

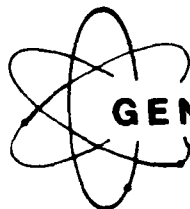
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US Army Corps
of Engineers

The Hydrologic
Engineering Center



GENERALIZED COMPUTER PROGRAM

723-X6-L7550

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Flood Flow

Frequency Analysis

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Users Manual

February 1982

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FLOOD FLOW FREQUENCY ANALYSIS
COMPUTER PROGRAM 723-X6-L7550

February 1982



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FLOOD FLOW FREQUENCY ANALYSIS

The Hydrologic Engineering Center

Computer Program 723-X6-L7550

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FLOOD FLOW FREQUENCY ANALYSIS

The Hydrologic Engineering Center
Computer Program 723-X6-L7550

1. PURPOSE

This users manual describes the 1 December 1981 version of the Flood Flow Frequency Analysis Program. The manual includes changes that have been made to the program to reflect techniques described in the revised, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, WRC, September 1981, hereafter referred to as the Guidelines.

2. ORIGIN OF PROGRAM

This program is a modification of the computer program FREQFLO, written by Leo R. Beard and David Ford (Center for Research in Water Resources, the University of Texas at Austin) under contract to the Water Resources Council (WRC). The original program and documentation may be found in Appendix 13, Guidelines for Determining Flood Flow Frequencies, WRC, Bulletin 17, March 1976. The latest version of the Guidelines (Bulletin 17B) does not contain computer program documentation. The input and output formats of the original program have been restructured, a number of improvements and options have been added, and a few computational errors have been corrected. *Revised: Computer program documentation. (K.R.)*

3. COMPUTATION METHODS

The computation methods are basically as described in "Section V, Determination of Frequency Curve," in the Guidelines. A very brief description of how the computer program treats specific conditions follows, along with references to appropriate page or appendix numbers in the Guidelines:

- Graphical Analysis - The data are arrayed and the plotting positions may be computed by the Weibull, median or Hazen formulae (p. 26).
- The Distribution - The log-Pearson Type III distribution is used in the computation of frequency curve (pp. 9, 10).
- Skew Coefficient - The computed skew coefficient is weighted with the input generalized skew coefficient (pp. 10-15).
- Broken Record - A broken record is automatically analyzed as a continuous record (p. 15).

- Incomplete Record - Missing data at the low end is indicated by a negative number (-1) and the conditional probability adjustment is used to determine the frequency curve (p. 15 and Appendix 5).
- Zero Flood Years - Any flood events of zero are automatically deleted and the conditional probability adjustment is used to determine the frequency curve (p. 15 and Appendix 5).
- Outliers - Initially the program calculates the station skew coefficient for the systematic record which is presented under preliminary results in the output. The program then tests for high or low outliers in an order depending on the value of the station skew as discussed on pages 17-19 and shown on the flow chart on page 12-3 of the Guidelines. Basically if the skew is greater than 0.4, tests and adjustments for high outliers and historic peaks are made before testing for low outliers. If the station skew is less than -0.4, tests and adjustments are made for low outliers first. If the skew is between 0.4 and -0.4, tests for both high and low outliers are made based on systematic record statistics before any adjustments are made.
- Historic Events - Weighted plotting positions and statistics are computed incorporating any input historic events (p. 19 and Appendix 6).
- Confidence Limits - The .05 and .95 confidence limit curves are computed unless other limits are specified (p. 23 and Appendix 9).
- Expected Probability - The frequency curve ordinates are computed with and without the expected probability adjustment (pp. 24, 25 and Appendix 11).

4. GENERAL INPUT AND OUTPUT INFORMATION

The input is designed to be flexible as default values are provided for all decision variables. Any option or nonstandard item activated by the J1 or J2 card will remain in effect for all succeeding station data or until modified by another J1 or J2 card. The only cards actually required for a flood frequency analysis at a station are three or more annual flood peaks (QR cards) and the end-of-data (ED) card. Input data preparation is described in detail in Exhibit 2.

Example problems illustrating input preparation and output are shown in Exhibit 1. The program output has been arranged to enable the tables to be copied for report purposes. When special conditions are encountered in the analysis, such as historic data, high or low outliers, etc., the preliminary results based on the systematic data only are output before the final results.

Output options allow for printing summary tables for multistation applications (Figure 2a and b) or to suppress unwanted printout. There is also an option to punch statistical summary cards for each station analyzed.

5. PROPOSED FUTURE DEVELOPMENT

Planned future capabilities include the ability to (1) read in statistics, either with or without flow data, and compute the frequency curve ordinates; (2) treat other durations of flow, such as 1-day, 3-day, etc.; and (3) adjust the statistics of short-record stations with those of long-record stations.

It is requested that any user of this program who finds a deficiency or would recommend desired additional capability notify the Hydrologic Engineering Center.

FLOW DIAGRAM FOR HISTORIC AND OUTLIER ADJUSTMENT

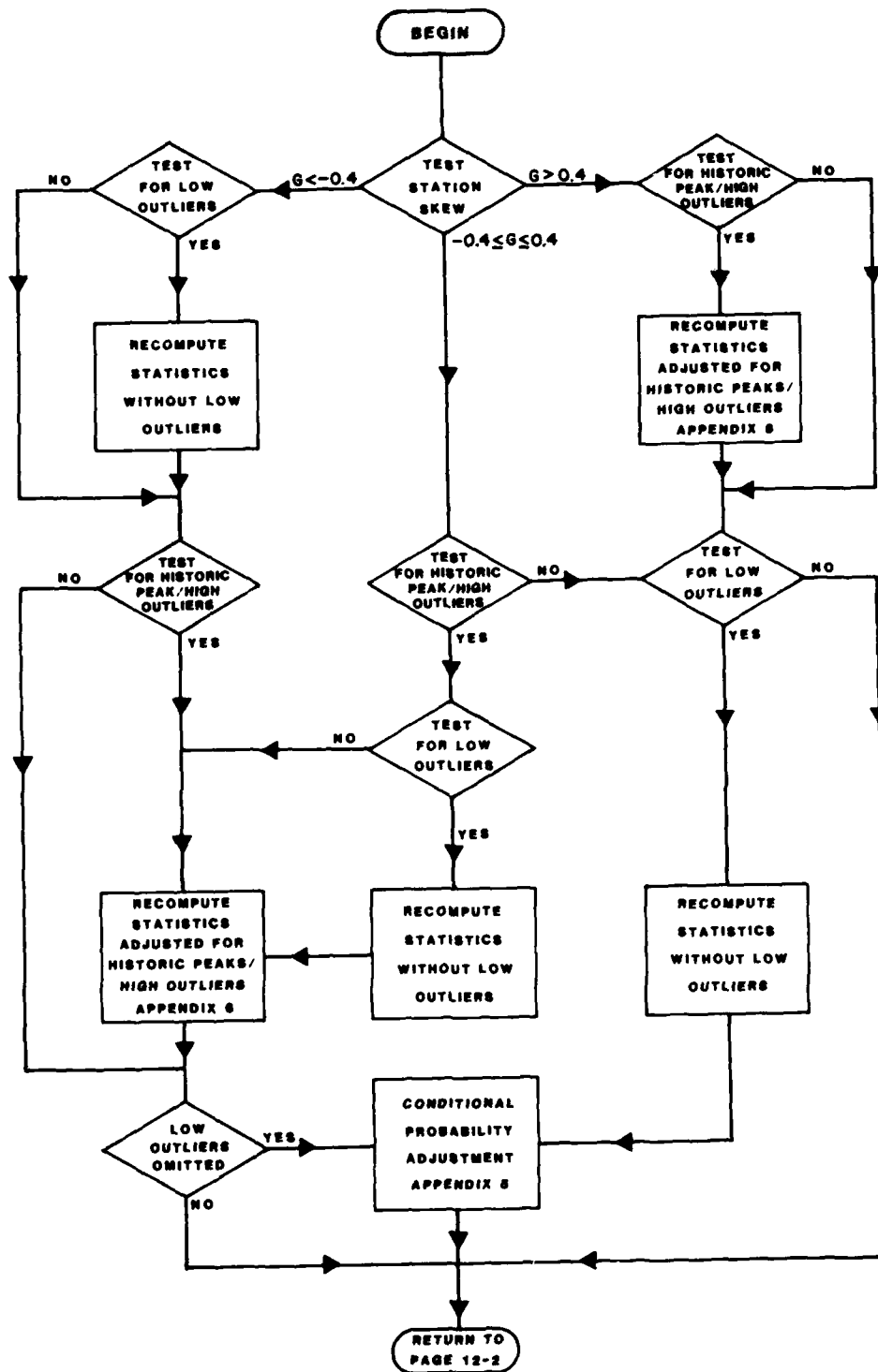


Figure 1. REVISED FLOW CHART FROM PAGE 12-3, BULLETIN 17B

SUMMARY OF STATISTICS -- FINAL RESULTS

STATION NUMBER	STATION NAME AND LOCATION	AREA SQ MI	RECD YEARS	ANLZD MEAN	STD DEV	COMP SKEN	GENL SKEN	ADPT SKEN	HIST EVENT	MIST HI	OUTLIER LD	ZERO/ MSG	TOTAL PERIOD
01160030	WALLKILL RIVER NEAR UNIONVILLE NY	144.	38	3.255	.180	1.217	.40	.50	0	0	0	0	38
01170000	WALLKILL R AT PPLETS ISLAND MOUNTAIN NY	385.	49	3.617	.166	.698	.40	.50	0	0	0	0	49
01172500	HAPPINGER CREEK NEAR HAPPINGERS FALLS NY	181.	47	3.474	.303	.711	.40	.50	0	0	0	0	47
01173500	FISHKILL CREEK AT HEACON NY	186.	24	3.300	.258	.844	.40	.50	1	0	0	0	47
01177000	HACKENSACK RIVER AT RIVERVALE NJ	58.0	34	2.868	.192	-.067	.40	.30	0	0	0	0	34
01177475	MUSQUAPESINK BROOK NEAR WESTWOOD NJ	2.16	6	2.205	.393	2.357	.40	.40	0	0	0	0	6
01177490	MUSQUAPESINK BROOK AT WESTWOOD NJ	6.53	10	2.335	.099	.085	.40	.40	0	0	0	0	10
01177500	PASCACK BROOK AT WESTWOOD NJ	29.6	41	2.874	.249	.011	.40	.30	0	0	0	0	41
01178350	TENAKILL BROOK AT CRESSKILL NJ	3.01	11	2.235	.089	-.575	.40	.40	0	0	0	0	11
01178385	TENAKILL BROOK AT CLOSTER NJ	8.56	11	2.607	.150	.302	.40	.40	0	0	0	0	11
01178500	HACKENSACK RIVER AT NEW MILFORD NJ	113.	54	3.269	.185	.087	.40	.30	0	0	0	0	54
01178590	METZLER BROOK AT ENGLEWOOD NJ	1.54	11	2.261	.081	-.265	.40	.40	0	0	0	0	11
01178615	WOLF CREEK AT RIDGEFIELD NJ	1.18	6	2.443	.036	-.681	.40	.40	0	0	0	0	6
01178690	PASSAIC RIVER NEAR HERNARDVILLE NJ	6.83	8	2.985	.327	-.576	.30	.30	0	0	0	0	8
01179000	PASSAIC RIVER NEAR MILLINGTON NJ	55.4	57	2.859	.166	.300	.30	.30	0	0	0	0	57
01179500	PASSAIC RIVER NEAR CHATMAN NJ	100.	46	3.121	.103	.283	.30	.30	0	0	0	0	46
01180000	BEAVER BROOK AT OUTLET OF SPLITROCK RES NJ	5.50	21	1.809	.169	-.417	.30	.30	0	0	0	0	21
01180500	WICKAWAY RIVER ABOVE RESERVOIR AT BOONTON NJ	116.	38	3.238	.181	-.088	.30	.20	0	0	0	0	38
01181000	WICKAWAY RIVER BELOW RESERVOIR AT BOONTON NJ	119.	63	3.134	.252	.421	.30	.40	1	1	0	0	72
01181500	WHIPPANY RIVER AT HURRISTOWN NJ	29.4	54	2.910	.207	-.036	.30	.20	0	0	0	0	54
01181900	PASSAIC RIVER AT PIFF BROOK NJ	349.	9	3.453	.165	-.495	.30	.30	0	0	0	0	9
01182500	PEQUANNOCK RIVER AT MACOPTN INTAKE DAM NJ	63.7	40	2.831	.545	1.307	.40	.70	1	0	0	0	72
01183500	MANAQUE RIVER AT AMSTING NJ	27.1	56	2.620	.255	.290	.40	.40	0	0	0	0	56
01184000	MANAQUE RIVER AT MINKS NJ	40.4	40	3.015	.274	.204	.40	.40	0	0	0	0	40
01184500	RINGWOOD CREEK NEAR MANAQUE NJ	19.1	40	2.619	.226	-.392	.40	.20	0	0	0	0	40
01185000	CUPSAM BROOK NEAR MANAQUE NJ	4.38	23	2.277	.292	.109	.40	.40	0	0	0	0	23
01186000	WEST BROOK NEAR MANAQUE NJ	11.8	40	2.734	.222	.090	.40	.30	0	0	0	0	40
01186500	BLUE MING BROOK NEAR MANAQUE NJ	1.71	23	2.078	.266	-.033	.40	.40	0	0	0	0	23
01187000	MANAQUE RIVER AT MANAQUE NJ	90.4	60	2.790	.693	-.853	.40	.20	0	0	0	0	60
01187500	RAMAPO RIVER NEAR MAMMAN NJ	118.	64	3.450	.259	.525	.40	.50	0	0	0	0	64
01188000	RAMAPO RIVER AT POMPTON LAKES NJ	160.	54	3.520	.267	.387	.40	.40	0	0	0	0	54
01188500	POMPTON RIVER AT POMPTON PLAINS NJ	355.	35	3.693	.300	.193	.40	.30	1	0	0	0	72
01189500	PASSAIC RIVER AT LITTLE FALLS NJ	762.	78	3.846	.182	.338	.40	.30	2	4	0	0	166
01189900	FLEISCHER BROOK AT MARKET ST, ELWOOD PARK NJ	1.37	9	2.225	.083	.352	.40	.40	0	0	0	0	9
01190450	SADDLE RIVER AT UPPER SADDLE RIVER NJ	10.9	9	3.009	.324	-.621	.40	.40	0	0	0	0	9
01190500	SADDLE RIVER AT HIDGEWOOD NJ	21.6	21	2.965	.280	.207	.40	.40	0	0	0	0	21
01190810	MINOKUS BROOK AT ALLENDALE NJ	9.00	7	2.720	.157	.130	.40	.40	0	0	0	0	7
01190900	RAMSEY BROOK AT ALLENDALE NJ	2.55	1										
01191000	MINOKUS BROOK AT MINOKUS NJ	16.4	21	2.959	.239	-.572	.40	.40	0	0	0	0	21
01191110	SADDLE RIVER AT PARAMUS NJ	45.0	7	3.143	.306	.469	.40	.40	0	0	0	0	7
01191445	SPROUT BROOK AT ROCHELLE PARK NJ	5.56	6	2.533	.246	.888	.40	.40	0	0	0	0	6
01191500	SADDLE RIVER AT LOOT NJ	54.6	52	3.096	.231	.254	.40	.30	0	0	0	0	52
01192000	WEASEL BROOK AT CLIFTON NJ	4.45	38	2.575	.219	-.028	.40	.30	0	0	0	0	38
01192500	SECOND RIVER AT HELLEVILLE NJ	11.6	37	3.272	.158	.011	.30	.30	0	0	0	0	37
01193000	ELIZABETH RIVER AT IRVINGTON NJ	2.91	8	3.142	.052	1.413	.30	.30	0	0	1	0	8
01193450	ELIZABETH RIVER AT URSINO LAKE, ELIZABETH NJ	16.9	3	3.487	.086	.916	.30	.30	0	0	0	0	3
01193500	ELIZABETH RIVER AT ELIZABETH NJ	20.2	51	3.157	.220	-.565	.30	.00	0	0	0	0	51
01193800	E FORK E HM RAMWAY R AT WEST ORANGE NJ	0.83	3	1.919	.018	-1.732	.30	.30	0	0	0	0	3
01194000	WEST BRANCH RAMWAY RIVER AT MILLBURN NJ	7.10	12	2.680	.294	.111	.30	.30	1	0	0	0	36
01194500	RAMWAY RIVER NEAR SPRINGFIELD NJ	25.5	38	3.056	.232	1.080	.30	.40	0	0	0	0	38

