APPENDIX B
HYDROLOGY

The Southwest Division computer program, known as the SUPER model, was used to model the Wister Lake pool levels and outflow from the dam, as well as the flows at the Poteau and Panama control points. Operation of the Wister Lake project with a conservation pool at 478.0 feet could increase flooding (both around Wister Lake and downstream), runoff, and sedimentation. Therefore, the hydrological analysis focused on determining the frequency and duration of flood events for Wister Lake and the downstream area of the Poteau River.

The SUPER Model is a suite of computer programs that simulates a multi-purpose reservoir system. In the SUPER Model, a complex set of intervening area flows is developed for the river system for the entire period of record. For this study, the period of record for the Arkansas River system is 56 years—from January 1940 through December 1995. Headwater reservoir inflows and subsequent releases, based on set regulation criteria for all reservoirs and control points within the system, are then routed through the system on a daily basis and combined with intervening area flows at all control point locations. Reservoir releases are simulated for flood control, hydroelectric power generation, water supply requirements, and stream flow requirements such as water quality and irrigation. Additional regulating considerations within the model include channel capacities, bank stability, and most importantly, system flood control storage. The computer simulation assumes that all reservoirs are in place for the entire period of record and that each reservoir operates based on specified operational criteria.

The SUPER Model was used in this study to model Wister Lake and the Poteau River downstream of the lake to the confluence with the Arkansas River. Two runs were done for this study, one with the conservation pool at 478.0 feet and one with the conservation pool at 471.6 feet.

Two additional “modules” were run to develop hypothetical frequency discharges for both existing and modified conditions. The additional frequency points were calculated to provide better definition on the upper end of the discharge-frequency curve for extremely rare events. The SUPER Model performed numerous storm simulations using the maximum precipitation throughout the basin for both pool levels. For this study, hypothetical storms were developed at 67 storm center locations at 40 and 50 percent of the maximum precipitation. For two hypothetical storms, exceedance probabilities of 0.005 and 0.001 were assigned, based on the annual series and partial duration frequency plots of all control points when compared collectively. The exceedance probabilities were also verified by use of the binomial risk equation.

All outflow-duration plots are based on daily average flows, and all elevation-frequency and duration plots are based on end-of-the-day values. Period-of-record duration plots are provided to compare how the elevations and flows change over time for the two conservation pool levels. The following plots and tabular data are provided: elevation frequency and duration for Wister Lake; flow duration and maximum flow frequency for the Wister Lake outflow, Poteau, and Panama control points. These plots and tabular data provide a comparison between the two conservation pool levels (see Attachment B).

The SUPER Model performed a period of record simulation which encompassed several of the large storm events with the conservation pool at both 471.6 and 478.0 feet. The flow-frequency curves for Poteau and Panama are adjusted for peaks if specified on the plots and tabulations, through a separate process and are considered to be instantaneous discharges. All other flow-frequency data are based on daily average flows.

Several assumptions were entered into the model for consistency and simplification. The model assumed no leakage (in terms of cubic feet per second [cfs]) at the dam. For both pool elevations, the model used elevation-area-capacity data based on current sediment data (1985), and the bottom of the conservation pool was set at 468.8. Water supply demands for the 471.6 run reflect only Heavener and PVIA, both of which were under contract when the pool was at 471.6. Water supply demands for the 478 run reflect what is currently under contract, which includes Heavener, PVIA, and AES Shady Point.

Results

The hydrological analysis information was provided on the frequency and duration of potential effects. Potential impacts include an increase in flooding, pool fluctuations, and duration of flooding. High-water events behind the dam, which dictate discharges, are the most critical since they are directly related to downstream discharges. Inundation time for the affected area and potential for downstream flooding are also directly linked to discharge. Low-water events or drought conditions can affect water supply, however, USACE does not recall low lake levels affecting any of the facilities or operations of the dam at Wister Lake.

Wister Lake Hydrology Analysis

Runs of the SUPER Model were used to estimate peak Wister Lake outflows at control points for Wister Lake, Poteau, and Panama. Table B-1 shows a summary of the estimated discharges for three large storm events with the pool at 471.6 or 478.0 feet. At these most extreme events, “bankfull” discharges (or those considered flooding) would occur at the Wister outflow with the pool elevation at 478.0 feet during the 1984 storm and at both 471.6 and 478.0 feet for the 1990 storm. The same hydrologic events were modeled with the Wister pool raised to 478.0 feet. Table B-2 compares USACE observed Wister

elevation data with model estimations for three flood events. Even with the associated discharges shown in Table B-1 for the three storm events, the Wister pool elevation does not exceed 508.2 feet, and there is little difference in elevation between the pool plans at 471.6 and 478.0 feet.

Table B-1 Peak Discharge Estimation

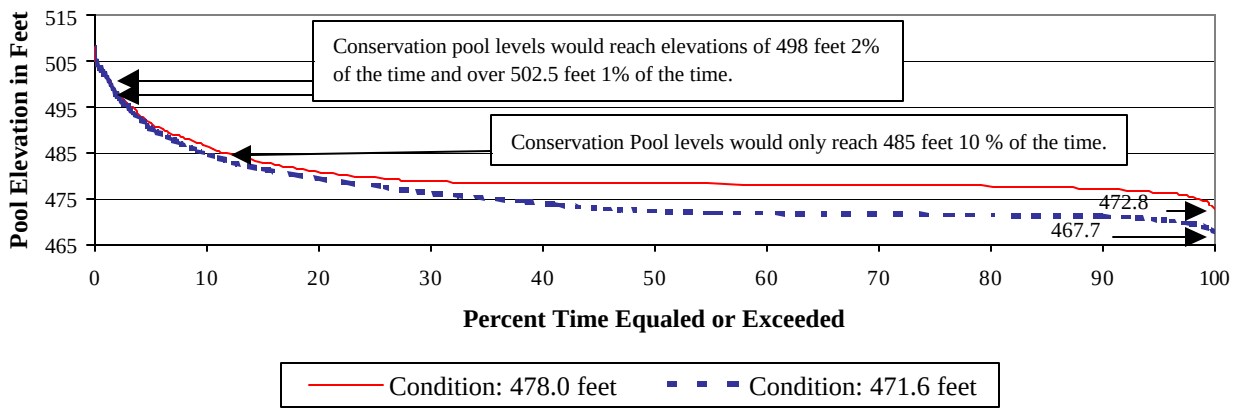
Lake Outflow		
Date	***471.6 feet***	***478.0 feet***
May 4, 1990	21,580.4 cfs	22,839.1 cfs
November 3, 1984	5,655.6 cfs	6,982.5 cfs
May 27, 1957	4,077 cfs	4,297.9 cfs
Modeled bankfull flow	6,600 cfs	
Poteau		
Date	***471.6 feet***	***478.0 feet***
May 4, 1990	34,223.7 cfs	34,951.7 cfs
November 3, 1984	9,267.1 cfs	10,586.6 cfs
May 27, 1957	9,862.8 cfs (*May 25*)	9,998.8 cfs (*May 25*)
Modeled bankfull flow	7,200 cfs	
Panama		
Date	***471.6 feet***	***478.0 feet***
May 4, 1990	34,223.7 cfs	34,951.7 cfs
November 3, 1984	9,267.1 cfs	10,586.6 cfs
May 27, 1957	9,862.8 cfs (*May 25*)	9,998.8 cfs (*May 25*)
Modeled bankfull flow	10,000 cfs	

Table B-2 Wister Pool Peak Elevation

Date	*Top of Conservation Level*	*USACE Monthly Charts (observed)*	*SUPER Model Estimation 471.6 feet*	*SUPER Model Estimation 478.0 feet*
May 4, 1990	474.6	508.22	508.01	508.11
November 3, 1984	474.6	504.94	504.43	504.79
May 27, 1957	471.6	505.73	504.01	504.09

The analyses also determined the duration and frequency of discharges and lake levels potentially occurring within the affected environment for the two conservation pool elevations. Comparison of the two pool levels provides information on effects of raising the pool from 471.6 to 478.0 feet, and on the frequency and duration of outflows or releases with the pool levels at both 471.6 and 478.0 feet. Comparative plots and summary tables were made from the output files of the SUPER Model run and are discussed below.

Figure B-1 Maximum Pool Elevation Duration at Wister Lake



The comparative plot in Figure B-1 shows that, with the conservation pool at 478.0 feet, there is no increase in the time during which pool level would reach or exceed the 502.5-foot elevation. Table B-3 shows a comparison of the amount of time the pool conservation levels would be within certain elevations. In fact, both pool levels show little difference in the percentage of time equaled or exceeded at elevations above 490.0 feet. In addition, the table shows that, for the majority of time, the pool level is within 471.6 to 485.0 feet for both alternatives. The minimum and maximum pool elevations for 471.6 and 478.0 feet are 467.7 and 508 feet and 472.8 and 508.1 feet, respectively (Figure B-1).

Table B-3 Percent of Time Pool Elevation is equaled or exceeded

Water Surface Elevation (WSE)		*WSE*	*478.0 Feet**	*471.6 Feet**
	>	471.6	0%	15%
471.6	To	478.0	35%	67%
478.0	To	485.0	63%	15%
485.0	To	496.0	10%	7%
496.0	To	502.5	1%	1%
502.5	To	511.0	1%	1%

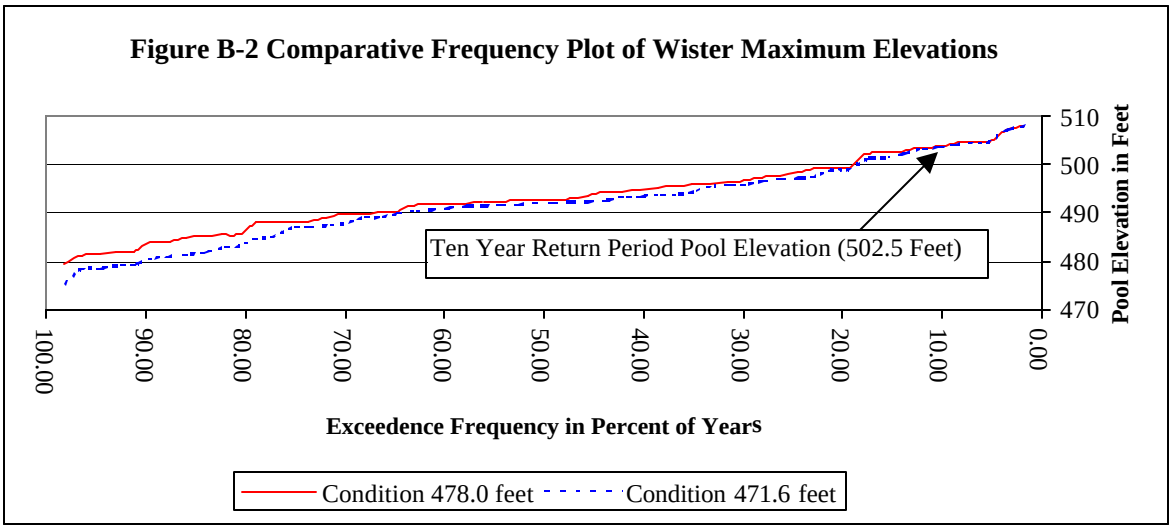
*Values represent the percentage of time pool elevation is equaled or exceeded.

Frequency and recurrence interval analysis was conducted by two methods, a Weibull Plotting and Log Pearson 3 methods. The Weibull plotting method is used for frequency or recurrence interval analysis and does not employ a curve fitting technique. The Log Pearson 3 method is a curve fitting technique know to fit many different shapes of observed sample frequency distributions. This method is best known for its ability to fit flood flow frequency. A Weilbull Plot is limited to recurrence intervals up to the number of years in the period of record, while the Log Pearson 3 method may extrapolate for additional time periods. Annual series peak pool elevation data was used in both methods. Both methods show similar return periods for reaching the spillway elevation of 502.5 feet (Table B-4). The Weibull method

shows a recurrence interval, for 502.5 feet, of 7 years with the top of conservation pool at 471.6 feet, and 6 years for the 478.0 feet conditions. The comparative frequency plot of Wister maximum elevations (Figure B-2 and Table B-4) shows a pool elevation of 502.5 has a 16 percent annual exceedance probability or chance of occurring, in any given year with a conservation pool set at 478.0 feet. Figure B-2 also shows a 14 percent annual exceedance probability of 502.5 feet when the conservation pool elevation is set at 471.6. This result indicates little change in the pool elevation frequency. The Log Pearson 3 method indicates identical pool elevations for the 5, 25, 100, 200, and 500-year return period at both conservation pool elevations. The highest recorded pool elevation of 508.22 correlates to the modeled 100-year pool elevation of 511.0. Historical records indicate that the 502.5-foot elevation has only been exceeded three times in the 56 years of record.

Table B-4 Annual Series Peak Pool Elevations

	Weibull Plot Method			***Log Pearson 3 Method***		
	Peak Pool Elevation	*Annual Exceedance Probability*	*Recurrence Interval*	*Peak Pool Elevation*	*Probability*	*Return Period*
Top of Conservation Pool Elevation 478.00 Feet	503	0.16	6	493	0.5	2
	498	0.25	4	499	0.2	5
	495	0.40	2	503	0.1	10
				506	0.04	25
				509	0.02	50
				511	0.01	100
				513	0.005	200
				515	0.002	500
Top of Conservation Pool Elevation 471.6 Feet	502	0.14	7	492	0.5	2
	498	0.23	4	499	0.2	5
	495	0.33	3	502	0.1	10
				506	0.04	25
				508	0.02	50
				511	0.01	100
				513	0.005	200
				515	0.002	500



For the economic impact analysis below Wister Lake, the Poteau River was broken into two reaches. The first reach was from the Wister Lake outflow to the confluence with Brazil Creek (just upstream of the Panama gauge). The second was from the confluence of Brazil Creek to the confluence of the Arkansas River near Forth Smith, Arkansas. For the hydrologic analysis, Wister outflow from the dam to Poteau gage, and then the Poteau flows in the reach down to Panama, and then the Panama flows to the outlet of the Poteau River were used. Threshold values at which the Poteau River is considered to be flowing "out of banks" or flooding were determined for each of the reaches. A threshold value of 7,200 cfs was applied to the reach below Wister outflow to the confluence of Brazil Creek. A flow of 11,496 or greater is the threshold value, or considered to be flooding, from Brazil creek to the confluence with the Arkansas River.

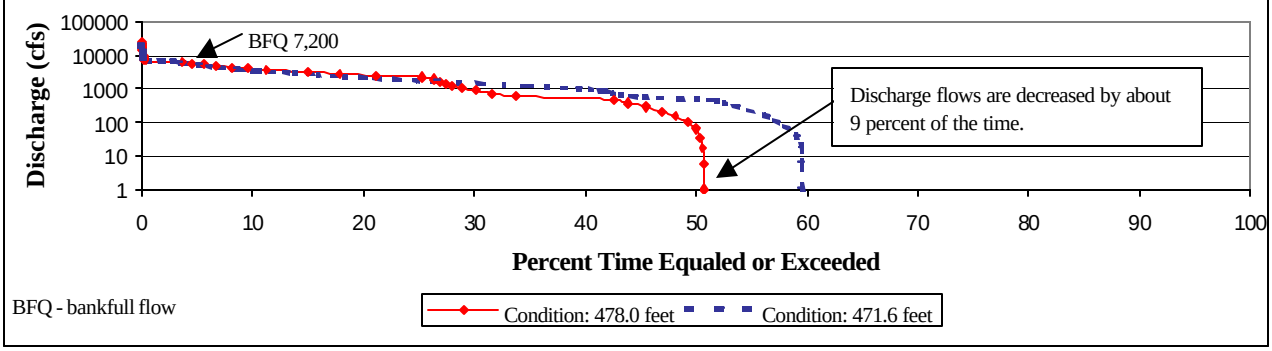
Weibull Plotting and Log Pearson 3 frequency analysis were conducted on the Annual Series Peak Flow data for the Wister Outflow, Poteau and Panama control points.

Down Stream Hydrology Analysis: Wister to the Confluence of Brazil Creek

The Wister Lake Outflow was modeled to show the maximum releases for both alternatives (Figure B-3). For the purpose of simplifying the model, the seepage through the dam was indicated to be 0 cfs. However flows ranging from 12 to 20 cfs are common seepage losses through the gate structure and seals.

The applied bankfull flow for the reach from Wister Lake outflow to the confluence of Brazil Creek is 7,200 cfs as described in section 3.2-1. However, 7,200 cfs has not been published as an official flooding flow for this reach, thus the SUPER model has applied 6,600 cfs for this section.

