi) 0.259

Flooding Elevation (FSTG(I), ft MSL) 1678.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.031

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)
1673.70	0.0	0.0940	0.0
1675.00	83.7	0.0940	0.0
1677.00	123.0	0.0940	0.0
1678.00	217.0	0.0940	0.0
1684.00	390.9	0.0940	0.0
1687.00	485.4	0.0940	0.0
1691.00	624.7	0.0940	0.0
1695.00	814.6	0.0940	0.0

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi) 0.382

Flooding Elevation (FSTG(I), ft MSL) 1668.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.050

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)
1660.00	0.0	0.0950	0.0
1663.00	85.5	0.0950	0.0
1667.00	108.5	0.0950	0.0
1669.00	256.4	0.0950	0.0
1672.00	489.5	0.0950	0.0
1675.00	659.2	0.0950	0.0
1678.00	765.0	0.0950	0.0
1680.00	915.0	0.0950	0.0

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi) 0.562

Flooding Elevation (FSTG(I), ft MSL) 1646.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.050

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)
1640.90	0.0	0.0960	0.0
1645.00	76.6	0.0960	0.0
1647.00	156.0	0.0960	0.0
1650.00	279.3	0.0960	0.0
1653.00	406.3	0.0960	0.0
1656.00	564.3	0.0960	0.0
1659.00	775.0	0.0960	0.0
1662.00	900.0	0.0960	0.0

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi) 0.795

Flooding Elevation (FSTG(I), ft MSL) 1622.000

DOWNSTREAM REACH NUMBER : 6

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.050

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)
1617.80	0.0	0.0910	0.0
1621.00	98.1	0.0910	0.0
1625.00	129.6	0.0910	0.0
1629.00	199.1	0.0910	0.0
1632.00	343.0	0.0910	0.0
1635.00	425.0	0.0910	0.0
1638.00	487.0	0.0910	0.0
1641.00	628.3	0.0910	0.0

CROSS-SECTION NUMBER : 7

Cross-Section Location (XS(I), mi) 0.996

Flooding Elevation (FSTG(I), ft MSL) 1610.000

DOWNSTREAM REACH NUMBER : 7

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.050

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)
1602.30	0.0	0.0920	0.0
1605.00	100.8	0.0920	0.0
1610.00	139.4	0.0920	0.0
1614.00	179.7	0.0920	0.0
1616.00	263.8	0.0920	0.0
1619.00	420.7	0.0920	0.0
1622.00	470.9	0.0920	0.0
1626.00	536.1	0.0920	0.0

CROSS-SECTION NUMBER : 8

Cross-Section Location (XS(I), mi) 1.245

Flooding Elevation (FSTG(I), ft MSL) 1594.000

DOWNSTREAM REACH NUMBER : 8

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.050

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)
1587.00	0.0	0.0960	0.0
1590.00	98.2	0.0960	0.0
1593.00	116.2	0.0960	0.0
1595.00	196.2	0.0960	0.0
1598.00	340.0	0.0960	0.0
1600.00	505.0	0.0960	0.0
1603.00	615.0	0.0960	0.0
1607.00	842.5	0.0960	0.0

CROSS-SECTION NUMBER : 9

Cross-Section Location (XS(I), mi) 1.499

Flooding Elevation (FSTG(I), ft MSL) 1570.000

DOWNSTREAM REACH NUMBER : 9

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.034

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)
1565.30	0.0	0.1210	0.0
1567.00	152.7	0.1210	0.0
1571.00	209.7	0.1210	0.0
1576.00	230.2	0.1210	0.0
1578.00	425.0	0.1210	0.0
1581.00	760.0	0.1210	0.0
1583.00	895.0	0.1210	0.0
1586.00	985.0	0.1210	0.0

CROSS-SECTION NUMBER : 10

Cross-Section Location (XS(I), mi) 1.602

Flooding Elevation (FSTG(I), ft MSL) 1560.000

DOWNSTREAM REACH NUMBER : 10

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.035

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)
1559.90	0.0	0.1170	0.0
1561.00	100.5	0.1170	0.0
1564.00	495.5	0.1170	0.0
1567.00	680.5	0.1170	0.0
1570.00	895.5	0.1170	0.0
1573.00	1003.0	0.1170	0.0
1576.00	1193.6	0.1170	0.0
1580.00	1265.0	0.1170	0.0

CROSS-SECTION NUMBER : 11

Cross-Section Location (XS(I), mi) 1.708

Flooding Elevation (FSTG(I), ft MSL) 1560.000

CROSS-SECTION DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)
1551.90	0.0	0.0
1553.00	53.8	0.0
1556.00	196.3	0.0
1559.00	387.9	0.0
1562.00	709.5	0.0
1565.00	855.0	0.0
1568.00	1170.0	0.0
1570.00	1210.0	0.0

DISTANCE BETWEEN INTERPOLATED CROSS-SECTIONS
(DXM) THAT WILL BE USED IN COMPUTATIONS :

Down Stream Reach Number I=1,NS1	Interp. Cross Section Distance DXM(I) (mi)
1	0.0020
2	0.0200
3	0.0310
4	0.0500
5	0.0500
6	0.0500
7	0.0500
8	0.0500
9	0.0340
10	0.0350

Total number of cross-sections (original+interpolated) 90

Maximum number of cross-sections allowed 2000

OUTPUT DATA SUMMARY :

CROSS-SECTION and REACH SUMMARY :

Cross Section Number	Cross Section Location (mi)	Bottom Elevation (ft MSL)	Reach Number	Reach Length (mi)	Reach Slope (ft/mi)
1	0.000	1694.700			
2	0.102	1684.800	1	0.102	97.058
3	0.259	1673.700	2	0.157	70.701
4	0.382	1660.000	3	0.123	111.382
5	0.562	1640.900	4	0.180	106.111
6	0.795	1617.800	5	0.233	99.142
7	0.996	1602.300	6	0.201	77.114
8	1.245	1587.000	7	0.249	61.446
9	1.499	1565.300	8	0.254	85.433
10	1.602	1559.900	9	0.103	52.427
11	1.708	1551.900	10	0.106	75.472

ING COMPLETED :

Number of Time Steps Used (KTIME)	200
Maximum Number of Time Steps Allowed	2999
Total Time of Flood Routing (TT, hr)	2.0
Flood Wave Arrival Time based upon a WSEL Increase of (ft)	1.00

CONSERVATION OF MASS RESULTS :

Should be close to 0.00%, a negative value denotes flow volume was lost during the routing, a positive value denotes flow volume was gained during the routing. Normalized as a percent of inflow volume, maximum change in conservation of mass during routing was 0.02

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)	Flood Wave Arrival Time (hr)
0.000	1725.77	46188	0.220	23.87	0.00	0.00	0.02
0.002	1720.05	46183	0.220	30.10	33.14	0.00	0.06
0.004	1718.63	46178	0.220	31.12	66.27	0.00	0.06
0.006	1717.52	46174	0.220	31.77	99.41	0.00	0.06
0.008	1716.60	46170	0.220	32.21	132.55	0.00	0.06
0.010	1715.79	46166	0.220	32.50	165.69	0.00	0.06
0.012	1715.08	46162	0.220	32.68	198.82	0.00	0.06
0.014	1714.43	46158	0.220	32.77	231.96	0.00	0.08
0.016	1713.84	46154	0.220	32.80	265.10	0.00	0.08
0.018	1713.29	46150	0.220	32.76	298.24	0.00	0.08
0.020	1712.78	46146	0.220	32.68	331.37	0.00	0.08
0.022	1712.29	46142	0.220	32.56	364.51	0.00	0.08
0.024	1711.83	46138	0.220	32.40	397.65	0.00	0.08
0.026	1711.39	46134	0.220	32.21	430.78	0.00	0.08
0.028	1710.97	46131	0.220	32.00	463.92	0.00	0.08
0.030	1710.57	46127	0.220	31.76	497.06	0.00	0.08
0.032	1710.18	46123	0.220	31.49	530.20	0.00	0.08
0.034	1709.80	46119	0.220	31.21	563.33	0.00	0.08
0.036	1709.44	46116	0.220	30.92	596.47	0.00	0.08
0.038	1709.08	46112	0.220	30.61	629.61	0.00	0.08
0.040	1708.73	46108	0.220	30.29	662.75	0.00	0.08
0.042	1708.39	46104	0.220	29.96	695.88	0.00	0.08
0.044	1708.05	46100	0.220	29.62	729.02	0.00	0.08
0.046	1707.72	46097	0.220	29.28	762.16	0.00	0.08
0.048	1707.40	46093	0.220	28.93	795.29	0.00	0.08
0.050	1707.08	46089	0.220	28.58	828.43	0.00	0.08
0.052	1706.76	46085	0.220	28.23	861.57	0.00	0.08
0.054	1706.44	46081	0.220	27.88	894.71	0.00	0.08
0.056	1706.13	46078	0.220	27.52	927.84	0.00	0.08
0.058	1705.82	46074	0.220	27.17	960.98	0.00	0.08
0.060	1705.52	46070	0.220	26.82	994.12	0.00	0.08
0.062	1705.21	46066	0.220	26.47	1027.26	0.00	0.08
0.064	1704.90	46062	0.220	26.13	1060.39	0.00	0.08
0.066	1704.60	46058	0.220	25.79	1093.53	0.00	0.08
0.068	1704.30	46054	0.220	25.46	1126.67	0.00	0.08
0.070	1703.99	46050	0.220	25.13	1159.80	0.00	0.08
0.072	1703.69	46045	0.220	24.80	1192.94	0.00	0.08
0.074	1703.39	46041	0.220	24.49	1226.08	0.00	0.08
0.076	1703.08	46037	0.220	24.18	1259.22	0.00	0.08
0.078	1702.78	46032	0.220	23.87	1292.35	0.00	0.08
0.080	1702.48	46028	0.220	23.58	1325.49	0.00	0.08
0.082	1702.17	46023	0.220	23.29	1358.63	0.00	0.08
0.084	1701.87	46018	0.220	23.00	1391.76	0.00	0.08
0.086	1701.56	46014	0.220	22.73	1424.90	0.00	0.08
0.088	1701.25	46009	0.220	22.46	1458.04	0.00	0.08
0.090	1700.94	46004	0.220	22.20	1491.18	0.00	0.08

0.092	1700.63	45999	0.220	21.95	1524.31	0.00	0.08
0.094	1700.32	45993	0.220	21.70	1557.45	0.00	0.08

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)	Flood Wave Arrival Time (hr)
0.096	1700.01	45988	0.220	21.46	1590.59	0.00	0.08
0.098	1699.69	45982	0.220	21.23	1623.72	0.00	0.10
0.100	1699.38	45977	0.220	21.01	1656.86	0.00	0.10
0.102	1699.06	45971	0.220	20.78	1690.00	0.00	0.08
0.124	1698.60	45883	0.220	15.91	1688.29	0.00	0.08
0.147	1696.41	45739	0.230	16.93	1686.57	0.00	0.08
0.169	1694.39	45681	0.230	15.11	1684.86	0.00	0.10
0.192	1692.81	45681	0.220	13.93	1683.14	0.00	0.10
0.214	1689.89	45643	0.240	15.63	1681.43	0.00	0.14
0.237	1689.52	45528	0.240	12.20	1679.71	0.00	0.12
0.259	1689.52	45374	0.240	9.26	1678.00	0.00	0.08
0.290	1686.48	45197	0.240	8.94	1675.50	0.00	0.08
0.320	1683.47	45078	0.240	8.65	1673.00	0.00	0.08
0.351	1680.49	44904	0.250	8.39	1670.50	0.00	0.08
0.382	1677.44	44818	0.250	8.25	1668.00	0.00	0.10
0.442	1671.26	44567	0.260	8.20	1660.67	0.00	0.10
0.502	1664.98	44332	0.270	8.26	1653.33	0.00	0.12
0.562	1659.35	44085	0.280	7.61	1646.00	0.00	0.12
0.620	1654.13	43835	0.300	7.88	1640.00	0.00	0.12
0.678	1648.91	43591	0.310	8.19	1634.00	0.00	0.14
0.737	1643.71	43338	0.320	8.57	1628.00	0.00	0.14
0.795	1638.62	43114	0.330	8.84	1622.00	0.00	0.14
0.845	1634.80	42955	0.340	8.83	1619.00	0.00	0.16
0.896	1630.96	42811	0.340	8.85	1616.00	0.00	0.16
0.946	1627.13	42706	0.350	8.86	1613.00	0.00	0.16
0.996	1623.47	42602	0.360	8.72	1610.00	0.00	0.16
1.046	1619.89	42481	0.360	8.43	1606.80	0.00	0.18
1.096	1616.27	42367	0.370	8.16	1603.60	0.00	0.18
1.145	1612.63	42254	0.380	7.91	1600.40	0.00	0.18
1.195	1608.93	42134	0.390	7.70	1597.20	0.00	0.20
1.245	1604.98	42019	0.390	7.74	1594.00	0.00	0.22
1.296	1600.45	41909	0.400	7.61	1589.20	0.00	0.22
1.347	1595.99	41809	0.410	7.47	1584.40	0.00	0.22
1.397	1591.58	41725	0.420	7.31	1579.60	0.00	0.24
1.448	1587.21	41634	0.430	8.00	1574.80	0.00	0.26
1.499	1583.09	41531	0.430	6.78	1570.00	0.00	0.24
1.533	1579.01	41439	0.440	6.67	1566.67	0.00	0.28
1.568	1575.59	41306	0.460	6.19	1563.33	0.00	0.30
1.602	1573.44	41115	0.470	4.99	1560.00	0.00	0.30
1.637	1571.76	40914	0.480	4.89	1560.00	0.00	0.30
1.673	1570.06	40754	0.480	4.77	1560.00	0.00	0.30
1.708	1568.33	40622	0.490	4.68	1560.00	0.00	0.32