Figure 2a. Example Output - Summary of Station Statistics

SUMMARY OF FREQUENCY CURVE ORDINATES

STATION NUMBER	STATION NAME AND LOCATION	AREA SQ MI	YEARS ANALYZED	TOTAL PERIOD	PERCENT CHANCE EXCEEDANCE				
					50.	2.	1.	.5	.2
01368000	WALKILL RIVER NEAR UNIONVILLE NY	188.	36	36	1740	3110	4680	5470	6330
01370000	WALKILL R AT PFLETS ISLAND MOUNTAIN NY	385.	49	49	4010	6850	9990	11500	13200
01372500	WAPPINGER CREEK NEAR WAPPINGERS FALLS NY	181.	47	47	2810	7490	10900	19400	24800
01373500	FISHKILL CREEK AT HAFCON NY	186.	24	67	2300	5240	9190	11300	13000
01377000	WACHENSACK RIVER AT RIVERVALE NJ	58.0	34	34	723	1320	1960	2270	2610
01377475	MUSQUAPINSINK BROOK NEAR WESTWOOD NJ	2.16	6	6	151	528	1240	1710	2310
01377800	MUSQUAPINSINK BROOK AT WESTWOOD NJ	6.53	10	10	213	292	362	392	465
01377850	PASCACK BROOK AT WESTWOOD NJ	29.6	41	41	728	1590	2660	3220	3840
01377850	TENAKILL BROOK AT CHESSKILL NJ	3.01	11	11	170	225	274	294	315
01379355	TENAKILL BROOK AT CLOSTER NJ	8.56	11	11	395	637	883	998	1120
01378500	WEIZLER BROOK AT NEW MILFORD NJ	113.	54	54	1820	3250	4770	5500	6290
01378500	WOLF CREEK AT HEDGEFIELD NJ	1.54	11	11	180	233	279	298	343
01378500	PASSAIC RIVER NEAR HERNANDSVILLE NJ	1.18	6	6	276	312	339	350	360
01379000	PASSAIC RIVER NEAR MILLINGTON NJ	8.83	8	8	930	2590	5110	6570	8310
01379000	PASSAIC RIVER NEAR CHATMAN NJ	55.4	57	57	777	1310	1880	2090	2360
01379000	BEAVER BROOK AT OUTLET OF SPLITRUCK RES NJ	100.	46	46	1290	2290	3360	3460	4010
01380000	ROCKAWAY RIVER ABOVE RESERVOIR AT BOONTON NJ	5.50	21	21	63	107	152	173	196
01380500	ROCKAWAY RIVER BELOW RESERVOIR AT BOONTON NJ	116.	38	38	1710	2970	4250	4440	5470
01381000	ROCKAWAY RIVER AT CHRISTIAN NJ	119.	63	72	1310	2920	5050	6200	7520
01381500	PASSAIC RIVER AT PIPE BROOK NJ	29.4	54	54	799	1510	2280	2640	3040
01381900	PASSAIC RIVER AT PIPE BROOK NJ	349.	9	9	2780	4670	6570	7660	8800
01382500	PEGANUNNOK RIVER AT MACONIN INTAKE DAM NJ	63.7	40	72	784	2990	5060	6540	7600
01383000	MANAQUE RIVER AT MANAQUE NJ	27.1	56	56	401	902	1570	1930	2350
01383500	MANAQUE RIVER AT MANAQUE NJ	40.4	40	40	492	2370	4030	5380	6640
01385000	CUPSAW BROOK NEAR MANAQUE NJ	19.1	40	40	469	938	1470	1720	2010
01386000	BLUE MINE BROOK NEAR MANAQUE NJ	4.38	23	23	181	458	864	1100	1370
01387000	RAMAPO RIVER NEAR MANAQUE NJ	11.8	40	40	529	1060	1640	1990	2330
01387500	RAMAPO RIVER NEAR MANAQUE NJ	90.4	60	60	115	268	479	595	730
01388000	POMPION RIVER AT POMPION PLAINS NJ	118.	64	64	651	4600	13800	20000	27900
01388500	POMPION RIVER AT POMPION PLAINS NJ	160.	54	54	2680	6210	11200	14000	17300
01389000	FLEISCHER BROOK AT MARKET ST, ELWOOD PARK NJ	355.	35	72	4770	12200	22800	28700	35600
01389500	SADDLE RIVER AT UPPER SADDLE RIVER NJ	762.	78	166	6870	12100	17700	20300	23200
01390000	SADDLE RIVER AT UPPER SADDLE RIVER NJ	1.37	9	9	166	215	258	276	294
01390500	RAMSEY BROOK AT ALLENDALE NJ	10.9	9	9	971	2720	5500	7160	9180
01390900	RAMSEY BROOK AT ALLENDALE NJ	21.6	21	21	890	1910	3230	3930	4720
01391000	WOMMUS BROOK AT WOMMUS NJ	9.00	7	7	513	845	1190	1350	1520
01391100	SADDLE RIVER AT PARAMUS NJ	16.4	21	21	877	1880	3160	3840	4610
01391455	SPRINT BROOK AT ROCHELLE PARK NJ	45.0	7	7	1330	3510	6030	6770	8110
01391500	SADDLE RIVER AT LINDI NJ	5.56	6	6	329	719	1230	1500	1810
01392000	FARSEL BROOK AT CLIFTON NJ	54.6	52	52	1220	2500	4040	4820	5690
01392500	SECOND RIVER AT BELLEVILLE NJ	4.45	38	38	366	727	1150	1360	1590
01393000	ELIZABETH RIVER AT IRVINGTON NJ	11.6	37	37	1040	3010	4180	4720	5280
01393450	ELIZABETH RIVER AT URSINO LAKE, ELIZABETH NJ	2.91	8	8	1350	1610	1790	1860	1940
01393500	ELIZABETH RIVER AT ELIZABETH NJ	16.9	3	3	3040	3970	4740	5060	5380
01393500	ELIZABETH RIVER AT ELIZABETH NJ	20.2	51	51	1440	2750	4060	4670	5290
01394000	WEST BRANCH RAMWAY RIVER AT MILLHURN NJ	0.83	3	3	82	87	91	92	93
01394500	RAMWAY RIVER NEAR SPRINGFIELD NJ	7.10	12	36	463	1160	2130	2670	3300
01394500	RAMWAY RIVER NEAR SPRINGFIELD NJ	25.5	38	38	1100	2300	3810	4400	5500

Figure 2b. Example Output - Summary of Exceedence Discharges

EXHIBIT 1

EXAMPLE INPUT AND OUTPUT

Computer Program 723-X6-L7550

Flood Flow Frequency Analysis

The input and output for six test examples are provided to illustrate the use of selected options and to assist in verifying the correct execution of the program. A brief description of each test example is provided. In all cases a generalized skew value was assumed.

a. Test 1 - Fitting the Log-Pearson Type III Distribution

The input data for Test 1 are the same as that for Example 1 in Appendix 12, Guidelines for Determining Flood Flow Frequency, Water Resources Council Bulletin 17B, September 1981. Test 1 illustrates the routine computation of a frequency curve.

b. Test 2 - Adjusting for High Outliers

The input data for Test 2 are the same as that for Example 2 in Appendix 12 of the WRC Guidelines. Test 2 illustrates the application to data with a high outlier. Note that preliminary results are output to enable comparison of the systematic data results with the results adjusted for a high outlier.

c. Test 3 - Testing and Adjusting for a Low Outlier

The input data for Test 3 are the same as that for Example 3 in Appendix 12 of the WRC Guidelines. Test 3 illustrates the application to data with a low outlier. Note that the program outputs the test value in the input flow units and automatically screens for low outliers. If low outliers are found, the program outputs the preliminary results to allow comparison with the final results.

d. Test 4 - Zero Flood Years

The input data for Test 4 are the same as that for Example 4 in Appendix 12 of the WRC Guidelines. Test 4 illustrates the application to data that includes several zero flood events.

e. Test 5 - Use of IPRØUT, CLIMIT and BASEPK

This test illustrates the use of three variables which modify the standard mode of computation and output. On the J1 card, the value for IPRØUT is 33 which is the sum of 1 (to suppress the printout of the input data for preliminary results) and 32 (to suppress the frequency plot based on the expected rprobability adjustment). The variable CLIMIT on the J2 card sets the confidence limit probability. In this case, .01 specifies the .01 and .99 confidence limit curves. This data set includes two very low values, and the second lowest value just missed being classified as a low outlier. As both of these values were below 2,000 cfs, this amount was input for the variable BASEPK and the program identified any values below 2,000 cfs as low outliers.

f. Test 6 - Use of IPPC, IFMT, QR Cards and IYRL

This test illustrates the use of variables which modify the standard mode of operation and provide for the incorporation of historic flood peaks. On the J1 card, the value of IPPC is 2 to compute the median plotting positions rather than the Weibull. The IPRØUT value of 21 is the sum of 1 (to suppress input data listing for preliminary results), 4 (to suppress the plot of preliminary results), and 16 (to suppress the plot based on the computed values, i.e., without the expected probability adjustment, from the final results). IFMT is 2 as the input data are punched in the format of four 8-column fields for day, month, year and flow. Note that the value for CLIMIT is .01 for this test as it was for Test 5 because it was not reset by a J2 card and the tests were run sequentially.

A historic flood peak of 15,000 cfs which occurred in 1843 is input on the OH card. This value is the highest known value up to the present time, even though the systematic record stopped in 1955. Therefore, the year 1974 is input for IYRL on the SI card.

LISTING OF TEST DATA (INPUT)

TT TEST NO. 1 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
TT WRC APPENDIX 12, EXAMPLE 1 - FITTING THE LOG-PEARSON TYPE III DIST
TT FISHKILL CREEK AT BEACON, NY
ID 01-3735 FISHKILL CREEK AT BEACON, NEW YORK DA=190 SQ MI 1945-68
GS 3735 .6
QR 373503051945 2290
QR 373512271945 1470
QR 373503151947 2220
QR 373503181948 2970
QR 373501011949 3020
QR 373503091950 1210
QR 373504011951 2490
QR 373503121952 3170
QR 373501251953 3220
QR 373509131954 1760
QR 373508201955 8800
QR 373510161955 8280
QR 373504101957 1310
QR 373512211957 2500
QR 373502111959 1960
QR 373504061960 2140
QR 373502261961 4340
QR 373503131962 3060
QR 373503281963 1780
QR 373501261964 1380
QR 373502091965 980
QR 3735 1966 1040
QR 3735 1967 1580
QR 3735 1968 3630
ED

TT TEST NO. 2 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
 TT WRC APPENDIX 12, EXAMPLE 2 - ADJUSTING FOR A HIGH OUTLIER
 TT FLOYD RIVER AT JAMES, IA

ID 06-6005	FLOYD RIVER AT JAMES, IOWA	DA=882 SQ MI	1935-73
GS 6005	-0.3		
SI 1892	1		
QR 600506281935	1460		
QR 600503101936	4050		
QR 600505271937	3570		
QR 600509151938	2060		
QR 600503121939	1300		
QR 600506051940	1390		
QR 600503111941	1720		
QR 600506041942	6280		
QR 600506171943	1360		
QR 600505131944	7440		
QR 600503121945	5320		
QR 600503011946	1400		
QR 600506251947	3240		
QR 600503171948	2710		
QR 600503051949	4520		
QR 600506191950	4840		
QR 600503281951	8320		
QR 600503311952	13900		
QR 600506081953	71500		
QR 600506221954	6250		
QR 600507101955	2260		
QR 600507131956	318		
QR 600507051957	1330		
QR 600506311958	970		
QR 600506011959	1920		
QR 600503291960	15100		
QR 600503021961	2870		
QR 600503291962	20600		
QR 600506021963	3810		
QR 600509091964	726		
QR 600504021965	7500		
QR 600502101966	7170		
QR 600506191967	2000		
QR 600507211968	829		
QR 600504051969	17300		
QR 600503041970	4740		
QR 6005 1971	13400		
QR 6005 1972	2940		
QR 6005 1973	5660		
ED			

TT TEST NO. 3 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
 TT WRC APPENDIX 12, EXAMPLE 3 - TESTING AND ADJUSTING FOR A LOW OUTLIER
 TT BACK CREEK NEAR JONES SPRINGS, WV
 ID 01-6140 BACK CR NEAR JONES SPRINGS, WEST VA DA=243 SQ MI 1929-31,39-73
 GS016140 0.5
 QR 614004171929 8750
 QR 614010231929 15500
 QR 614005081931 4060
 QR 614002041939 6300
 QR 614004201940 3130
 QR 614004061941 4160
 QR 614005221942 6700
 QR 614010151942 22400
 QR 614003241944 3880
 QR 614009181945 8050
 QR 614006031946 4020
 QR 614003151947 1600
 QR 614004141948 4460
 QR 614012311948 4230
 QR 614002021950 3010
 QR 614012051950 9150
 QR 614004281952 5100
 QR 614011221952 9820
 QR 614003021954 6200
 QR 614008191955 10700
 QR 614003151956 3880
 QR 614002101957 3420
 QR 614003271958 3240
 QR 614006031959 6800
 QR 614005091960 3740
 QR 614002191961 4700
 QR 614003221962 4380
 QR 614003201963 5190
 QR 614001101964 3960
 QR 614003061965 5600
 QR 6140 1966 4670
 QR 6140 1967 7080
 QR 6140 1968 4640
 QR 6140 1969 536
 QR 6140 1970 6680
 QR 6140 1971 8360
 QR 6140 1972 18700
 QR 6140 1973 5210
 ED

TT TEST NO. 4 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM

TT WRC APPENDIX 12, EXAMPLE 4 - ZERO FLOOD YEARS

TT ORESTIMBA CREEK NEAR NEWMAN, CA

ID 11-2745 ORESTIMBA CREEK NEAR NEWMAN, CA

DA=134 SQ MI

1932-73

GS112745	-0.3
QR 274502081932	4260
QR 274501291933	345
QR 274501011934	516
QR 274504081935	1320
QR 274502131936	1200
QR 274502131937	2180
QR 274502111938	3230
QR 274503091939	115
QR 274502271940	3440
QR 274504041941	3070
QR 274501241942	1880
QR 274501211943	6450
QR 274502291944	1290
QR 274502021945	5970
QR 274512251945	782
QR 2745 1947	0
QR 2745 1948	0
QR 274503121949	335
QR 274502051950	175
QR 274512031950	2920
QR 274501121952	3660
QR 274512071952	147
QR 2745 1954	0
QR 274501191955	16
QR 274512231955	5620
QR 274502241957	1440
QR 274504021958	10200
QR 274502161959	5380
QR 274502101960	448
QR 2745 1961	0
QR 274502151962	1740
QR 274502011963	8300
QR 274501221964	156
QR 2745 1966	560
QR 274512301965	128
QR 274501241967	4200
QR 2745 1968	0
QR 274501251969	5080
QR 274503011970	1010
QR 274512211970	584
QR 2745 1972	0
QR 274502111973	1510

ED

TT TEST NO. 5 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
 TT EXAMPLE USE OF PRINTOUT SUPPRESSION (IPROUT), OTHER CONFIDENCE LIMITS
 TT (CLIMIT), AND A BASE PEAK DISCHARGE (BASEPK)
 J1 33
 J2 .01
 ID 05-5925 KASKASKIA RIVER AT VANDALIA, ILL DA=1980 SQ MI 1908-70
 GS 5925 -.4
 SI 2000
 QR 592505061908 7870
 QR 592504141909 7670
 QR 592503011910 7020
 QR 592505011911 5670
 QR 592510041911 13000
 QR 592507211915 15800
 QR 592501311916 14400
 QR 592506051917 16800
 QR 592505111918 8880
 QR 592503191919 11000
 QR 592505191920 12600
 QR 592504181922 18800
 QR 592503171923 14300

(Continued on following page)

QR	592512151923	10500
QR	592503161925	9980
QR	592509171926	8460
QR	592503201927	20000
QR	592512011927	12200
QR	592505141929	12200
QR	592501141930	11500
QR	592509181931	1270
QR	592501241932	5550
QR	592505151933	17500
QR	592508191934	4250
QR	592505161935	11200
QR	592503261936	7290
QR	592501151937	14900
QR	592503311938	40700
QR	592503141939	16000
QR	592505031940	6760
QR	592506121941	4560
QR	592507121942	13600
QR	592505181943	52200
QR	592504241944	31000
QR	592506101945	21500
QR	592505041946	13000
QR	592506101947	12300
QR	592503281948	19000
QR	592502161949	25000
QR	592501041950	51300
QR	592506291951	31000
QR	592504151952	10500
QR	592503051953	5680
QR	592504191954	505
QR	592504251955	5000
QR	592502271956	7840
QR	592506291957	62700
QR	592508041958	12400
QR	592502121959	17200
QR	592506301960	11800
QR	592504101961	34400
QR	592503251962	17100
QR	592505221963	9000
QR	592505041964	8500
QR	592505041965	5350
QR	592505191966	11900
QR	592512101966	27000
QR	592512231967	20800
QR	592501311969	20700
QR	592506161970	30000
ED		

TT TEST NO. 6 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM

TT EXAMPLE USE OF MEDIAN PLOT POSITIONS(IPPC),WRC FORMAT(IFMT), HISTORIC
TT DATA(QR CARD), AND PERIOD OF KNOWLEDGE BEYOND LAST YEAR OF DATA(IYRL)

J1 2 21 2

ID 01-4765 RIDLEY CREEK AT MOYLAN, PA

DA=31.9 SQ MI

1932-55

GS 4765 .4

SI 1974

QH	5	8	1843	15000
	28	3	1932	891
	23	8	1933	2680
	5	3	1934	1080
	9	7	1935	3000
	3	1	1936	1590
	22	2	1937	770
	23	7	1938	3320
	3	2	1939	978
	15	3	1940	1770
	7	2	1941	746
	13	8	1942	1000
	30	12	1942	980
	6	1	1944	865
	18	9	1945	1040
	26	12	1945	1000
	22	5	1947	483
	5	5	1948	740
	30	12	1948	1040
	3	8	1950	1590
	25	11	1951	5720
	11	3	1952	1490
	22	11	1952	918
	14	12	1953	670
	18	8	1955	4390

ED

OUTPUT FROM TEST DATA

 * FLOOD FLOW FREQUENCY ANALYSIS *
 * VERSION DATE -- FEB 9, 1982 *
 * AFTER BULLETIN 17B, SEPT 1981 *

TITLE CARD(S)

TT TEST NO. 1 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
 TT WRC APPENDIX 12, EXAMPLE I - FITTING THE LOG-PEARSON TYPE III DIST
 TT FISHKILL CREEK AT BEACON, NY

STATION IDENTIFICATION

ID 01-3735 FISHKILL CREEK AT BEACON, NEW YORK DA=190 SQ MI

1945-68

GENERALIZED SKEW

ISTN GGMSE SKEW
 GS 3735 -0. .60

SYSTEMATIC EVENTS

24 EVENTS TO BE ANALYZED

END OF INPUT DATA

ED ++++++
 ++++++

FINAL RESULTS

-PLOTTING POSITIONS- 01-3735 FISHKILL CREEK AT BEACON, NEW YORK

.....EVENTS ANALYZED..........ORDERED EVENTS.....*

* MON	* DAY	* YEAR	* FLOW,CFS	* RANK	* WATER YEAR	* FLOW,CFS	* WEIBULL PLOT POS	* *		
*	3	5	1945	2290.	*	1	1955	8800.	.0400	*
*	12	27	1945	1470.	*	2	1956	8280.	.0800	*
*	3	15	1947	2220.	*	3	1961	4340.	.1200	*
*	3	18	1948	2970.	*	4	1968	3630.	.1600	*
*	1	1	1949	3020.	*	5	1953	3220.	.2000	*
*	3	9	1950	1210.	*	6	1952	3170.	.2400	*
*	4	1	1951	2490.	*	7	1962	3060.	.2800	*
*	3	12	1952	3170.	*	8	1949	3020.	.3200	*
*	1	25	1953	3220.	*	9	1948	2970.	.3600	*
*	9	13	1954	1760.	*	10	1958	2500.	.4000	*
*	8	20	1955	8800.	*	11	1951	2490.	.4400	*
*	10	16	1955	8280.	*	12	1945	2290.	.4800	*
*	4	10	1957	1310.	*	13	1947	2220.	.5200	*
*	12	21	1957	2500.	*	14	1960	2140.	.5600	*
*	2	11	1959	1960.	*	15	1959	1960.	.6000	*
*	4	6	1960	2140.	*	16	1963	1780.	.6400	*
*	2	26	1961	4340.	*	17	1954	1760.	.6800	*
*	3	13	1962	3060.	*	18	1967	1580.	.7200	*
*	3	28	1963	1780.	*	19	1946	1470.	.7600	*
*	1	26	1964	1380.	*	20	1964	1380.	.8000	*
*	2	9	1965	980.	*	21	1957	1310.	.8400	*
*	-0	-0	1966	1040.	*	22	1950	1210.	.8800	*
*	-0	-0	1967	1580.	*	23	1966	1040.	.9200	*
*	-0	-0	1968	3630.	*	24	1965	980.	.9600	*

EXHIBIT 1
 10 of 44

-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 24 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.467

0 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 578.7

HIGH OUTLIER TEST

BASED ON 24 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.467

0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 9425.