Figure B-3 Annual Flow Duration at Wister Outflow



BFQ - bankfull flow

*Modeled regulating flow = 6,600 cfs
Current regulating outflow = 7,200 cfs

Annual series peak flow data indicate that Wister outflow discharges are frequently reaching 6,600 cfs when both pool elevations are modeled. The Weibull plotting method indicates a flow of 6,600 cfs for the 2, 5, and 10-year flow event. Discharges significantly greater than 6,600 cfs are uncommon at the Wister outflow, according to the Weibull method (Table B-5). In this case, the Log Pearson method more accurately describes the larger events, due to the ability of the USACE to regulate discharges for average storm events having 25 and 100-year return periods. Discharges equaling or exceeding 7,200 cfs would occur only 0.2 percent of the time at both 471.6 feet and 478.0 feet conditions (Figure B-3). Wister discharge is reduced approximately 9 percent of the time with the top of conservation pool elevation at 478.0. The percent of time with discharges above 1,000 cfs is very similar at both conservation pool elevations (Figure B-3). A maximum discharge of 13,800 cfs from the Wister outflow had an occurrence of 0.1 percent for both pool levels. This indicates the change in the conservation pool elevation from 471.6 to 478.0 does not change the potential for flooding along the Poteau River from the Wister outflow to the confluence with Brazil Creek.

Table B-5 Wister Outflow Annual Series Data

	Weibull Method			***Log Pearson 3 Method***		
	Peak Flow	*Annual Exceedance Probability*	*Recurrence Interval*	*Peak Flow*	*Probability*	*Return Period*
Top of Conservation Pool Elevation 478.00 Feet	6,600	0.49	2	5,733	0.5	2
	6,600	0.19	5	7,766	0.2	5
	6,600	0.11	10	9,414	0.1	10
	17,662	0.04	25	11,882	0.04	25
	22,839	0.02	57	14,033	0.02	50
				16,483	0.01	100
				19,282	0.005	200
				23,618	0.002	500
Top of Conservation Pool Elevation 471.6 Feet	6,600	0.49	2	5,708	0.5	2
	6,600	0.21	5	8,100	0.2	5
	6,600	0.11	10	9,593	0.1	10
	17,678	0.04	25	11,307	0.04	25
	21,581	0.02	57	12,620	0.02	50
				13,811	0.01	100
				14,955	0.005	200
				16,409	0.002	500

Down Stream Hydrology Analysis: Confluence of Brazil Creek to the Confluence of the Arkansas River

Annual series peak flow data for the lower reach of the Poteau River was analyzed at Poteau and Panama control points (Figure B-4 and Table B-6). A flow of 11,496 or greater is considered to be flooding. A significant amount of flow is contributed to this reach from uncontrolled tributaries. Weibull analysis indicates bankfull discharge for this reach has a recurrence interval of approximately 2 years for both conservation pool elevations. The Log Pearson 3 method yielded nearly identical peak flows and return periods for both conservation pool elevations. This indicates flows in the lower reach of the Poteau are not significantly effected by the 1996 conservation pool level increase to 478.0 feet.

Table B-6 Poteau Annual Series Data						
	Weibull Method			***Log Pearson 3 Method***		
	Peak Flow	*Annual Exceedance Probability*	*Recurrence interval*	*Peak Flow*	*Probability*	*Return Period*
Top of Conservation Pool Elevation 478.00 Feet	8,710	0.49	2	8,815	0.5	2
	14,534	0.21	5	14,421	0.2	5
	21,903	0.11	10	19,144	0.1	10
	26,043	0.04	25	26,427	0.04	25
	41,136	0.02	57	32,921	0.02	50
				40,430	0.01	100
				49,121	0.005	200
				62,735	0.002	500
Top of Conservation Pool Elevation 471.6 Feet	8,710	0.49	2	8,714	0.5	2
	14,534	0.21	5	14,576	0.2	5
	21,903	0.11	10	19,196	0.1	10
	36,043	0.04	25	25,864	0.04	25
	40,408	0.02	57	31,437	0.02	50
				37,533	0.01	100
				44,206	0.005	200
				54,003	0.002	500

Conclusions

The Super Model as well as the Weibull Plotting and Log Pearson 3 methods provided the following information on pool levels and frequency of discharges:

1. In a comparison of the modeled pool elevations at the 471.6 feet and the 478.0 feet conditions insignificant increases in frequency and duration occurs for the 2-500 year return period pool elevations.

2. For the period of record examined, through several major storm events Wister Lake pool did not exceed elevation 508.0 feet for the two pool levels.

3. There is minimal difference in the occurrence of pool elevations above 485.0 feet at Wister Lake for either pool level. The most frequent pool elevation is from 471.6 to 478.0 with the conservation pool at 471.6 and from 478.0 to 485.0 with a conservation pool at 478.0 feet.

4. Wister outflow peak discharges will frequently be at or near bankfull flow but only exceeded in extreme events.

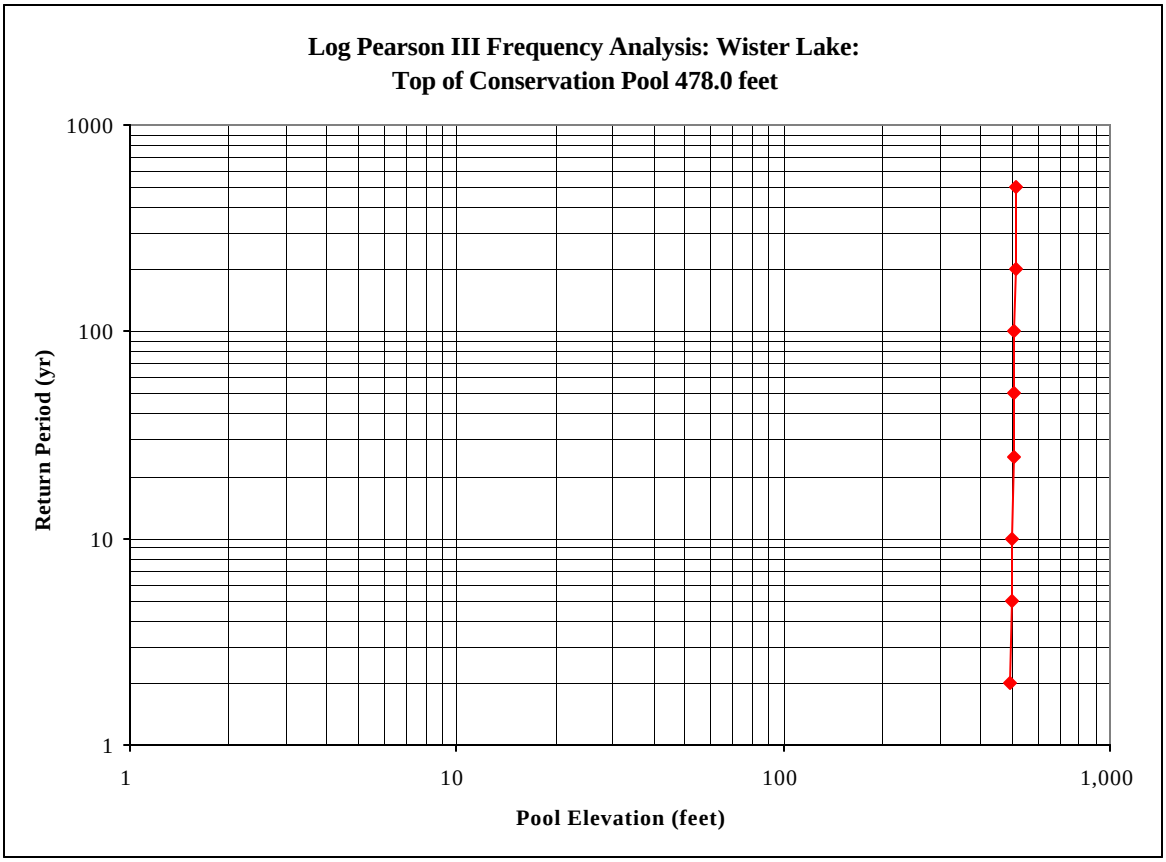
5. The 6.4-foot increase in the Wister Lake conservation pool elevations has a minimal effect on flows in the lower reaches.

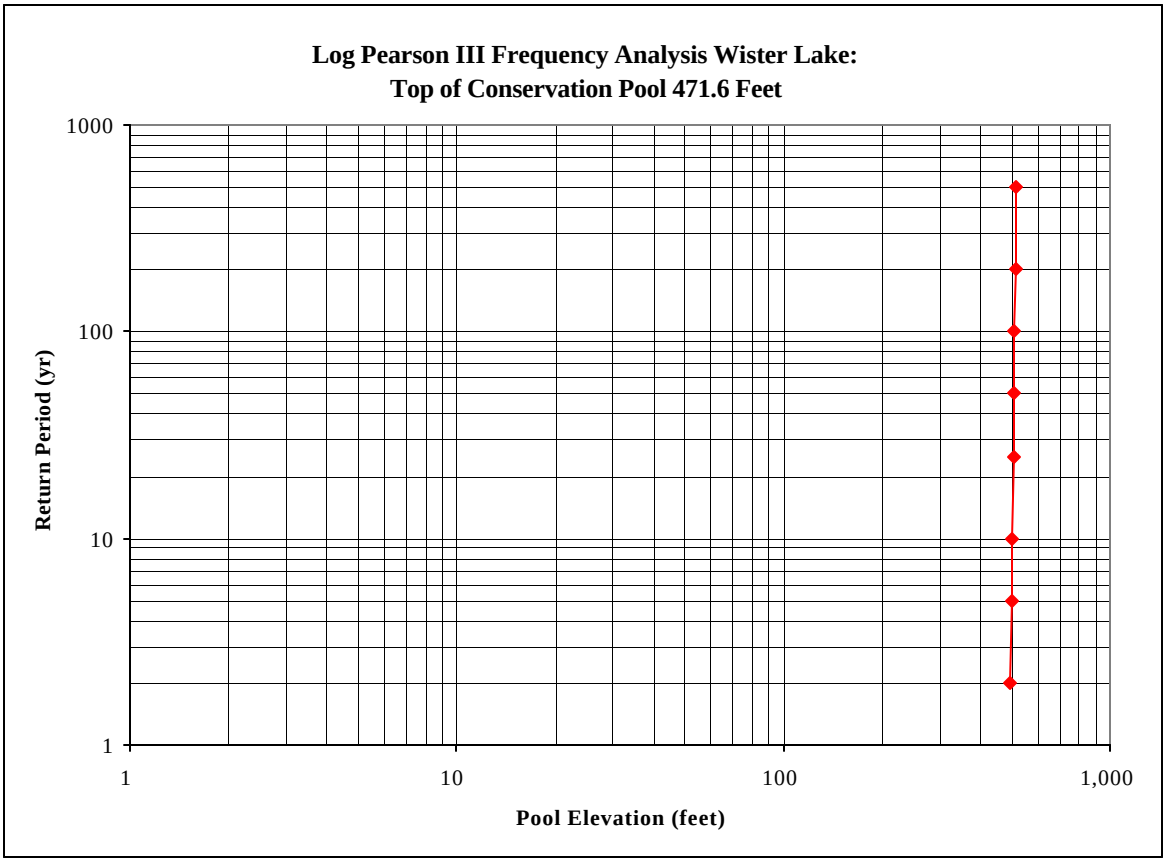
Attachments

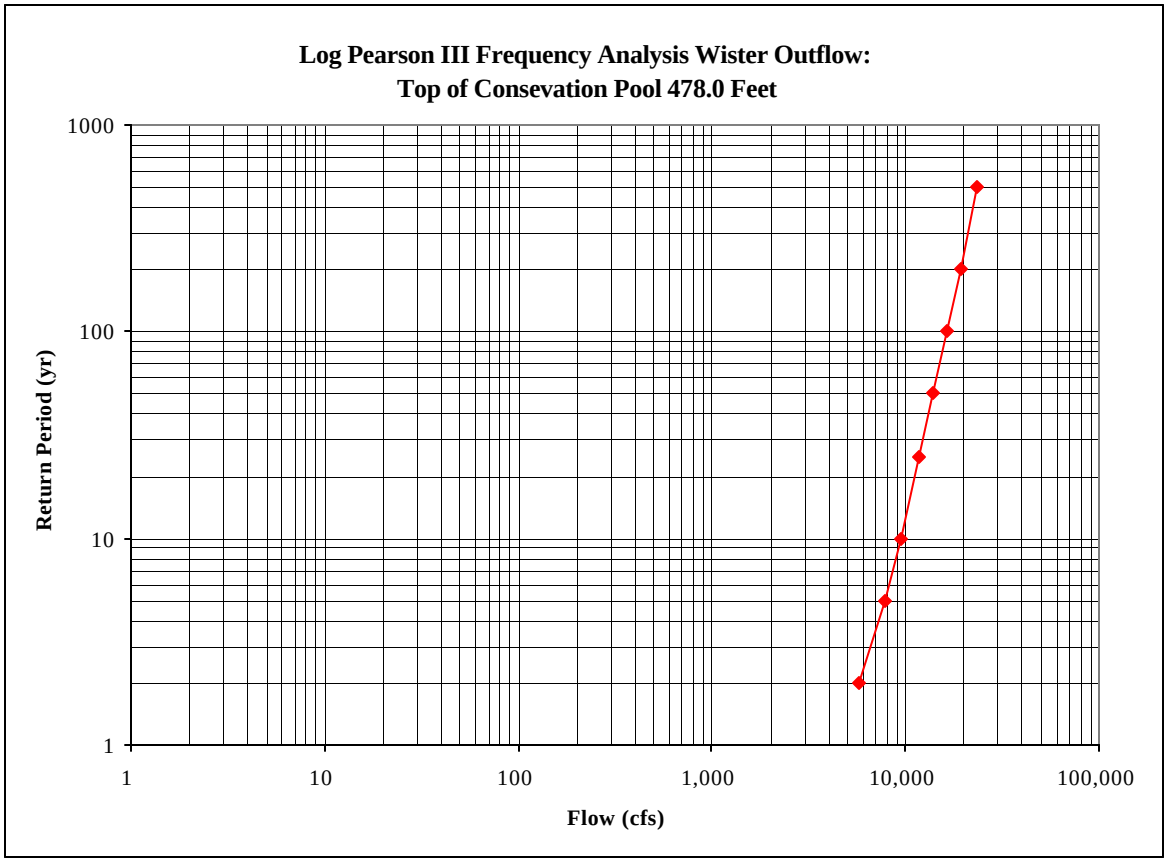
Attachment A is the Log Pearson 3 frequency analysis plots for Wister Lake pool elevation as well as discharges for the Wister outflow, Poteau, and Panama control points.

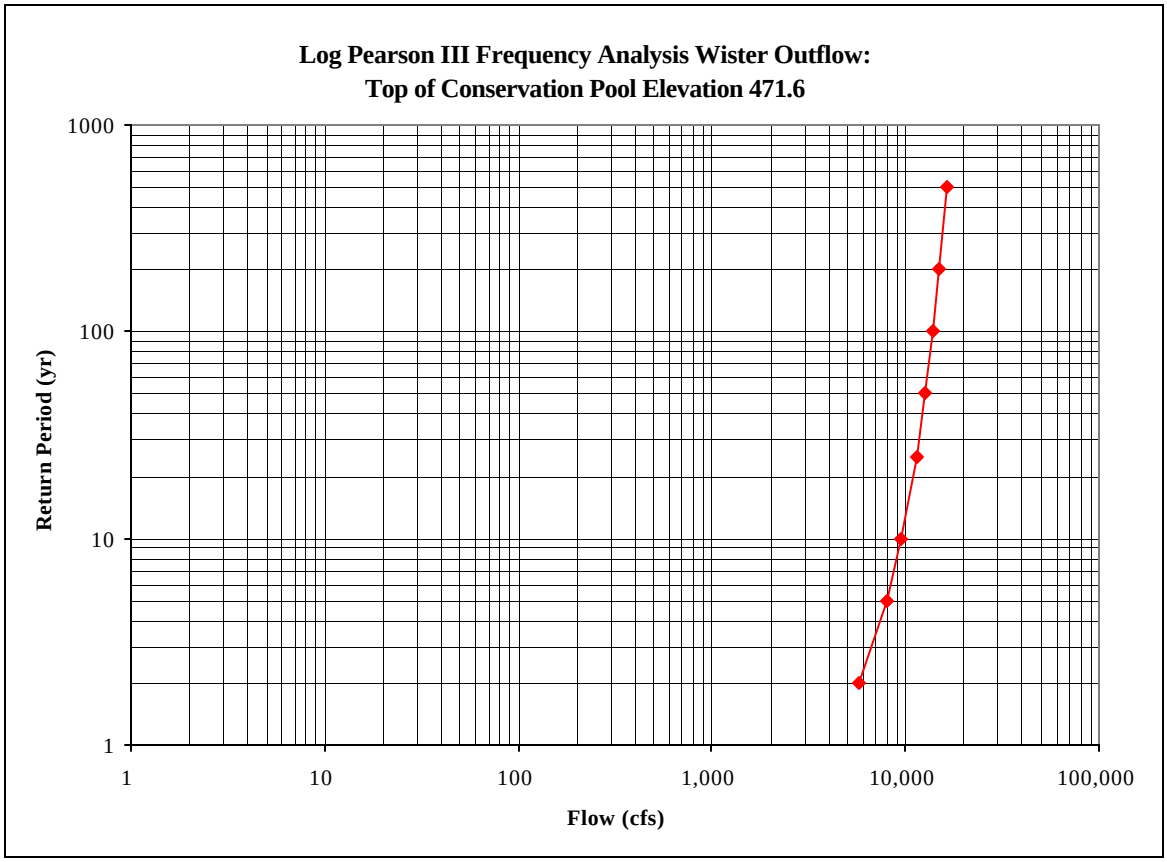
Attachment B is the SUPER model output data files provided by USACE.