COMPUTED WATER SURFACE ELEVATIONS AT REQUESTED
STATIONS WHERE HYDROGRAPHS ARE PLOTTED :

Time Step Count K	Elapsed Time TTP(K) (hr)	Station 1 Water Surface Elevation YC(K,1) (ft MSL)	Station 2 Water Surface Elevation YC(K,2) (ft MSL)	Station 3 Water Surface Elevation YC(K,3) (ft MSL)	Station 4 Water Surface Elevation YC(K,4) (ft MSL)	Station 5 Water Surface Elevation YC(K,5) (ft MSL)	Station 6 Water Surface Elevation YC(K,6) (ft MSL)
1	0.000	1709.95	1695.88	1672.38	1631.69	1599.69	1563.02
3	0.020	1711.12	1696.02	1672.43	1631.69	1599.69	1563.03
5	0.040	1712.23	1696.33	1672.56	1631.70	1599.69	1563.03
7	0.060	1713.91	1696.75	1672.81	1631.73	1599.69	1563.03
9	0.080	1716.03	1697.40	1673.23	1631.82	1599.70	1563.04
11	0.100	1717.97	1697.14	1673.85	1632.01	1599.70	1563.04
13	0.120	1719.65	1697.58	1674.56	1632.36	1599.72	1563.05
15	0.140	1721.23	1697.97	1675.23	1632.92	1599.77	1563.05
17	0.160	1722.64	1698.32	1675.82	1633.70	1599.88	1563.05
19	0.180	1723.90	1698.61	1676.33	1634.59	1600.10	1563.06
21	0.200	1725.11	1698.89	1676.79	1635.49	1600.49	1563.07
23	0.220	1725.77	1699.06	1677.18	1636.31	1601.08	1563.09
25	0.240	1725.29	1698.99	1677.41	1637.05	1601.79	1563.14
27	0.260	1724.80	1698.88	1677.44	1637.68	1602.54	1563.26
29	0.280	1724.29	1698.76	1677.35	1638.16	1603.23	1563.49
31	0.300	1723.76	1698.64	1677.22	1638.48	1603.83	1563.92
33	0.320	1723.26	1698.53	1677.07	1638.61	1604.31	1564.54
35	0.340	1722.76	1698.41	1676.92	1638.60	1604.65	1565.32
37	0.360	1722.31	1698.31	1676.76	1638.49	1604.86	1566.16
39	0.380	1721.94	1698.22	1676.62	1638.33	1604.96	1566.86
41	0.400	1721.56	1698.13	1676.49	1638.12	1604.97	1567.42
43	0.420	1721.15	1698.03	1676.36	1637.91	1604.92	1567.83
45	0.440	1720.73	1697.93	1676.24	1637.71	1604.83	1568.11
47	0.460	1720.30	1697.83	1676.11	1637.52	1604.70	1568.26
49	0.480	1719.85	1697.73	1675.97	1637.34	1604.57	1568.32
51	0.500	1719.39	1697.62	1675.84	1637.16	1604.42	1568.33
53	0.520	1718.96	1697.51	1675.71	1636.99	1604.28	1568.30
55	0.540	1718.52	1697.40	1675.56	1636.81	1604.13	1568.25
57	0.560	1718.02	1697.29	1675.43	1636.63	1603.98	1568.18
59	0.580	1717.46	1697.96	1675.28	1636.45	1603.83	1568.11
61	0.600	1716.89	1697.01	1675.11	1636.26	1603.68	1568.03
63	0.620	1716.45	1696.90	1674.95	1636.07	1603.53	1567.94
65	0.640	1716.00	1696.78	1674.80	1635.87	1603.37	1567.83
67	0.660	1715.60	1696.68	1674.65	1635.66	1603.21	1567.72
69	0.680	1715.24	1696.59	1674.51	1635.46	1603.05	1567.59
71	0.700	1714.88	1696.50	1674.37	1635.26	1602.88	1567.46
73	0.720	1714.63	1696.43	1674.25	1635.07	1602.72	1567.32
75	0.740	1714.38	1696.36	1674.14	1634.89	1602.56	1567.18
77	0.760	1714.15	1696.30	1674.04	1634.71	1602.41	1567.03
79	0.780	1713.95	1696.25	1673.95	1634.54	1602.26	1566.87
81	0.800	1713.75	1696.20	1673.88	1634.39	1602.12	1566.72
83	0.820	1713.65	1696.17	1673.80	1634.24	1601.99	1566.56
85	0.840	1713.54	1696.14	1673.75	1634.11	1601.86	1566.41

87	0.860	1713.39	1696.11	1673.70	1634.00	1601.75	1566.26
89	0.880	1713.18	1696.05	1673.65	1633.89	1601.64	1566.10
91	0.900	1712.96	1696.00	1673.59	1633.80	1601.55	1565.94
93	0.920	1712.67	1695.93	1673.52	1633.72	1601.46	1565.78
95	0.940	1712.38	1695.86	1673.44	1633.64	1601.39	1565.62
97	0.960	1712.06	1695.78	1673.35	1633.55	1601.32	1565.46

Time Step Count K	Elapsed Time TTP(K) (hr)	Station 1 Water Surface Elevation YC(K,1) (ft MSL)	Station 2 Water Surface Elevation YC(K,2) (ft MSL)	Station 3 Water Surface Elevation YC(K,3) (ft MSL)	Station 4 Water Surface Elevation YC(K,4) (ft MSL)	Station 5 Water Surface Elevation YC(K,5) (ft MSL)	Station 6 Water Surface Elevation YC(K,6) (ft MSL)
99	0.980	1711.73	1695.69	1673.25	1633.46	1601.25	1565.30
101	1.000	1711.39	1695.60	1673.14	1633.35	1601.19	1565.15
103	1.020	1711.39	1695.58	1673.04	1633.24	1601.13	1565.00
105	1.040	1711.39	1695.58	1672.96	1633.11	1601.06	1564.87
107	1.060	1711.39	1695.58	1672.92	1632.98	1600.99	1564.76
109	1.080	1711.39	1695.58	1672.90	1632.85	1600.92	1564.66
111	1.100	1711.39	1695.58	1672.89	1632.74	1600.84	1564.58
113	1.120	1711.39	1695.58	1672.89	1632.65	1600.76	1564.50
115	1.140	1711.39	1695.58	1672.89	1632.59	1600.68	1564.42
117	1.160	1711.39	1695.58	1672.89	1632.55	1600.61	1564.34
119	1.180	1711.39	1695.58	1672.88	1632.52	1600.55	1564.27
121	1.200	1711.39	1695.58	1672.88	1632.51	1600.49	1564.19
123	1.220	1711.39	1695.58	1672.88	1632.50	1600.44	1564.12
125	1.240	1711.39	1695.58	1672.88	1632.50	1600.41	1564.04
127	1.260	1711.39	1695.58	1672.88	1632.49	1600.38	1563.97
129	1.280	1711.39	1695.58	1672.88	1632.49	1600.36	1563.91
131	1.300	1711.39	1695.58	1672.88	1632.49	1600.35	1563.85
133	1.320	1711.39	1695.58	1672.88	1632.49	1600.34	1563.80
135	1.340	1711.39	1695.58	1672.88	1632.49	1600.34	1563.75
137	1.360	1711.39	1695.58	1672.88	1632.49	1600.33	1563.72
139	1.380	1711.39	1695.58	1672.88	1632.49	1600.33	1563.69
141	1.400	1711.39	1695.58	1672.88	1632.49	1600.33	1563.66
143	1.420	1711.39	1695.58	1672.88	1632.49	1600.33	1563.64
145	1.440	1711.39	1695.58	1672.88	1632.49	1600.33	1563.63
147	1.460	1711.39	1695.58	1672.88	1632.49	1600.33	1563.62
149	1.480	1711.39	1695.58	1672.88	1632.49	1600.33	1563.61
151	1.500	1711.39	1695.58	1672.88	1632.49	1600.33	1563.60
153	1.520	1711.39	1695.58	1672.88	1632.49	1600.33	1563.60
155	1.540	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
157	1.560	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
159	1.580	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
161	1.600	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
163	1.620	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
165	1.640	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
167	1.660	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
169	1.680	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
171	1.700	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
173	1.720	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
175	1.740	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
177	1.760	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
179	1.780	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
181	1.800	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
183	1.820	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
185	1.840	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
187	1.860	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
189	1.880	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
191	1.900	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59

193	1.920	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
195	1.940	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59
197	1.960	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59

Time Step Count K	Elapsed Time TTP(K) (hr)	Station 1 Water Surface Elevation YC(K,1) (ft MSL)	Station 2 Water Surface Elevation YC(K,2) (ft MSL)	Station 3 Water Surface Elevation YC(K,3) (ft MSL)	Station 4 Water Surface Elevation YC(K,4) (ft MSL)	Station 5 Water Surface Elevation YC(K,5) (ft MSL)	Station 6 Water Surface Elevation YC(K,6) (ft MSL)
199	1.980	1711.39	1695.58	1672.88	1632.49	1600.33	1563.59

APPENDIX U

Dam Break output for Golden Eagle Park plus Hesperus Wash Dams

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

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Version : 3.00
Serial Number : 20568

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PROGRAM ORIGIN :

Boss Dambrk (tm) is an enhanced version of Professor D. L. Fread's 1991 NWS DAMBRK program.

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PROJECT DESCRIPTION :

PROJECT TITLE : Fountain Hills Dam Break Analysis
PROJECT NUMBER : # 83
DESCRIPTION : Ashbrook Wash
ENGINEER : CCC
DATE OF RUN : 1/03/1996
TIME OF RUN : 11:37 am

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Problem Specification Option	7	
Number of Dynamic Routing Reaches (KKN)	9	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	28	
No. of Informational Cross-Sections (NPRT)	10	
Flood-Plain Routing (KFLP)	0	(no)

SEQUENTIAL CROSS-SECTION NUMBERS (NPT) :

1 10 13 62 80 83 86 98
104 147

BOUNDARY CONDITIONS :

Hydrograph Time Intervals (DHF, hr)	0.00
Routing Period (TEH, hr)	1.00
Breach Development Exponent (BREX)	1.00
Mud/Debris Flow Parameter (MUD)	0
Dry Bed Routing Parameter (IWF)	0
Hydraulic Radius Computation Parameter (KPRES)	1 (R=A/P)
Landslide Simulation (KSL)	0 (none)
Critical Flow Froude Number (DFR)	0.950

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
0.00	32400.0
0.02	36660.0
0.04	40600.0
0.06	43850.0
0.08	46300.0
0.10	48020.0
0.12	48990.0
0.14	49290.0
0.16	49090.0
0.18	48550.0
0.20	47790.0
0.22	46880.0
0.24	45900.0
0.26	44870.0
0.28	43860.0
0.30	42850.0
0.32	41820.0
0.34	40770.0
0.36	39710.0
0.38	38630.0
0.40	37550.0
0.42	36460.0
0.44	35400.0
0.46	34380.0
0.48	33370.0

0.50	32400.0
0.52	31470.0
0.54	30580.0

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Problem Specification Option (KKN, KUI, MULDAM, IDAM)	7	
Number of Cross-Sections Entered (NS)	11	
Number of Top Widths Entered (NCS)	8	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Flow Type Parameter (KSUPC)	3	(mixed flow)
Number of Lateral Inflow Hydrographs (LQ)	0	
Number of Points in Gate Control Curve (KCG)	0	

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

1 2 4 6 8 11

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	0.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	0.0000
Initial Time-Step Size (DTHM, hr)	0.0100
Time at which Dam Starts to Fail (TFI, hr)	0.0000
Theta Weighting Factor (F1I)	1.000
Stage Convergence Criterion (EPSY, ft)	0.000
Downstream Boundary Type Paramter (YDN)	0.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	0.0000

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi) 0.000

Flooding Elevation (FSTG(I), ft MSL) 1562.000

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.005

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)
1556.00	0.0	0.1180	0.0
1558.00	95.0	0.1180	0.0
1559.00	233.3	0.1180	0.0
1562.00	407.0	0.1180	0.0
1564.00	739.3	0.1180	0.0
1567.00	864.1	0.1180	0.0
1569.00	990.0	0.1180	0.0
1572.00	1033.1	0.1180	149.0

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi) 0.049

Flooding Elevation (FSTG(I), ft MSL) 1690.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC) -0.050

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.038

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)
1551.90	0.0	0.1180	0.0
1553.00	53.8	0.1180	0.0
1556.00	196.3	0.1180	0.0
1559.00	387.9	0.1180	0.0
1562.00	709.5	0.1180	0.0
1564.00	840.0	0.1180	0.0
1567.00	1217.5	0.1180	0.0
1570.00	1362.0	0.1180	0.0

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi) 0.164

Flooding Elevation (FSTG(I), ft MSL) 1548.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.004

CROSS-SECTION and REACH DESCRIPTION :

Elevation BS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)
1540.40	0.0	0.1180	0.0
1542.00	70.8	0.1180	0.0
1545.00	188.0	0.1180	0.0
1548.00	290.6	0.1180	0.0
1551.00	684.3	0.1180	0.0
1554.00	925.3	0.1180	0.0
1557.00	1197.5	0.1180	0.0
1561.00	1535.5	0.1180	0.0

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi) 0.362

Flooding Elevation (FSTG(I), ft MSL) 1536.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.003