-SKEW WEIGHTING -

BASED ON 24 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = 0.277

DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = 0.302

FINAL RESULTS

-FREQUENCY CURVE- 01-3735 FISHKILL CREEK AT BEACON, NEW YORK

.....FLOW,CFS..... *...CONFIDENCE LIMITS...*

* EXPECTED * EXCEEDANCE *

* COMPUTED PROBABILITY * PROBABILITY * 0.05 LIMIT 0.95 LIMIT *

* 19200. 28300. * 0.002 * 39100. 12300. *

* 14500. 19000. * 0.005 * 26900. 9740. *

* 11500. 14100. * 0.010 * 20100. 8080. *

* 9110. 10500. * 0.020 * 14800. 6640. *

* 7100. 7820. * 0.040 * 10800. 5380. *

* 4960. 5210. * 0.100 * 6850. 3950. *

* 3650. 3740. * 0.200 * 4710. 2990. *

* 2190. 2190. * 0.500 * 2650. 1790. *

* 1440. 1420. * 0.800 * 1760. 1110. *

* 1200. 1170. * 0.900 * 1490. 884. *

* 1040. 1010. * 0.950 * 1320. 746. *

* 841. 791. * 0.990 * 1100. 568. *

* FREQUENCY CURVE STATISTICS * STATISTICS BASED ON *

* MEAN LOGARITHM 3.3684 * HISTORIC EVENTS 0 *

* STANDARD DEVIATION 0.2456 * HIGH OUTLIERS 0 *

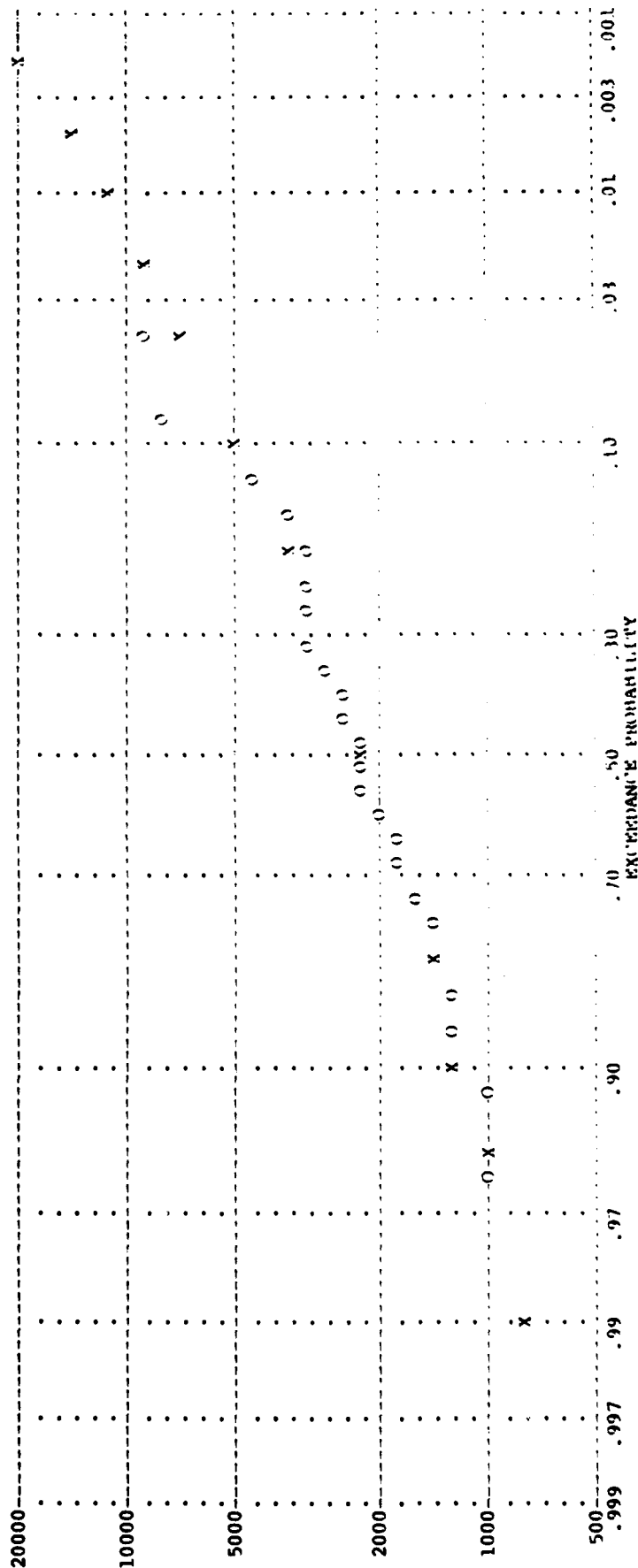
* COMPUTED SKEW 0.7300 * LOW OUTLIERS 0 *

* GENERALIZED SKEW 0.6000 * ZERO OR MISSING 0 *

* ADOPTED SKEW 0.7000 * SYSTEMATIC EVENTS 24 *

EXHIBIT 1
11 of 44

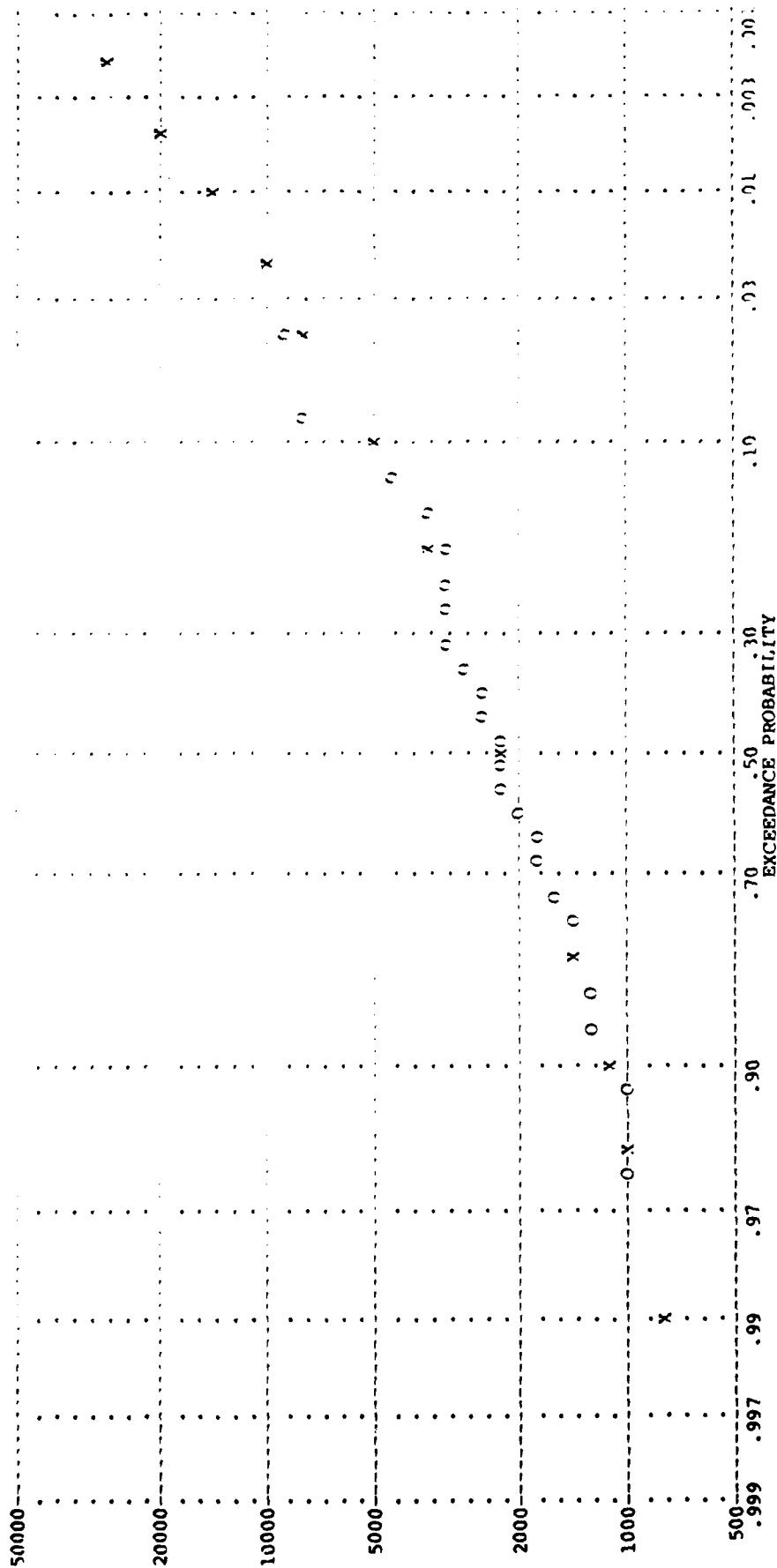
FINAL RESULTS
 -FREQUENCY PLOT - 01-3735 FISHKILL CREEK AT BEACON, NEW YORK DA=190 SQ MI 1945-63
 BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND



LEGEND - O-OBSERVED EVENT, H-HIGH OUTLIER OR HISTORIC EVENT, L-LAW OUTLIER, S-ZERO OR MISSING X-COMPUTED CURVE

FINAL RESULTS
 -FREQUENCY PLOT - 01-1735 FISHKILL CREEK AT DEARBY, NEW YORK DA-120 G0 MI
 BASED ON EXPECTED PROBABILITY ADJUSTMENT, FLOW IN "CUBIC FEET PER SECOND"

1245 59



LEGEND - O-OBSERVED EVENT, H-HIGH OUTLIER OR HISTORIC EVENT, L-LOW OUTLIER, Z=ZERO OR MISSING X=COMPUTED CURVE

* FLOOD FLOW FREQUENCY ANALYSIS *
* VERSION DATE -- FEB 9, 1982 *
* AFTER BULLETIN 17B, SEPT 1981 *

TITLE CARD(S)

TT TEST NO. 2 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
TT WRC APPENDIX 12, EXAMPLE 2 - ADJUSTING FOR A HIGH OUTLIER
TT FLOYD RIVER AT JAMES, IA

STATION IDENTIFICATION

ID 06-6005 FLOYD RIVER AT JAMES, IOWA DA=882 SQ MI 1935-73

GENERALIZED SKEW

	ISTN	GGMSE	SKEW
GS	6005	-0.	-.30

SPECIAL STATION INFORMATION

	IYRA	IYRL	NOUFL	BASEPK
SI	1892	-0	1	-0.