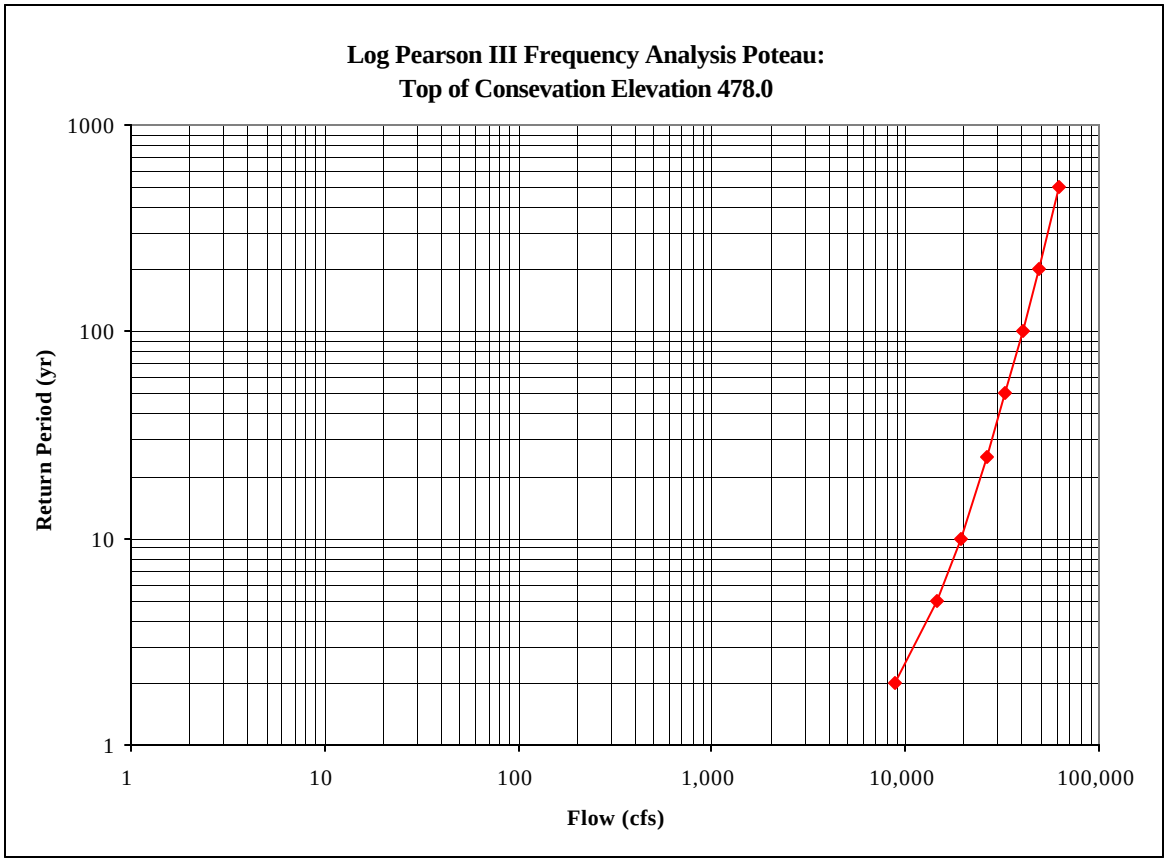
ATTACHMENT A

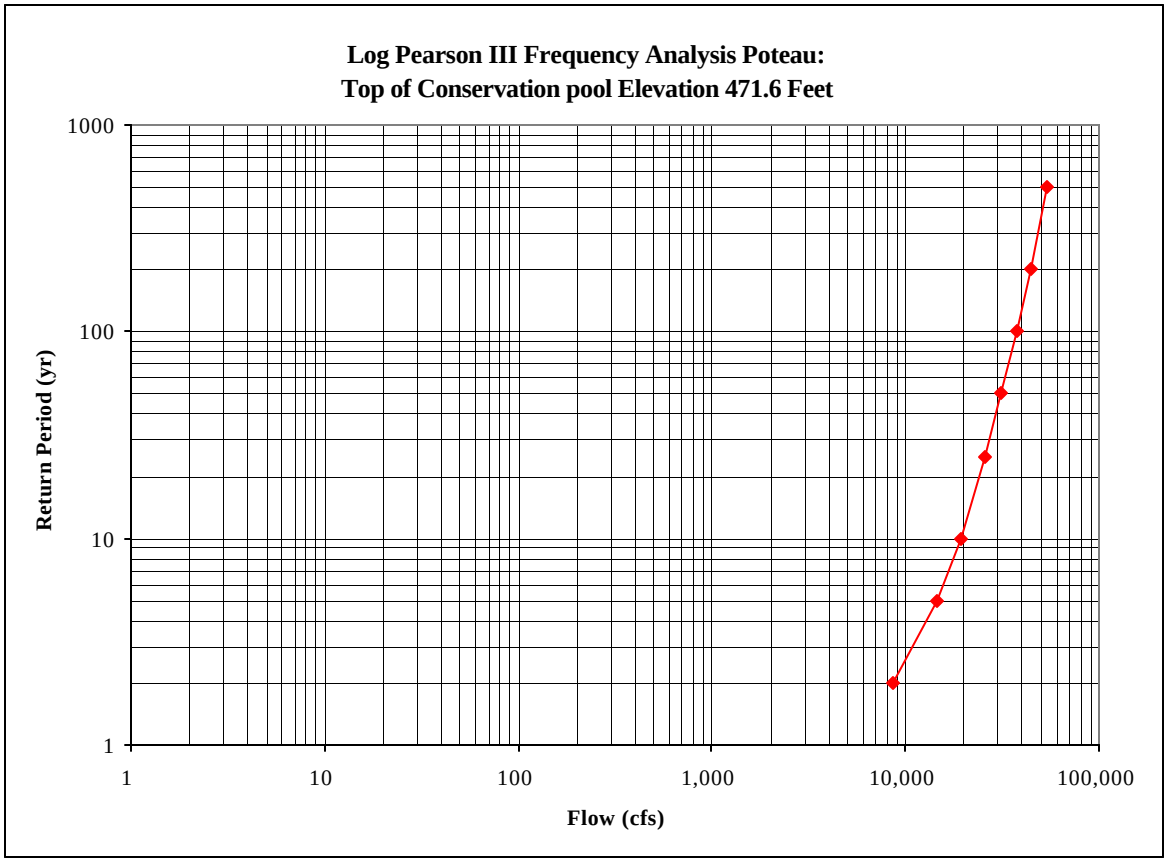

Log Pearson III Frequency Analysis: Wister Lake:
Top of Conservation Pool 478.0 feet
1000
100
10
1
Return Period (yr)
1
10
100
1,000
Pool Elevation (feet)

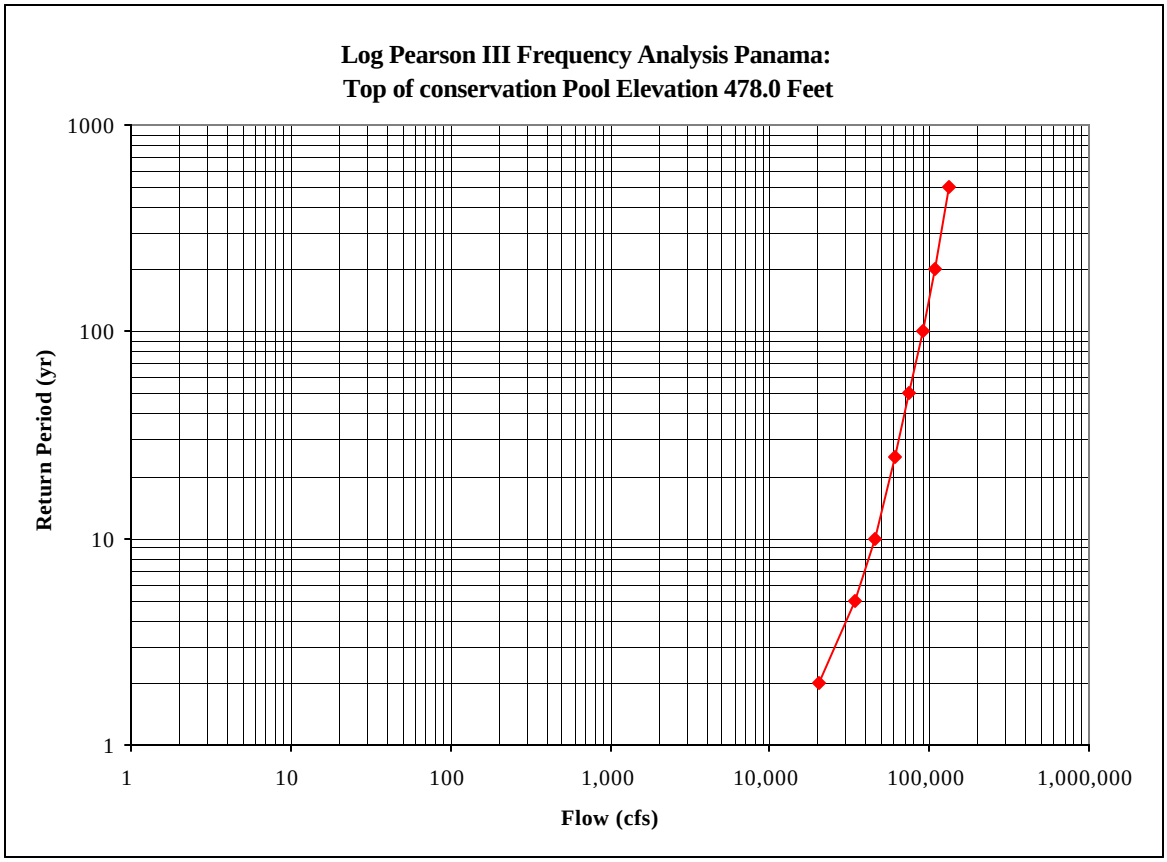

Log Pearson III Frequency Analysis Wister Lake:
Top of Conservation Pool 471.6 Feet
1000
100
10
1
Return Period (yr)
1
10
100
1,000
Pool Elevation (feet)

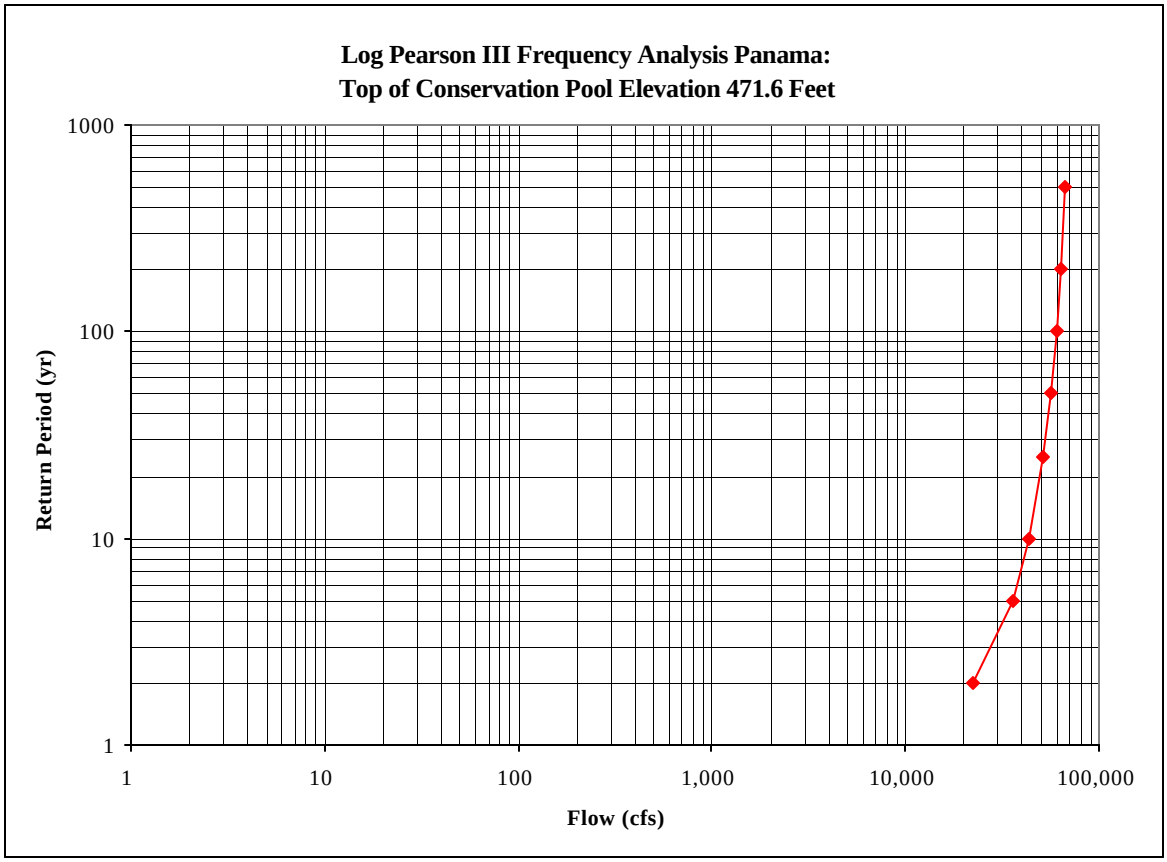

Log Pearson III Frequency Analysis Wister Outflow:
Top of Consevation Pool 478.0 Feet
Return Period (yr)
1000
100
10
1
1
10
100
1,000
10,000
100,000
Flow (cfs)


Log Pearson III Frequency Analysis Wister Outflow:
Top of Conservation Pool Elevation 471.6
Return Period (yr)
1000
100
10
1
1
10
100
1,000
10,000
100,000
Flow (cfs)

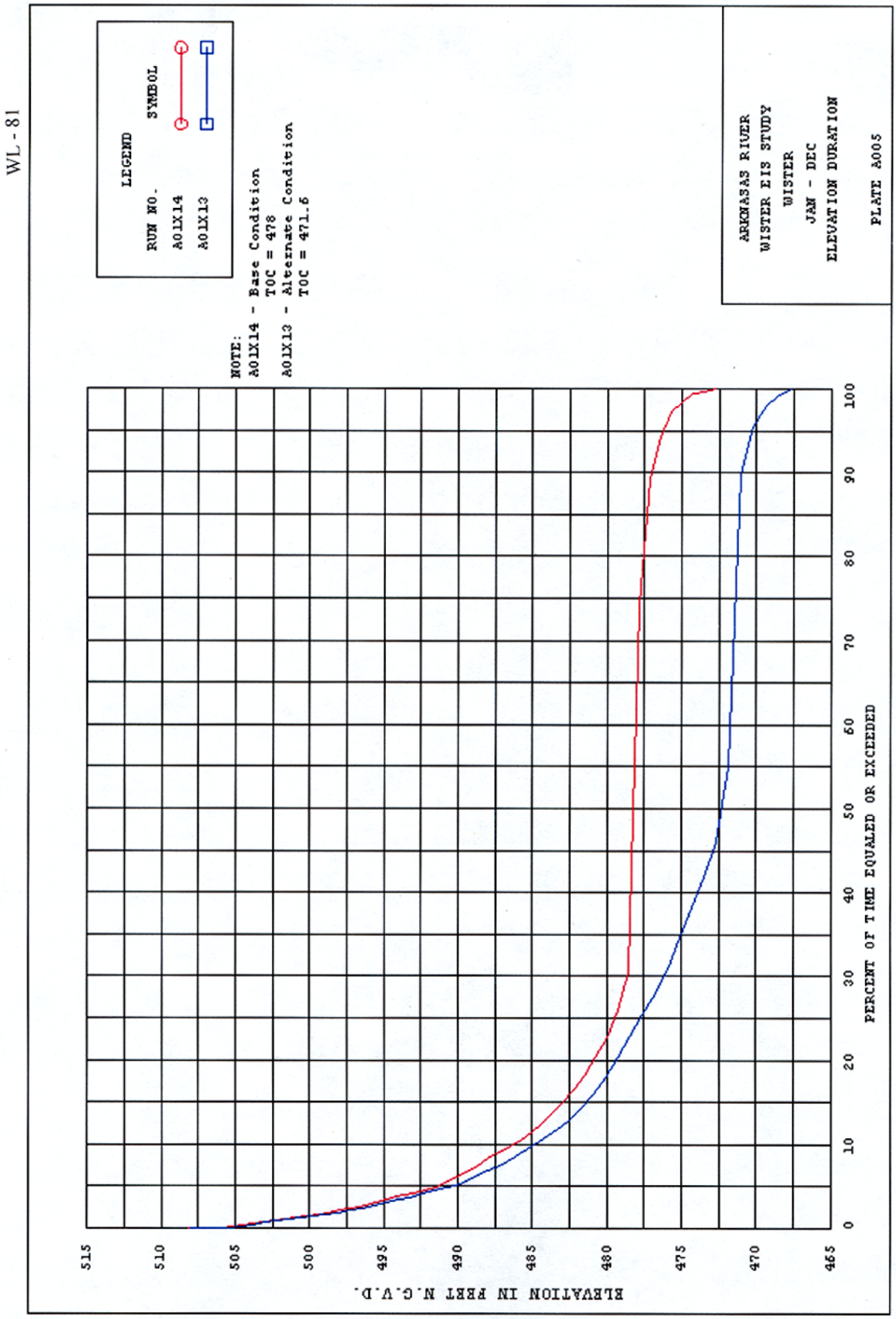

Log Pearson III Frequency Analysis Poteau:
Top of Consevation Elevation 478.0
1000
100
10
1
Return Period (yr)
1
10
100
1,000
10,000
100,000
Flow (cfs)