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)
1527.40	0.0	0.0770	0.0
1531.00	36.6	0.0770	0.0
1532.00	165.7	0.0770	0.0
1535.00	198.2	0.0770	0.0
1537.00	319.6	0.0770	0.0
1539.00	612.4	0.0770	0.0
1542.00	890.0	0.0770	0.0
1546.00	1240.0	0.0770	0.0

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi) 0.417

Flooding Elevation (FSTG(I), ft MSL) 1528.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.041

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)
1519.20	0.0	0.0780	0.0
1521.00	117.1	0.0780	0.0
1524.00	201.8	0.0780	0.0
1527.00	344.5	0.0780	0.0
1529.00	506.0	0.0780	0.0
1531.00	640.0	0.0780	0.0
1533.00	785.5	0.0780	0.0
1536.00	1047.0	0.0780	0.0

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi) 0.542

Flooding Elevation (FSTG(I), ft MSL) 1516.000

DOWNSTREAM REACH NUMBER : 6

Reach Contraction-Expansion Coefficient (FKC) -0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.049

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)
1506.90	0.0	0.0740	0.0
1509.00	118.3	0.0740	0.0
1512.00	157.9	0.0740	0.0
1515.00	258.7	0.0740	0.0
1518.00	394.6	0.0740	0.0
1521.00	498.0	0.0740	0.0
1523.00	597.0	0.0740	0.0
1526.00	824.0	0.0740	0.0

CROSS-SECTION NUMBER : 7

Cross-Section Location (XS(I), mi) 0.692

Flooding Elevation (FSTG(I), ft MSL) 1520.000

DOWNSTREAM REACH NUMBER : 7

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.022

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)
1499.30	0.0	0.0740	0.0
1502.00	85.8	0.0740	0.0
1505.00	191.9	0.0740	0.0
1506.00	398.1	0.0740	0.0
1509.00	732.2	0.0740	0.0
1511.00	837.8	0.0740	0.0
1513.00	865.9	0.0740	0.0
1516.00	895.1	0.0740	0.0

CROSS-SECTION NUMBER : 8

Cross-Section Location (XS(I), mi) 0.965

Flooding Elevation (FSTG(I), ft MSL) 1500.000

DOWNSTREAM REACH NUMBER : 8

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.060

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)
1486.20	0.0	0.0740	0.0
1487.00	97.0	0.0740	0.0
1489.00	339.4	0.0740	0.0
1491.00	581.8	0.0740	0.0
1493.00	718.9	0.0740	0.0
1495.00	750.7	0.0740	0.0
1497.00	782.4	0.0740	0.0
1499.00	877.1	0.0740	0.0

CROSS-SECTION NUMBER : 9

Cross-Section Location (XS(I), mi) 1.325

Flooding Elevation (FSTG(I), ft MSL) 1460.000

DOWNSTREAM REACH NUMBER : 9

Reach Contraction-Expansion Coefficient (FKC) -0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.007

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)
1453.30	0.0	0.0740	0.0
1454.00	223.5	0.0740	0.0
1457.00	384.7	0.0740	0.0
1459.00	492.1	0.0740	0.0
1461.00	636.6	0.0740	0.0
1463.00	678.3	0.0740	0.0
1465.00	740.0	0.0740	0.0
1467.00	772.0	0.0740	0.0

CROSS-SECTION NUMBER : 10

Cross-Section Location (XS(I), mi) 1.626

Flooding Elevation (FSTG(I), ft MSL) 1420.000

DOWNSTREAM REACH NUMBER : 10

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.005

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)
1418.90	0.0	0.0740	0.0
1419.00	80.0	0.0740	0.0
1420.00	400.0	0.0740	0.0
1422.00	621.0	0.0740	0.0
1424.00	842.0	0.0740	0.0
1426.00	863.0	0.0740	0.0
1428.00	884.0	0.0740	0.0
1430.00	905.0	0.0740	0.0

CROSS-SECTION NUMBER : 11

Cross-Section Location (XS(I), mi) 1.875

Flooding Elevation (FSTG(I), ft MSL) 1410.000

CROSS-SECTION DESCRIPTION :

Elevation BS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)
1401.00	0.0	0.0
1402.00	74.7	0.0
1403.00	149.4	0.0
1405.00	298.9	0.0
1406.00	560.4	0.0
1408.00	1083.6	0.0
1410.00	1438.3	0.0
1412.00	1499.0	110.0

DISTANCE BETWEEN INTERPOLATED CROSS-SECTIONS
(DXM) THAT WILL BE USED IN COMPUTATIONS :

Down Stream Reach Number I=1,NS1	Interp. Cross Section Distance DXM(I) (mi)
1	0.0050
2	0.0380
3	0.0040
4	0.0030
5	0.0410
6	0.0490
7	0.0220
8	0.0600
9	0.0070
10	0.0050

Total number of cross-sections (original+interpolated) 196

Maximum number of cross-sections allowed 2000

OUTPUT DATA SUMMARY :

CROSS-SECTION and REACH SUMMARY :

Cross Section Number	Cross Section Location (mi)	Bottom Elevation (ft MSL)	Reach Number	Reach Length (mi)	Reach Slope (ft/mi)
1	0.000	1556.000			
2	0.049	1551.900	1	0.049	83.673
3	0.164	1540.400	2	0.115	100.000
4	0.362	1527.400	3	0.198	65.657
5	0.417	1519.200	4	0.055	149.092
6	0.542	1506.900	5	0.125	98.399
7	0.692	1499.300	6	0.150	50.667
8	0.965	1486.200	7	0.273	47.986
9	1.325	1453.300	8	0.360	91.389
10	1.626	1418.900	9	0.301	114.286
11	1.875	1401.000	10	0.249	71.888

ROUTING COMPLETED :

Number of Time Steps Used (KTIME)	100
Maximum Number of Time Steps Allowed	2999
Total Time of Flood Routing (TT, hr)	1.0
Flood Wave Arrival Time based upon a WSEL Increase of (ft)	1.00

CONSERVATION OF MASS RESULTS :

Should be close to 0.00%, a negative value denotes flow volume was lost during the routing, a positive value denotes flow volume was gained during the routing. Normalized as a percent of inflow volume, maximum change in conservation of mass during routing was 0.00

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)	Flood Wave Arrival Time (hr)
0.000	1571.11	49290	0.150	5.63	1562.00	0.00	0.06
0.005	1570.79	49270	0.150	5.60	1576.22	0.00	0.06
0.011	1570.46	49250	0.150	5.57	1590.44	0.00	0.04
0.016	1570.12	49228	0.150	5.55	1604.67	0.00	0.04
0.022	1569.76	49206	0.150	5.55	1618.89	0.00	0.04
0.027	1569.39	49184	0.150	5.56	1633.11	0.00	0.04
0.033	1569.00	49166	0.150	5.59	1647.33	0.00	0.04
0.038	1568.58	49157	0.160	5.65	1661.56	0.00	0.06
0.044	1568.13	49148	0.160	5.75	1675.78	0.00	0.06
0.049	1567.62	49136	0.160	5.90	1690.00	0.00	0.06
0.087	1564.09	49050	0.170	5.93	1642.67	0.00	0.08
0.126	1560.71	48917	0.180	5.82	1595.33	0.00	0.12
0.164	1558.16	48756	0.190	5.07	1548.00	0.00	0.08
0.168	1557.92	48742	0.190	5.07	1547.76	0.00	0.08
0.172	1557.69	48726	0.190	5.07	1547.51	0.00	0.08
0.176	1557.46	48710	0.190	5.07	1547.27	0.00	0.08
0.180	1557.22	48693	0.190	5.07	1547.02	0.00	0.08
0.184	1556.99	48675	0.190	5.07	1546.78	0.00	0.08
0.188	1556.75	48655	0.190	5.07	1546.53	0.00	0.06
0.192	1556.51	48635	0.200	5.07	1546.29	0.00	0.06
0.196	1556.28	48613	0.200	5.07	1546.04	0.00	0.06
0.200	1556.04	48600	0.200	5.07	1545.80	0.00	0.06
0.204	1555.81	48587	0.200	5.07	1545.55	0.00	0.04
0.208	1555.57	48574	0.200	5.07	1545.31	0.00	0.04
0.212	1555.34	48560	0.200	5.08	1545.06	0.00	0.04
0.217	1555.10	48545	0.200	5.08	1544.82	0.00	0.02
0.221	1554.86	48529	0.200	5.08	1544.57	0.00	0.02
0.225	1554.62	48512	0.200	5.08	1544.33	0.00	0.02
0.229	1554.38	48494	0.200	5.08	1544.08	0.00	0.02
0.233	1554.14	48476	0.200	5.09	1543.84	0.00	0.02
0.237	1553.90	48457	0.210	5.09	1543.59	0.00	0.02
0.241	1553.66	48447	0.210	5.09	1543.35	0.00	0.02
0.245	1553.42	48436	0.210	5.10	1543.10	0.00	0.02
0.249	1553.18	48425	0.210	5.10	1542.86	0.00	0.02
0.253	1552.93	48413	0.210	5.11	1542.61	0.00	0.02
0.257	1552.69	48400	0.210	5.12	1542.37	0.00	0.02
0.261	1552.44	48386	0.210	5.13	1542.12	0.00	0.02
0.265	1552.19	48372	0.210	5.13	1541.88	0.00	0.02
0.269	1551.94	48357	0.210	5.14	1541.63	0.00	0.02
0.273	1551.69	48341	0.210	5.16	1541.39	0.00	0.02
0.277	1551.44	48325	0.210	5.17	1541.14	0.00	0.02
0.281	1551.18	48318	0.210	5.18	1540.90	0.00	0.02
0.285	1550.92	48310	0.210	5.20	1540.65	0.00	0.02
0.289	1550.66	48302	0.210	5.22	1540.41	0.00	0.02
0.293	1550.40	48293	0.220	5.24	1540.16	0.00	0.02
0.297	1550.13	48284	0.220	5.27	1539.92	0.00	0.02

0.301	1549.85	48274	0.220	5.29	1539.67	0.00	0.02
0.305	1549.57	48264	0.220	5.33	1539.43	0.00	0.02

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

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)	Flood Wave Arrival Time (hr)
0.309	1549.29	48253	0.220	5.36	1539.18	0.00	0.02
0.314	1549.00	48242	0.220	5.41	1538.94	0.00	0.02
0.318	1548.70	48230	0.220	5.46	1538.69	0.00	0.02
0.322	1548.39	48220	0.220	5.52	1538.45	0.00	0.02
0.326	1548.06	48216	0.220	5.59	1538.20	0.00	0.02
0.330	1547.73	48212	0.220	5.67	1537.96	0.00	0.02
0.334	1547.37	48208	0.220	5.77	1537.71	0.00	0.02
0.338	1546.99	48204	0.220	5.90	1537.47	0.00	0.02
0.342	1546.58	48199	0.220	6.05	1537.22	0.00	0.02
0.346	1546.13	48195	0.220	6.25	1536.98	0.00	0.02
0.350	1545.62	48190	0.220	6.53	1536.73	0.00	0.02
0.354	1545.00	48185	0.220	6.93	1536.49	0.00	0.02
0.358	1544.18	48181	0.220	7.63	1536.24	0.00	0.02
0.362	1542.26	48177	0.220	10.36	1536.00	0.00	0.14
0.365	1541.71	48174	0.220	10.41	1535.56	0.00	0.16
0.368	1541.17	48170	0.220	10.47	1535.11	0.00	0.16
0.371	1540.62	48167	0.220	10.52	1534.67	0.00	0.16
0.374	1540.07	48163	0.230	10.58	1534.22	0.00	0.18
0.377	1539.52	48160	0.230	10.63	1533.78	0.00	0.18
0.380	1538.97	48156	0.230	10.69	1533.33	0.00	0.20
0.383	1538.42	48152	0.230	10.73	1532.89	0.00	0.00
0.386	1537.88	48151	0.230	10.77	1532.44	0.00	0.00
0.389	1537.34	48150	0.230	10.78	1532.00	0.00	0.00
0.393	1536.82	48148	0.230	10.76	1531.56	0.00	0.00
0.396	1536.33	48147	0.230	10.70	1531.11	0.00	0.00
0.399	1535.87	48144	0.230	10.57	1530.67	0.00	0.00
0.402	1535.47	48141	0.230	10.36	1530.22	0.00	0.00
0.405	1535.11	48138	0.230	10.06	1529.78	0.00	0.22
0.408	1534.81	48133	0.240	9.68	1529.33	0.00	0.18
0.411	1534.57	48129	0.240	9.24	1528.89	0.00	0.16
0.414	1534.37	48124	0.240	8.76	1528.44	0.00	0.14
0.417	1534.20	48118	0.240	8.28	1528.00	0.00	0.12
0.459	1530.79	48033	0.240	8.54	1524.00	0.00	0.14
0.500	1527.40	47949	0.250	8.85	1520.00	0.00	0.14
0.542	1523.59	47898	0.260	9.70	1516.00	0.00	0.14
0.592	1519.88	47843	0.260	9.12	1517.33	0.00	0.16
0.642	1516.40	47794	0.270	8.60	1518.67	0.00	0.20
0.692	1513.38	47748	0.270	7.79	1520.00	0.00	0.18
0.715	1512.04	47720	0.280	7.81	1518.33	0.00	0.18
0.737	1510.69	47689	0.280	7.84	1516.67	0.00	0.18
0.760	1509.35	47670	0.280	7.86	1515.00	0.00	0.18
0.783	1508.00	47643	0.290	7.88	1513.33	0.00	0.18
0.806	1506.66	47607	0.290	7.90	1511.67	0.00	0.16
0.828	1505.31	47589	0.290	7.93	1510.00	0.00	0.16
0.851	1503.96	47564	0.300	7.96	1508.33	0.00	0.16
0.874	1502.60	47531	0.300	7.99	1506.67	0.00	0.16