SYSTEMATIC EVENTS

39 EVENTS TO BE ANALYZED

END OF INPUT DATA

ED +++++
+++++

```

PRELIMINARY RESULTS
-PLOTTING POSITIONS- 06-6005 FLOYD RIVER AT JAMES, IOWA
*****
*.....EVENTS ANALYZED.....*.....ORDERED EVENTS.....*
* MON DAY YEAR FLOW,CFS * RANK WATER FLOW,CFS WEIBULL *
*-----*-----*-----*-----*-----*-----*
* 6 28 1935 1460. * 1 1953 71500. .0250 *
* 3 10 1936 4050. * 2 1962 20600. .0500 *
* 5 27 1937 3570. * 3 1969 17300. .0750 *
* 9 15 1938 2060. * 4 1960 15100. .1000 *
* 3 12 1939 1300. * 5 1952 13900. .1250 *
* 6 5 1940 1390. * 6 1971 13400. .1500 *
* 3 11 1941 1720. * 7 1951 8320. .1750 *
* 6 4 1942 6280. * 8 1965 7500. .2000 *
* 6 17 1943 1360. * 9 1944 7440. .2250 *
* 5 13 1944 7440. * 10 1966 7170. .2500 *
* 3 12 1945 5320. * 11 1942 6280. .2750 *
* 3 1 1946 1400. * 12 1954 6250. .3000 *
* 6 25 1947 3240. * 13 1973 5660. .3250 *
* 3 17 1948 2710. * 14 1945 5320. .3500 *
* 3 5 1949 4520. * 15 1950 4840. .3750 *
* 6 19 1950 4840. * 16 1970 4740. .4000 *
* 3 28 1951 8320. * 17 1949 4520. .4250 *
* 3 31 1952 13900. * 18 1936 4050. .4500 *
* 6 8 1953 71500. * 19 1963 3810. .4750 *
* 6 22 1954 6250. * 20 1937 3570. .5000 *
* 7 10 1955 2260. * 21 1947 3240. .5250 *
* 7 13 1956 318. * 22 1972 2940. .5500 *
* 7 5 1957 1330. * 23 1961 2870. .5750 *
* 6 31 1958 970. * 24 1948 2710. .6000 *
* 6 1 1959 1920. * 25 1955 2260. .6250 *
* 3 29 1960 15100. * 26 1938 2060. .6500 *
* 3 2 1961 2870. * 27 1967 2000. .6750 *
* 3 29 1962 20600. * 28 1959 1920. .7000 *
* 6 2 1963 3810. * 29 1941 1720. .7250 *
* 9 9 1964 726. * 30 1935 1460. .7500 *
* 4 2 1965 7500. * 31 1946 1400. .7750 *
* 2 10 1966 7170. * 32 1940 1390. .8000 *
* 6 19 1967 2000. * 33 1943 1360. .8250 *
* 7 21 1968 829. * 34 1957 1330. .8500 *
* 4 5 1969 17300. * 35 1939 1300. .8750 *
* 3 4 1970 4740. * 36 1958 970. .9000 *
* -0 -0 1971 13400. * 37 1968 829. .9250 *
* -0 -0 1972 2940. * 38 1964 726. .9500 *
* -0 -0 1973 5660. * 39 1956 318. .9750 *
*****

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-SKEW WEIGHTING -

 BASED ON 39 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = .158
 DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = .302

PRELIMINARY RESULTS

-FREQUENCY CURVE- 06-6005 FLOYD RIVER AT JAMES, IOWA

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*****
*.....FLOW,CFS.....*
*.....EXPECTED* EXCEEDANCE *...CONFIDENCE LIMITS...*
* COMPUTED PROBABILITY * PROBABILITY * .05 LIMIT .95 LIMIT *
*-----*-----*-----*-----*-----*
* 88700. 116000. * .002 * 199000. 50100. *
* 62300. 76000. * .005 * 130000. 37000. *
* 46700. 54500. * .010 * 91500. 28800. *
* 34100. 38300. * .020 * 62800. 21900. *
* 24200. 26200. * .040 * 41600. 16200. *
* 14300. 14900. * .100 * 22300. 10100. *
* 8780. 8980. * .200 * 12700. 6490. *
* 3530. 3530. * .500 * 4700. 2650. *
* 1450. 1420. * .800 * 1970. 1000. *
* 924. 888. * .900 * 1300. 595. *
* 639. 600. * .950 * 933. 385. *
* 323. 284. * .990 * 514. 170. *
*****
* FREQUENCY CURVE STATISTICS * STATISTICS BASED ON *
*-----*-----*-----*-----*-----*
* MEAN LOGARITHM 3.5553 * HISTORIC EVENTS 0 *
* STANDARD DEVIATION .4642 * HIGH OUTLIERS 0 *
* COMPUTED SKEW .3566 * LOW OUTLIERS 0 *
* GENERALIZED SKEW -.3000 * ZERO OR MISSING 0 *
* ADOPTED SKEW .1000 * SYSTEMATIC EVENTS 39 *
*****

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1935-73



FINAL RESULTS

-PLOTTING POSITIONS- 06-6005 FLOYD RIVER AT JAMES, IOWA

.....EVENTS ANALYZED..........ORDERED EVENTS.....*

* MON DAY YEAR FLOW,CFS * RANK WATER YEAR FLOW,CFS WEIBULL *
* PLOT POS *

*	6	28	1935	1460.	*	1	1953	71500.	.0120	*
*	3	10	1936	4050.	*	2	1962	20600.	.0309	*
*	5	27	1937	3570.	*	3	1969	17300.	.0566	*
*	9	15	1938	2060.	*	4	1960	15100.	.0823	*
*	3	12	1939	1300.	*	5	1952	13900.	.1080	*
*	6	5	1940	1390.	*	6	1971	13400.	.1336	*
*	3	11	1941	1720.	*	7	1951	8320.	.1593	*
*	6	4	1942	6280.	*	8	1965	7500.	.1850	*
*	6	17	1943	1360.	*	9	1944	7440.	.2107	*
*	5	13	1944	7440.	*	10	1966	7170.	.2364	*
*	3	12	1945	5320.	*	11	1942	6280.	.2620	*
*	3	1	1946	1400.	*	12	1954	6250.	.2877	*
*	6	25	1947	3240.	*	13	1973	5660.	.3134	*
*	3	17	1948	2710.	*	14	1945	5320.	.3391	*
*	3	5	1949	4520.	*	15	1950	4840.	.3648	*
*	6	19	1950	4840.	*	16	1970	4740.	.3905	*
*	3	28	1951	8320.	*	17	1949	4520.	.4161	*
*	3	31	1952	13900.	*	18	1936	4050.	.4418	*
*	6	8	1953	71500.	*	19	1963	3810.	.4675	*
*	6	22	1954	6250.	*	20	1937	3570.	.4932	*
*	7	10	1955	2260.	*	21	1947	3240.	.5189	*
*	7	13	1956	318.	*	22	1972	2940.	.5445	*
*	7	5	1957	1330.	*	23	1961	2870.	.5702	*
*	6	31	1958	970.	*	24	1948	2710.	.5959	*
*	6	1	1959	1920.	*	25	1955	2260.	.6216	*
*	3	29	1960	15100.	*	26	1938	2060.	.6473	*
*	3	2	1961	2870.	*	27	1967	2000.	.6730	*
*	3	29	1962	20600.	*	28	1959	1920.	.6986	*
*	6	2	1963	3810.	*	29	1941	1720.	.7243	*
*	9	9	1964	726.	*	30	1935	1460.	.7500	*
*	4	2	1965	7500.	*	31	1946	1400.	.7757	*
*	2	10	1966	7170.	*	32	1940	1390.	.8014	*
*	6	19	1967	2000.	*	33	1943	1360.	.8270	*
*	7	21	1968	829.	*	34	1957	1330.	.8527	*
*	4	5	1969	17300.	*	35	1939	1300.	.8784	*
*	3	4	1970	4740.	*	36	1958	970.	.9041	*
*	-0	-0	1971	13400.	*	37	1968	829.	.9298	*
*	-0	-0	1972	2940.	*	38	1964	726.	.9555	*
*	-0	-0	1973	5660.	*	39	1956	318.	.9811	*

* NOTE- PLOTTING POSITIONS BASED ON-HISTORIC PERIOD (H) = 82 *

* NUMBER OF HISTORIC EVENTS PLUS HIGH OUTLIERS(Z) = 1 *

* WEIGHTING FACTOR FOR SYSTEMATIC EVENTS (W) = 2.1316 *

-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 39 EVENTS, 10 PERCENT OUTLIER TEST VALUE $K(N) = 2.671$

0 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 206.8

HIGH OUTLIER TEST

BASED ON 39 EVENTS, 10 PERCENT OUTLIER TEST VALUE $K(N) = 2.671$

1 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 62395.
OR INPUT BASE OF 71500.

NOTE - COLLECTION OF HISTORICAL INFORMATION AND COMPARISONS
WITH SIMILAR DATA SETS SHOULD BE EXPLORED IF NOT
INCORPORATED IN THIS ANALYSIS.

STATISTICS AND FREQUENCY CURVE ADJUSTED FOR 1 HIGH OUTLIER(S)
AND 0 HISTORIC EVENT(S)

-SKEW WEIGHTING -

BASED ON 82 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = 0.073
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = 0.302

FINAL RESULTS

-FREQUENCY CURVE- 06-6005 FLOYD RIVER AT JAMES, IOWA

*****FLOW,CFS.....*							*...CONFIDENCE LIMITS...*		
.....FLOW,CFS.....		* EXPECTED	* EXCEEDANCE	*...CONFIDENCE LIMITS...*					
* COMPUTED	* PROBABILITY	* PROBABILITY	* .05 LIMIT	* .95 LIMIT					

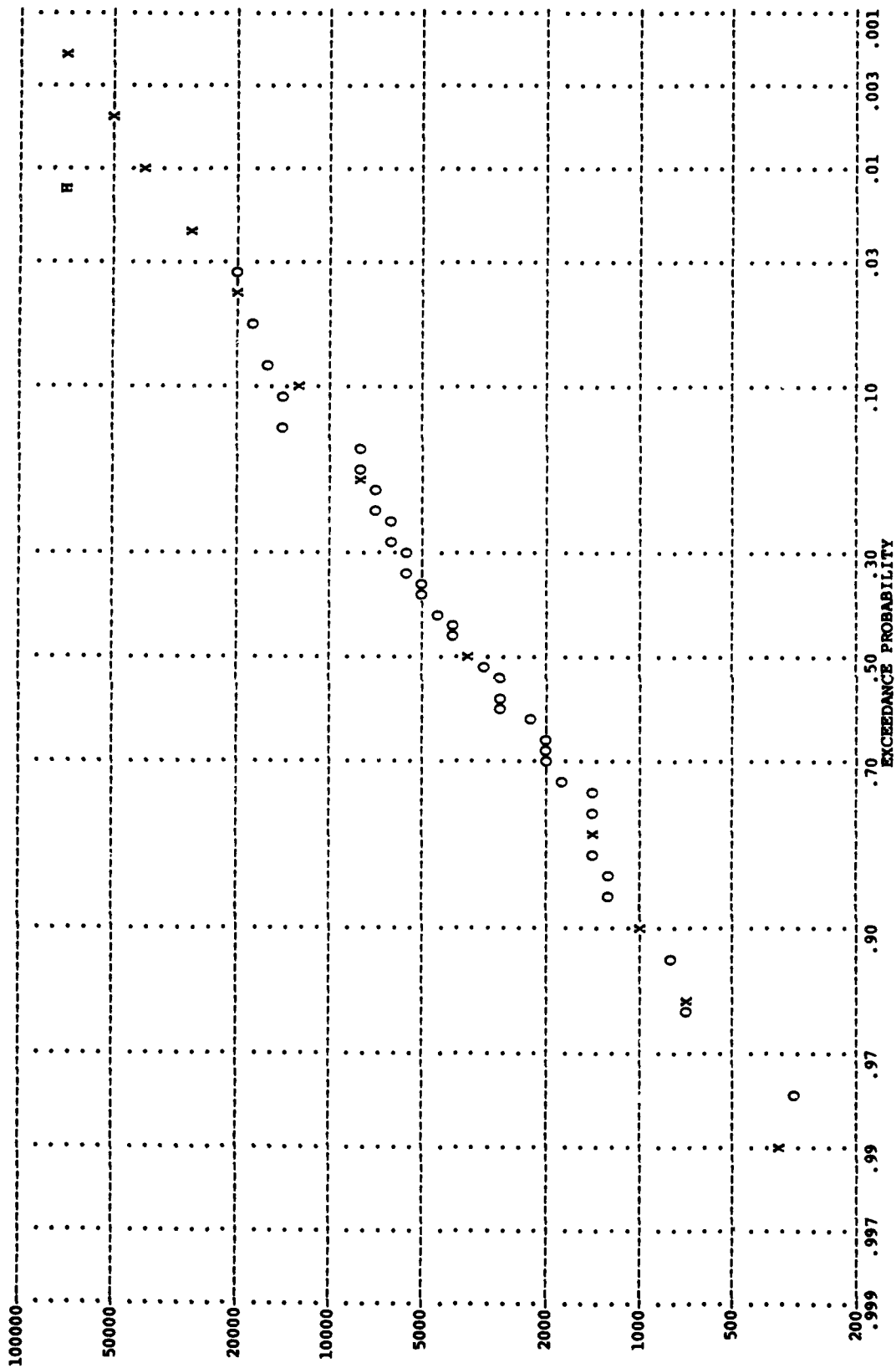
* 70900.	91000.	* .002	* 152000.	41300.					
* 50800.	61300.	* .005	* 101000.	31000.					
* 38700.	44700.	* .010	* 73000.	24500.					
* 28800.	32100.	* .020	* 51200.	19000.					
* 20800.	22500.	* .040	* 34700.	14300.					
* 12700.	13200.	* .100	* 19300.	9170.					
* 8010.	8180.	* .200	* 11300.	6020.					
* 3390.	3390.	* .500	* 4440.	2590.					
* 1470.	1440.	* .800	* 1960.	1040.					
* 958.	923.	* .900	* 1320.	632.					
* 676.	637.	* .950	* 967.	419.					
* 356.	315.	* .990	* 551.	195.					
+++++									
* FREQUENCY CURVE STATISTICS			* STATISTICS BASED ON						

* MEAN LOGARITHM	3.5374	* HISTORIC EVENTS	0						
* STANDARD DEVIATION	.4377	* HIGH OUTLIERS	1						
* COMPUTED SKEW	.1654	* LOW OUTLIERS	0						
* GENERALIZED SKEW	-.3000	* ZERO OR MISSING	0						
* ADOPTED SKEW	.1000	* SYSTEMATIC EVENTS	39						
		* HISTORIC PERIOD	82						

FINAL RESULTS
-FREQUENCY PLOT - 06-6005 FLOYD RIVER AT JAMES, IOWA
BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND

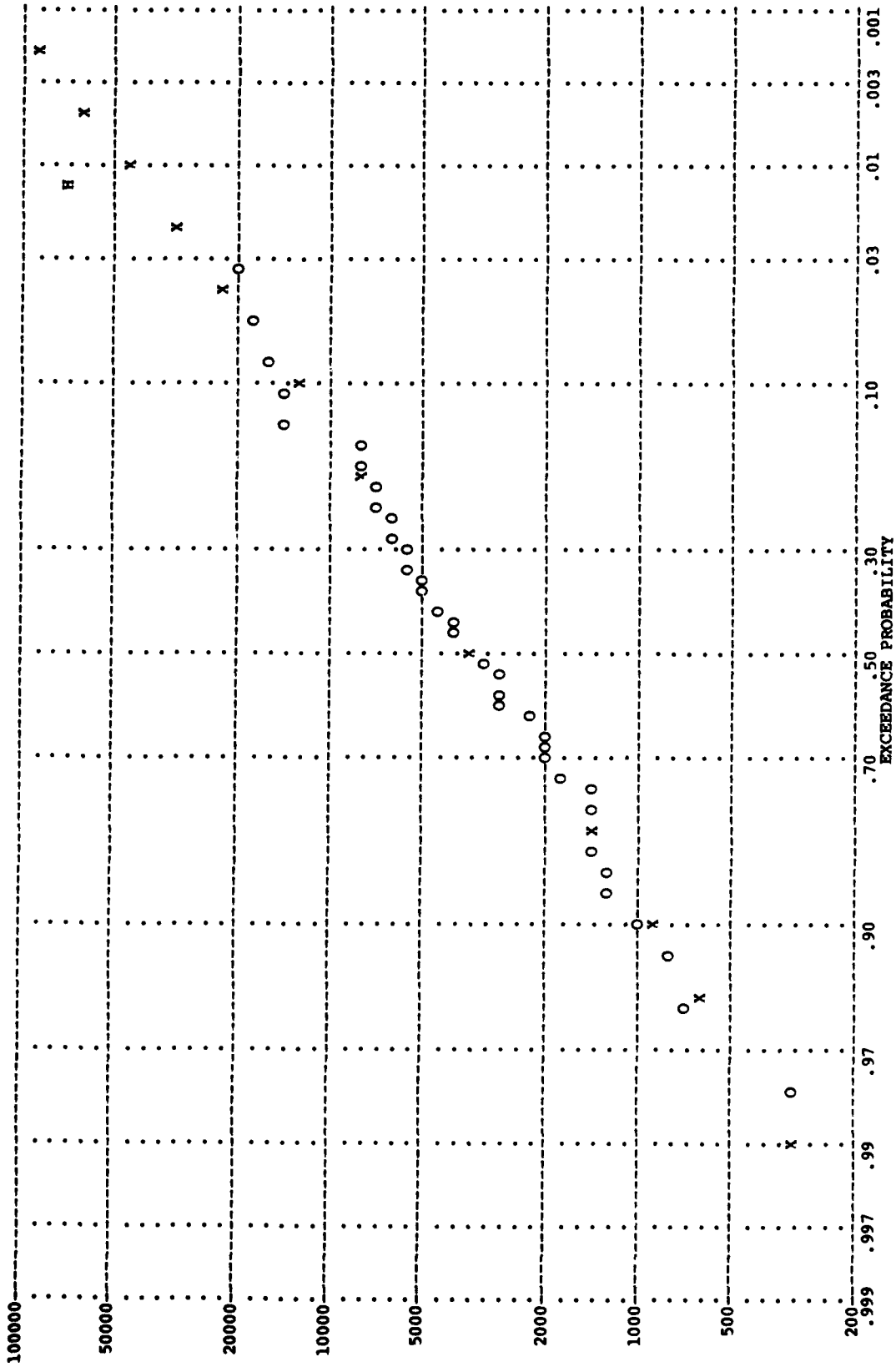
DA-882 SQ MI

1935-73



LEGEND - O-OBSERVED EVENT, H-HIGH OUTLIER OR HISTORIC EVENT, L-LOW OUTLIER, Z-ZERO OR MISSING X-COMPUTED CURVE

FINAL RESULTS
 FREQUENCY PLOT - 06-5005 FLOYD RIVER AT JAMES, IOWA DA-882 SQ MI 1935-73
 BASED ON EXPECTED PROBABILITY ADJUSTMENT, FLOW IN CUBIC FEET PER SECOND



LEGEND - O-OBSERVED EVENT, H-HIGH OUTLIER OR HISTORIC EVENT, L-LOW OUTLIER, Z-ZERO OR MISSING X-COMPUTED CURVE

* FLOOD FLOW FREQUENCY ANALYSIS *
* VERSION DATE -- FEB 9, 1982 *
* AFTER BULLETIN 17B, SEPT 1981 *

TITLE CARD(S)

TT TEST NO. 3 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
TT WRC APPENDIX 12, EXAMPLE 3 - TESTING AND ADJUSTING FOR A LOW OUTLIER
TT BACK CREEK NEAR JONES SPRINGS, WV

STATION IDENTIFICATION

ID 01-6140 BACK CR NEAR JONES SPRINGS, WEST VA DA=243 SQ MI 1929-31,39-73

GENERALIZED SKEW

	ISTN	GGMSE	SKEW
GS 016140	0.000	0.50	

SYSTEMATIC EVENTS

38 EVENTS TO BE ANALYZED

END OF INPUT DATA

ED ++++++
+++++

-SKEW WEIGHTING -

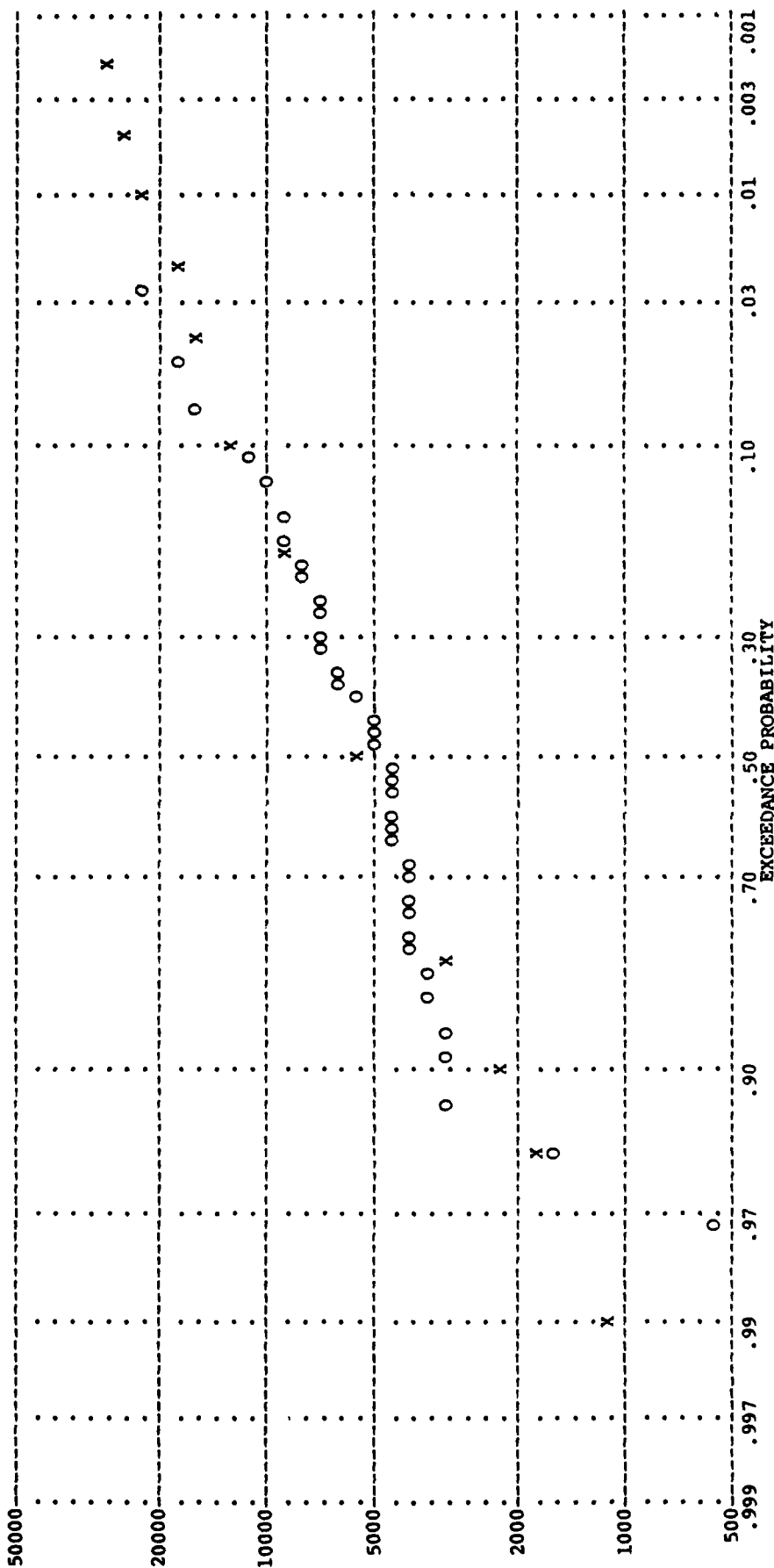
BASED ON 38 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = 0.197
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = 0.302