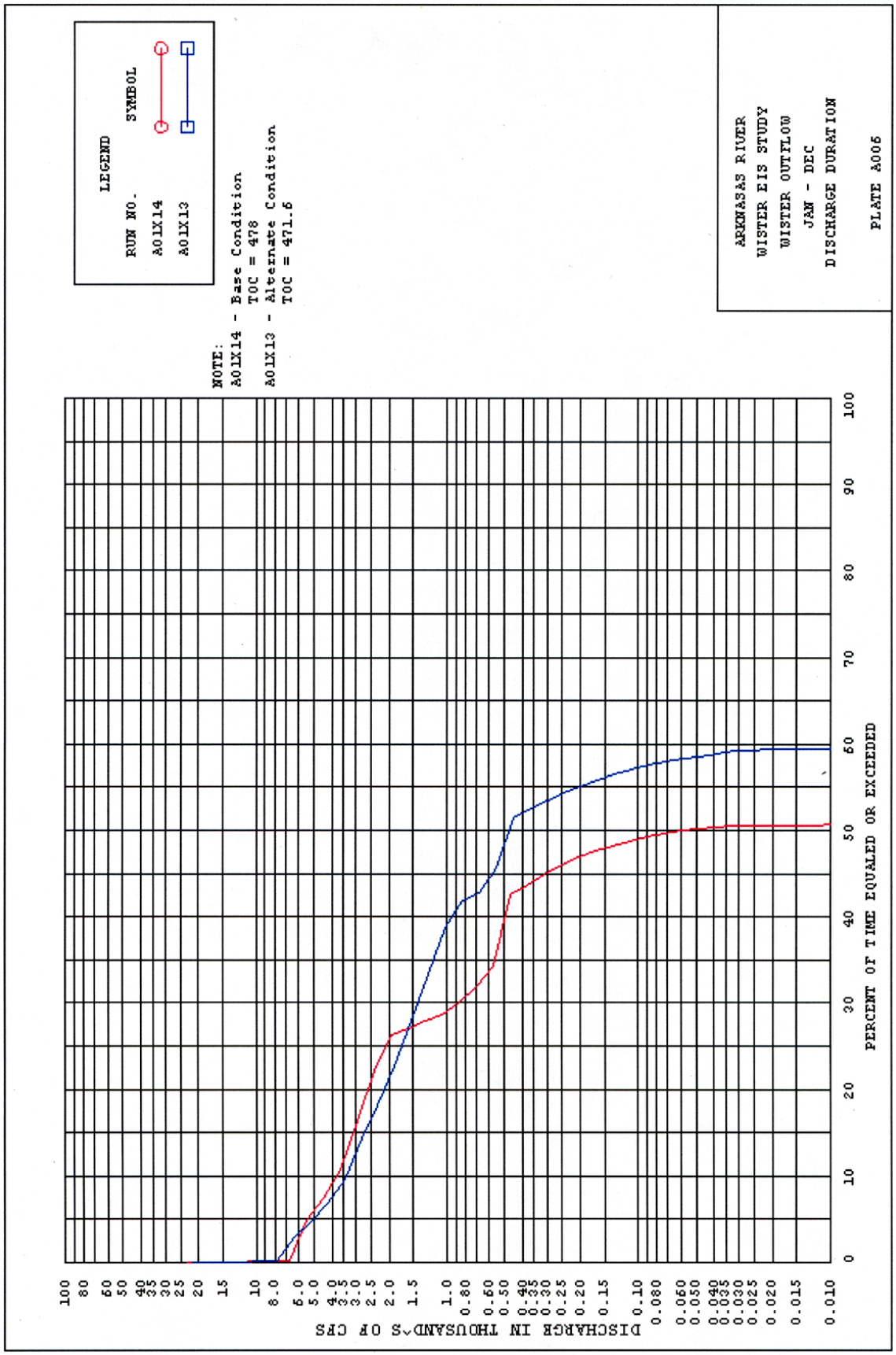

Log Pearson III Frequency Analysis Poteau:
Top of Conservation pool Elevation 471.6 Feet
1000
100
10
1
Return Period (yr)
1
10
100
1,000
10,000
100,000
Flow (cfs)

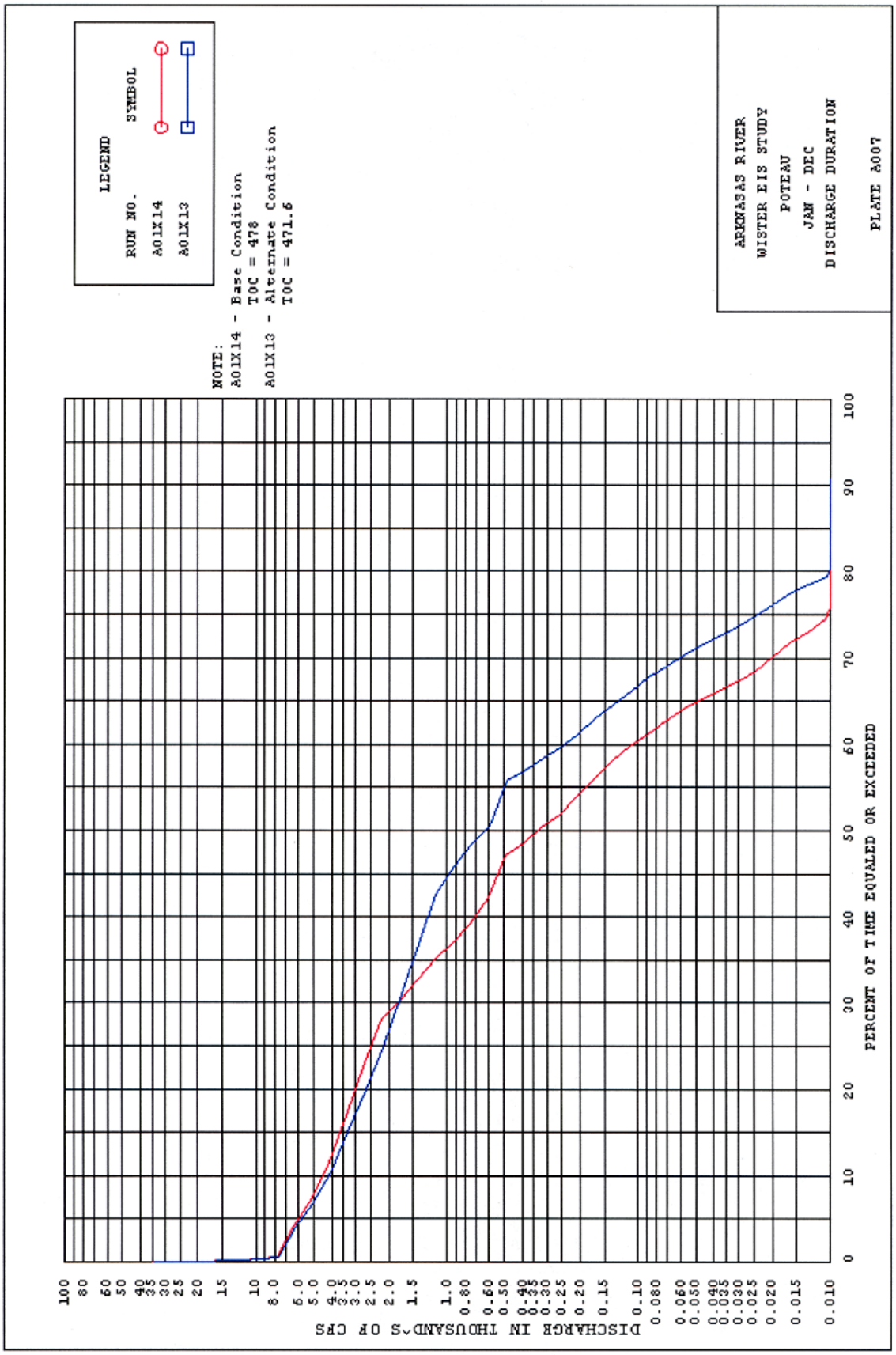

Log Pearson III Frequency Analysis Panama:
Top of conservation Pool Elevation 478.0 Feet
Return Period (yr)
1000
100
10
1
1
10
100
1,000
10,000
100,000
1,000,000
Flow (cfs)

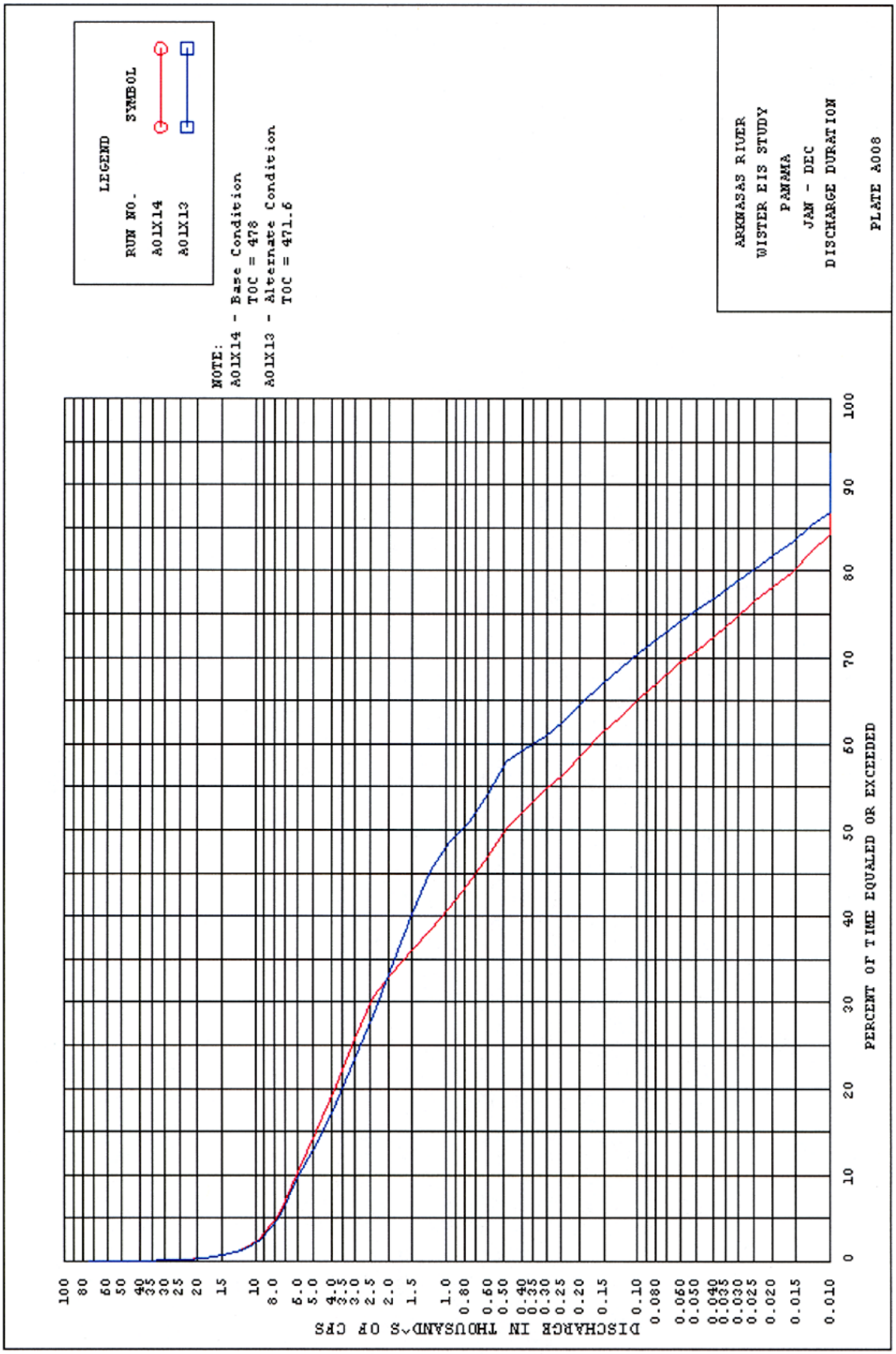

Log Pearson III Frequency Analysis Panama:
Top of Conservation Pool Elevation 471.6 Feet
Return Period (yr)
1000
100
10
1
1
10
100
1,000
10,000
100,000
Flow (cfs)