0.897	1501.22	47511	0.300	8.05	1505.00	0.00	0.16
0.919	1499.81	47492	0.300	8.15	1503.33	0.00	0.16

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)	Flood Wave Arrival Time (hr)
0.942	1498.29	47470	0.310	8.37	1501.67	0.00	0.16
0.965	1496.27	47450	0.310	9.24	1500.00	0.00	0.22
1.025	1490.91	47416	0.310	9.28	1493.33	0.00	0.22
1.085	1485.51	47377	0.320	9.36	1486.67	0.00	0.22
1.145	1480.17	47329	0.330	9.34	1480.00	0.27	0.20
1.205	1474.63	47294	0.340	9.58	1473.33	0.16	0.22
1.265	1469.59	47252	0.340	9.14	1466.67	0.00	0.18
1.325	1463.20	47209	0.350	10.61	1460.00	0.00	0.26
1.332	1462.36	47208	0.350	10.59	1459.07	0.00	0.26
1.339	1461.51	47206	0.350	10.56	1458.14	0.00	0.26
1.346	1460.67	47204	0.350	10.53	1457.21	0.00	0.26
1.353	1459.82	47202	0.350	10.51	1456.28	0.00	0.28
1.360	1458.98	47199	0.350	10.48	1455.35	0.00	0.28
1.367	1458.13	47196	0.350	10.46	1454.42	0.00	0.28
1.374	1457.28	47193	0.350	10.43	1453.49	0.00	0.28
1.381	1456.43	47189	0.350	10.41	1452.56	0.00	0.28
1.388	1455.58	47185	0.350	10.38	1451.63	0.00	0.30
1.395	1454.73	47180	0.350	10.36	1450.70	0.00	0.30
1.402	1453.88	47175	0.350	10.33	1449.77	0.00	0.30
1.409	1453.03	47170	0.360	10.31	1448.84	0.00	0.30
1.416	1452.18	47164	0.360	10.29	1447.91	0.00	0.32
1.423	1451.33	47160	0.360	10.26	1446.98	0.00	0.32
1.430	1450.48	47159	0.360	10.24	1446.05	0.00	0.34
1.437	1449.63	47158	0.360	10.22	1445.12	0.00	0.34
1.444	1448.78	47156	0.360	10.20	1444.19	0.00	0.00
1.451	1447.93	47154	0.360	10.17	1443.26	0.00	0.00
1.458	1447.07	47152	0.360	10.15	1442.33	0.00	0.00
1.465	1446.22	47149	0.360	10.13	1441.40	0.00	0.00
1.472	1445.36	47146	0.360	10.11	1440.47	0.00	0.00
1.479	1444.51	47142	0.360	10.09	1439.53	0.00	0.00
1.486	1443.65	47139	0.360	10.07	1438.60	0.00	0.00
1.493	1442.80	47134	0.360	10.05	1437.67	0.00	0.00
1.500	1441.94	47130	0.360	10.03	1436.74	0.00	0.00
1.507	1441.09	47125	0.360	10.01	1435.81	0.00	0.00
1.514	1440.23	47119	0.370	9.99	1434.88	0.00	0.00
1.521	1439.38	47114	0.370	9.97	1433.95	0.00	0.00
1.528	1438.52	47112	0.370	9.95	1433.02	0.00	0.00
1.535	1437.66	47111	0.370	9.93	1432.09	0.00	0.00
1.542	1436.80	47110	0.370	9.91	1431.16	0.00	0.00
1.549	1435.95	47108	0.370	9.89	1430.23	0.00	0.00
1.556	1435.09	47106	0.370	9.87	1429.30	0.00	0.00
1.563	1434.23	47103	0.370	9.85	1428.37	0.00	0.00
1.570	1433.37	47100	0.370	9.83	1427.44	0.00	0.00
1.577	1432.52	47097	0.370	9.81	1426.51	0.00	0.00
1.584	1431.66	47093	0.370	9.78	1425.58	0.00	0.00
1.591	1430.82	47089	0.370	9.74	1424.65	0.00	0.00

1.598	1430.00	47084	0.370	9.64	1423.72	0.00	0.00
1.605	1429.25	47079	0.380	9.45	1422.79	0.00	0.00

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)	Flood Wave Arrival Time (hr)
1.612	1428.62	47072	0.380	9.07	1421.86	0.00	0.00
1.619	1428.14	47064	0.380	8.50	1420.93	0.00	0.00
1.626	1427.81	47060	0.380	7.83	1420.00	0.00	0.30
1.631	1427.50	47058	0.380	7.80	1419.80	0.00	0.30
1.636	1427.19	47056	0.380	7.77	1419.59	0.00	0.28
1.641	1426.88	47054	0.380	7.74	1419.39	0.00	0.28
1.646	1426.56	47051	0.380	7.71	1419.18	0.00	0.28
1.651	1426.24	47048	0.380	7.68	1418.98	0.00	0.28
1.656	1425.93	47045	0.380	7.65	1418.78	0.00	0.28
1.662	1425.61	47041	0.380	7.62	1418.57	0.00	0.28
1.667	1425.29	47037	0.380	7.59	1418.37	0.00	0.28
1.672	1424.96	47033	0.380	7.56	1418.16	0.00	0.28
1.677	1424.64	47028	0.380	7.53	1417.96	0.00	0.28
1.682	1424.31	47024	0.390	7.51	1417.76	0.00	0.28
1.687	1423.99	47018	0.390	7.48	1417.55	0.00	0.28
1.692	1423.66	47013	0.390	7.45	1417.35	0.00	0.28
1.697	1423.33	47007	0.390	7.42	1417.14	0.00	0.28
1.702	1423.00	47001	0.390	7.40	1416.94	0.00	0.28
1.707	1422.67	47000	0.390	7.37	1416.73	0.00	0.28
1.712	1422.34	46998	0.390	7.34	1416.53	0.00	0.28
1.717	1422.01	46995	0.390	7.31	1416.33	0.00	0.28
1.723	1421.67	46993	0.390	7.29	1416.12	0.00	0.28
1.728	1421.34	46990	0.390	7.26	1415.92	0.00	0.28
1.733	1421.00	46986	0.390	7.24	1415.71	0.00	0.28
1.738	1420.67	46983	0.390	7.21	1415.51	0.00	0.28
1.743	1420.33	46979	0.390	7.18	1415.31	0.00	0.28
1.748	1419.99	46974	0.390	7.16	1415.10	0.00	0.28
1.753	1419.65	46969	0.390	7.13	1414.90	0.00	0.28
1.758	1419.31	46964	0.400	7.11	1414.69	0.00	0.28
1.763	1418.97	46958	0.400	7.09	1414.49	0.00	0.30
1.768	1418.63	46952	0.400	7.06	1414.29	0.00	0.30
1.773	1418.29	46946	0.400	7.04	1414.08	0.00	0.30
1.778	1417.94	46942	0.400	7.01	1413.88	0.00	0.30
1.784	1417.60	46940	0.400	6.99	1413.67	0.00	0.30
1.789	1417.26	46938	0.400	6.97	1413.47	0.00	0.30
1.794	1416.91	46935	0.400	6.94	1413.27	0.00	0.30
1.799	1416.57	46932	0.400	6.92	1413.06	0.00	0.30
1.804	1416.22	46929	0.400	6.90	1412.86	0.00	0.32
1.809	1415.87	46925	0.400	6.87	1412.65	0.00	0.32
1.814	1415.52	46921	0.400	6.85	1412.45	0.00	0.32
1.819	1415.17	46916	0.400	6.83	1412.24	0.00	0.32
1.824	1414.83	46911	0.400	6.81	1412.04	0.00	0.32
1.829	1414.48	46905	0.410	6.79	1411.84	0.00	0.32
1.834	1414.13	46899	0.410	6.77	1411.63	0.00	0.34
1.839	1413.77	46893	0.410	6.75	1411.43	0.00	0.34
1.845	1413.42	46886	0.410	6.73	1411.22	0.00	0.34

1.850	1413.07	46884	0.410	6.71	1411.02	0.00	0.34
1.855	1412.72	46882	0.410	6.69	1410.82	0.00	0.36

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

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)	Flood Wave Arrival Time (hr)
1.860	1412.36	46880	0.410	6.67	1410.61	0.00	0.36
1.865	1412.00	46877	0.410	6.66	1410.41	0.00	0.38
1.870	1411.65	46874	0.410	6.64	1410.20	0.00	0.38
1.875	1411.29	46870	0.410	6.63	1410.00	0.00	0.40

COMPUTED WATER SURFACE ELEVATIONS AT REQUESTED
STATIONS WHERE HYDROGRAPHS ARE PLOTTED :

Time Step Count K	Elapsed Time TTP(K) (hr)	Station 1 Water Surface Elevation YC(K,1) (ft MSL)	Station 2 Water Surface Elevation YC(K,2) (ft MSL)	Station 3 Water Surface Elevation YC(K,3) (ft MSL)	Station 4 Water Surface Elevation YC(K,4) (ft MSL)	Station 5 Water Surface Elevation YC(K,5) (ft MSL)	Station 6 Water Surface Elevation YC(K,6) (ft MSL)
1	0.000	1569.18	1565.65	1540.81	1521.44	1494.82	1410.29
3	0.020	1569.62	1565.94	1540.81	1521.45	1494.82	1410.31
5	0.040	1570.07	1566.39	1540.84	1521.47	1494.82	1410.32
7	0.060	1570.46	1566.83	1540.95	1521.52	1494.82	1410.32
9	0.080	1570.74	1567.17	1541.15	1521.67	1494.83	1410.32
11	0.100	1570.94	1567.40	1541.39	1521.91	1494.87	1410.33
13	0.120	1571.06	1567.54	1541.65	1522.23	1494.95	1410.33
15	0.140	1571.11	1567.61	1541.87	1522.57	1495.09	1410.33
17	0.160	1571.11	1567.62	1542.05	1522.88	1495.28	1410.34
19	0.180	1571.07	1567.60	1542.17	1523.15	1495.49	1410.36
21	0.200	1571.00	1567.54	1542.24	1523.36	1495.71	1410.39
23	0.220	1570.91	1567.47	1542.26	1523.50	1495.91	1410.45
25	0.240	1570.81	1567.38	1542.25	1523.57	1496.06	1410.55
27	0.260	1570.71	1567.29	1542.22	1523.59	1496.17	1410.66
29	0.280	1570.60	1567.19	1542.16	1523.56	1496.24	1410.80
31	0.300	1570.50	1567.09	1542.10	1523.49	1496.27	1410.93
33	0.320	1570.39	1566.98	1542.02	1523.40	1496.27	1411.05
35	0.340	1570.27	1566.86	1541.95	1523.29	1496.24	1411.15
37	0.360	1570.15	1566.73	1541.86	1523.18	1496.19	1411.22
39	0.380	1570.03	1566.60	1541.78	1523.05	1496.13	1411.26
41	0.400	1569.90	1566.47	1541.69	1522.93	1496.06	1411.28
43	0.420	1569.77	1566.33	1541.60	1522.80	1495.98	1411.29
45	0.440	1569.64	1566.19	1541.50	1522.67	1495.89	1411.27
47	0.460	1569.50	1566.05	1541.41	1522.53	1495.80	1411.24
49	0.480	1569.37	1565.91	1541.31	1522.39	1495.71	1411.21
51	0.500	1569.24	1565.77	1541.21	1522.25	1495.62	1411.16
53	0.520	1569.18	1565.65	1541.11	1522.11	1495.52	1411.11
55	0.540	1569.18	1565.65	1541.01	1521.96	1495.42	1411.06
57	0.560	1569.18	1565.65	1540.93	1521.82	1495.32	1411.00
59	0.580	1569.18	1565.65	1540.86	1521.70	1495.23	1410.94
61	0.600	1569.18	1565.65	1540.82	1521.60	1495.13	1410.88
63	0.620	1569.18	1565.65	1540.81	1521.53	1495.05	1410.81
65	0.640	1569.18	1565.65	1540.81	1521.49	1494.97	1410.75
67	0.660	1569.18	1565.65	1540.81	1521.47	1494.92	1410.69
69	0.680	1569.18	1565.65	1540.81	1521.46	1494.88	1410.63
71	0.700	1569.18	1565.65	1540.81	1521.46	1494.85	1410.57
73	0.720	1569.18	1565.65	1540.81	1521.46	1494.83	1410.52
75	0.740	1569.18	1565.65	1540.81	1521.46	1494.82	1410.47
77	0.760	1569.18	1565.65	1540.81	1521.46	1494.82	1410.43
79	0.780	1569.18	1565.65	1540.81	1521.46	1494.82	1410.40
81	0.800	1569.18	1565.65	1540.81	1521.46	1494.82	1410.37
83	0.820	1569.18	1565.65	1540.81	1521.46	1494.82	1410.36
85	0.840	1569.18	1565.65	1540.81	1521.46	1494.82	1410.34

87	0.860	1569.18	1565.65	1540.81	1521.46	1494.82	1410.34
89	0.880	1569.18	1565.65	1540.81	1521.46	1494.82	1410.33
91	0.900	1569.18	1565.65	1540.81	1521.46	1494.82	1410.33
93	0.920	1569.18	1565.65	1540.81	1521.46	1494.82	1410.33
95	0.940	1569.18	1565.65	1540.81	1521.46	1494.82	1410.33
97	0.960	1569.18	1565.65	1540.81	1521.46	1494.82	1410.33