```

PRELIMINARY RESULTS
-FREQUENCY CURVE- 01-6140 BACK CR NEAR JONES SPRINGS, WEST VA
*****
*.....FLOW,CFS.....*
*      EXPECTED      * EXCEEDANCE *
*      PROBABILITY   * PROBABILITY *
*      COMPUTED      * .05 LIMIT  .95 LIMIT *
*-----*-----*-----*
* 28900.  32600.  * .002    * 45200.  21100. *
* 24600.  27000.  * .005    * 37200.  18400. *
* 21500.  23200.  * .010    * 31600.  16300. *
* 18500.  19600.  * .020    * 26300.  14300. *
* 15600.  16300.  * .040    * 21500.  12300. *
* 11900.  12200.  * .100    * 15500.   9650. *
*  9130.   9240.  * .200    * 11500.   7580. *
*  5390.   5390.  * .500    *  6430.   4520. *
*  3080.   3040.  * .800    *  3710.   2460. *
*  2280.   2210.  * .900    *  2810.   1730. *
*  1760.   1680.  * .950    *  2230.   1280. *
*  1070.   964.   * .990    *  1440.    700. *
*+++++*+++++*+++++*
*  FREQUENCY CURVE STATISTICS *  STATISTICS BASED ON *
*-----*-----*-----*
* MEAN LOGARITHM      3.7220 * HISTORIC EVENTS      0 *
* STANDARD DEVIATION  .2804 * HIGH OUTLIERS        0 *
* COMPUTED SKEW       -.7311 * LOW OUTLIERS         0 *
* GENERALIZED SKEW    .5000 * ZERO OR MISSING      0 *
* ADOPTED SKEW       -.2000 * SYSTEMATIC EVENTS    38 *
*****

```

PRELIMINARY RESULTS
 -FREQUENCY PLOT - 01-6140 BACK CR NEAR JONES SPRINGS, WEST VA DA=243 SQ MI 1929-31,39-73
 BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND



LEGEND - O=OBSERVED EVENT, H=HIGH OUTLIER OR HISTORIC EVENT, L=LOW OUTLIER, Z=ZERO OR MISSING X=COMPUTED CURVE

FINAL RESULTS
 -PLOTING POSITIONS- 01-6140 BACK CR NEAR JONES SPRINGS, WEST VA

EVENTS ANALYZED..........ORDERED EVENTS.....*
 * MON DAY YEAR FLOW,CFS * RANK YEAR FLOW,CFS WEIBULL *
 * PLOT POS *

 * 4 17 1929 8750. * 1 1943 22400. .0256 *
 * 10 23 1929 15500. * 2 1972 18700. .0513 *
 * 5 8 1931 4060. * 3 1930 15500. .0769 *
 * 2 4 1939 6300. * 4 1955 10700. .1026 *
 * 4 20 1940 3130. * 5 1953 9820. .1282 *
 * 4 6 1941 4160. * 6 1951 9150. .1538 *
 * 5 22 1942 6700. * 7 1929 8750. .1795 *
 * 10 15 1942 22400. * 8 1971 8360. .2051 *
 * 3 24 1944 3880. * 9 1945 8050. .2308 *
 * 9 18 1945 8050. * 10 1967 7080. .2564 *
 * 6 3 1946 4020. * 11 1959 6800. .2821 *
 * 3 15 1947 1600. * 12 1942 6700. .3077 *
 * 4 14 1948 4460. * 13 1970 6680. .3333 *
 * 12 31 1948 4230. * 14 1939 6300. .3590 *
 * 2 2 1950 3010. * 15 1954 6200. .3846 *
 * 12 5 1950 9150. * 16 1965 5600. .4103 *
 * 4 28 1952 5100. * 17 1973 5210. .4359 *
 * 11 22 1952 9820. * 18 1963 5190. .4615 *
 * 3 2 1954 6200. * 19 1952 5100. .4872 *
 * 8 19 1955 10700. * 20 1961 4700. .5128 *
 * 3 15 1956 3880. * 21 1966 4670. .5385 *
 * 2 10 1957 3420. * 22 1968 4640. .5641 *
 * 3 27 1958 3240. * 23 1948 4460. .5897 *
 * 6 3 1959 6800. * 24 1962 4380. .6154 *
 * 5 9 1960 3740. * 25 1949 4230. .6410 *
 * 2 19 1961 4700. * 26 1941 4160. .6667 *
 * 3 22 1962 4380. * 27 1931 4060. .6923 *
 * 3 20 1963 5190. * 28 1946 4020. .7179 *
 * 1 10 1964 3960. * 29 1964 3960. .7436 *
 * 3 6 1965 5600. * 30 1956 3880. .7692 *
 * -0 -0 1966 4670. * 31 1944 3880. .7949 *
 * -0 -0 1967 7080. * 32 1960 3740. .8205 *
 * -0 -0 1968 4640. * 33 1957 3420. .8462 *
 * -0 -0 1969 536. * 34 1958 3240. .8718 *
 * -0 -0 1970 6680. * 35 1940 3130. .8974 *
 * -0 -0 1971 8360. * 36 1950 3010. .9231 *
 * -0 -0 1972 18700. * 37 1947 1600. .9487 *
 * -0 -0 1973 5210. * 38 1969 536. .9744 *

-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 38 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.661

1 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 945.8

STATISTICS AND FREQUENCY CURVE ADJUSTED FOR 1 LOW OUTLIER(S)

HIGH OUTLIER TEST

BASED ON 37 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.650

0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 22760.

-SKEW WEIGHTING -

BASED ON 38 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = 0.186
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = 0.302

FINAL RESULTS

-FREQUENCY CURVE- 01-6140 BACK CR NEAR JONES SPRINGS, WEST VA

.....FLOW,CFS..... *...CONFIDENCE LIMITS...*

* EXPECTED * EXCEEDANCE *

* COMPUTED PROBABILITY * PROBABILITY * 0.05 LIMIT 0.95 LIMIT *

* 37700. 46200. * 0.002 * 61000. 27000. *

* 29300. 33900. * 0.005 * 44800. 21700. *

* 23900. 26700. * 0.010 * 35000. 18300. *

* 19400. 21000. * 0.020 * 27100. 15200. *

* 15500. 16300. * 0.040 * 20700. 12500. *

* 11200. 11500. * 0.100 * 14100. 9390. *

* 8440. 8550. * 0.200 * 10100. 7250. *

* 5230. 5230. * 0.500 * 6030. 4510. *

* 3490. 3460. * 0.800 * 4070. 2890. *

* 2910. 2860. * 0.900 * 3440. 2340. *

* 2530. 2480. * 0.950 * 3040. 1990. *

* 2020. 1940. * 0.990 * 2490. 1520. *

* FREQUENCY CURVE STATISTICS * STATISTICS BASED ON *

* MEAN LOGARITHM 3.7413 * HISTORIC EVENTS 0 *

* STANDARD DEVIATION 0.2315 * HIGH OUTLIERS 0 *

* COMPUTED SKEW 0.6238 * LOW OUTLIERS 1 *

* GENERALIZED SKEW 0.5000 * ZERO OR MISSING 0 *

* ADOPTED SKEW 0.6000 * SYSTEMATIC EVENTS 38 *

EXHIBIT 1
27 of 44

FINAL RESULTS

1929-31, 39-73

DA=243 SQ MI

GS, WEST VA

01-6140 BACK CR NI

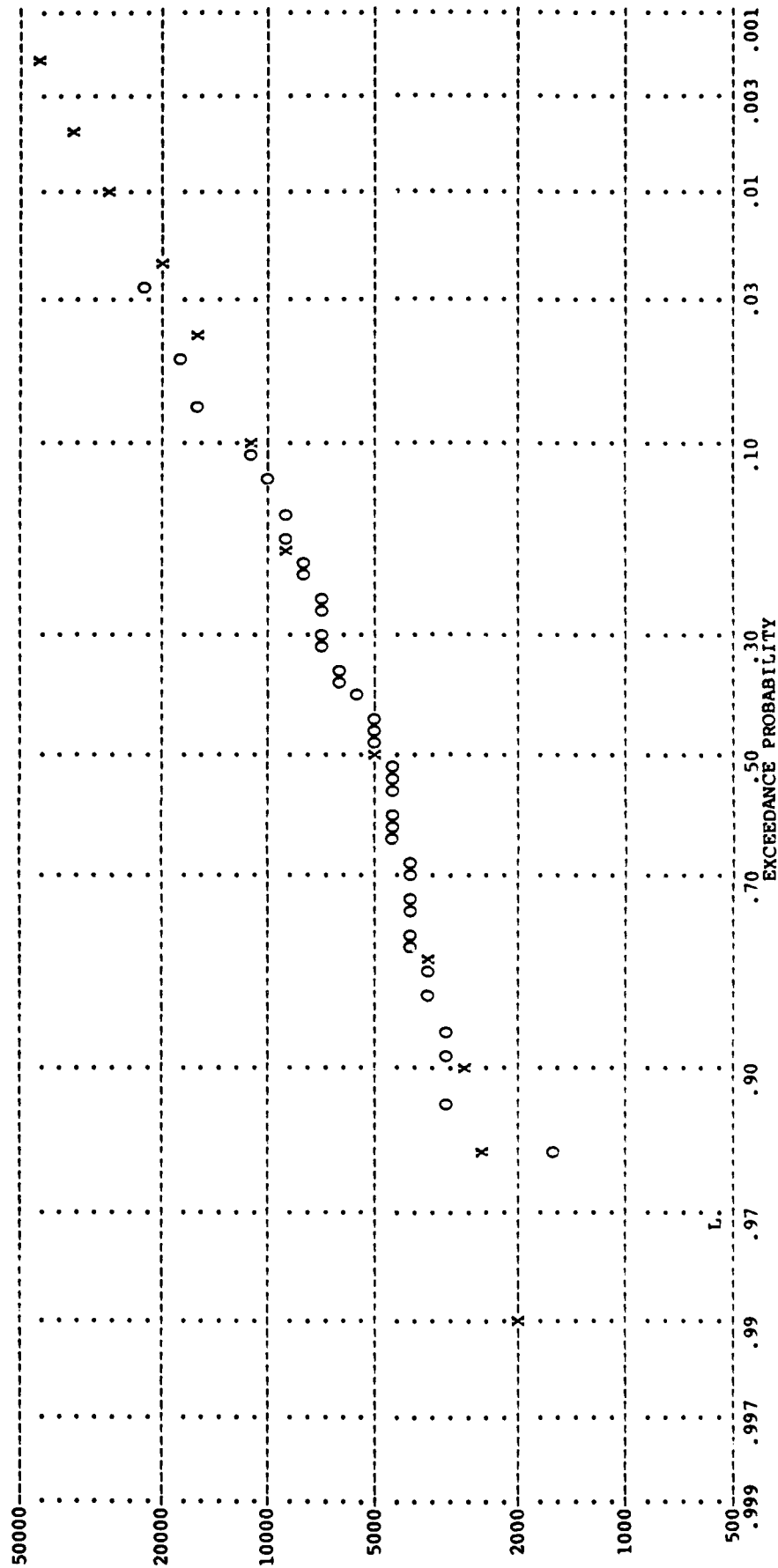
-FREQUENCY PLOT

—FREQUENCY FLOT - 01-6140 BACK CR NEAR JONES SPRINGS,
BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND



LEGEND - 0=OBSERVED EVENT, 1=HIGH OUTFLIER OR HISTORIC EVENT, 2=ZERO OR MISSING Y=COMPUTED CURVE

FINAL RESULTS
 -FREQUENCY PLOT - 01-6140 BACK CR NEAR JONES SPRINGS, WEST VA DA=243 SQ MI 1929-31,39-73
 BASED ON EXPECTED PROBABILITY ADJUSTMENT, FLOW IN CUBIC FEET PER SECOND



LEGEND - O=OBSERVED EVENT, H=HIGH OUTLIER OR HISTORIC EVENT, L=LOW OUTLIER, Z=ZERO OR MISSING X=COMPUTED CURVE

 * FLOOD FLOW FREQUENCY ANALYSIS *
 * VERSION DATE -- FEB 9, 1982 *
 * AFTER BULLETIN 17B, SEPT 1981 *

TITLE CARD(S)

TT TEST NO. 4 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
 TT WRC APPENDIX 12, EXAMPLE 4 - ZERO FLOOD YEARS
 TT ORESTIMBA CREEK NEAR NEWMAN, CA

STATION IDENTIFICATION

ID 11-2745 ORESTIMBA CREEK NEAR NEWMAN, CA DA=134 SQ MI

1932-73

GENERALIZED SKEW

ISTN GGMSE SKEW
 GS 112745 0.000 -0.30

SYSTEMATIC EVENTS

42 EVENTS TO BE ANALYZED

END OF INPUT DATA

ED ++++++
 ++++++

NOTE - ADOPTED SKEW EQUALS COMPUTED SKEW AND PRELIMINARY
 FREQUENCY STATISTICS ARE FOR THE CONDITIONAL
 FREQUENCY CURVE BECAUSE OF ZERO OR MISSING EVENTS.

PRELIMINARY RESULTS

-FREQUENCY CURVE- 11-2745 ORESTIMBA CREEK NEAR NEWMAN, CA

FLOW,CFS..... *...CONFIDENCE LIMITS...*
 * EXPECTED * EXCEEDANCE * *
 * COMPUTED PROBABILITY * PROBABILITY * 0.05 LIMIT 0.95 LIMIT *

 * 19868. 21800. * 0.002 * 42000. 11400. *
 * 16898. 18300. * 0.005 * 34600. 9880. *
 * 14498. 15600. * 0.010 * 28900. 8620. *
 * 12025. 12800. * 0.020 * 23200. 7300. *
 * 9475. 9950. * 0.040 * 17500. 5890. *
 * 6101. 6310. * 0.100 * 10500. 3950. *
 * 3735. 3800. * 0.200 * 6020. 2500. *
 * 1077. 1077. * 0.500 * 1570. 732. *
 * 104. 94. * 0.800 * 175. 53. *
 * 0. 0. * 0.900 * 0. 0. *
 * 0. 0. * 0.950 * 0. 0. *
 * 0. 0. * 0.990 * 0. 0. *

 * FREQUENCY CURVE STATISTICS * STATISTICS BASED ON *

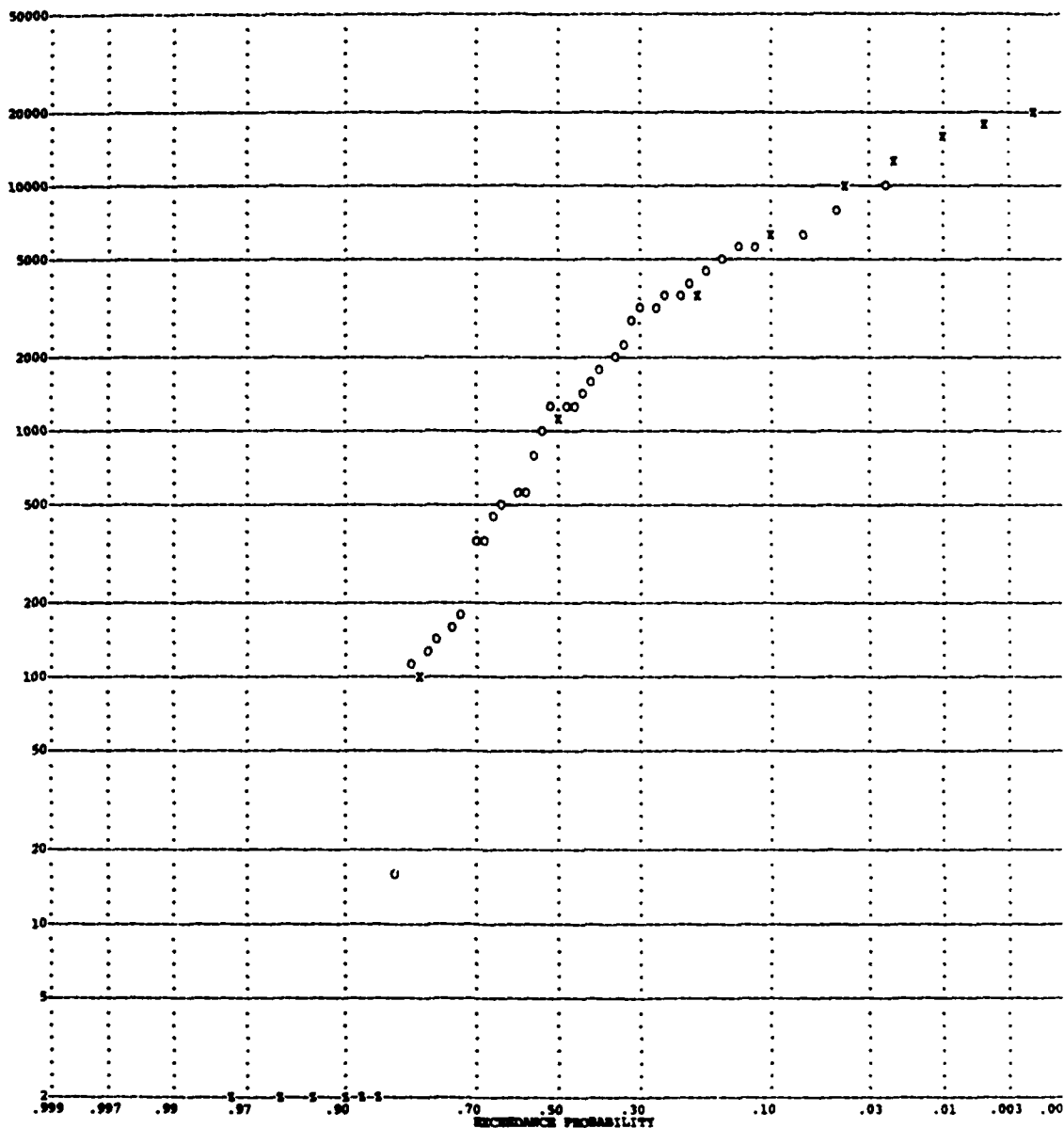
 * MEAN LOGARITHM 3.0786 * HISTORIC EVENTS 0 *
 * STANDARD DEVIATION 0.6443 * HIGH OUTLIERS 0 *
 * COMPUTED SKEW -0.8360 * LOW OUTLIERS 0 *
 * GENERALIZED SKEW -0.3000 * ZERO OR MISSING 6 *
 * ADOPTED SKEW -0.8360 * SYSTEMATIC EVENTS 42 *

EXHIBIT 1
 30 of 44

PRELIMINARY RESULTS
 -FREQUENCY PLOT - 11-2745 CHRISTINA CREEK NEAR HENDON, CA
 BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND

DA-134 SQ MI

1932-73



LEGEND - O-OBSERVED EVENT, B-HIGH OUTLIER OR HISTORIC EVENT, L-LOW OUTLIER, S-ZERO OR MISSING X-COMPUTED CURVE

FINAL RESULTS
 -PLOTTING POSITIONS- 11-2745 ORESTIMBA CREEK NEAR NEWMAN, CA

EVENTS ANALYZED..........ORDERED EVENTS.....*
 * MON DAY YEAR FLOW,CFS * RANK YEAR FLOW,CFS WEIBULL *
 * PLOT POS *
 * 2 8 1932 4260. * 1 1958 10200. .0233 *
 * 1 29 1933 345. * 2 1963 8300. .0465 *
 * 1 1 1934 516. * 3 1943 6450. .0698 *
 * 4 8 1935 1320. * 4 1945 5970. .0930 *
 * 2 13 1936 1200. * 5 1956 5620. .1163 *
 * 2 13 1937 2180. * 6 1959 5380. .1395 *
 * 2 11 1938 3230. * 7 1969 5080. .1628 *
 * 3 9 1939 115. * 8 1932 4260. .1860 *
 * 2 27 1940 3440. * 9 1967 4200. .2093 *
 * 4 4 1941 3070. * 10 1952 3660. .2326 *
 * 1 24 1942 1880. * 11 1940 3440. .2558 *
 * 1 21 1943 6450. * 12 1938 3230. .2791 *
 * 2 29 1944 1290. * 13 1941 3070. .3023 *
 * 2 2 1945 5970. * 14 1951 2920. .3256 *
 * 12 25 1945 782. * 15 1937 2180. .3488 *
 * -0 -0 1947 0. * 16 1942 1880. .3721 *
 * -0 -0 1948 0. * 17 1962 1740. .3953 *
 * 3 12 1949 335. * 18 1973 1510. .4186 *
 * 2 5 1950 175. * 19 1957 1440. .4419 *
 * 12 3 1950 2920. * 20 1935 1320. .4651 *
 * 1 12 1952 3660. * 21 1944 1290. .4884 *
 * 12 7 1952 147. * 22 1936 1200. .5116 *
 * -0 -0 1954 0. * 23 1970 1010. .5349 *
 * 1 19 1955 16. * 24 1946 782. .5581 *
 * 12 23 1955 5620. * 25 1971 584. .5814 *
 * 2 24 1957 1440. * 26 1966 560. .6047 *
 * 4 2 1958 10200. * 27 1934 516. .6279 *
 * 2 16 1959 5380. * 28 1960 448. .6512 *
 * 2 10 1960 448. * 29 1933 345. .6744 *
 * -0 -0 1961 0. * 30 1949 335. .6977 *
 * 2 15 1962 1740. * 31 1950 175. .7209 *
 * 2 1 1963 8300. * 32 1964 156. .7442 *
 * 1 22 1964 156. * 33 1953 147. .7674 *
 * -0 -0 1966 560. * 34 1966 128. .7907 *
 * 12 30 1965 128. * 35 1939 115. .8140 *
 * 1 24 1967 4200. * 36 1955 16. .8372 *
 * -0 -0 1968 0. * 37 1968 0. .8605 *
 * 1 25 1969 5080. * 38 1948 0. .8837 *
 * 3 1 1970 1010. * 39 1954 0. .9070 *
 * 12 21 1970 584. * 40 1947 0. .9302 *
 * -0 -0 1972 0. * 41 1972 0. .9535 *
 * 2 11 1973 1510. * 42 1961 0. .9767 *

-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 36 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.639

1 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 23.9
BASED ON THE STATISTICS AFTER 6 ZERO OR MISSING EVENTS DELETED

STATISTICS AND FREQUENCY CURVE ADJUSTED FOR 1 LOW OUTLIER(S)
AND/OR 6 ZERO OR MISSING EVENT(S)

HIGH OUTLIER TEST

BASED ON 35 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.628

0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 41786.

-SKEW WEIGHTING -

BASED ON 42 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = 0.167
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = 0.302

FINAL RESULTS

-FREQUENCY CURVE- 11-2745 ORESTIMBA CREEK NEAR NEWMAN, CA