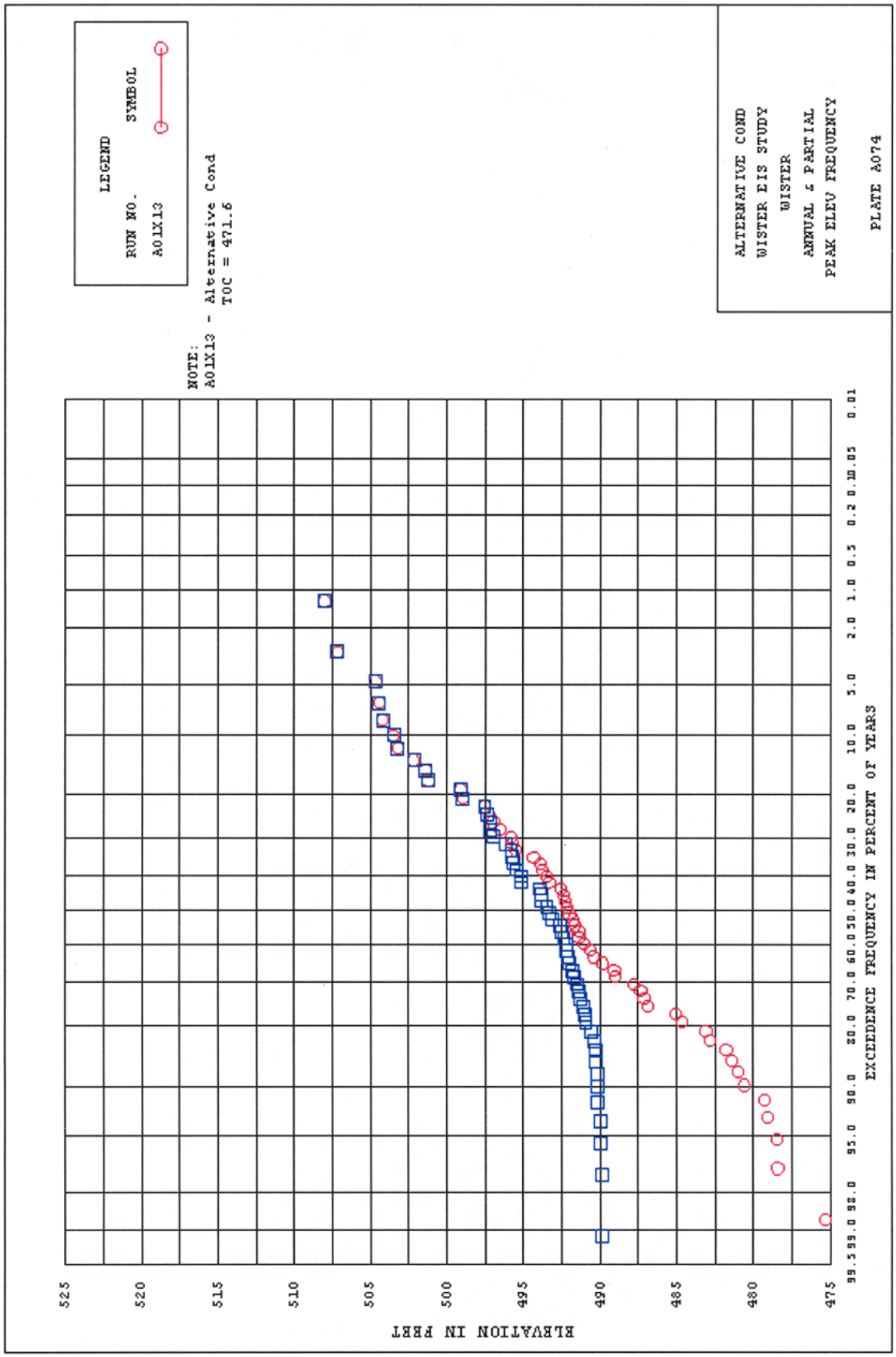
ATTACHMENT B

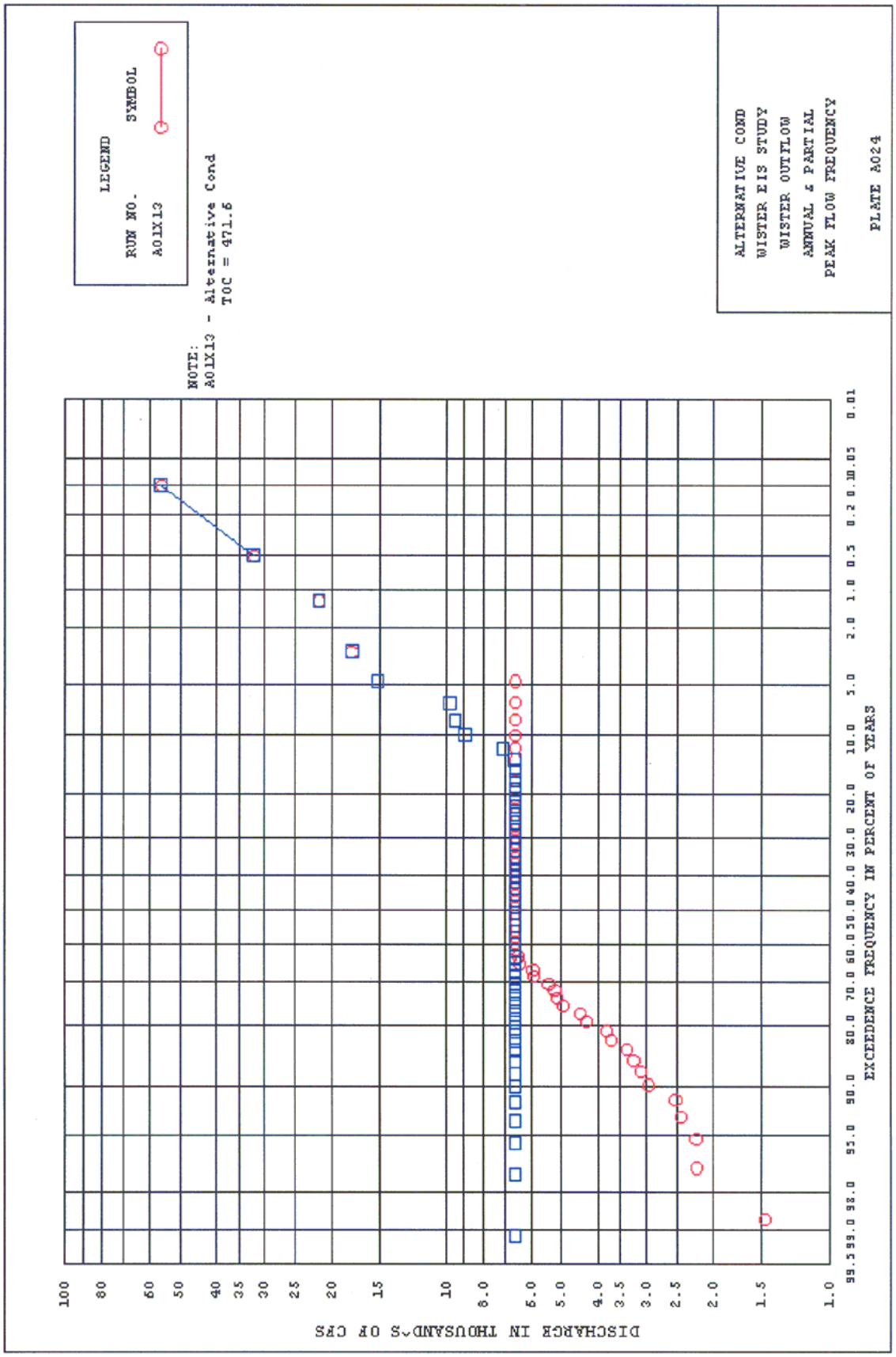

WL - 81
LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
WISTER
JAN - DEC
ELEVATION DURATION
PLATE A005
ELEVATION IN FEET N.G.V.D.
515
510
505
500
495
490
485
480
475
470
465
PERCENT OF TIME EQUALED OR EXCEEDED
0
10
20
30
40
50
60
70
80
90
100

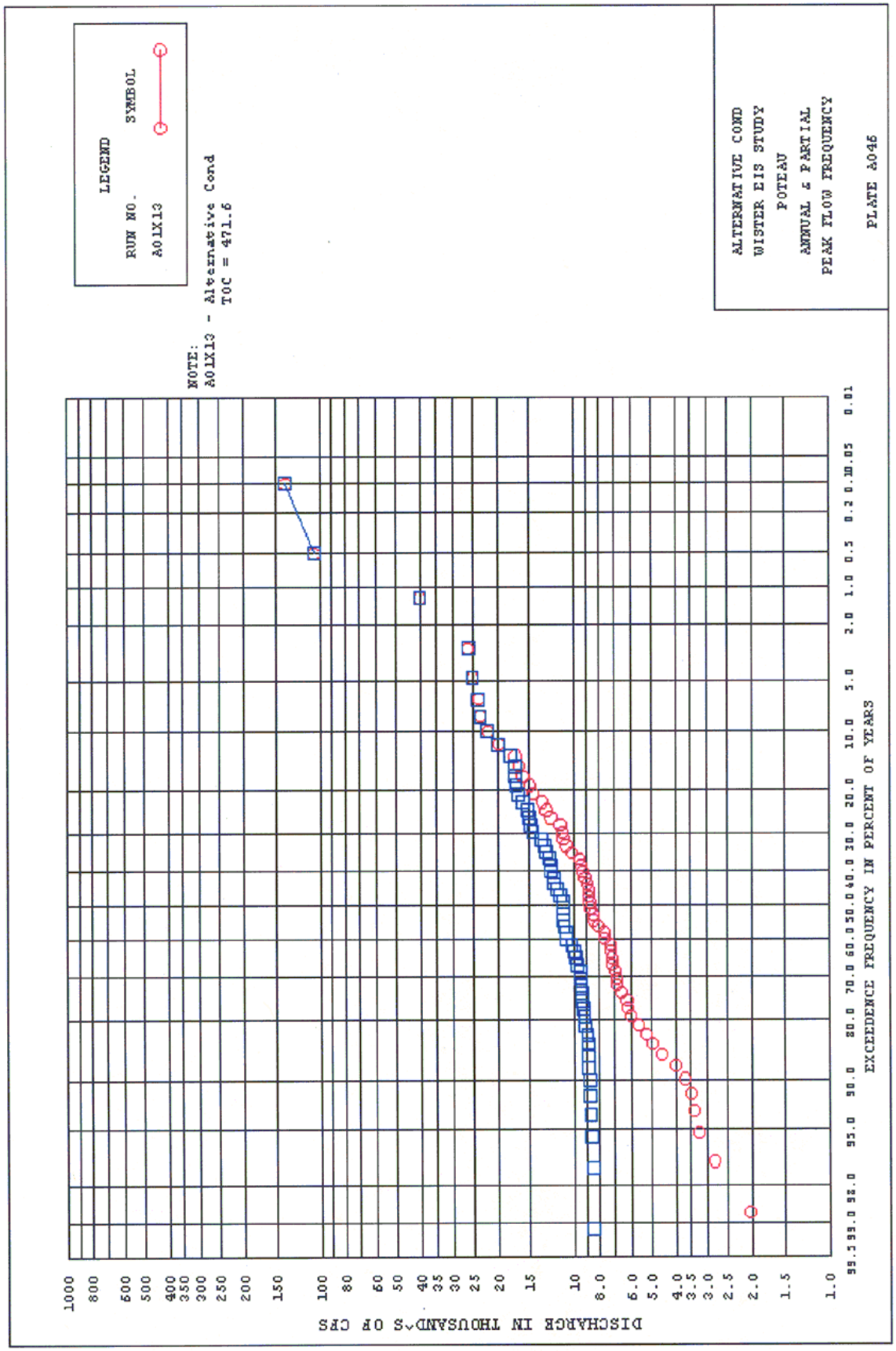

LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
WISTER OUTFLOW
JAN - DEC
DISCHARGE DURATION
PLATE A006
DISCHARGE IN THOUSANDS OF CFS
PERCENT OF TIME EQUALED OR EXCEEDED

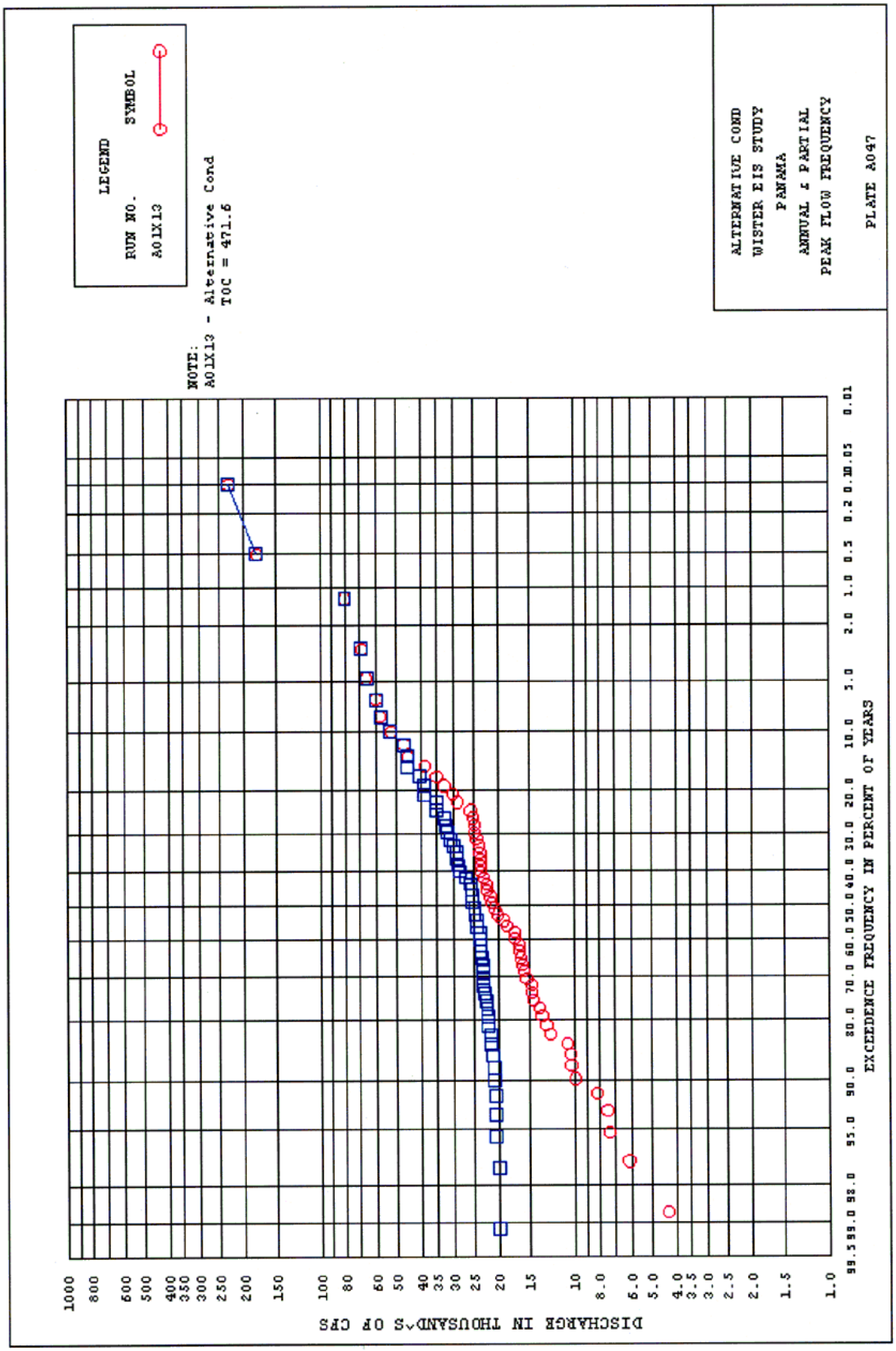

LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
POTEAU
JAN - DEC
DISCHARGE DURATION
PLATE A007
DISCHARGE IN THOUSANDS OF CFS
PERCENT OF TIME EQUALED OR EXCEEDED

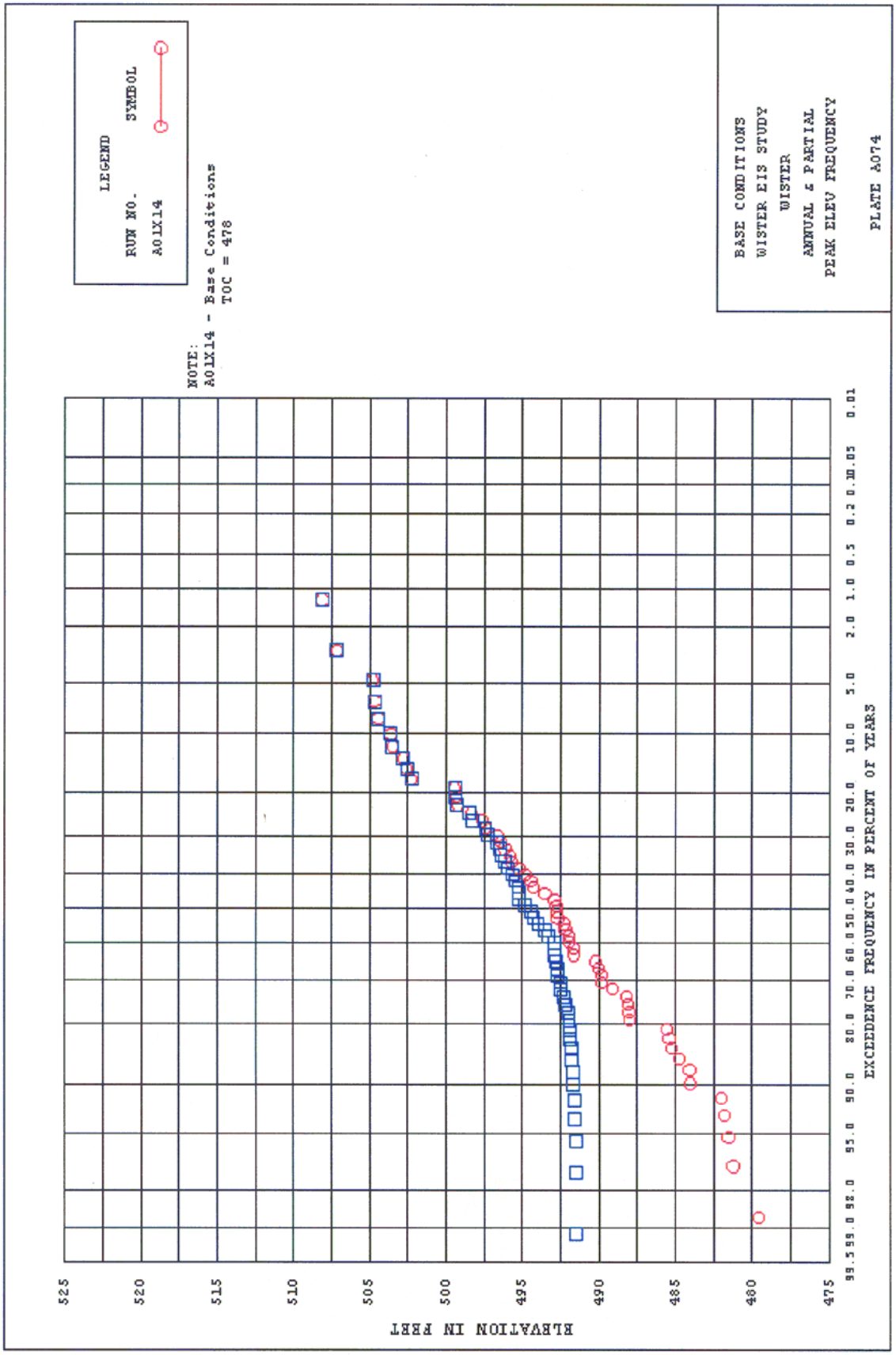

LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
PANAMA
JAN - DEC
DISCHARGE DURATION
PLATE A008
PERCENT OF TIME EQUALED OR EXCEEDED
DISCHARGE IN THOUSANDS OF CFS