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

Time Step Count K	Elapsed Time TTP(K) (hr)	Station 1 Water Surface Elevation YC(K,1) (ft MSL)	Station 2 Water Surface Elevation YC(K,2) (ft MSL)	Station 3 Water Surface Elevation YC(K,3) (ft MSL)	Station 4 Water Surface Elevation YC(K,4) (ft MSL)	Station 5 Water Surface Elevation YC(K,5) (ft MSL)	Station 6 Water Surface Elevation YC(K,6) (ft MSL)
99	0.980	1569.18	1565.65	1540.81	1521.46	1494.82	1410.33

COMPUTED DISCHARGES AT REQUESTED
STATIONS WHERE HYDROGRAPHS ARE PLOTTED :

Time Step Count K	Elapsed Time (x 1000) TTP(K) (hr)	Station 1 Discharge (x 1000) QC(K,1) (cfs)	Station 2 Discharge (x 1000) QC(K,2) (cfs)	Station 3 Discharge (x 1000) QC(K,3) (cfs)	Station 4 Discharge (x 1000) QC(K,4) (cfs)	Station 5 Discharge (x 1000) QC(K,5) (cfs)	Station 6 Discharge (x 1000) QC(K,6) (cfs)
1	0.000	32.40	32.40	32.40	32.40	32.40	32.40
3	0.020	36.66	34.99	32.42	32.40	32.40	32.40
5	0.040	40.60	38.73	32.82	32.50	32.40	32.40
7	0.060	43.85	42.25	33.94	32.93	32.42	32.40
9	0.080	46.30	45.11	35.91	33.97	32.56	32.41
11	0.100	48.02	47.19	38.48	35.74	32.96	32.43
13	0.120	48.99	48.49	41.22	38.08	33.80	32.45
15	0.140	49.29	49.08	43.73	40.62	35.20	32.48
17	0.160	49.09	49.10	45.74	42.97	37.12	32.59
19	0.180	48.55	48.72	47.12	44.96	39.36	32.84
21	0.200	47.79	48.07	47.91	46.44	41.63	33.36
23	0.220	46.88	47.23	48.18	47.39	43.68	34.24
25	0.240	45.90	46.29	48.04	47.84	45.31	35.56
27	0.260	44.87	45.29	47.60	47.86	46.46	37.29
29	0.280	43.86	44.28	46.95	47.56	47.16	39.28
31	0.300	42.85	43.28	46.16	47.02	47.45	41.32
33	0.320	41.82	42.27	45.30	46.31	47.38	43.17
35	0.340	40.77	41.25	44.38	45.50	47.03	44.70
37	0.360	39.71	40.20	43.44	44.63	46.48	45.82
39	0.380	38.63	39.15	42.47	43.71	45.78	46.52
41	0.400	37.55	38.08	41.48	42.74	44.98	46.84
43	0.420	36.46	37.00	40.48	41.76	44.10	46.83
45	0.440	35.40	35.95	39.45	40.75	43.17	46.56
47	0.460	34.38	34.92	38.42	39.71	42.22	46.09
49	0.480	33.37	33.91	37.40	38.67	41.24	45.47
51	0.500	32.40	32.94	36.38	37.64	40.25	44.73
53	0.520	32.40	32.40	35.38	36.63	39.24	43.92
55	0.540	32.40	32.40	34.42	35.64	38.24	43.05
57	0.560	32.40	32.40	33.58	34.69	37.25	42.15
59	0.580	32.40	32.40	32.99	33.87	36.28	41.22
61	0.600	32.40	32.40	32.64	33.25	35.36	40.28
63	0.620	32.40	32.40	32.47	32.83	34.54	39.34
65	0.640	32.40	32.40	32.40	32.60	33.84	38.40
67	0.660	32.40	32.40	32.40	32.49	33.31	37.48
69	0.680	32.40	32.40	32.40	32.44	32.94	36.58
71	0.700	32.40	32.40	32.40	32.42	32.70	35.75
73	0.720	32.40	32.40	32.40	32.42	32.56	34.99
75	0.740	32.40	32.40	32.40	32.41	32.49	34.32
77	0.760	32.40	32.40	32.40	32.41	32.45	33.78
79	0.780	32.40	32.40	32.40	32.41	32.43	33.34
81	0.800	32.40	32.40	32.40	32.41	32.42	33.02
83	0.820	32.40	32.40	32.40	32.41	32.42	32.80
85	0.840	32.40	32.40	32.40	32.41	32.41	32.64
87	0.860	32.40	32.40	32.40	32.41	32.41	32.55

89	0.880	32.40	32.40	32.40	32.41	32.41	32.50
91	0.900	32.40	32.40	32.40	32.41	32.41	32.48
93	0.920	32.40	32.40	32.40	32.41	32.41	32.46
95	0.940	32.40	32.40	32.40	32.41	32.41	32.46
97	0.960	32.40	32.40	32.40	32.41	32.41	32.45

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

Time Step Count K	Elapsed Time (x 1000) TTP(K) (hr)	Station 1 Discharge (x 1000) QC(K,1) (cfs)	Station 2 Discharge (x 1000) QC(K,2) (cfs)	Station 3 Discharge (x 1000) QC(K,3) (cfs)	Station 4 Discharge (x 1000) QC(K,4) (cfs)	Station 5 Discharge (x 1000) QC(K,5) (cfs)	Station 6 Discharge (x 1000) QC(K,6) (cfs)
99	0.980	32.40	32.40	32.40	32.41	32.41	32.45

END OF OUTPUT

APPENDIX V

Dam Break output for Aspen Dam

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

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Version : 3.00
Serial Number : 20568

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PROGRAM ORIGIN :

Boss Dambrk (tm) is an enhanced version of Professor D. L. Fread's 1991 NWS DAMBRK program.

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PROJECT DESCRIPTION :

PROJECT TITLE : Fountain Hills Dam Break Analysis
PROJECT NUMBER : # 83
DESCRIPTION : Aspen Dam (Dam 6)
ENGINEER : CCC
DATE OF RUN : 1/03/1996
TIME OF RUN : 10:29 am

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Problem Specification Option	7	
Number of Dynamic Routing Reaches (KKN)	9	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	22	
No. of Informational Cross-Sections (NPRT)	13	
Flood-Plain Routing (KFLP)	0	(no)

SEQUENTIAL CROSS-SECTION NUMBERS (NPT) :

1	2	11	16	32	44	45	54
59	65	70	76	84			

BOUNDARY CONDITIONS :

Hydrograph Time Intervals (DHF, hr)	0.00
Routing Period (TEH, hr)	1.00
Breach Development Exponent (BREX)	1.00
Mud/Debris Flow Parameter (MUD)	0
Dry Bed Routing Parameter (IWF)	0
Hydraulic Radius Computation Parameter (KPRES)	1 (R=A/P)
Landslide Simulation (KSL)	0 (none)
Critical Flow Froude Number (DFR)	0.950

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
0.00	17409.0
0.05	17409.0
0.10	17409.0
0.15	17409.0
0.20	21987.0
0.25	24893.0
0.25	24829.0
0.30	20000.0
0.35	20000.0
0.40	20000.0
0.45	20000.0
0.50	20000.0
0.55	20000.0
0.60	20000.0
0.65	20000.0
0.70	20000.0
0.75	20000.0
0.80	20000.0
0.85	20000.0
0.90	20000.0
0.95	20000.0
1.00	14801.0

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Problem Specification Option (KKN, KUI, MULDAM, IDAM)	7	
Number of Cross-Sections Entered (NS)	13	
Number of Top Widths Entered (NCS)	8	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Flow Type Parameter (KSUPC)	3	(mixed flow)
Number of Lateral Inflow Hydrographs (LQ)	0	
Number of Points in Gate Control Curve (KCG)	0	

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

1 2 4 6 12 13

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	0.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	0.0000
Initial Time-Step Size (DTHM, hr)	0.0100
Time at which Dam Starts to Fail (TFI, hr)	0.0000
Theta Weighting Factor (F1I)	1.000
Stage Convergence Criterion (EPSY, ft)	0.000
Downstream Boundary Type Paramter (YDN)	0.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	252.0000

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi) 0.000

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC) -0.200

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.100

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)
1808.70	0.0	0.0550	0.0
1808.80	35.6	0.0550	0.0
1815.00	47.5	0.0550	0.0
1820.00	57.0	0.0550	0.0
1830.00	76.2	0.0550	0.0
1840.00	95.3	0.0550	0.0
1843.20	101.4	0.0550	0.0
1850.00	114.4	0.0550	0.0

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi) 0.038

Flooding Elevation (FSTG(I), ft MSL) 1808.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC) 0.050

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.008

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)
1799.20	0.0	0.0550	0.0
1801.00	32.8	0.0550	0.0
1804.00	48.0	0.0550	0.0
1807.00	62.4	0.0550	0.0
1809.00	90.1	0.0550	0.0
1812.00	333.0	0.0550	0.0
1815.00	634.3	0.0550	0.0
1817.00	657.3	0.0550	0.0

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi) 0.117

Flooding Elevation (FSTG(I), ft MSL) 1798.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC) -0.250

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.012

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)
1789.80	0.0	0.0560	0.0
1792.00	49.6	0.0560	0.0
1794.00	64.9	0.0560	0.0
1796.00	77.3	0.0560	0.0
1798.00	116.4	0.0560	0.0
1800.00	458.0	0.0560	0.0
1802.00	729.2	0.0560	0.0
1805.00	916.7	0.0560	0.0

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi) 0.182

Flooding Elevation (FSTG(I), ft MSL) 1790.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.005

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)
1784.20	0.0	0.0580	0.0
1786.00	54.9	0.0580	0.0
1788.00	68.7	0.0580	0.0
1790.00	378.8	0.0580	0.0
1792.00	639.1	0.0580	0.0
1794.00	699.0	0.0580	0.0
1796.00	819.0	0.0580	0.0
1798.00	848.0	0.0580	0.0

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi) 0.263

Flooding Elevation (FSTG(I), ft MSL) 1780.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.005

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)
1772.20	0.0	0.0560	0.0
1779.00	119.9	0.0560	0.0
1782.00	261.5	0.0560	0.0
1783.00	515.3	0.0560	0.0
1785.00	617.5	0.0560	0.0
1787.00	628.6	0.0560	0.0
1788.00	634.5	0.0560	0.0
1790.00	650.3	0.0560	0.0

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi) 0.324

Flooding Elevation (FSTG(I), ft MSL) 1774.000

DOWNSTREAM REACH NUMBER : 6

Reach Contraction-Expansion Coefficient (FKC) 0.050

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.051

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)
1770.00	0.0	0.0560	0.0
1772.00	61.7	0.0560	0.0
1775.00	80.4	0.0560	0.0
1776.00	190.1	0.0560	0.0
1778.00	417.5	0.0560	0.0
1781.00	559.7	0.0560	0.0
1783.00	580.4	0.0560	0.0
1785.00	616.6	0.0560	0.0

CROSS-SECTION NUMBER : 7

Cross-Section Location (XS(I), mi) 0.362

Flooding Elevation (FSTG(I), ft MSL) 1770.000

DOWNSTREAM REACH NUMBER : 7

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.006

CROSS-SECTION and REACH DESCRIPTION :

Elevation BS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Channel Manning n CM(K,I)	Storage Top Width BSS(K,I) (ft)
1765.40	0.0	0.0550	0.0
1766.00	64.8	0.0550	0.0
1768.00	90.2	0.0550	0.0
1771.00	173.8	0.0550	0.0
1772.00	417.9	0.0550	0.0
1774.00	500.4	0.0550	0.0
1776.00	528.8	0.0550	0.0
1778.00	559.4	0.0550	0.0

CROSS-SECTION NUMBER : 8

Cross-Section Location (XS(I), mi) 0.420

Flooding Elevation (FSTG(I), ft MSL) 1766.000

DOWNSTREAM REACH NUMBER : 8

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.007

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)
1754.20	0.0	0.0480	0.0
1757.00	53.3	0.0480	0.0
1759.00	77.8	0.0480	0.0
1761.00	93.1	0.0480	0.0
1763.00	196.6	0.0480	0.0
1766.00	426.7	0.0480	0.0
1769.00	582.9	0.0480	0.0
1771.00	636.8	0.0480	0.0

CROSS-SECTION NUMBER : 9

Cross-Section Location (XS(I), mi) 0.458

Flooding Elevation (FSTG(I), ft MSL) 1762.000

DOWNSTREAM REACH NUMBER : 9

Reach Contraction-Expansion Coefficient (FKC) 0.050

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.006

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)
1750.00	0.0	0.0470	0.0
1752.00	50.0	0.0470	0.0
1754.00	81.0	0.0470	0.0
1756.00	93.7	0.0470	0.0
1758.00	142.3	0.0470	0.0
1761.00	364.0	0.0470	0.0
1763.00	601.5	0.0470	0.0
1766.00	627.7	0.0470	0.0

CROSS-SECTION NUMBER : 10

Cross-Section Location (XS(I), mi) 0.495

Flooding Elevation (FSTG(I), ft MSL) 1758.000

DOWNSTREAM REACH NUMBER : 10

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.006

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)
1742.90	0.0	0.0460	0.0
1745.00	28.3	0.0460	0.0
1748.00	85.9	0.0460	0.0
1751.00	113.4	0.0460	0.0
1753.00	123.9	0.0460	0.0
1756.00	287.2	0.0460	0.0
1758.00	469.7	0.0460	0.0
1760.00	580.0	0.0460	0.0