```
*****
*.....FLOW,CFS.....*          *...CONFIDENCE LIMITS...*
*          EXPECTED    * EXCEEDANCE *
*  COMPUTED PROBABILITY * PROBABILITY * 0.05 LIMIT 0.95 LIMIT *
*-----*-----*-----*-----*-----*-----*
*   31000.    36900.    *   0.002    *   75500.    16200. *
*   23700.    27200.    *   0.005    *   54800.    12800. *
*   18700.    21000.    *   0.010    *   41300.    10400. *
*   14200.    15600.    *   0.020    *   29900.     8160. *
*   10300.    11100.    *   0.040    *   20400.     6130. *
*    6000.     6260.    *   0.100    *   10900.     3770. *
*    3450.     3540.    *   0.200    *    5770.     2260. *
*    1050.     1050.    *   0.500    *    1570.      708. *
*     266.      258.    *   0.800    *     405.      161. *
*     121.      113.    *   0.900    *     195.       65. *
*      60.       54.    *   0.950    *     105.       29. *
*      15.       11.    *   0.990    *      31.        5. *
*****
```

```
*  FREQUENCY CURVE STATISTICS  *  STATISTICS BASED ON  *
*-----*-----*-----*-----*
*  MEAN LOGARITHM      2.9657 *  HISTORIC EVENTS      0 *
*  STANDARD DEVIATION  0.6682 *  HIGH OUTLIERS        0 *
*  COMPUTED SKEW      -0.5682 *  LOW OUTLIERS         1 *
*  GENERALIZED SKEW   -0.3000 *  ZERO OR MISSING      6 *
*  ADOPTED SKEW       -0.5000 *  SYSTEMATIC EVENTS    42 *
*****
```

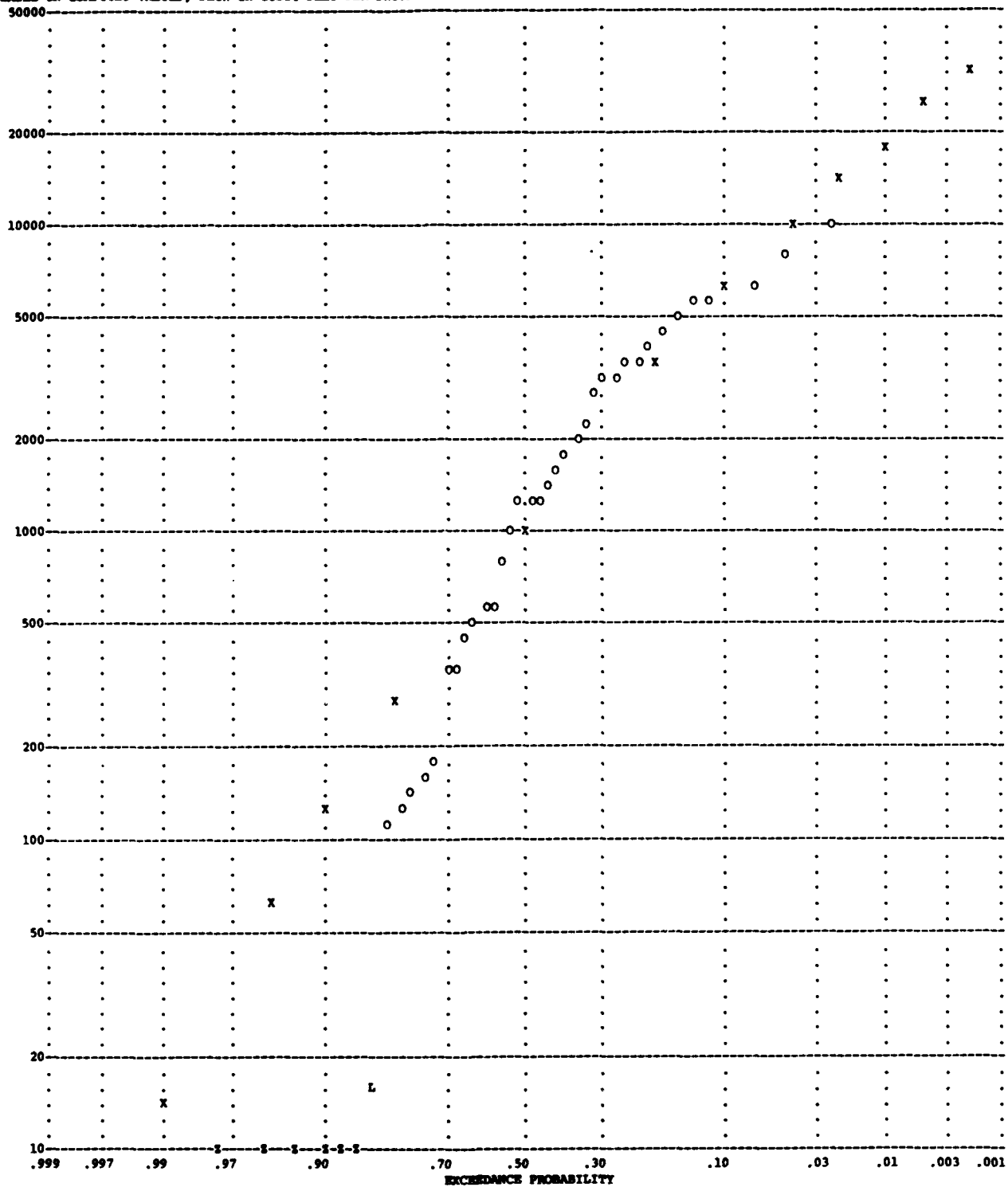
EXHIBIT 1
33 of 44

FINAL RESULTS

-FREQUENCY PLOT - 11-2745 CRESTINA CREEK NEAR WENHAM, CA
BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND

DA=134 SQ MI

1932-73



LEGEND - O-OBSERVED EVENT, H-HIGH OUTLIER OR HISTORIC EVENT, L-LOW OUTLIER, S-SERO OR MISSING X-COMPUTED CURVE

1932-73



 * FLOOD FLOW FREQUENCY ANALYSIS *
 * VERSION DATE — FEB 9, 1982 *
 * AFTER BULLETIN 17B, SEPT 1981 *

TITLE CARD(S)
 TT TEST NO. 5 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
 TT EXAMPLE USE OF PRINTOUT SUPPRESSION (IPROUT), OTHER CONFIDENCE LIMITS
 TT (CLIMIT), AND A BASE PEAK DISCHARGE (BASEPK)

JOB CARD(S)
 J1 IPPC ISKFX IPROUT IPMT IWYR IUNIT ISMRY IPNCH IREG
 -0 -0 33 -0 -0 -0 -0 -0
 J2 A B CLIMIT
 -0. -0. .01

STATION IDENTIFICATION
 ID 05-5925 KASKASKIA RIVER AT VANDALIA, ILL DA-1980 SQ MI 1908-70

GENERALIZED SKEW
 ISTN GMSK SKEW
 GS 5925 -0. -.40

SPECIAL STATION INFORMATION
 SI IYRA IYRL NOUTL BASEPK
 -0 -0 -0 2000.

SYSTEMATIC EVENTS
 60 EVENTS TO BE ANALYZED

END OF INPUT DATA
 ED ++++++

-SKEW WEIGHTING -

BASED ON 60 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = .199
 DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = .302

PRELIMINARY RESULTS
 -FREQUENCY CURVE- 05-5925 KASKASKIA RIVER AT VANDALIA, ILL

.....FLOW,CFS.....		...CONFIDENCE LIMITS...	
COMPUTED	EXPECTED	EXCEEDANCE	
PROBABILITY	PROBABILITY		
			.01 LIMIT .99 LIMIT
* 58300.	60600.	* .002	* 96600. 40900. *
* 53300.	55100.	* .005	* 86500. 37900. *
* 49100.	50500.	* .010	* 78100. 35200. *
* 44300.	45400.	* .020	* 69000. 32200. *
* 39100.	39800.	* .040	* 59100. 28800. *
* 31100.	31500.	* .100	* 45000. 23600. *
* 24300.	24500.	* .200	* 33600. 18800. *
* 13600.	13600.	* .500	* 17500. 10700. *
* 6530.	6450.	* .800	* 8420. 4770. *
* 4180.	4060.	* .900	* 5600. 2810. *
* 2790.	2660.	* .950	* 3930. 1720. *
* 1200.	1070.	* .990	* 1910. 603. *

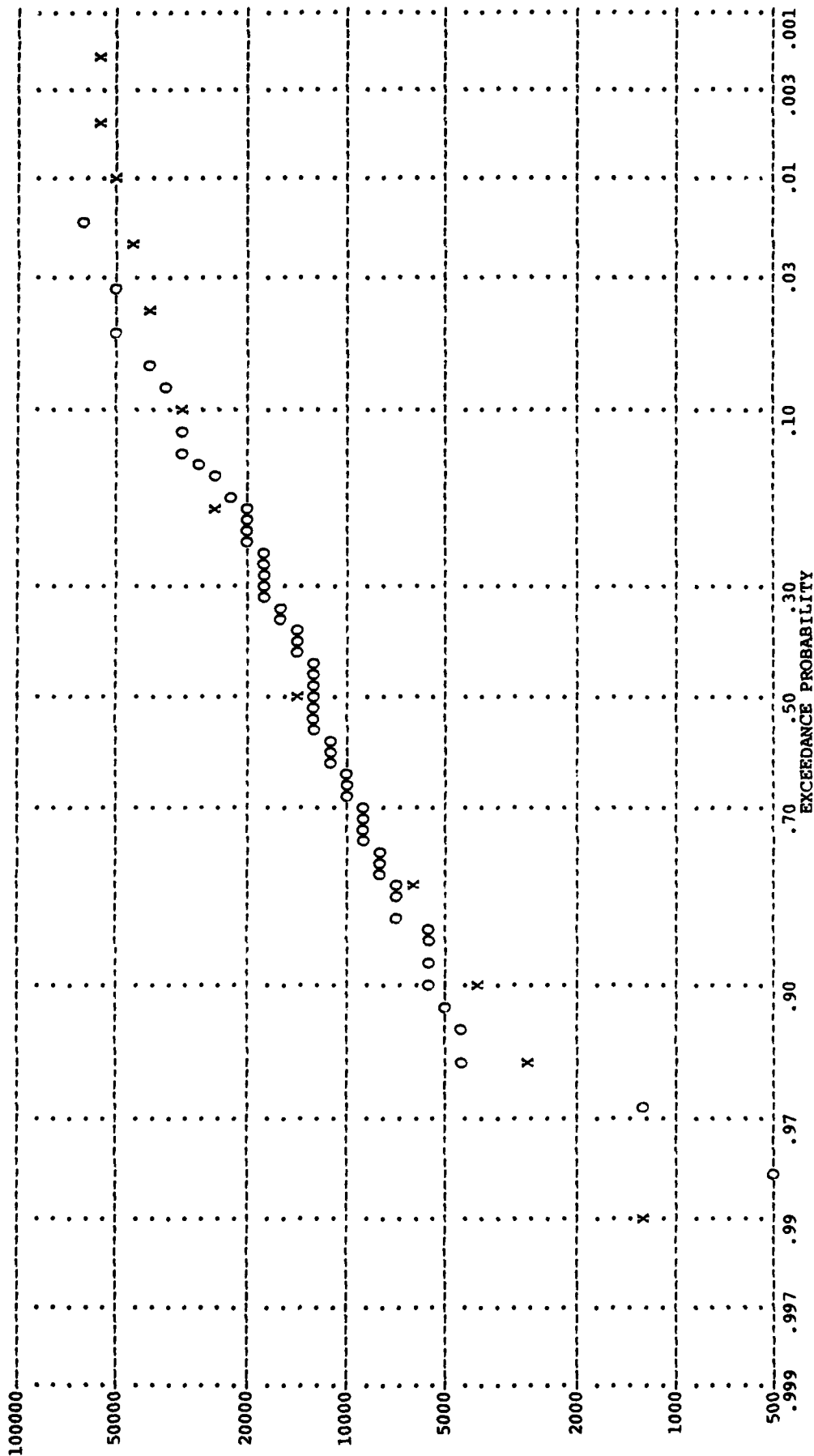
FREQUENCY CURVE STATISTICS		STATISTICS BASED ON	
* MEAN LOGARITHM	4.0869	* HISTORIC EVENTS	0
* STANDARD DEVIATION	.3486	* HIGH OUTLIERS	0
* COMPUTED SKEW	-1.0942	* LOW OUTLIERS	0
* GENERALIZED SKEW	-.4000	* ZERO OR MISSING	0
* ADOPTED SKEW	-.8000	* SYSTEMATIC EVENTS	60

PRELIMINARY RESULTS

-FREQUENCY PLOT - 05-5925 KASKASKIA RIVER AT VANDALIA, ILL
BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND

DA=1980 SQ MI

1908-70



LEGEND - O-OBSERVED EVENT, H-HIGH OUTLIER OR HISTORIC EVENT, L-LOW OUTLIER, Z-ZERO OR MISSING X-COMPUTED CURVE

FINAL RESULTS
 -PLOTTING POSITIONS- 05-5925 KASKASKIA RIVER AT VANDALIA, ILL.

EVENTS ANALYZED.....				ORDERED EVENTS.....					
MON	DAY	YEAR	FLOW,CFS	RANK	WATER YEAR	FLOW,CFS	WEIBULL PLOT POS		
*	5	6	1908	7870.	*	1	1957	62700.	.0164
*	4	14	1909	7670.	*	2	1943	52200.	.0328
*	3	1	1910	7020.	*	3	1950	51300.	.0492
*	5	1	1911	5670.	*	4	1938	40700.	.0656
*	10	4	1911	13000.	*	5	1961	34400.	.0820
*	7	21	1915	15800.	*	6	1944	31000.	.0984
*	1	31	1916	14400.	*	7	1951	31000.	.1148
*	6	5	1917	16800.	*	8	1970	30000.	.1311
*	5	11	1918	8880.	*	9	1967	27000.	.1475
*	3	19	1919	11000.	*	10	1949	25000.	.1639
*	5	19	1920	12600.	*	11	1945	21500.	.1803
*	4	18	1922	18800.	*	12	1968	20800.	.1967
*	3	17	1923	14300.	*	13	1969	20700.	.2131
*	12	15	1923	10500.	*	14	1927	20000.	.2295
*	3	16	1925	9980.	*	15	1948	19000.	.2459
*	9	17	1926	8460.	*	16	1922	18800.	.2623
*	3	20	1927	20000.	*	17	1933	17500.	.2787
*	12	1	1927	12200.	*	18	1959	17200.	.2951
*	5	14	1929	12200.	*	19	1962	17100.	.3115
*	1	14	1930	11500.	*	20	1917	16800.	.3279
*	9	18	1931	1270.	*	21	1939	16000.	.3443
*	1	24	1932	5550.	*	22	1915	15800.	.3607
*	5	15	1933	17500.	*	23	1937	14900.	.3770
*	8	19	1934	4250.	*	24	1916	14400.	.3934
*	5	16	1935	11200.	*	25	1923	14300.	.4098
*	3	26	1936	7290.	*	26	1942	13600.	.4262
*	1	15	1937	14900.	*	27	1946	13000.	.4426
*	3	31	1938	40700.	*	28	1912	13000.	.4590
*	3	14	1939	16000.	*	29	1920	12600.	.4754
*	5	3	1940	6760.	*	30	1958	12400.	.4918
*	6	12	1941	4560.	*	31	1947	12300.	.5082
*	7	12	1942	13600.	*	32	1928	12200.	.5246
*	5	18	1943	52200.	*	33	1929	12200.	.5410
*	4	24	1944	31000.	*	34	1966	11900.	.5574
*	6	10	1945	21500.	*	35	1960	11800.	.5738
*	5	4	1946	13000.	*	36	1930	11500.	.5902
*	6	10	1947	12300.	*	37	1935	11200.	.6066
*	3	28	1948	19000.	*	38	1919	11000.	.6230
*	2	16	1949	25000.	*	39	1952	10500.	.6393
*	1	4	1950	51300.	*	40	1924	10500.	.6557
*	6	29	1951	31000.	*	41	1925	9980.	.6721
*	4	15	1952	10500.	*	42	1963	9000.	.6885
*	3	5	1953	5680.	*	43	1918	8880.	.7049
*	4	19	1954	505.	*	44	1964	8500.	.7213
*	4	25	1955	5000.	*	45	1926	8460.	.7377
*	2	27	1956	7840.	*	46	1908	7870.	.7541
*	6	29	1957	62700.	*	47	1956	7840.	.7705
*	8	4	1958	12400.	*	48	1909	7670.	.7869
*	2	12	1959	17200.	*	49	1936	7290.	.8033
*	6	30	1960	11800.	*	50	1910	7020.	.8197
*	4	10	1961	34400.	*	51	1940	6760.	.8361
*	3	25	1962	17100.	*	52	1953	5680.	.8525
*	5	22	1963	9000.	*	53	1911	5670.	.8689
*	5	4	1964	8500.	*	54	1932	5550.	.8852
*	5	4	1965	5350.	*	55	1965	5350.	.9016
*	5	19	1966	11900.	*	56	1955	5000.	.9180
*	12	10	1966	27000.	*	57	1941	4560.	.9344
*	12	23	1967	20800.	*	58	1934	4250.	.9508
*	1	31	1969	20700.	*	59	1931	1270.	.9672
*	6	16	1970	30000.	*	60	1954	505.	.9836

-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 60 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.837

2 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 1253.2
OR INPUT BASE OF 2000.0

STATISTICS AND FREQUENCY CURVE ADJUSTED FOR 2 LOW OUTLIER(S)

HIGH OUTLIER TEST

BASED ON 58 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.824

0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 78238.

-SKEW WEIGHTING -

BASED ON 60 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = 0.113
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = 0.302

FINAL RESULTS

-FREQUENCY CURVE- 05-5925 KASKASKIA RIVER AT VANDALIA, ILL

.....FLOW,CFS..... *...CONFIDENCE LIMITS...*
* EXPECTED * EXCEEDANCE *
* COMPUTED PROBABILITY * PROBABILITY * 0.01 LIMIT 0.99 LIMIT *

* 93600. 104000. * 0.002 * 167000. 63500. *
* 74600. 80900. * 0.005 * 126000. 52500. *
* 62100. 66100. * 0.010 * 99900. 44900. *
* 51000. 53400. * 0.020 * 78200. 37900. *
* 41100. 42500. * 0.040 * 60000. 31500. *
* 29700. 30200. * 0.100 * 40400. 23600. *
* 22100. 22300. * 0.200 * 28400. 18000. *
* 12800. 12800. * 0.500 * 15500. 10500. *
* 7650. 7590. * 0.800 * 9360. 5930. *
* 5910. 5830. * 0.900 * 7410. 4370. *
* 4810. 4700. * 0.950 * 6170. 3410. *
* 3310. 3160. * 0.990 * 4460. 2150. *
++++
* FREQUENCY CURVE STATISTICS * STATISTICS BASED ON *

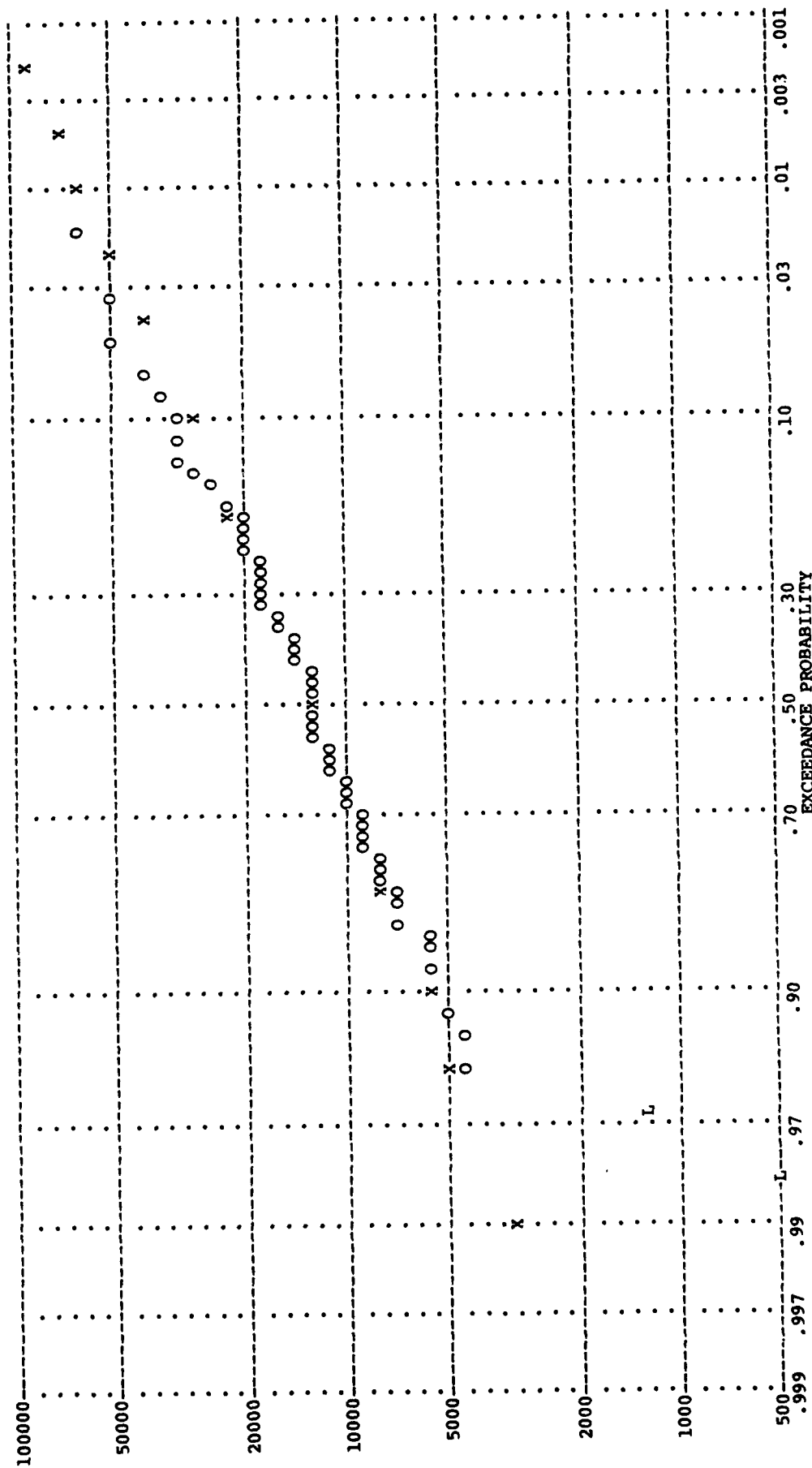
* MEAN LOGARITHM 4.1163 * HISTORIC EVENTS 0 *
* STANDARD DEVIATION 0.2738 * HIGH OUTLIERS 0 *
* COMPUTED SKEW 0.3993 * LOW OUTLIERS 2 *
* GENERALIZED SKEW -0.4000 * ZERO OR MISSING 0 *
* ADOPTED SKEW 0.2000 * SYSTEMATIC EVENTS 60 *

EXHIBIT 1
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FINAL RESULTS
 -FREQUENCY PLOT - 05-5925 KASKASKIA RIVER AT VANDALIA, ILL.
 BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND

DA=1980 SQ MI

1908-70



LEGEND - O=OBSERVED EVENT, H=HIGH OUTLIER OR HISTORIC EVENT, L=LOW OUTLIER, Z=ZERO OR MISSING X=COMPUTED CURVE

 * FLOOD FLOW FREQUENCY ANALYSIS *
 * VERSION DATE -- FEB 9, 1982 *
 * AFTER BULLETIN 178, SEPT 1981 *

TITLE CARD(S)

TT TEST NO. 6 FLOOD FLOW FREQUENCY ANALYSIS PROGRAM
 TT EXAMPLE USE OF MEDIAN PLOT POSITIONS(IPPC),WRC FORMAT(IFMT), HISTORIC
 TT DATA(QR CARD), AND PERIOD OF KNOWLEDGE BEYOND LAST YEAR OF DATA(IYRL)

JOB CARD(S)

	IPPC	ISKFX	IPROUT	IFMT	IWYR	IUNIT	ISMRY	IPNCH	IREG
J1	2	-0	21	2	-0	-0	-0	-0	-0

STATION IDENTIFICATION

ID 01-4765 RIDLEY CREEK AT MOYLAN, PA DA=31.9 SQ MI 1932-55

GENERALIZED SKEW

	ISTN	GGMSE	SKEW
GS	4765	-0.	.40

SPECIAL STATION INFORMATION

	IYRA	IYRL	NOU TL	BASEPK
SI	-0	1974	-0	-0.

HISTORIC EVENTS

QH 5 8 1843 15000.

SYSTEMATIC EVENTS

24 EVENTS TO BE ANALYZED

END OF INPUT DATA

ED +++++
 +++++

-SKEW WEIGHTING -

BASED ON 24 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW =	.315
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW =	.302

PRELIMINARY RESULTS

-FREQUENCY CURVE- 01-4765 RIDLEY CREEK AT MOYLAN, PA

*****FLOW,CFS*****						***CONFIDENCE LIMITS***					
EXPECTED			EXCEEDANCE			.01 LIMIT			.99 LIMIT		
COMPUTED	PROBABILITY		PROBABILITY								
13600.	21000.		.002		49100.	7070.					
9890.	13400.		.005		30400.	5530.					
7680.	9640.		.010		20900.	4550.					
5910.	6950.		.020		14100.	3700.					
4480.	4980.		.040		9410.	2960.					
3000.	3170.		.100		5300.	2130.					
2130.	2190.		.200		3310.	1570.					
1200.	1200.		.500		1640.	865.					
754.	742.		.800		1030.	479.					
613.	597.		.900		855.	361.					
527.	506.		.950		750.	291.					