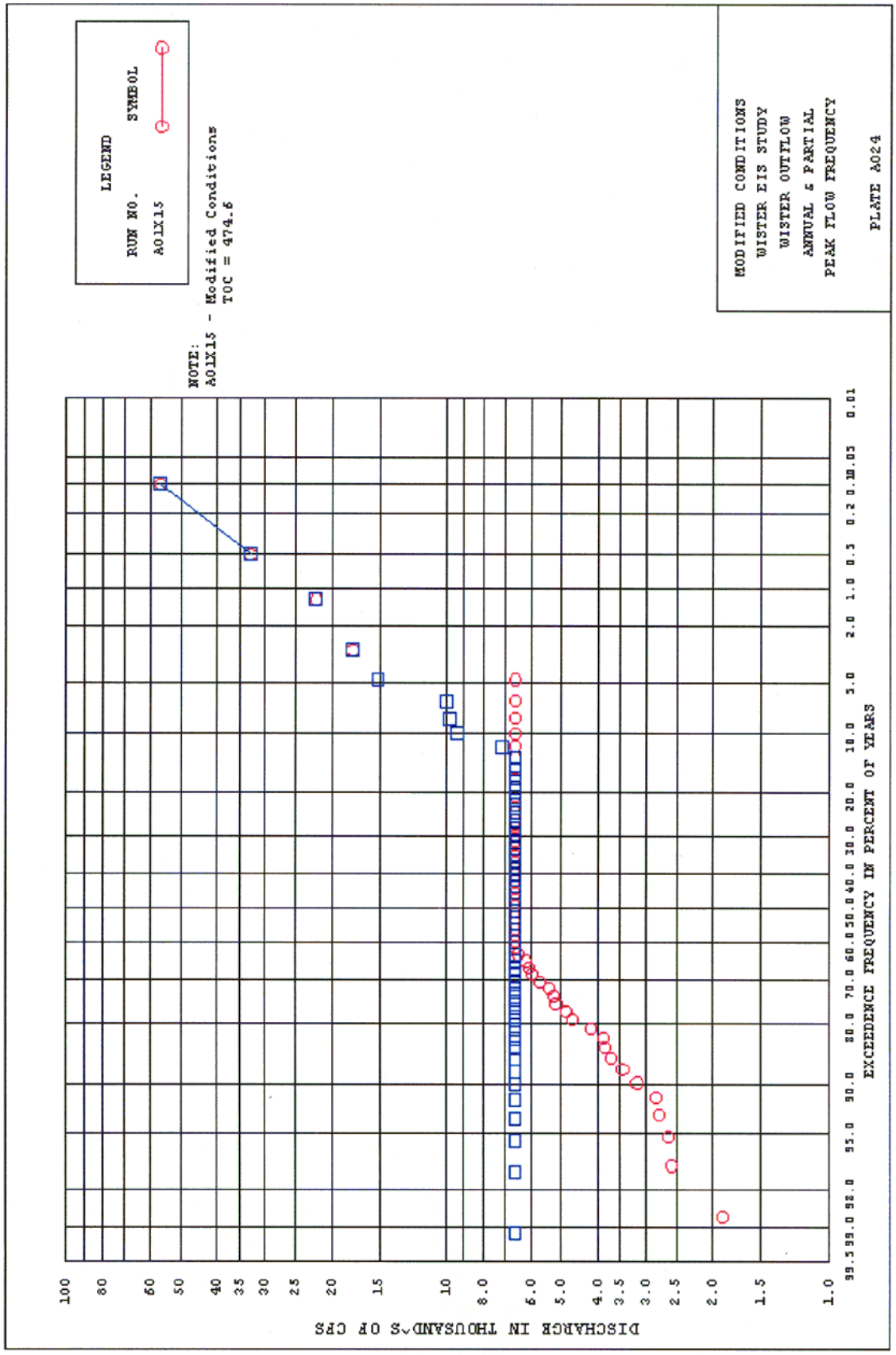

LEGEND
RUN NO.
SYMBOL
A01X13
NOTE:
A01X13 - Alternative Cond
TOC = 471.6
ALTERNATIVE COND
WISTER EIS STUDY
WISTER
ANNUAL & PARTIAL
PEAK ELEV FREQUENCY
PLATE A074
ELEVATION IN FEET
525
520
515
510
505
500
495
490
485
480
475
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS

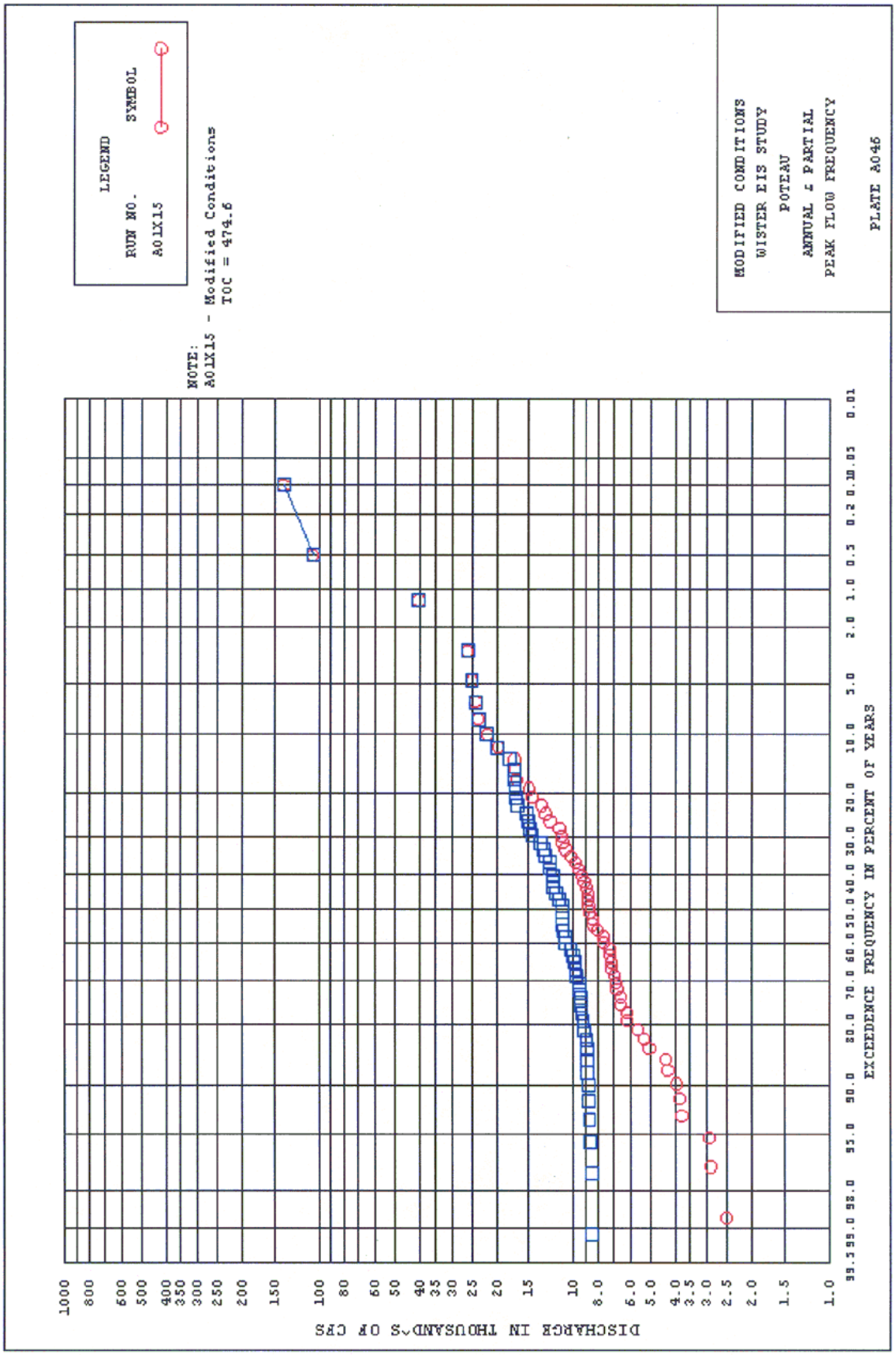

LEGEND
RUN NO.
SYMBOL
A01X13
NOTE:
A01X13 - Alternative Cond
TOC = 471.6
ALTERNATIVE COND
WISTER EIS STUDY
WISTER OUTFLOW
ANNUAL & PARTIAL
PEAK FLOW FREQUENCY
PLATE A024
DISCHARGE IN THOUSAND^S OF CFS
100
80
60
50
40
35
30
25
20
15
10
8.0
6.0
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS

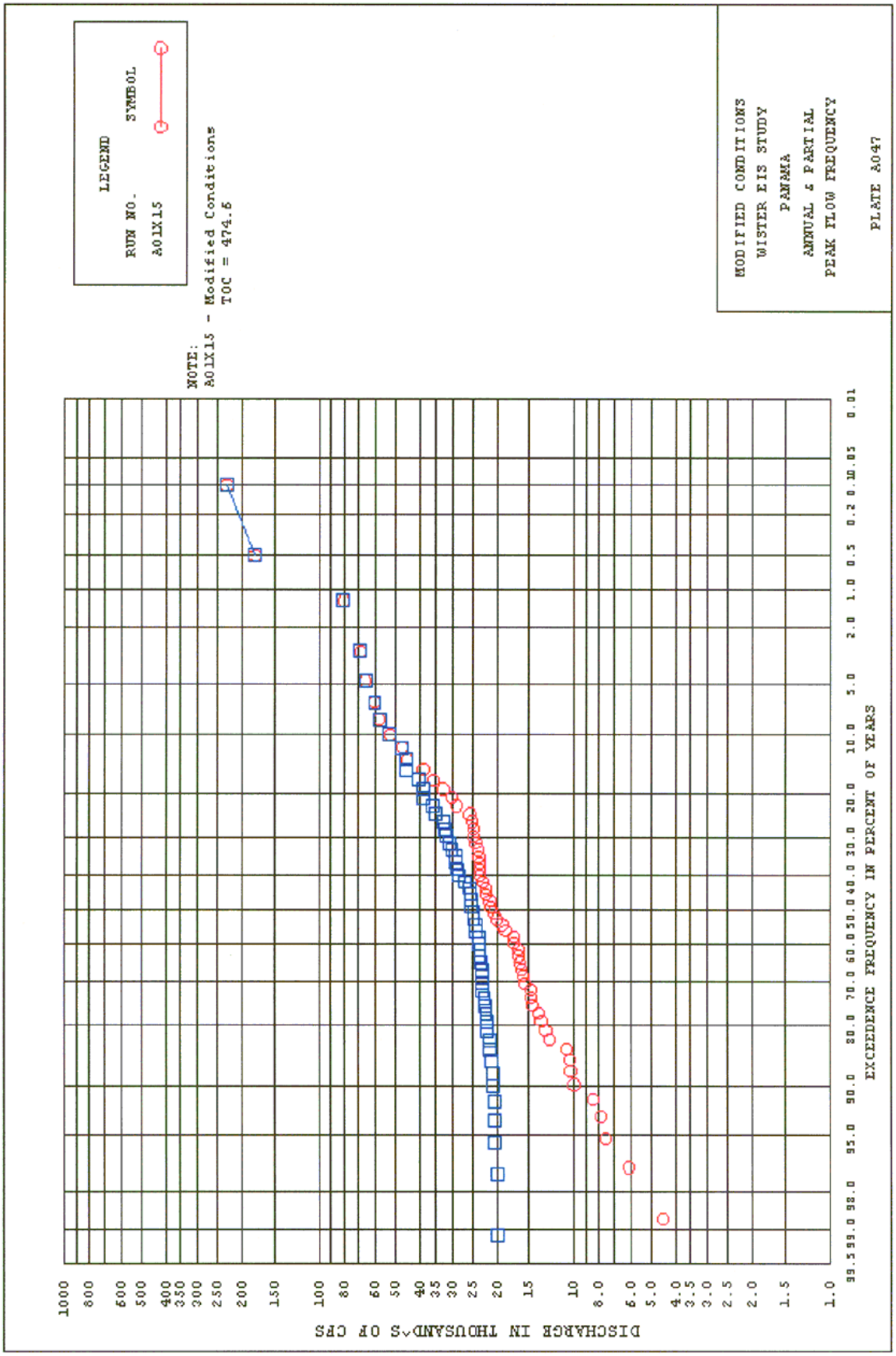

LEGEND
RUN NO.
SYMBOL
A01X13
NOTE:
A01X13 - Alternative Cond
TOC = 471.6
ALTERNATIVE COND
WISTER EIS STUDY
POTEAU
ANNUAL & PARTIAL
PEAK FLOW FREQUENCY
PLATE A046
DISCHARGE IN THOUSAND^S OF CFS
1000
800
600
500
400
350
300
250
200
150
100
80
60
50
40
35
30
25
20
15
10
8.0
6.0
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS

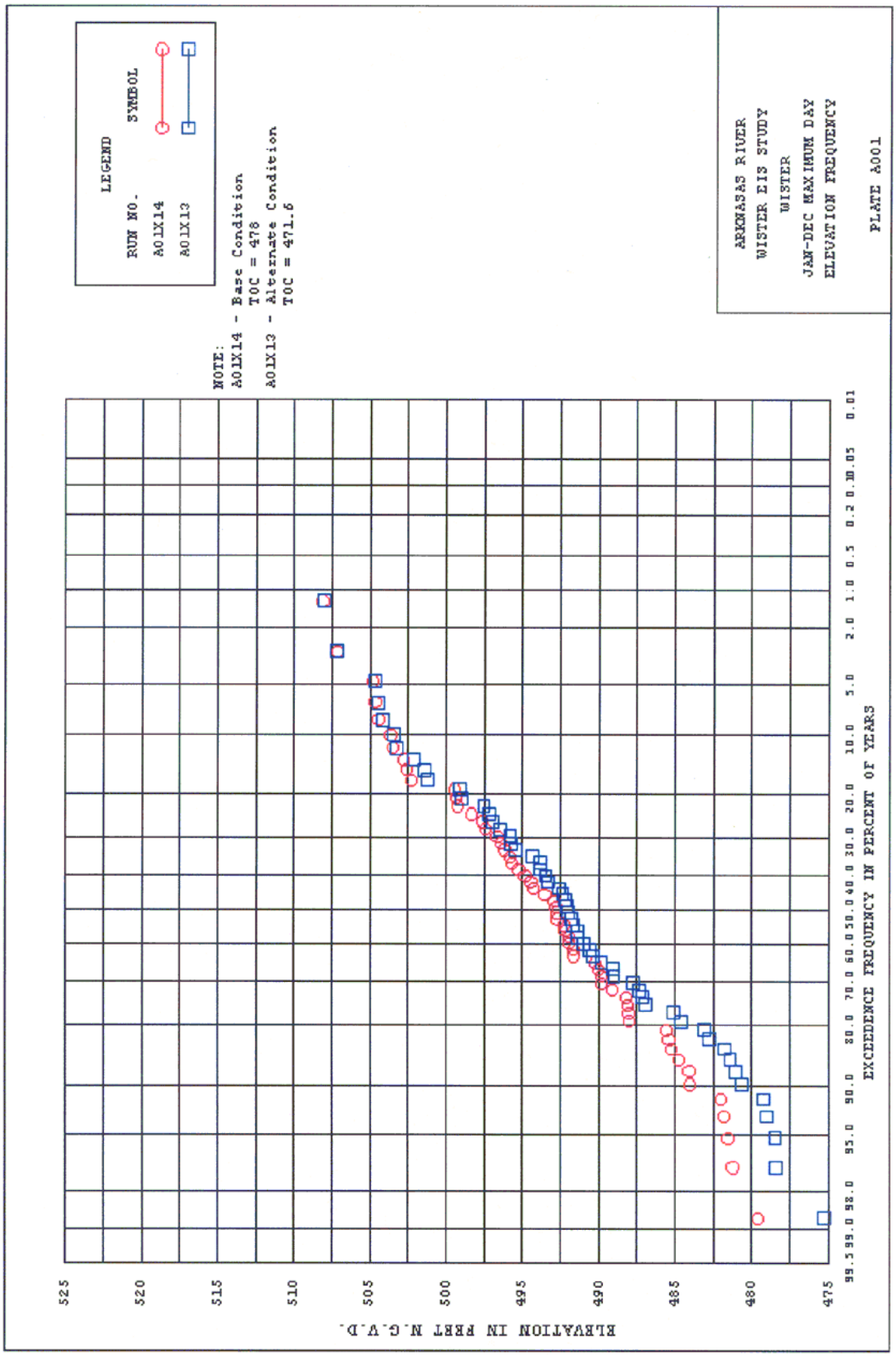

LEGEND
RUN NO.
SYMBOL
A01X13
NOTE:
A01X13 - Alternative Cond
TOC = 471.6
ALTERNATIVE COND
WISTER EIS STUDY
PANAMA
ANNUAL & PARTIAL
PEAK FLOW FREQUENCY
PLATE A047
DISCHARGE IN THOUSANDS OF CFS
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS

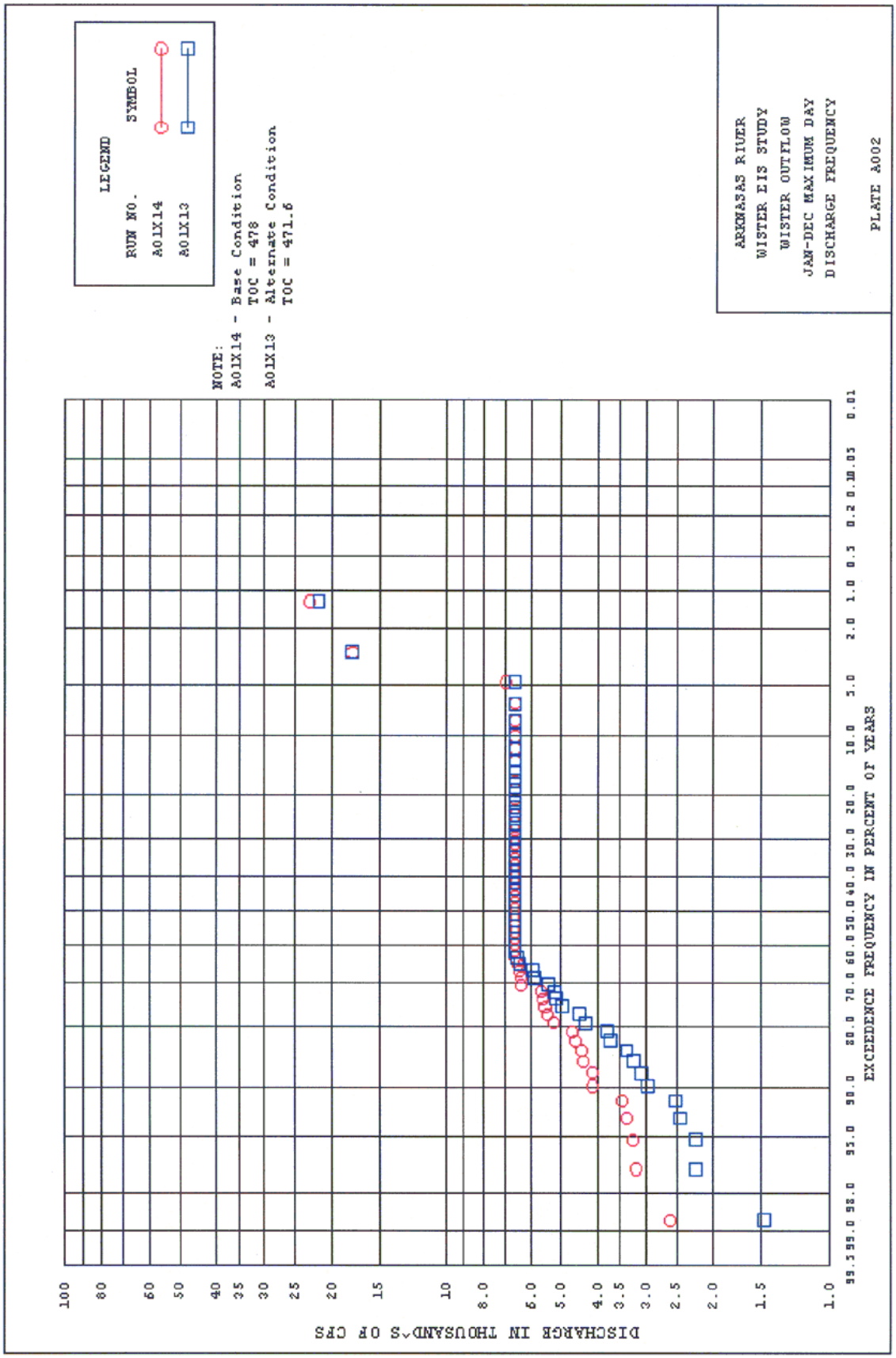

LEGEND
RUN NO.
SYMBOL
A01X14
NOTE:
A01X14 - Base Conditions
TOC = 478
BASE CONDITIONS
WISTER EIS STUDY
WISTER
ANNUAL & PARTIAL
PEAK ELEV FREQUENCY
PLATE A074
ELEVATION IN FEET
525
520
515
510
505
500
495
490
485
480
475
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01

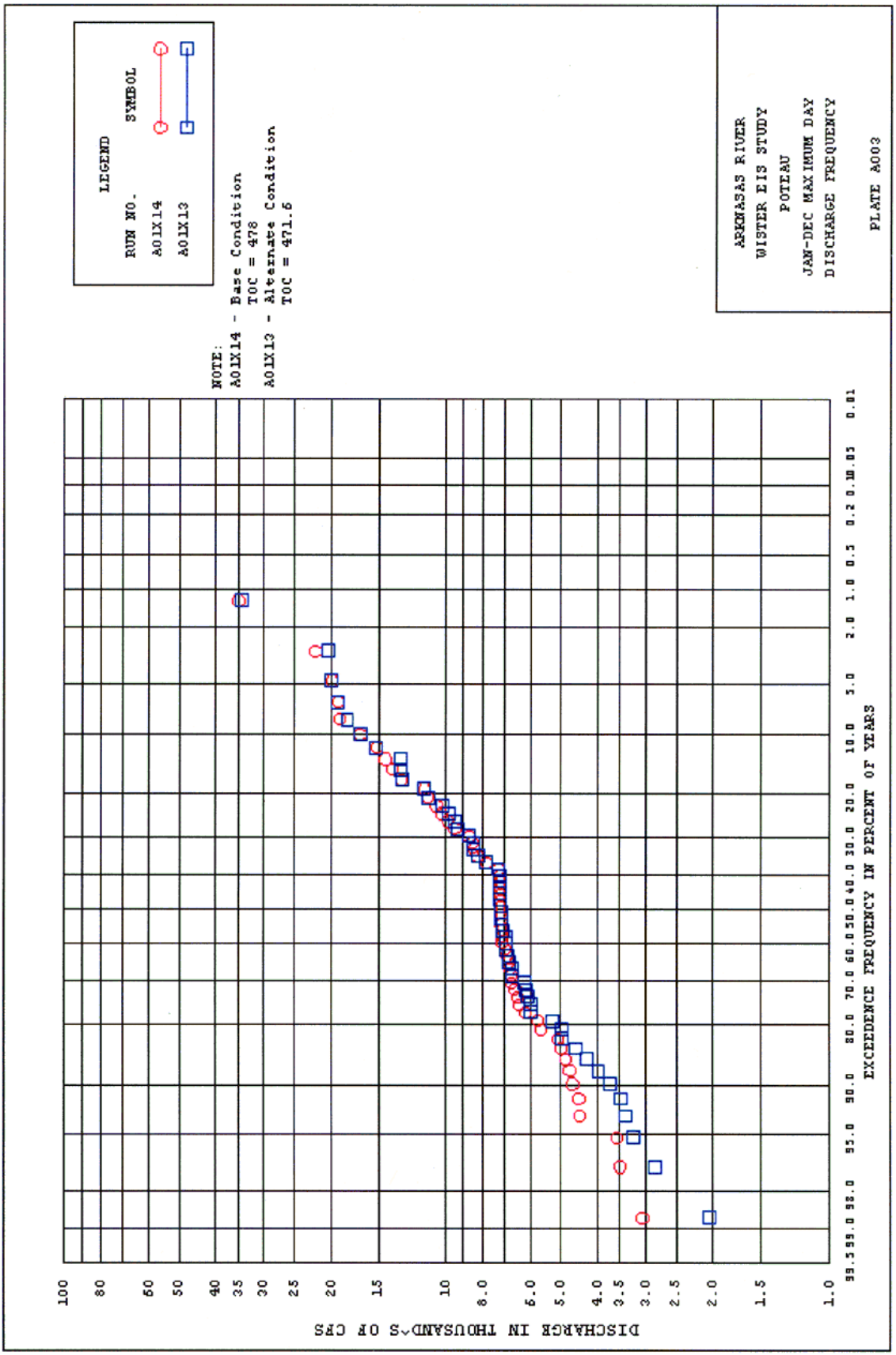

LEGEND
RUN NO.
SYMBOL
A01X15
NOTE:
A01X15 - Modified Conditions
TOC = 474.6
MODIFIED CONDITIONS
WISTER EIS STUDY
WISTER OUTFLOW
ANNUAL & PARTIAL
PEAK FLOW FREQUENCY
PLATE A024
DISCHARGE IN THOUSAND'S OF CFS
100
80
60
50
40
35
30
25
20
15
10
8.0
6.0
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS

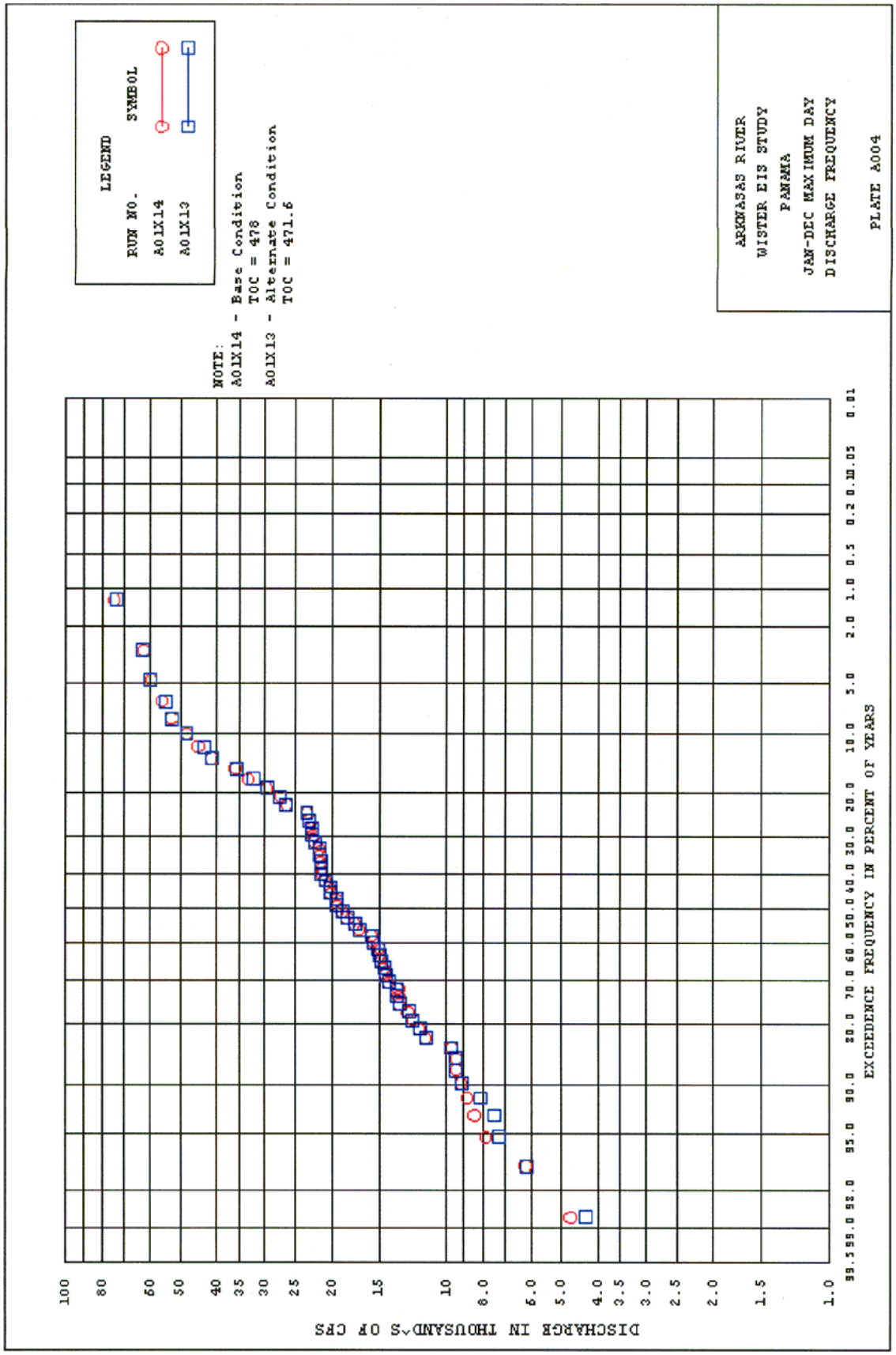

LEGEND
RUN NO.
SYMBOL
A01X15
NOTE:
A01X15 - Modified Conditions
TOC = 474.6
MODIFIED CONDITIONS
WISTER EIS STUDY
POTEAU
ANNUAL & PARTIAL
PEAK FLOW FREQUENCY
PLATE A046
DISCHARGE IN THOUSAND'S OF CFS
1000
800
600
500
400
350
300
250
200
150
100
80
60
50
40
35
30
25
20
15
10
8.0
6.0
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
99.999.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS


LEGEND
RUN NO.
SYMBOL
A01X15
NOTE:
A01X15 - Modified Conditions
TOC = 474.6
MODIFIED CONDITIONS
WISTER EIS STUDY
PANAMA
ANNUAL & PARTIAL
PEAK FLOW FREQUENCY
PLATE A047
DISCHARGE IN THOUSANDS OF CFS
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS


LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
WISTER
JAN-DEC MAXIMUM DAY
ELEVATION FREQUENCY
PLATE A001
ELEVATION IN FEET N.G.V.D.
525
520
515
510
505
500
495
490
485
480
475
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS


LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
WISTER OUTFLOW
JAN-DEC MAXIMUM DAY
DISCHARGE FREQUENCY
PLATE A002
DISCHARGE IN THOUSAND^S OF CFS
100
80
60
50
40
35
30
25
20
15
10
8.0
6.0
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
99.999.0 98.0
95.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
5.0
2.0
1.0
0.5
0.2
0.1
0.05
0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS


LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
POTEAU
JAN-DEC MAXIMUM DAY
DISCHARGE FREQUENCY
PLATE A003
DISCHARGE IN THOUSANDS OF CFS
100
80
60
50
40
35
30
25
20
15
10
8.0
6.0
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS


LEGEND
RUN NO.
SYMBOL
A01X14
A01X13
NOTE:
A01X14 - Base Condition
TOC = 478
A01X13 - Alternate Condition
TOC = 471.6
ARKANSAS RIVER
WISTER EIS STUDY
PANAMA
JAN-DEC MAXIMUM DAY
DISCHARGE FREQUENCY
PLATE A004
DISCHARGE IN THOUSAND^S OF CFS
100
80
60
50
40
35
30
25
20
15
10
8.0
6.0
5.0
4.0
3.5
3.0
2.5
2.0
1.5
1.0
99.5 99.0 98.0 95.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 5.0 2.0 1.0 0.5 0.2 0.10 0.05 0.01
EXCEEDENCE FREQUENCY IN PERCENT OF YEARS

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ARK RIVER DAILY REGULATION SIMULATION - TAKEN FROM A00X01 * RUN A01X15 *
EXISTING CONDITIONS AT WISTER - FLAT POOL SET AT 474.6 HEAV+PVIA+ AES WS DEMAN
PERIOD OF SIMULATION 1940-1995       LEAKAGE 0 CFS AT WIST
NUMBER OF DAYS=20454+1=20455; NYRS=56;
JUL 2001


JOB CARD PARAMETERS

  ITYPE  IRSTRT   IWRIT   IPRNT    NDTC    NYRS   TRAC1   TRAC2   IQUIK    IRDAT
     -1      -1       1       0   20455      56     0.0     0.0       1        0