CROSS-SECTION NUMBER : 11

Cross-Section Location (XS(I), mi) 0.525

Flooding Elevation (FSTG(I), ft MSL) 1752.000

DOWNSTREAM REACH NUMBER : 11

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.006

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)
1735.00	0.0	0.0460	0.0
1738.00	49.0	0.0460	0.0
1741.00	65.0	0.0460	0.0
1744.00	79.8	0.0460	0.0
1747.00	116.9	0.0460	0.0
1749.00	134.8	0.0460	0.0
1752.00	256.7	0.0460	0.0
1754.00	594.7	0.0460	0.0

CROSS-SECTION NUMBER : 12

Cross-Section Location (XS(I), mi) 0.561

Flooding Elevation (FSTG(I), ft MSL) 1748.000

DOWNSTREAM REACH NUMBER : 12

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.006

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)
1722.40	0.0	0.0450	0.0
1726.00	44.6	0.0450	0.0
1730.00	63.1	0.0450	0.0
1733.00	73.6	0.0450	0.0
1736.00	84.2	0.0450	0.0
1739.00	95.0	0.0450	0.0
1742.00	128.5	0.0450	0.0
1746.00	143.8	0.0450	0.0

CROSS-SECTION NUMBER : 13

Cross-Section Location (XS(I), mi) 0.613

Flooding Elevation (FSTG(I), ft MSL) 1732.000

CROSS-SECTION DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)
1714.70	0.0	0.0
1717.50	54.5	0.0
1720.50	87.0	0.0
1723.50	111.3	0.0
1726.50	135.7	0.0
1729.50	160.0	0.0
1731.50	167.5	0.0
1733.50	172.0	0.0

DISTANCE BETWEEN INTERPOLATED CROSS-SECTIONS
(DXM) THAT WILL BE USED IN COMPUTATIONS :

Down Stream Reach Number I=1,NS1	Interp. Cross Section Distance DXM(I) (mi)
1	0.1000
2	0.0080
3	0.0120
4	0.0050
5	0.0050
6	0.0510
7	0.0060
8	0.0070
9	0.0060
10	0.0060
11	0.0060
12	0.0060

Total number of cross-sections (original+interpolated) 84

Maximum number of cross-sections allowed 2000

OUTPUT DATA SUMMARY :

CROSS-SECTION and REACH SUMMARY :

Cross Section Number	Cross Section Location (mi)	Bottom Elevation (ft MSL)	Reach Number	Reach Length (mi)	Reach Slope (ft/mi)
1	0.000	1808.700			
2	0.038	1799.200	1	0.038	250.000
3	0.117	1789.800	2	0.079	118.986
4	0.182	1784.200	3	0.065	86.155
5	0.263	1772.200	4	0.081	148.148
6	0.324	1770.000	5	0.061	36.065
7	0.362	1765.400	6	0.038	121.052
8	0.420	1754.200	7	0.058	193.105
9	0.458	1750.000	8	0.038	110.525
10	0.495	1742.900	9	0.037	191.891
11	0.525	1735.000	10	0.030	263.334
12	0.561	1722.400	11	0.036	349.999
13	0.613	1714.700	12	0.052	148.078

ROUTING COMPLETED :

Number of Time Steps Used (KTIME)	100
Maximum Number of Time Steps Allowed	2999
Total Time of Flood Routing (TT, hr)	1.0
Flood Wave Arrival Time based upon a WSEL Increase of (ft)	1.00

CONSERVATION OF MASS RESULTS :

Should be close to 0.00%, a negative value denotes flow volume was lost during the routing, a positive value denotes flow volume was gained during the routing. Normalized as a percent of inflow volume, maximum change in conservation of mass during routing was -0.39

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

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)	Flood Wave Arrival Time (hr)
0.000	1825.63	24828	0.250	28.96	0.00	0.00	0.00
0.038	1812.73	24782	0.000	19.05	1808.00	0.00	0.00
0.047	1812.41	24766	0.000	13.86	1806.89	0.00	0.00
0.056	1811.61	24744	0.250	11.31	1805.78	0.00	0.00
0.064	1810.24	24711	0.250	11.70	1804.67	0.00	0.00
0.073	1808.90	24673	0.250	10.98	1803.56	0.00	0.00
0.082	1807.55	24634	0.250	11.02	1802.44	0.00	0.00
0.091	1806.21	24592	0.250	10.59	1801.33	0.00	0.00
0.099	1804.87	24549	0.250	10.47	1800.22	0.00	0.00
0.108	1803.53	24505	0.250	10.30	1799.11	0.00	0.00
0.117	1802.18	24464	0.250	10.19	1798.00	0.00	0.00
0.130	1800.42	24464	0.250	10.03	1796.40	0.00	0.00
0.143	1798.43	24384	0.250	10.44	1794.80	0.00	0.00
0.156	1796.62	24306	0.260	10.34	1793.20	0.00	0.00
0.169	1794.76	24290	0.260	10.49	1791.60	0.00	0.00
0.182	1793.66	24274	0.260	8.85	1790.00	0.00	0.00
0.187	1793.14	24265	0.260	8.89	1789.38	0.00	0.00
0.192	1792.62	24254	0.260	8.94	1788.75	0.00	0.00
0.197	1792.10	24243	0.260	8.98	1788.13	0.00	0.00
0.202	1791.57	24231	0.260	9.02	1787.50	0.00	0.00
0.207	1791.04	24218	0.260	9.06	1786.88	0.00	0.00
0.212	1790.51	24204	0.260	9.10	1786.25	0.00	0.00
0.217	1789.97	24190	0.260	9.14	1785.63	0.00	0.00
0.223	1789.44	24175	0.260	9.17	1785.00	0.00	0.00
0.228	1788.90	24159	0.260	9.21	1784.38	0.00	0.00
0.233	1788.36	24142	0.260	9.24	1783.75	0.00	0.00
0.238	1787.82	24125	0.260	9.27	1783.13	0.00	0.00
0.243	1787.28	24108	0.260	9.30	1782.50	0.00	0.00
0.248	1786.74	24089	0.260	9.30	1781.88	0.00	0.00
0.253	1786.24	24069	0.270	9.24	1781.25	0.00	0.00
0.258	1785.83	24047	0.270	8.97	1780.63	0.00	0.00
0.263	1785.56	24022	0.270	8.45	1780.00	0.00	0.00
0.268	1785.21	24003	0.270	8.46	1779.50	0.00	0.00
0.273	1784.86	23997	0.270	8.46	1779.00	0.00	0.26
0.278	1784.52	23990	0.270	8.46	1778.50	0.00	0.26
0.283	1784.19	23982	0.270	8.45	1778.00	0.00	0.24
0.288	1783.86	23972	0.270	8.45	1777.50	0.00	0.24
0.293	1783.53	23962	0.270	8.45	1777.00	0.00	0.24
0.299	1783.20	23950	0.270	8.45	1776.50	0.00	0.22
0.304	1782.86	23939	0.270	8.48	1776.00	0.00	0.22
0.309	1782.51	23926	0.270	8.53	1775.50	0.00	0.22
0.314	1782.14	23914	0.270	8.61	1775.00	0.00	0.20
0.319	1781.74	23901	0.270	8.77	1774.50	0.00	0.20
0.324	1780.30	23890	0.270	11.35	1774.00	0.00	0.00
0.362	1774.62	23796	0.280	11.34	1770.00	0.00	0.00
0.368	1773.75	23778	0.270	11.26	1769.56	0.00	0.00

0.375	1772.86	23770	0.280	11.31	1769.11	0.00	0.00
0.381	1772.02	23767	0.280	11.23	1768.67	0.00	0.00

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)	Flood Wave Arrival Time (hr)
0.388	1771.16	23764	0.280	11.39	1768.22	0.00	0.00
0.394	1770.36	23759	0.280	11.18	1767.78	0.00	0.00
0.401	1769.57	23759	0.280	11.06	1767.33	0.00	0.28
0.407	1768.70	23752	0.280	11.24	1766.89	0.00	0.28
0.414	1768.15	23744	0.280	11.11	1766.44	0.00	0.24
0.420	1766.94	23735	0.280	11.71	1766.00	0.00	0.28
0.428	1765.97	23724	0.280	12.46	1765.20	0.19	0.00
0.435	1765.13	23711	0.280	11.86	1764.40	0.20	0.00
0.443	1764.27	23696	0.280	11.77	1763.60	0.21	0.00
0.450	1763.42	23679	0.280	11.62	1762.80	0.22	0.00
0.458	1762.57	23659	0.280	11.43	1762.00	0.22	0.00
0.464	1761.62	23641	0.280	12.13	1761.33	0.25	0.00
0.470	1760.77	23620	0.290	12.41	1760.67	0.27	0.26
0.477	1759.92	23598	0.290	12.74	1760.00	0.00	0.26
0.483	1759.06	23580	0.290	13.10	1759.33	0.00	0.26
0.489	1758.19	23575	0.290	13.47	1758.67	0.00	0.24
0.495	1757.32	23569	0.290	13.90	1758.00	0.00	0.24
0.501	1755.69	23562	0.290	15.64	1756.80	0.00	0.26
0.507	1754.40	23555	0.290	16.67	1755.60	0.00	0.24
0.513	1753.22	23546	0.290	17.53	1754.40	0.00	0.24
0.519	1752.14	23537	0.290	18.38	1753.20	0.00	0.24
0.525	1751.21	23525	0.290	19.27	1752.00	0.00	0.22
0.531	1748.62	23514	0.290	21.54	1751.33	0.00	0.24
0.537	1746.29	23503	0.290	23.01	1750.67	0.00	0.24
0.543	1744.00	23492	0.290	24.15	1750.00	0.00	0.24
0.549	1741.78	23482	0.290	25.10	1749.33	0.00	0.24
0.555	1739.67	23473	0.290	25.94	1748.67	0.00	0.24
0.561	1737.63	23465	0.290	26.82	1748.00	0.00	0.24
0.567	1735.65	23457	0.290	27.77	1746.00	0.00	0.24
0.574	1734.05	23450	0.290	27.99	1744.00	0.00	0.26
0.580	1732.61	23444	0.290	27.82	1742.00	0.00	0.26
0.587	1731.27	23438	0.290	27.44	1740.00	0.00	0.26
0.593	1729.98	23432	0.290	26.94	1738.00	0.00	0.26
0.600	1728.73	23426	0.290	26.37	1736.00	0.00	0.26
0.606	1727.51	23420	0.290	25.79	1734.00	0.00	0.26
0.613	1726.30	23413	0.290	25.20	1732.00	0.00	0.26

APPENDIX W

Dam Break output for North Heights Dam

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

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Version : 3.00
Serial Number : 20568

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PROGRAM ORIGIN :

Boss Dambrk (tm) is an enhanced version of Professor D. L. Fread's 1991 NWS DAMBRK program.

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PROJECT DESCRIPTION :

PROJECT TITLE : Fountain Hills Dam Break Analysis
PROJECT NUMBER : # 83
DESCRIPTION : North Heights Dam (No. 11)
ENGINEER : CCC
DATE OF RUN : 1/03/1996
TIME OF RUN : 11:18 am

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Problem Specification Option	7	
Number of Dynamic Routing Reaches (KKN)	9	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	17	
No. of Informational Cross-Sections (NPRT)	9	
Flood-Plain Routing (KFLP)	0	(no)

SEQUENTIAL CROSS-SECTION NUMBERS (NPT) :

1 7 13 24 31 36 40 45
58

BOUNDARY CONDITIONS :

Hydrograph Time Intervals (DHF, hr)	0.00
Routing Period (TEH, hr)	1.00
Breach Development Exponent (BREX)	1.00
Mud/Debris Flow Parameter (MUD)	0
Dry Bed Routing Parameter (IWF)	0
Hydraulic Radius Computation Parameter (KPRES)	1 (R=A/P)
Landslide Simulation (KSL)	0 (none)
Critical Flow Froude Number (DFR)	0.950

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
0.00	4963.0
0.05	7495.0
0.10	17960.0
0.15	25187.0
0.20	28795.0
0.21	29206.0
0.25	24856.0
0.30	11001.0
0.35	7488.0
0.40	6706.0
0.45	6242.0
0.50	5623.0
0.55	4970.0
0.60	4324.0
0.65	3680.0
0.70	3157.0
0.75	2930.0

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Problem Specification Option (KKN, KUI, MULDAM, IDAM)	7	
Number of Cross-Sections Entered (NS)	9	
Number of Top Widths Entered (NCS)	8	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Flow Type Parameter (KSUPC)	3	(mixed flow)
Number of Lateral Inflow Hydrographs (LQ)	0	
Number of Points in Gate Control Curve (KCG)	0	

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

1 3 5 7 8 9

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	0.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	0.0000
Initial Time-Step Size (DTHM, hr)	0.0100
Time at which Dam Starts to Fail (TFI, hr)	0.0000
Theta Weighting Factor (F1I)	1.000
Stage Convergence Criterion (EPSY, ft)	0.000
Downstream Boundary Type Paramter (YDN)	0.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	0.0000

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi) 0.000

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.009

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)
1783.00	0.0	0.0500	0.0
1785.00	110.3	0.0500	0.0
1787.00	110.3	0.0500	0.0
1789.00	110.3	0.0500	0.0
1791.00	110.3	0.0500	0.0
1793.00	110.3	0.0500	0.0
1795.00	110.3	0.0500	0.0
1797.00	110.3	0.0500	0.0

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi) 0.056

Flooding Elevation (FSTG(I), ft MSL) 1808.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.017