414.	387.		.990		614.	206.					
*****FREQUENCY CURVE STATISTICS*****						*****STATISTICS BASED ON*****					
MEAN LOGARITHM			3.1120		HISTORIC EVENTS			0			
STANDARD DEVIATION			.2740		HIGH OUTLIERS			0			
COMPUTED SKEW			.9416		LOW OUTLIERS			0			
GENERALIZED SKEW			.4000		ZERO OR MISSING			0			
ADOPTED SKEW			.7000		SYSTEMATIC EVENTS			24			

FINAL RESULTS

-PLOTING POSITIONS- 01-4765 RIDLEY CREEK AT MOYLAN, PA

*****EVENTS ANALYZED*****						*****ORDERED EVENTS*****					
MON	DAY	YEAR	FLOW,CFS	RANK	WATER YEAR	FLOW,CFS	MEDIAN	PLOT	POS		
3	28	1932	891.	1	1843	15000.	.0053				
8	23	1933	2680.	2	1952	5720.	.0297				
3	5	1934	1080.	3	1955	4390.	.0709				
7	9	1935	3000.	4	1938	3320.	.1121				
1	3	1936	1590.	5	1935	3000.	.1534				
2	22	1937	770.	6	1933	2680.	.1946				
7	23	1938	3320.	7	1940	1770.	.2358				
2	3	1939	978.	8	1936	1590.	.2770				
3	15	1940	1770.	9	1950	1590.	.3183				
2	7	1941	746.	10	1952	1490.	.3595				
8	13	1942	1000.	11	1934	1080.	.4007				
12	30	1942	980.	12	1949	1040.	.4419				
1	6	1944	865.	13	1945	1040.	.4832				
9	18	1945	1040.	14	1946	1000.	.5244				
12	26	1945	1000.	15	1942	1000.	.5656				
5	22	1947	483.	16	1943	980.	.6068				
5	5	1948	740.	17	1939	978.	.6481				
12	30	1948	1040.	18	1953	918.	.6893				
8	3	1950	1590.	19	1932	891.	.7305				
11	25	1951	5720.	20	1944	865.	.7717				
3	11	1952	1490.	21	1937	770.	.8130				
11	22	1952	918.	22	1941	746.	.8542				
12	14	1953	670.	23	1948	740.	.8954				
8	18	1955	4390.	24	1954	670.	.9367				
8	5	1843	15000.	25	1947	483.	.9779				
*****NOTE- PLOTING POSITIONS BASED ON-HISTORIC PERIOD (H) = 132*****											
*****NUMBER OF HISTORIC EVENTS PLUS HIGH OUTLIERS(Z) = 1*****											
*****WEIGHTING FACTOR FOR SYSTEMATIC EVENTS (W) = 5.4583*****											

EXHIBIT 1

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-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 132 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 3.109

LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 172.9

HIGH OUTLIER TEST

BASED ON 24 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.467

HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 6136.

STATISTICS AND FREQUENCY CURVE ADJUSTED FOR 0 HIGH OUTLIER(S)
AND 1 HISTORIC EVENT(S)

-SKEW WEIGHTING -

BASED ON 132 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = 0.116
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = 0.302

FINAL RESULTS

-FREQUENCY CURVE- 01-4765 RIDLEY CREEK AT MOYLAN, PA

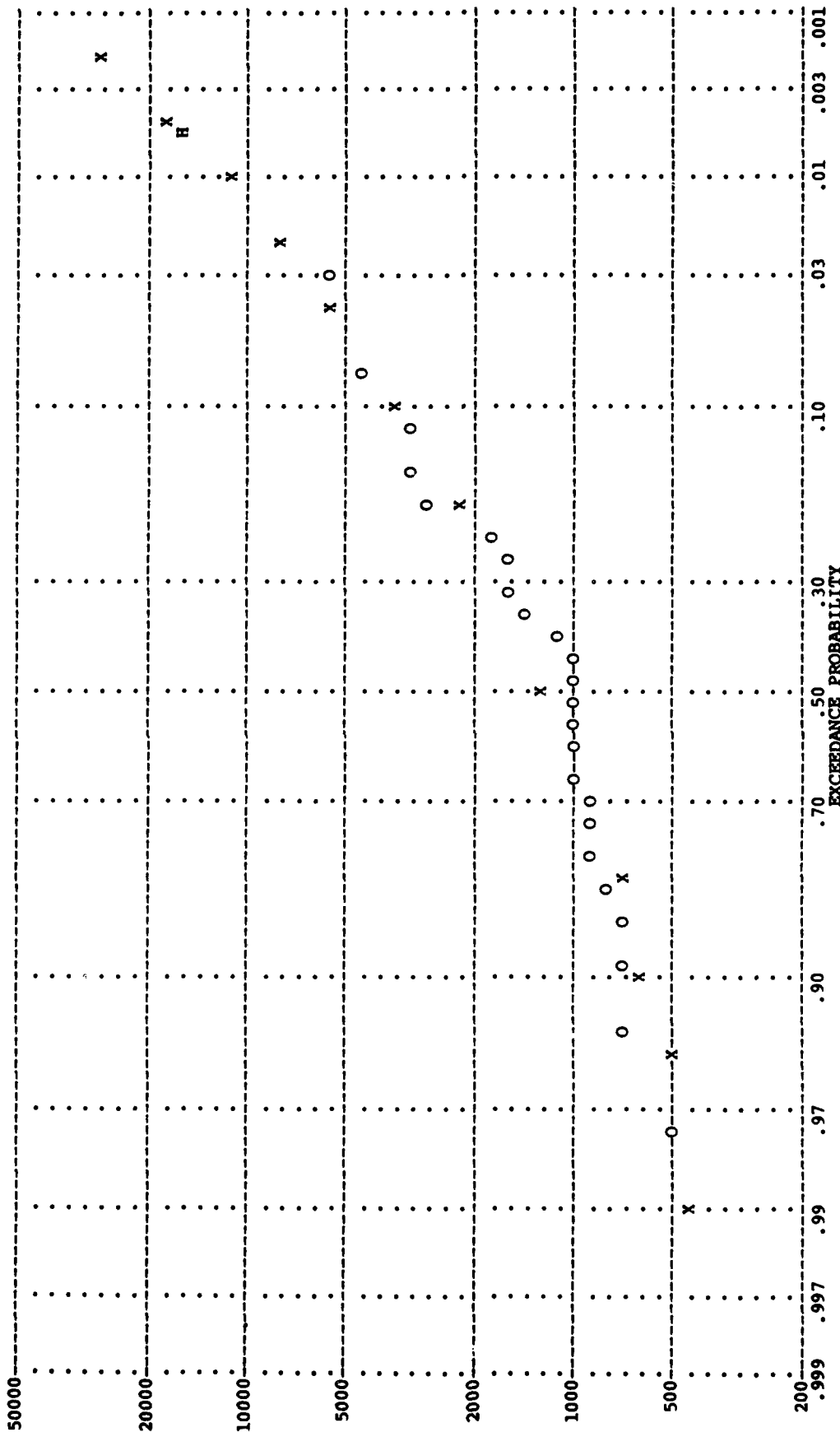
```
*****
*.....FLOW,CFS.....*          *...CONFIDENCE LIMITS...*
*          EXPECTED  * EXCEEDANCE *
*  COMPUTED PROBABILITY * PROBABILITY * 0.01 LIMIT 0.99 LIMIT *
*-----*-----*-----*-----*
*   17600.    29300.  *   0.002   *   72000.    8630.  *
*   12200.    17400.  *   0.005   *   41300.    6490.  *
*    9100.    11800.  *   0.010   *   26800.    5190.  *
*    6740.     8110.  *   0.020   *   17100.    4100.  *
*    4930.     5570.  *   0.040   *   10800.    3190.  *
*    3160.     3360.  *   0.100   *    5710.    2210.  *
*    2180.     2240.  *   0.200   *    3420.    1590.  *
*    1200.     1200.  *   0.500   *    1650.     847.  *
*     754.      744.  *   0.800   *    1040.     472.  *
*     623.      608.  *   0.900   *     876.     363.  *
*     545.      526.  *   0.950   *     780.     301.  *
*     446.      423.  *   0.990   *     659.     226.  *
*+++++*
*  FREQUENCY CURVE STATISTICS  *  STATISTICS BASED ON  *
*-----*-----*-----*
*  MEAN LOGARITHM      3.1200  *  HISTORIC EVENTS      1  *
*  STANDARD DEVIATION  0.2838  *  HIGH OUTLIERS        0  *
*  COMPUTED SKEW       1.0783  *  LOW OUTLIERS         0  *
*  GENERALIZED SKEW    0.4000  *  ZERO OR MISSING      0  *
*  ADOPTED SKEW        0.9000  *  SYSTEMATIC EVENTS    24  *
*                               *  HISTORIC PERIOD      132  *
*****
```

EXHIBIT 1
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FINAL RESULTS

-FREQUENCY PLOT - 01-4765 RIDLEY CREEK AT MOYLAN, PA DA=31.9 SQ MI
BASED ON EXPECTED PROBABILITY ADJUSTMENT, FLOW IN CUBIC FEET PER SECOND

1932-55



LEGEND - O=OBSERVED EVENT, H=HIGH OUTLIER OR HISTORIC EVENT, L=LOW OUTLIER, Z=ZERO OR MISSING X=COMPUTED CURVE

EXHIBIT 2

INPUT DESCRIPTION

Flood Flow Frequency Analysis

Computer Program 723-X6-L7550

This exhibit contains a detailed description of each variable on each input card. Many of the cards shown can be omitted if certain options are not required. The Summary of Input Cards at the end of this exhibit shows the sequential arrangement of cards and the location of variables on the cards.

The location of variables for each input card is shown by field number. The cards are normally divided into ten fields of eight columns each except field 1. Variables occurring in field 1 may only occupy card columns 3-8 since card columns 1 and 2 are reserved for the required identification characters. The different values a variable may assume and the conditions for each are described for each variable. Some variables are used simply to indicate whether or not a program option is to be used. The values for these variables are integer values and must be right justified (punched on the far right side of the field) without any decimal points. Other variables are assigned numbers which express the variable's magnitude. For these, either a "+" or a "±" sign where the value may also be negative, is shown in the description under "value" and the numerical value of the variable is entered as input. Where the variable value is to be zero, the variable may be left blank, since a blank field is read as zero and any number without a sign is considered positive. Unless noted otherwise, variable names beginning with the letters I, J, K, L, M or N represent integer variables and a decimal point must not appear in the field. All others are floating point variables and may either have a decimal point or be right justified. The location of variables on cards is sometimes referred to by an abbreviated designation, for example, J1.4 means the fourth field of the J1 card.

Those cards that are flagged with two asterisks are required cards and must be supplied for each job. Several jobs may be processed at the same time by stacking the respective data decks.

TT
J1

A. TITLE CARDS

*TT Card - Title Card

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1-10	--	Alpha	Alphanumeric information to identify the run. As many TT cards may be supplied as necessary to input the desired descriptive information.

B. JOB CARDS

*J1 Card - First Job Card

Job card which specifies program options. If omitted, default values in parentheses will be assigned. When this card is provided, the specified input options will be maintained for all succeeding stations until another J1 card is encountered.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1	IPPC (1)		Plotting positions in the program are computed by the general formula $(m-A)/(N+1-A-B)$ where:

m = order number

N = number of years

A,B = constants

The standard constants may be specified below.
If other constants are desired, they may be
specified on the J2 card.

0 or 1	Weibull plotting positions will be used for output and plotting (A and B equal 0.).
2	Median plotting positions will be used for output and plotting (A and B equal .3).
3	Hazen plotting positions will be used for output and plotting (A and B equal .5).
4	Plotting positions constants (A and B) will be read in on J2 card.

*Optional card

*J1 Card - First Job Card (continued)

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
2	ISKFX (1)	0 or 1	Adopted skew coefficient will be the weighted value computed in accordance with the WRC Guidelines and rounded to the nearest tenth.
		2	Adopted skew coefficient will be the weighted value computed as above, except it is not rounded.
		3	Adopted skew coefficient will be set equal to the input generalized skew coefficient which is read in on the GS card, i.e., <u>no</u> weighting with the station skew coefficient.
3	IPROUT (0)	+	The sum of the following output codes which suppress selected portions of the normal output. For example, a value of 63 would suppress all output except the printout of the frequency curve ordinates and corresponding statistics of the <u>final</u> results.
		0	No output suppressed.
		1	Suppress the printout of input data, arrayed data, and plotting positions of the <u>preliminary</u> results.
		2	Suppress the printout of the frequency curve ordinates and corresponding statistics of the <u>preliminary</u> results.
		4	Suppress the plot of the <u>preliminary</u> results.
		8	Suppress the printout of input data, arrayed data, and plotting positions of the <u>final</u> results.
		16	Suppress the plot based on computed flows from the <u>final</u> results.
		32	Suppress the plot based on the expected probability adjustment of the flows from the <u>final</u> results.
		64	Suppress the printout of the frequency curve ordinates and corresponding statistics of the <u>final</u> results. A value of 127 for IPROUT will suppress all station output except for the summary of results.

*Optional card

EXHIBIT 2
3 of 11

J1

*J1 Card - First Job Card (continued)

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
4	IFMT (1)	0 or 1	Flow data is in the format specified for QH or QR cards.
		2	Data is in the format of four 2-column fields for day, month, year and flow (note order of day and month).
		3	Format of data is specified by FT card for month, day, year and flow (note order of month and day).
		4	Format of data is specified by FT card for day, month, year and flow (note order of day and month).
5	IWYR (10)	0	Annual series data selected from the standard water year (October-September), IWYR will be set to 10.
		+	The order number of the first month in the water year, e.g., 1 for calendar year beginning in January, etc.
6	IUNIT (1)	0 or 1	Label for plot will be "CUBIC FEET PER SECOND."