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)
1770.30	0.0	0.0490	0.0
1772.00	36.5	0.0490	0.0
1774.00	66.5	0.0490	0.0
1777.00	97.0	0.0490	0.0
1779.00	129.0	0.0490	0.0
1781.00	145.0	0.0490	0.0
1783.00	155.0	0.0490	0.0
1786.00	217.0	0.0490	0.0

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi) 0.170

Flooding Elevation (FSTG(I), ft MSL) 1790.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.006

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)
1760.60	0.0	0.0450	0.0
1762.00	38.8	0.0450	0.0
1764.00	91.9	0.0450	0.0
1766.00	114.0	0.0450	0.0
1768.00	158.0	0.0450	0.0
1770.00	174.0	0.0450	0.0
1772.00	182.2	0.0450	0.0
1775.00	220.0	0.0450	0.0

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi) 0.240

Flooding Elevation (FSTG(I), ft MSL) 1774.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.017

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)
1751.70	0.0	0.0490	0.0
1753.00	62.0	0.0490	0.0
1755.00	232.0	0.0490	0.0
1757.00	245.7	0.0490	0.0
1759.00	266.9	0.0490	0.0
1761.00	306.7	0.0490	0.0
1762.00	354.0	0.0490	0.0
1764.00	383.0	0.0490	0.0

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi) 0.367

Flooding Elevation (FSTG(I), ft MSL) 1766.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.017

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)
1741.50	0.0	0.0400	0.0
1743.00	26.7	0.0400	0.0
1746.00	122.0	0.0400	0.0
1747.00	224.0	0.0400	0.0
1749.00	313.0	0.0400	0.0
1751.00	334.0	0.0400	0.0
1753.00	342.0	0.0400	0.0
1755.00	350.0	0.0400	0.0

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi) 0.453

Flooding Elevation (FSTG(I), ft MSL) 1748.000

DOWNSTREAM REACH NUMBER : 6

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.017

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)
1735.10	0.0	0.0390	0.0
1737.00	53.9	0.0390	0.0
1740.00	75.0	0.0390	0.0
1742.00	108.8	0.0390	0.0
1744.00	136.6	0.0390	0.0
1747.00	318.0	0.0390	0.0
1749.00	344.4	0.0390	0.0
1751.00	366.4	0.0390	0.0

CROSS-SECTION NUMBER : 7

Cross-Section Location (XS(I), mi) 0.525

Flooding Elevation (FSTG(I), ft MSL) 1732.000

DOWNSTREAM REACH NUMBER : 7

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.016

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)
1728.90	0.0	0.0470	0.0
1730.00	53.0	0.0470	0.0
1732.00	102.0	0.0470	0.0
1734.00	130.0	0.0470	0.0
1736.00	214.8	0.0470	0.0
1738.00	227.2	0.0470	0.0
1740.00	240.0	0.0470	0.0
1742.00	252.7	0.0470	0.0

CROSS-SECTION NUMBER : 8

Cross-Section Location (XS(I), mi) 0.619

Flooding Elevation (FSTG(I), ft MSL) 1732.000

DOWNSTREAM REACH NUMBER : 8

Reach Contraction-Expansion Coefficient (FKC) -0.300

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.007

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)
1720.90	0.0	0.0400	0.0
1722.00	29.0	0.0400	0.0
1724.00	45.0	0.0400	0.0
1726.00	155.6	0.0400	0.0
1729.00	254.4	0.0400	0.0
1732.00	271.8	0.0400	0.0
1734.00	280.6	0.0400	0.0
1737.00	297.8	0.0400	0.0

CROSS-SECTION NUMBER : 9

Cross-Section Location (XS(I), mi) 0.710

Flooding Elevation (FSTG(I), ft MSL) 1726.000

CROSS-SECTION DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)
1715.90	0.0	0.0
1719.00	69.5	0.0
1722.00	106.2	0.0
1724.00	133.4	0.0
1726.00	161.4	0.0
1728.00	225.2	0.0
1730.00	304.0	0.0
1733.00	352.0	0.0

DISTANCE BETWEEN INTERPOLATED CROSS-SECTIONS
(DXM) THAT WILL BE USED IN COMPUTATIONS :

Down Stream Reach Number I=1,NS1	Interp. Cross Section Distance DXM(I) (mi)
1	0.0090
2	0.0170
3	0.0060
4	0.0170
5	0.0170
6	0.0170
7	0.0160
8	0.0070

Total number of cross-sections (original+interpolated) 58

Maximum number of cross-sections allowed 2000

OUTPUT DATA SUMMARY :

CROSS-SECTION and REACH SUMMARY :

Cross Section Number	Cross Section Location (mi)	Bottom Elevation (ft MSL)	Reach Number	Reach Length (mi)	Reach Slope (ft/mi)
1	0.000	1783.000			
2	0.056	1770.300	1	0.056	226.785
3	0.170	1760.600	2	0.114	85.088
4	0.240	1751.700	3	0.070	127.143
5	0.367	1741.500	4	0.127	80.315
6	0.453	1735.100	5	0.086	74.419
7	0.525	1728.900	6	0.072	86.110
8	0.619	1720.900	7	0.094	85.106
9	0.710	1715.900	8	0.091	54.945

ROUTING COMPLETED :

Number of Time Steps Used (KTIME)	100
Maximum Number of Time Steps Allowed	2999
Total Time of Flood Routing (TT, hr)	1.0
Flood Wave Arrival Time based upon a WSEL Increase of (ft)	1.00

CONSERVATION OF MASS RESULTS :

Should be close to 0.00%, a negative value denotes flow volume was lost during the routing, a positive value denotes flow volume was gained during the routing. Normalized as a percent of inflow volume, maximum change in conservation of mass during routing was 0.22

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)	Flood Wave Arrival Time (hr)
0.000	1794.11	29088	0.210	26.07	0.00	0.00	0.06
0.009	1792.37	29078	0.210	25.60	301.33	0.00	0.06
0.019	1790.49	29068	0.210	25.45	602.67	0.00	0.06
0.028	1788.66	29058	0.210	25.14	904.00	0.00	0.06
0.037	1786.86	29047	0.210	24.72	1205.33	0.00	0.06
0.047	1785.08	29035	0.210	24.22	1506.67	0.00	0.06
0.056	1783.32	29020	0.210	23.61	1808.00	0.00	0.08
0.075	1782.48	28982	0.210	20.23	1805.00	0.00	0.02
0.094	1781.33	28934	0.210	18.12	1802.00	0.00	0.06
0.113	1779.71	28877	0.210	17.30	1799.00	0.00	0.04
0.132	1777.75	28811	0.210	17.20	1796.00	0.00	0.06
0.151	1775.77	28743	0.220	17.19	1793.00	0.00	0.02
0.170	1773.81	28674	0.220	17.15	1790.00	0.00	0.06
0.176	1770.14	28668	0.210	23.23	1788.55	0.00	0.10
0.183	1768.96	28668	0.220	22.80	1787.09	0.00	0.10
0.189	1767.87	28667	0.220	22.20	1785.64	0.00	0.10
0.195	1766.82	28666	0.220	21.58	1784.18	0.00	0.10
0.202	1765.80	28664	0.220	21.01	1782.73	0.00	0.10
0.208	1764.78	28662	0.220	20.48	1781.27	0.00	0.10
0.215	1763.77	28659	0.220	20.01	1779.82	0.00	0.10
0.221	1762.77	28656	0.220	19.59	1778.36	0.00	0.10
0.227	1761.77	28652	0.220	19.21	1776.91	0.00	0.10
0.234	1760.78	28647	0.220	18.87	1775.45	0.00	0.10
0.240	1762.26	28647	0.220	12.35	1774.00	0.00	0.08
0.258	1760.93	28613	0.220	12.39	1772.86	0.00	0.08
0.276	1759.60	28572	0.220	12.41	1771.71	0.00	0.08
0.294	1758.27	28524	0.220	12.44	1770.57	0.00	0.08
0.313	1756.94	28471	0.220	12.46	1769.43	0.00	0.08
0.331	1755.62	28413	0.220	12.45	1768.29	0.00	0.08
0.349	1754.37	28349	0.230	12.36	1767.14	0.00	0.08
0.367	1753.30	28307	0.230	11.93	1766.00	0.00	0.08
0.384	1752.70	28282	0.230	11.69	1762.40	0.00	0.08
0.401	1752.13	28251	0.230	11.47	1758.80	0.00	0.08
0.419	1751.55	28215	0.230	11.32	1755.20	0.00	0.08
0.436	1750.93	28175	0.230	11.31	1751.60	0.00	0.06
0.453	1749.06	28136	0.230	13.80	1748.00	0.16	0.08
0.471	1745.92	28097	0.230	16.81	1744.00	0.14	0.10
0.489	1743.76	28054	0.230	17.18	1740.00	0.11	0.12
0.507	1741.61	28010	0.240	17.63	1736.00	0.05	0.12
0.525	1739.47	27999	0.240	18.14	1732.00	0.00	0.10
0.544	1739.23	27988	0.240	20.00	1732.00	0.00	0.10
0.563	1738.57	27973	0.310	15.46	1732.00	0.00	0.10
0.581	1736.00	27954	0.240	22.38	1732.00	0.10	0.10
0.600	1734.23	27930	0.240	15.76	1732.00	0.15	0.12
0.619	1734.86	27930	0.240	11.21	1732.00	0.15	0.10
0.626	1734.65	27912	0.240	11.29	1731.54	0.14	0.10

0.633	1734.43	27893	0.250	11.37	1731.08	0.14	0.10
0.640	1734.20	27873	0.250	11.44	1730.62	0.14	0.10

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

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)	Flood Wave Arrival Time (hr)
0.647	1733.97	27852	0.250	11.51	1730.15	0.14	0.10
0.654	1733.74	27830	0.250	11.57	1729.69	0.14	0.10
0.661	1733.49	27807	0.250	11.63	1729.23	0.13	0.10
0.668	1733.24	27783	0.250	11.68	1728.77	0.13	0.10
0.675	1732.99	27757	0.250	11.72	1728.31	0.13	0.10
0.682	1732.73	27730	0.250	11.76	1727.85	0.13	0.10
0.689	1732.46	27718	0.250	11.80	1727.38	0.13	0.10
0.696	1732.19	27709	0.250	11.82	1726.92	0.13	0.10
0.703	1731.92	27698	0.250	11.84	1726.46	0.13	0.10
0.710	1731.65	27686	0.250	11.84	1726.00	0.13	0.12

APPENDIX X

Dam Break output for SunRidge Canyon Dam

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

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Version : 3.00
Serial Number : 20568

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PROGRAM ORIGIN :

Boss Dambrk (tm) is an enhanced version of Professor D. L. Fread's 1991 NWS DAMBRK program.

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PROJECT DESCRIPTION :

PROJECT TITLE : Fountain Hills Dam Break Analysis
PROJECT NUMBER : # 83
DESCRIPTION : Sunridge Canyon Dam (Dam 7)
ENGINEER : CCC
DATE OF RUN : 1/03/1996
TIME OF RUN : 11:10 am

PROJECT TITLE : Fountain Hills Dam Break Analysis

PROJECT NUMBER : # 83 1/03/1996

INPUT DATA SUMMARY :

INPUT CONTROL PARAMETERS :

Problem Specification Option	7	
Number of Dynamic Routing Reaches (KKN)	9	
Type of Reservoir Routing (KUI)	0	(storage routing)
Number of multiple dams/bridges (MULDAM)	0	
No. of Reservoir Inflow Hydrograph Points (ITEH)	19	
No. of Informational Cross-Sections (NPRT)	11	
Flood-Plain Routing (KFLP)	0	(no)

SEQUENTIAL CROSS-SECTION NUMBERS (NPT) :

1	4	10	20	25	33	38	42
48	62	70					

BOUNDARY CONDITIONS :

Hydrograph Time Intervals (DHF, hr)	0.00
Routing Period (TEH, hr)	1.00
Breach Development Exponent (BREX)	1.00
Mud/Debris Flow Parameter (MUD)	0
Dry Bed Routing Parameter (IWF)	0
Hydraulic Radius Computation Parameter (KPRES)	1 (R=A/P)
Landslide Simulation (KSL)	0 (none)
Critical Flow Froude Number (DFR)	0.950

INFLOW HYDROGRAPH DESCRIPTION :

Time Elapsed TI(K) (hr)	Upstream Inflow QI(K) (cfs)
0.00	4080.4
0.05	5741.1
0.10	10814.1
0.15	17971.5
0.20	21964.5
0.22	22290.7
0.25	20370.4
0.30	9810.8
0.35	6745.3
0.40	5840.5
0.45	4997.2
0.50	4282.1
0.55	3653.9
0.60	3368.7
0.65	3105.2
0.70	2848.4
0.75	2602.5
0.80	2356.9
0.85	2228.0

SUMMARY OF PROGRAM CONTROL PARAMETERS :

Problem Specification Option (KKN, KUI, MULDAM, IDAM)	7	
Number of Cross-Sections Entered (NS)	11	
Number of Top Widths Entered (NCS)	8	
Number of Cross-Sectional Hydrographs to Plot (NTT)	6	
Flow Type Parameter (KSUPC)	3	(mixed flow)
Number of Lateral Inflow Hydrographs (LQ)	0	
Number of Points in Gate Control Curve (KCG)	0	

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

1 2 4 6 9 11

CHANNEL-VALLEY BOUNDARY CONDITIONS :