		2	Label for plot will be "CUBIC METERS PER SECOND."
		3	Label for plot will be input on FU card.
7	ISMRY (0)	0	No summary will be printed.
		1	A summary of the final results will be printed for all of the stations in the run.
		2	A summary of the preliminary results will be printed.
		3	A summary of both the preliminary and the final results will be printed.

*Optional card

*J1 Card - First Job Card (continued)

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
8	IPNCH (0)	0	No station statistics will be punched.
		1	Station statistics will be punched for final results.
		2	Station statistics will be punched for the preliminary results.
		3	Station statistics will be punched for the preliminary and final results.

The punched data format is shown below:

	<u>Item</u>	<u>Card Column</u>
	SS - Record ID	1- 2
	Duration in days (zero or blank for instantaneous peaks)	3- 8
	USGS Part Number (if WATSTORE input or ISTN (QR.1))	9-10
	Station Identification Number (from WATSTORE input)	11-16
	Number of events in systematic record	17-20
	Historic record length, years	21-24
	Mean of logarithms	25-32
	Standard deviation of logarithms	33-40
	Adopted skew coefficient of logarithms	41-48
	Computed skew coefficient	49-56
	Generalized skew coefficient	57-64
	Number of historic events	65-68
	Number of high outliers	69-72
	Number of low outliers	73-76
	Number of zero or missing events	77-80
9	IREG (0)	This field is only needed when the input flow data is in WATSTORE format. Otherwise the field should be left blank.
		0 Delete all events with a <u>known</u> or <u>unknown</u> effect of regulation or diversion. All flow cards with a "1", "2", "5", or "6" in column 33 are deleted.
		1 Delete all events with a <u>known</u> effect of regulation or diversion. All flow cards with a "2" or a "6" in column 33 are deleted.
		2 Include all flow data, regardless of the code in column 33 of the flow card.

*Optional card

J2 FT FU

*J2 Card - Second Job Card

Job card which specifies nonstandard plotting position constants and criteria for confidence limits.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1	A	+	Plotting position constants A and B. Default values are those specified by IPPC (J1.1). IPPC must equal 4 to activate these input constants.
2	B	+	
3	CLIMIT (.05)	+	Confidence limit probability for either side. Default value of zero computes the .05 and the complimentary .95 confidence limits. The approximating equations become less accurate for small sample sizes as smaller values are specified, e.g., the .01 limit values are less accurate than .05 limit values for 10 years of data.

*FT Card - Flow Format

Provide this card if IFMT (J1.4) is 3 or 4.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1-10	IFRMT	Alpha	Format of data on cards. If IFMT is 3, the format specification must have fields for data in the following order: month, day, year, and flow, e.g., "(8X, 2I2, I4, F8.0)" is the standard program format. The parentheses <u>must</u> be included in the format specification. If IFMT is 4, the format specification must have fields for data in the following order: day, month, year, and flow, e.g., "(3I8, F8.0)" is the format of input data for the program in the WRC Guidelines. The parentheses <u>must</u> be included in the format specification.

*FU Card - Flow Units Label

Provide this card if IUNIT (J1.6) equals 3.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1-10	IUNT	Alpha	Alphanumeric label of input units for printer plot of frequency curve.

*Optional card

C. STATION DATA CARDS

*ID Card - Station Identification and Information

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1-10	ISTA	Alpha	Alphanumeric information such as station number, location, drainage area, period of record, etc. Although columns 2-8 may be used for station identification, only columns 3 through 48 are printed as a heading for each table. If this card is not provided, the brief station identification on the GS card (GS.1) will be used. If a GS card is not provided, the array is filled with blanks.

*GS Card - Generalized Skew

This card is used to specify the generalized (regional) skew coefficient which will be weighted with the station skew coefficient in accordance with the WRC Guidelines. If this card is not provided, the computed station skew coefficient, rounded to the nearest tenth if ISKFX(J1.2) is equal to 0 or 1, will be used in computing the frequency curve.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1	ISTN	Alpha	Brief alphanumeric identification of station, e.g., could be USGS station number, to assist in identifying card. If a ID card is not provided, the information in this field will be used to label the output.
2	GGMSE (0.302)	+	Mean squared error (MSE) of the generalized skew if Plate I, Bulletin 17b is not used. If left blank, a value of 0.302 will be used to correspond with Plate I.
3	SKEW	±	Generalized skew coefficient.

*Optional card

SI

*SI Card - Special Station Information

This card is used to input a historic period other than that represented by the flow data cards, to specify the number of high outliers in the systematic record, and to input a base peak discharge.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1	IYRA	+	The earliest year for defining a period during which the largest recorded events (see NOUTL, SI.3) or historic events (see QH cards) are known to be a maximum. If left blank, IYRA will be the first year found on either QH or QR cards.
2	IYRL	+	The last year of the period for which the historic information applies. If left blank, IYRL will be the last year found on either QH or QR cards.
3	NOULT (0)	+	Number of flood peaks <u>in the systematic record</u> (QR cards) that are considered to be the high outliers in the historic period IYRA to IYRL.
4	BASEPK	+	Magnitude of base flood peak. Any recorded event less than or equal to this value will be treated as a low outlier. Note that the program automatically applies the WRC procedures to identify and adjust for low outliers.

*Optional card

*QH Card - Historic Flood Peak

This card is used to input historic flood peaks that are to be weighted with the systematic record (QR cards). Care must be exercised in selecting historic peaks as those peaks in the systematic record that exceed the smallest historic peak will be treated as high outliers. Any peaks in the systematic record that are larger than the smallest input historic peak are automatically weighted along with the historic peaks. A nonstandard format and order of month and day may be used, see J1.4.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1	ISTN	Alpha	Brief alphanumeric identification of station e.g., could be USGS station number, to assist in identifying data.
2	IMO, IDAY IYR	+	The month number (columns 9 and 10), the day (columns 11 and 12) and the year (columns 13-16) of the flood flow peak. The month and/or day may be left blank. The year must be the calendar year of the event if the month is indicated; otherwise, the year must be the water year. (See J1.5 for establishing water year.)
3	QH	+	Historic annual flood peak. The program is dimensioned for up to 50 historic peaks.

*Optional card

QR ED

**QR Card - Systematic (Recorded) Flood Peak

This card is used to input recorded flood peaks. A period of years may be absent (broken record). The QR is not required in the first two columns. Two blanks or a G blank (Regional Frequency Computation program flow card) is treated as a QR card. A nonstandard format and order of month and day may be used, see IFMT (J1.4). Not required for WATSTORE input data.

<u>Field</u>	<u>Variable</u>	<u>Value</u>	<u>Description</u>
1	ISTN	Alpha	Brief alphanumeric identification of station, e.g., could be USGS station number, to assist in identifying data.
2	IM,IDY, IY	+	The month number (columns 9 and 10), the day (columns 11 and 12) and the year (columns 13-16) of the flood flow peak. The month and/or day may be left blank. The year must be the calendar year of the event if the month is indicated; otherwise, the year must be the water year. (See J1.5 for establishing water year.)
3	Q	+	Recorded annual flood peak. If flow was too low to record, enter -1, and the data will be analyzed by the incomplete record procedure. The number of QH cards plus QR cards is dimensioned for up to 130 values.

WATSTORE Format

The program can automatically process data that has been retrieved from the USGS WATSTORE Peak Flow File by program J980 in "input/update format" (an "H" in column 47 and an "U" in column 48 of the M card).

**ED Card - End of Data Card

The program reads flow data until it encounters a card that does not have an "QR", "G ", or two blanks in the first two columns; or encounters a completely blank card, or an ED. When any of these conditions occur, a new station is assumed unless there is no more data (end of file) in which case normal termination occurs. Not required for WATSTORE input data.

**Required card

SUMMARY OF INPUT CARDS

Flood Flow Frequency Analysis

Computer Program 723-X6-L7550

Data for another station may follow or 1 blank card causes a normal stop											
**ED	Not needed for WATSTORE input										
(2) **QR	ISTN	IM	IDY	IV	Q	or WATSTORE format					
(2) QH	ISTN	IMO	IDAY	IYR	QH						
SI	IYRA	IYRL	NOUTL	BASEPK							
GS	ISTN	GGMSE	SKEW								
ID	Station Identification										
FU	Flow units if other than cfs or m ³ /s										
FT	Nonstandard format for flood peak data										
J2	A	B	CLIMIT								
J1	IPPC	ISKFX	IPROUT	IFMT	IWYR	IUNIT	ISMRY	IPNCH	IREG		
(1) TT	Output title information, as many as necessary										

** Required cards, cards without two asterisks are optional.

- (1) The card codes, e.g., TT, J1, J2, etc., are required in columns 1 and 2, except for the QR card. For the QR card, two blanks or G blank are also acceptable.
- (2) Standard program format for flood peaks. Nonstandard formats possible, see IFMT (J1.4).