Max Discharge at Downstream End (QMAXD, cfs)	0.0
Max Lateral Outflow due to Flood Wave (QLL, cfs/ft)	0.0000
Initial Time-Step Size (DTHM, hr)	0.0100
Time at which Dam Starts to Fail (TFI, hr)	0.0000
Theta Weighting Factor (F1I)	1.000
Stage Convergence Criterion (EPSY, ft)	0.000
Downstream Boundary Type Paramter (YDN)	0.00
Slope of Channel Downstream of Dam (SOM, ft/mi)	205.0000

CROSS-SECTION NUMBER : 1

Cross-Section Location (XS(I), mi) 0.000

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 1

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.024

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)
1889.90	0.0	0.0550	0.0
1892.00	61.6	0.0550	0.0
1894.00	83.2	0.0550	0.0
1896.00	104.6	0.0550	0.0
1898.00	104.6	0.0550	0.0
1901.00	104.6	0.0550	0.0
1903.00	104.6	0.0550	0.0
1905.00	104.6	0.0550	0.0

CROSS-SECTION NUMBER : 2

Cross-Section Location (XS(I), mi) 0.083

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 2

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.018

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)
1872.90	0.0	0.0410	0.0
1875.00	33.0	0.0410	0.0
1880.00	53.0	0.0410	0.0
1885.00	82.0	0.0410	0.0
1888.00	105.8	0.0410	0.0
1890.00	126.7	0.0410	45.0
1892.00	145.0	0.0410	90.0
1895.00	150.0	0.0410	125.0

CROSS-SECTION NUMBER : 3

Cross-Section Location (XS(I), mi) 0.199

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 3

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.019

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)
1860.00	0.0	0.0390	0.0
1861.00	24.6	0.0390	0.0
1863.00	124.8	0.0390	0.0
1865.00	150.0	0.0390	0.0
1867.00	175.8	0.0390	0.0
1869.00	202.6	0.0390	0.0
1871.00	232.6	0.0390	0.0
1872.00	242.2	0.0390	0.0

CROSS-SECTION NUMBER : 4

Cross-Section Location (XS(I), mi) 0.400

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 4

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.019

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)
1825.00	0.0	0.0400	0.0
1827.00	64.0	0.0400	0.0
1829.00	97.7	0.0400	0.0
1831.00	118.2	0.0400	0.0
1833.00	152.6	0.0400	0.0
1835.00	194.0	0.0400	0.0
1836.00	206.4	0.0400	0.0
1837.00	263.8	0.0400	0.0

CROSS-SECTION NUMBER : 5

Cross-Section Location (XS(I), mi) 0.513

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 5

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.015

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)
1814.30	0.0	0.0340	0.0
1816.00	50.0	0.0340	0.0
1818.00	95.5	0.0340	0.0
1820.00	115.0	0.0340	0.0
1822.00	127.0	0.0340	0.0
1824.00	139.0	0.0340	0.0
1826.00	151.8	0.0340	0.0
1828.00	198.4	0.0340	0.0

CROSS-SECTION NUMBER : 6

Cross-Section Location (XS(I), mi) 0.634

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 6

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.020

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)
1800.49	0.0	0.0320	0.0
1802.50	32.4	0.0320	0.0
1804.50	48.0	0.0320	0.0
1806.50	103.5	0.0320	0.0
1808.50	103.5	0.0320	0.0
1810.50	171.0	0.0320	0.0
1812.50	233.0	0.0320	0.0
1813.50	245.0	0.0320	0.0

CROSS-SECTION NUMBER : 7

Cross-Section Location (XS(I), mi) 0.747

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 7

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.020

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)
1784.90	0.0	0.0370	0.0
1787.00	25.5	0.0370	0.0
1789.00	38.5	0.0370	0.0
1792.00	67.0	0.0370	0.0
1794.00	106.0	0.0370	0.0
1796.00	170.8	0.0370	0.0
1798.00	194.4	0.0370	0.0
1800.00	214.0	0.0370	0.0

CROSS-SECTION NUMBER : 8

Cross-Section Location (XS(I), mi) 0.842

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 8

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.018

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)
1771.70	0.0	0.0410	0.0
1773.00	28.7	0.0410	0.0
1775.00	50.0	0.0410	0.0
1777.00	81.5	0.0410	0.0
1779.00	140.0	0.0410	0.0
1781.00	192.0	0.0410	0.0
1783.00	206.0	0.0410	0.0
1785.00	230.0	0.0410	0.0

CROSS-SECTION NUMBER : 9

Cross-Section Location (XS(I), mi) 0.959

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 9

Reach Contraction-Expansion Coefficient (FKC) 0.100

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.010

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)
1756.25	0.0	0.0470	0.0
1757.00	24.0	0.0470	0.0
1758.00	68.0	0.0470	0.0
1760.00	187.0	0.0470	0.0
1762.00	269.0	0.0470	0.0
1764.00	395.0	0.0470	0.0
1765.00	407.4	0.0470	0.0
1767.00	468.3	0.0470	0.0

CROSS-SECTION NUMBER : 10

Cross-Section Location (XS(I), mi) 1.101

Flooding Elevation (FSTG(I), ft MSL) 0.000

DOWNSTREAM REACH NUMBER : 10

Reach Contraction-Expansion Coefficient (FKC) 0.000

Minimum Distance Between Interpolated Cross-Sections (DXM, mi) 0.014

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)
1732.90	0.0	0.0530	0.0
1736.00	43.9	0.0530	90.0
1738.00	76.2	0.0530	175.0
1741.00	107.5	0.0530	350.0
1743.00	118.5	0.0530	360.0
1746.00	163.3	0.0530	390.0
1748.00	188.0	0.0530	440.0
1750.00	253.0	0.0530	530.0

CROSS-SECTION NUMBER : 11

Cross-Section Location (XS(I), mi) 1.223

Flooding Elevation (FSTG(I), ft MSL) 0.000

CROSS-SECTION DESCRIPTION :

Elevation HS(K,I) (ft MSL)	Channel Top Width BS(K,I) (ft)	Storage Top Width BSS(K,I) (ft)
1719.90	0.0	0.0
1721.00	34.0	0.0
1722.00	105.0	0.0
1723.00	195.0	0.0
1724.00	380.0	0.0
1726.00	563.6	0.0
1728.00	610.8	0.0
1730.00	638.0	0.0

DISTANCE BETWEEN INTERPOLATED CROSS-SECTIONS
(DXM) THAT WILL BE USED IN COMPUTATIONS :

Down Stream Reach Number I=1,NS1	Interp. Cross Section Distance DXM(I) (mi)
1	0.0240
2	0.0180
3	0.0190
4	0.0190
5	0.0150
6	0.0200
7	0.0200
8	0.0180
9	0.0100
10	0.0140

Total number of cross-sections (original+interpolated) 70

Maximum number of cross-sections allowed 2000

OUTPUT DATA SUMMARY :

CROSS-SECTION and REACH SUMMARY :

Cross Section Number	Cross Section Location (mi)	Bottom Elevation (ft MSL)	Reach Number	Reach Length (mi)	Reach Slope (ft/mi)
1	0.000	1889.900			
2	0.083	1872.900	1	0.083	204.819
3	0.199	1860.000	2	0.116	111.207
4	0.400	1825.000	3	0.201	174.129
5	0.513	1814.300	4	0.113	94.690
6	0.634	1800.490	5	0.121	114.133
7	0.747	1784.900	6	0.113	137.964
8	0.842	1771.700	7	0.095	138.948
9	0.959	1756.250	8	0.117	132.051
10	1.101	1732.900	9	0.142	164.436
11	1.223	1719.900	10	0.122	106.557

ING COMPLETED :

Number of Time Steps Used (KTIME)	100
Maximum Number of Time Steps Allowed	2999
Total Time of Flood Routing (TT, hr)	1.0
Flood Wave Arrival Time based upon a WSEL Increase of (ft)	1.00

CONSERVATION OF MASS RESULTS :

Should be close to 0.00%, a negative value denotes flow volume was lost during the routing, a positive value denotes flow volume was gained during the routing. Normalized as a percent of inflow volume, maximum change in conservation of mass during routing was 4.40

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)	Flood Wave Arrival Time (hr)
0.000	1901.73	22170	0.220	22.26	0.00	0.00	0.06
0.028	1897.77	22164	0.220	20.93	0.00	0.00	0.04
0.055	1893.96	22147	0.220	21.50	0.00	0.00	0.04
0.083	1890.72	22109	0.220	23.50	0.00	0.00	0.02
0.102	1884.53	22082	0.220	26.79	0.00	0.00	0.06
0.122	1880.81	22063	0.220	24.77	0.00	0.00	0.06
0.141	1877.53	22043	0.220	24.18	0.00	0.00	0.06
0.160	1874.46	22021	0.220	23.16	0.00	0.00	0.06
0.180	1871.49	21997	0.220	22.01	0.00	0.00	0.08
0.199	1868.55	21972	0.220	20.89	0.00	0.00	0.08
0.219	1865.22	21942	0.220	20.78	0.00	0.00	0.08
0.239	1861.87	21908	0.220	20.76	0.00	0.00	0.08
0.259	1858.51	21875	0.230	20.76	0.00	0.00	0.08
0.279	1855.15	21871	0.230	20.77	0.00	0.00	0.08
0.299	1851.78	21863	0.230	20.78	0.00	0.00	0.08
0.320	1848.41	21851	0.230	20.80	0.00	0.00	0.08
0.340	1845.04	21835	0.230	21.19	0.00	0.00	0.08
0.360	1841.67	21815	0.230	21.68	0.00	0.00	0.10
0.380	1838.30	21792	0.230	22.15	0.00	0.00	0.10
0.400	1834.92	21765	0.230	22.58	0.00	0.00	0.10
0.423	1833.83	21727	0.240	17.77	0.00	0.00	0.04
0.445	1832.24	21691	0.240	19.26	0.00	0.00	0.08
0.468	1830.25	21666	0.240	18.03	0.00	0.00	0.06
0.490	1828.15	21628	0.240	18.67	0.00	0.00	0.08
0.513	1826.07	21588	0.240	18.26	0.00	0.00	0.08
0.528	1823.62	21566	0.240	22.05	0.00	0.00	0.10
0.543	1821.80	21548	0.240	22.03	0.00	0.00	0.10
0.558	1820.15	21531	0.250	22.47	0.00	0.00	0.10
0.573	1818.56	21512	0.250	22.87	0.00	0.00	0.10
0.589	1817.01	21499	0.250	23.20	0.00	0.00	0.10
0.604	1815.47	21496	0.250	23.42	0.00	0.00	0.10
0.619	1813.94	21491	0.250	23.48	0.00	0.00	0.10
0.634	1812.41	21484	0.250	23.34	0.00	0.00	0.10
0.657	1809.38	21470	0.250	27.38	0.00	0.00	0.12
0.679	1806.42	21452	0.250	28.44	0.00	0.00	0.12
0.702	1803.51	21431	0.250	29.26	0.00	0.00	0.12
0.724	1800.62	21406	0.250	30.05	0.00	0.00	0.12
0.747	1797.75	21379	0.250	30.88	0.00	0.00	0.12
0.771	1793.80	21349	0.260	28.65	0.00	0.00	0.12
0.794	1789.91	21345	0.260	27.72	0.00	0.00	0.12
0.818	1786.05	21339	0.260	26.81	0.00	0.00	0.12
0.842	1782.21	21331	0.260	25.92	0.00	0.00	0.12
0.861	1778.98	21323	0.260	21.66	0.00	0.00	0.12
0.881	1775.92	21313	0.260	20.27	0.00	0.00	0.14
0.900	1772.91	21301	0.260	18.85	0.00	0.00	0.14
0.920	1769.91	21285	0.260	17.80	0.00	0.00	0.14

0.939	1766.92	21266	0.260	16.90	0.00	0.00	0.16
0.959	1763.95	21240	0.260	16.15	0.00	0.00	0.16

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)	Flood Wave Arrival Time (hr)
0.969	1763.25	21222	0.260	13.62	0.00	0.00	0.14
0.979	1762.11	21198	0.270	15.44	0.00	0.00	0.14
0.989	1760.81	21188	0.270	15.04	0.00	0.00	0.14
1.000	1759.52	21180	0.270	15.90	0.00	0.00	0.14
1.010	1758.24	21168	0.270	16.18	0.00	0.00	0.14
1.020	1756.96	21149	0.270	16.75	0.00	0.00	0.14
1.030	1755.69	21124	0.270	17.22	0.00	0.00	0.14
1.040	1754.42	21089	0.270	17.74	0.00	0.00	0.14
1.050	1753.16	21043	0.280	18.24	0.00	0.00	0.14
1.060	1751.91	20982	0.280	18.73	0.00	0.00	0.14
1.071	1750.67	20923	0.280	19.18	0.00	0.00	0.14
1.081	1749.43	20871	0.290	19.58	0.00	0.00	0.16
1.091	1748.22	20792	0.290	19.91	0.00	0.00	0.16
1.101	1747.02	20673	0.290	20.15	0.00	0.00	0.16
1.116	1742.88	20527	0.290	18.76	0.00	0.00	0.14
1.131	1740.77	20499	0.290	17.58	0.00	0.00	0.16
1.147	1738.55	20464	0.290	14.55	0.00	0.00	0.16
1.162	1736.21	20431	0.290	15.59	0.00	0.00	0.16
1.177	1733.84	20398	0.290	12.58	0.00	0.00	0.16
1.192	1731.46	20361	0.290	13.82	0.00	0.00	0.18
1.208	1729.08	20323	0.300	11.33	0.00	0.00	0.18
1.223	1726.71	20312	0.300	11.41	0.00	0.00	0.20