EXECUTION CARD PARAMETERS

  IHYPO   IMOH2   ISTRM   IHDAT  NTRANS    NYRS    NDTC   IPRNT    SPCT
      1       5       0     501       0      56   20455       0    0.00
```

WISTER
RESERVOIR DATA

RESERVOIR NO. 24

ELEVATION(FT-MSL)	428.50	460.00	465.00	468.80	471.60	474.60	478.00	488.00	495.00	502.50	503.00
*CAPACITY (A-F) *	0.	3602.	8360.	14872.	23897.	39038.	61429.	162695.	271843.	427389.	439168.
*AREA (ACRES) *	0.	564.	1280.	2340.	4132.	5759.	7386.	12963.	17988.	23366.	23747.

ELEVATION(FT-MSL)	503.50	504.75	508.00	510.00	516.00	526.00					
*CAPACITY (A-F) *	451154.	482112.	568108.	624480.	809100.	1187700.					
*AREA (ACRES) *	24197.	25347.	27530.	28765.	33630.	42050.					

INDUCED SURCHARGE AND FREE FLOW RATING CURVES

ELEVATION(FT-MSL)	428.50	502.50	503.00	503.50	504.75	508.00	510.00	515.00	525.00		
*CAPACITY (A-F) *	0.	427389.	439168.	451154.	482112.	568108.	624480.	778330.	1149840.		
*QFREE FLOW (CFS) *	0.	14500.	15200.	17800.	23050.	39000.	47700.	78800.	151500.		
*Q IND. SUR.(CFS) *		0.	600.	1900.	6600.	21400.					

SEASONAL STORAGE (ACRE-FEET) VS. LEVEL TABLE
NEGATIVE VALUES INDICATE % OF CONSERVATION STORAGE - POSITIVE VALUES INDICATE % OF FLOOD POOL STORAGE

	* DATE*	101										
	LEVEL	ELEV *	STORAGE *	% FULL*	ELEV *	STORAGE *	% FULL*	ELEV *	STORAGE *	% FULL*	ELEV *	STORAGE *	% FULL*
	* 1	* 428.50*	0.*	0.0*	*	*	*	*	*	*	*	*	*
BOC	* 2	* 468.80*	14872.*	0.0*	*	*	*	*	*	*	*	*	*
	* 3	* 468.80*	14872.*	0.0*	*	*	*	*	*	*	*	*	*
	* 4	* 474.42*	38130.*	-50.0*	*	*	*	*	*	*	*	*	*
	* 5	* 478.00*	61429.*	0.0*	*	*	*	*	*	*	*	*	*
TOC	* 6	* 478.00*	61429.*	0.0*	*	*	*	*	*	*	*	*	*
	* 7	* 478.00*	61429.*	0.0*	*	*	*	*	*	*	*	*	*
	* 8	* 478.00*	61429.*	0.0*	*	*	*	*	*	*	*	*	*
	* 9	* 481.61*	97986.*	10.0*	*	*	*	*	*	*	*	*	*
	* 10	* 488.55*	171271.*	30.0*	*	*	*	*	*	*	*	*	*
	* 11	* 493.24*	244400.*	50.0*	*	*	*	*	*	*	*	*	*
	* 12	* 497.21*	317677.*	70.0*	*	*	*	*	*	*	*	*	*
	* 13	* 500.74*	390888.*	90.0*	*	*	*	*	*	*	*	*	*
TFP	* 14	* 502.50*	427389.*	100.0*	*	*	*	*	*	*	*	*	*
	* 15	* 510.00*	624480.*	153.9*	*	*	*	*	*	*	*	*	*
	* 16	* 526.00*	1187700.*	307.8*	*	*	*	*	*	*	*	*	*

Water Supply Demands (cfs)

Jan	**28.7**
Feb	**28.9**
Mar	**29**
Apr	**29.5**
May	**29.7**
Jun	**32.7**
Jul	**35.2**
Aug	**34.3**
Sep	**31.9**
Oct	**30.3**
Nov	**29.5**
Dec	**29.4**

WISTER
RESERVOIR DATA

RESERVOIR NO. 24

ELEVATION(FT-MSL)	428.50	460.00	465.00	468.80	471.60	474.60	478.00	488.00	495.00	502.50	503.00
CAPACITY (A-F)	0.	3602.	8360.	14872.	23897.	39038.	61429.	162695.	271843.	427389.	439168.
AREA (ACRES)	0.	564.	1280.	2340.	4132.	5759.	7386.	12963.	17988.	23366.	23747.
ELEVATION(FT-MSL)	503.50	504.75	508.00	510.00	516.00	526.00					
CAPACITY (A-F)	451154.	482112.	568108.	624480.	809100.	1187700.					
AREA (ACRES)	24197.	25347.	27530.	28765.	33630.	42050.					

INDUCED SURCHARGE AND FREE FLOW RATING CURVES

ELEVATION(FT-MSL)	428.50	502.50	503.00	503.50	504.75	508.00	510.00	515.00	525.00		
CAPACITY (A-F)	0.	427389.	439168.	451154.	482112.	568108.	624480.	778330.	1149840.		
QFREE FLOW (CFS)	0.	14500.	15200.	17800.	23050.	39000.	47700.	78800.	151500.		
Q IND. SUR.(CFS)		0.	600.	1900.	6600.	21400.					

SEASONAL STORAGE (ACRE-FEET) VS. LEVEL TABLE
NEGATIVE VALUES INDICATE % OF CONSERVATION STORAGE - POSITIVE VALUES INDICATE % OF FLOOD POOL STORAGE

	DATE	101										
	LEVEL	ELEV	STORAGE	% FULL	ELEV	STORAGE	% FULL	ELEV	STORAGE	% FULL	ELEV	STORAGE	% FULL
	1	428.50	0.	0.0									
BOC	2	468.80	14872.	0.0									
	3	468.80	14872.	0.0									
	4	470.20	19384.	-50.0									
	5	471.60	23897.	0.0									
TOC	6	471.60	23897.	0.0									
	7	471.60	23897.	0.0									
	8	471.60	23897.	0.0									
	9	478.28	64264.	10.0									
	10	486.25	144973.	30.0									
	11	492.04	225689.	50.0									
	12	496.66	306271.	70.0									
	13	500.55	386947.	90.0									
TFP	14	502.50	427389.	100.0									
	15	510.00	624480.	148.8									
	16	526.00	1187700.	288.4									

Water Supply Demands (cfs)

Jan	**12.7**
Feb	**12.9**
Mar	**13.1**
Apr	**13.5**
May	**13.7**
Jun	**16.7**
Jul	**19.3**
Aug	**18.3**
Sep	**15.9**
Oct	**14.3**
Nov	**13.5**
Dec	**13.4**

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ARK RIVER DAILY REGULATION SIMULATION - TAKEN FROM A00X01 * RUN A01X13 *
EXISTING CONDITIONS AT WISTER - FLAT POOL SET AT 471.6 HEAV+PVIA WS ONLY
PERIOD OF SIMULATION 1940-1995        LEAKAGE 0 CFS AT WIST
NUMBER OF DAYS=20454+1=20455; NYRS=56;
JUL 2001


JOB CARD PARAMETERS

  ITYPE  IRSTRT   IWRIT   IPRNT    NDTC    NYRS   TRAC1   TRAC2   IQUIK    IRDAT
     -1      -1       1       0   20455      56     0.0     0.0       1         0

EXECUTION CARD PARAMETERS

  IHYPO   IMOH2   ISTRM   IHDAT  NTRANS    NYRS    NDTC   IPRNT    SPCT
      1       5       0     501       0      56   20455       0    0.00
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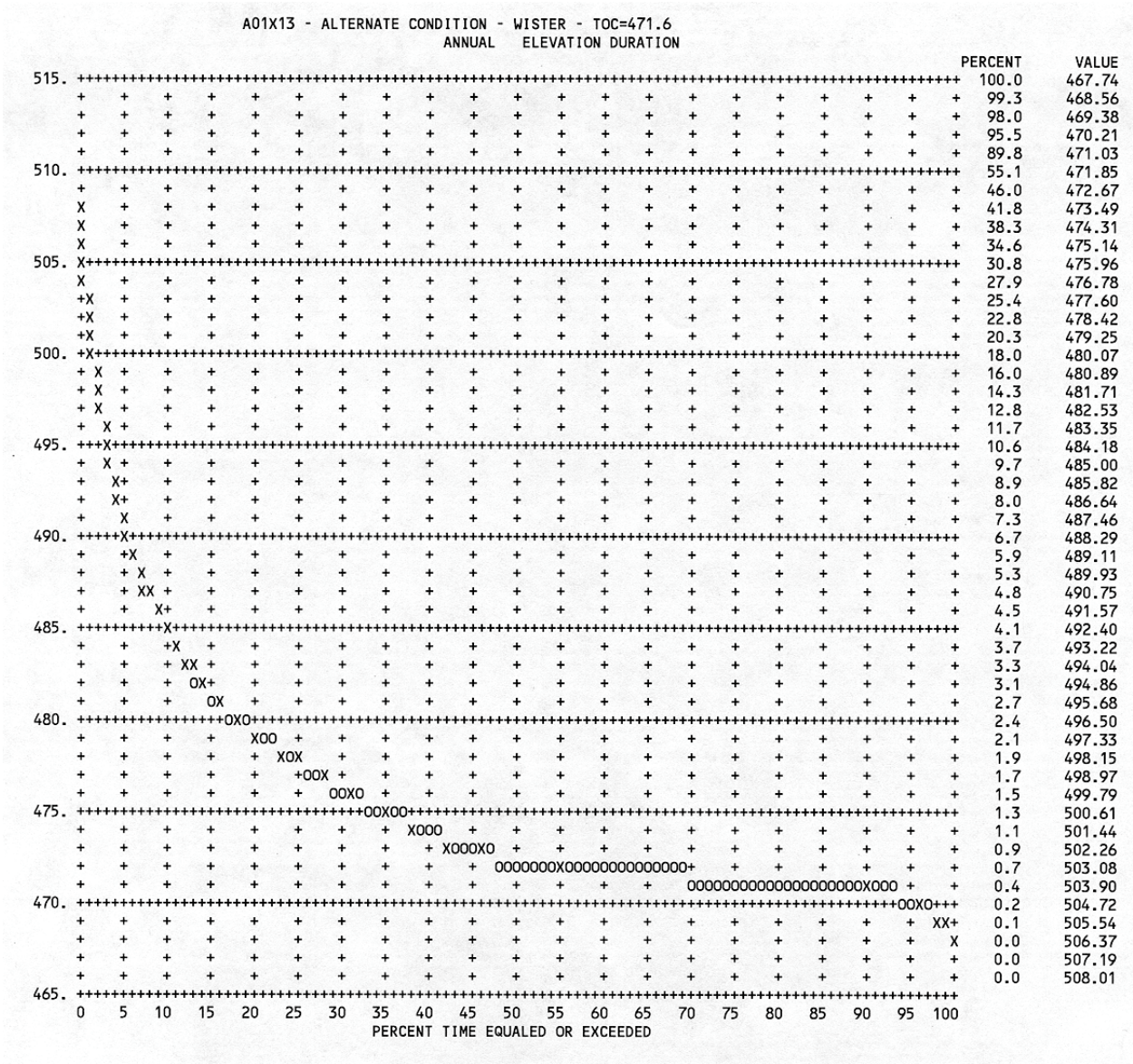
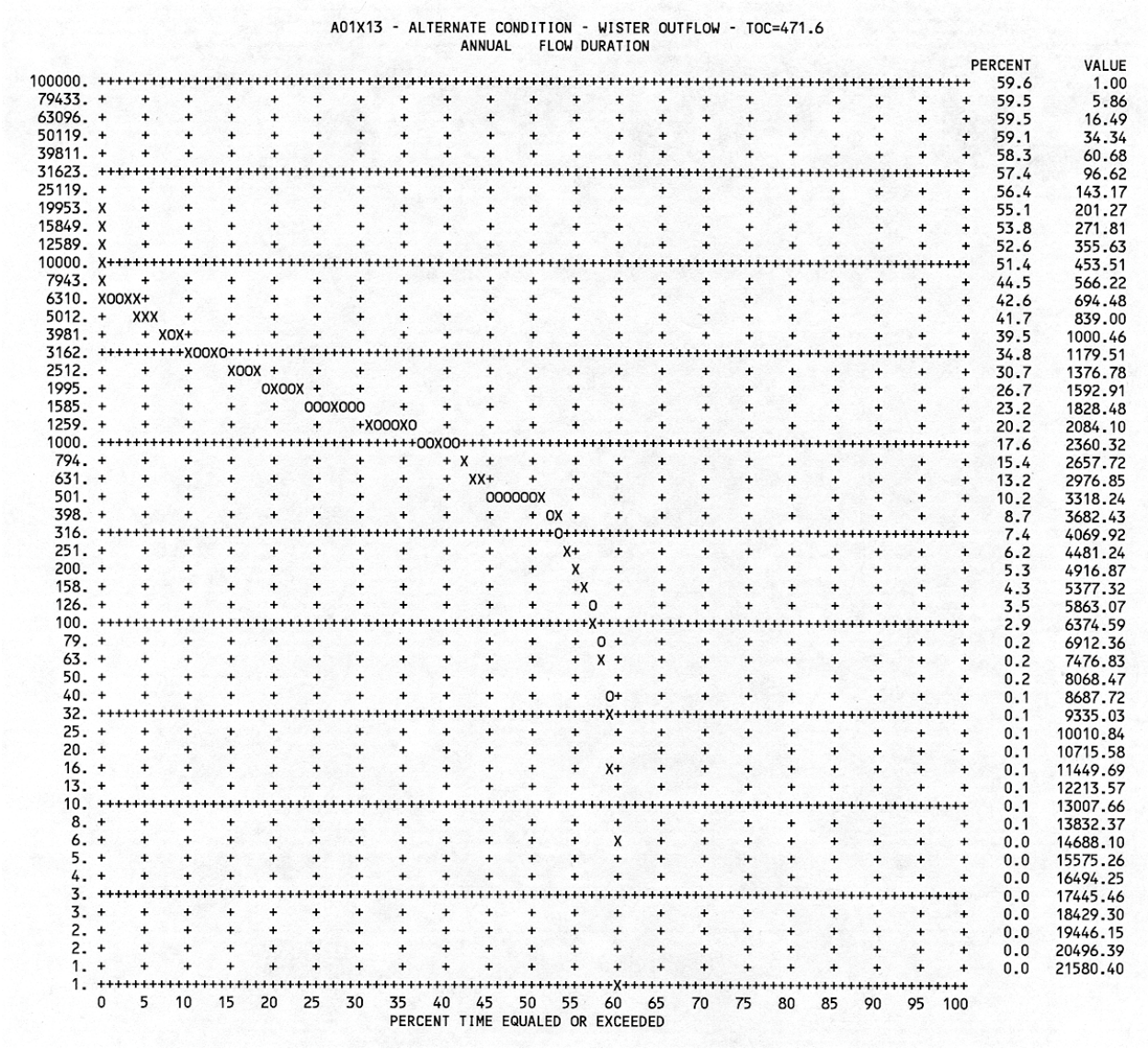
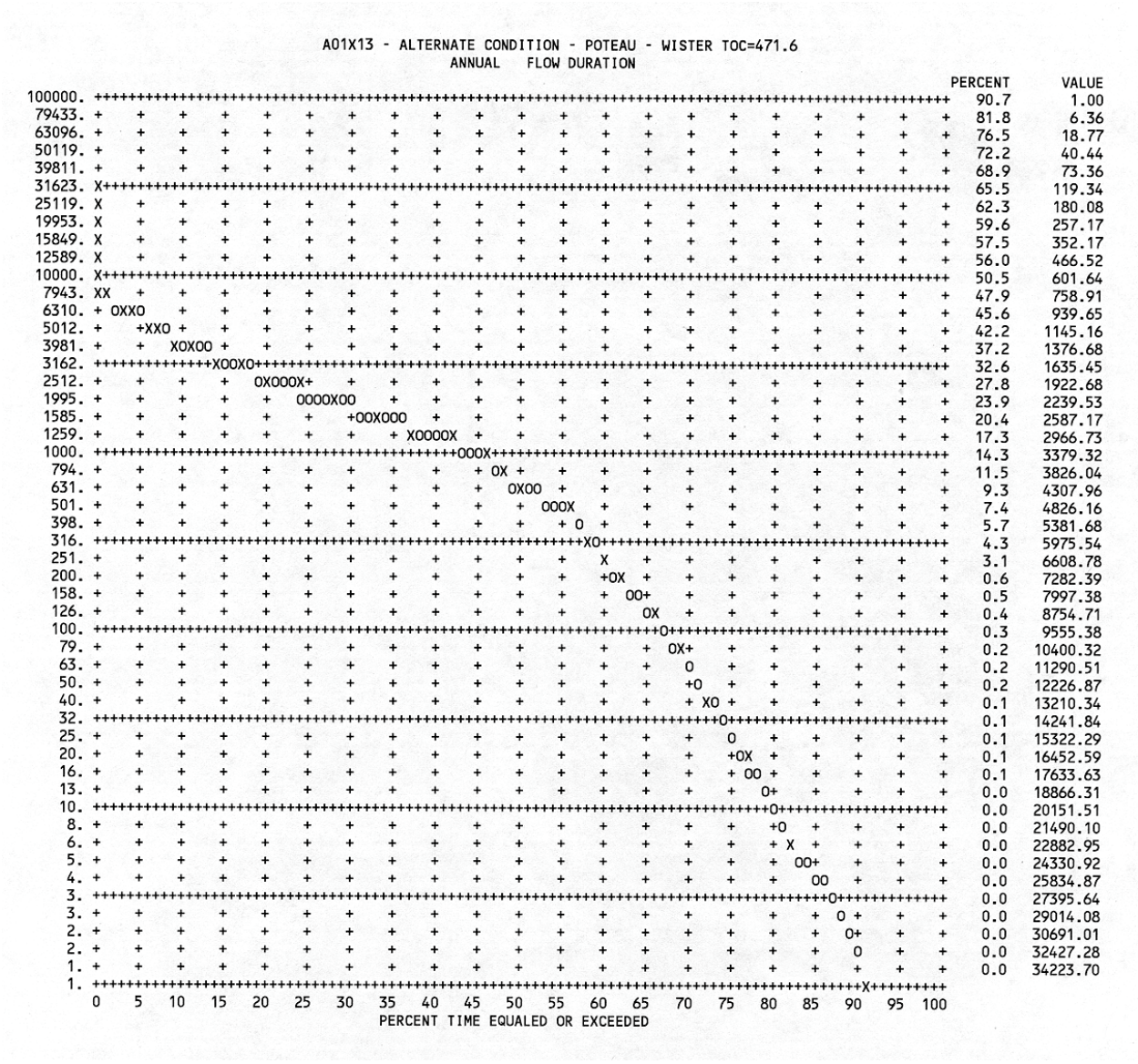
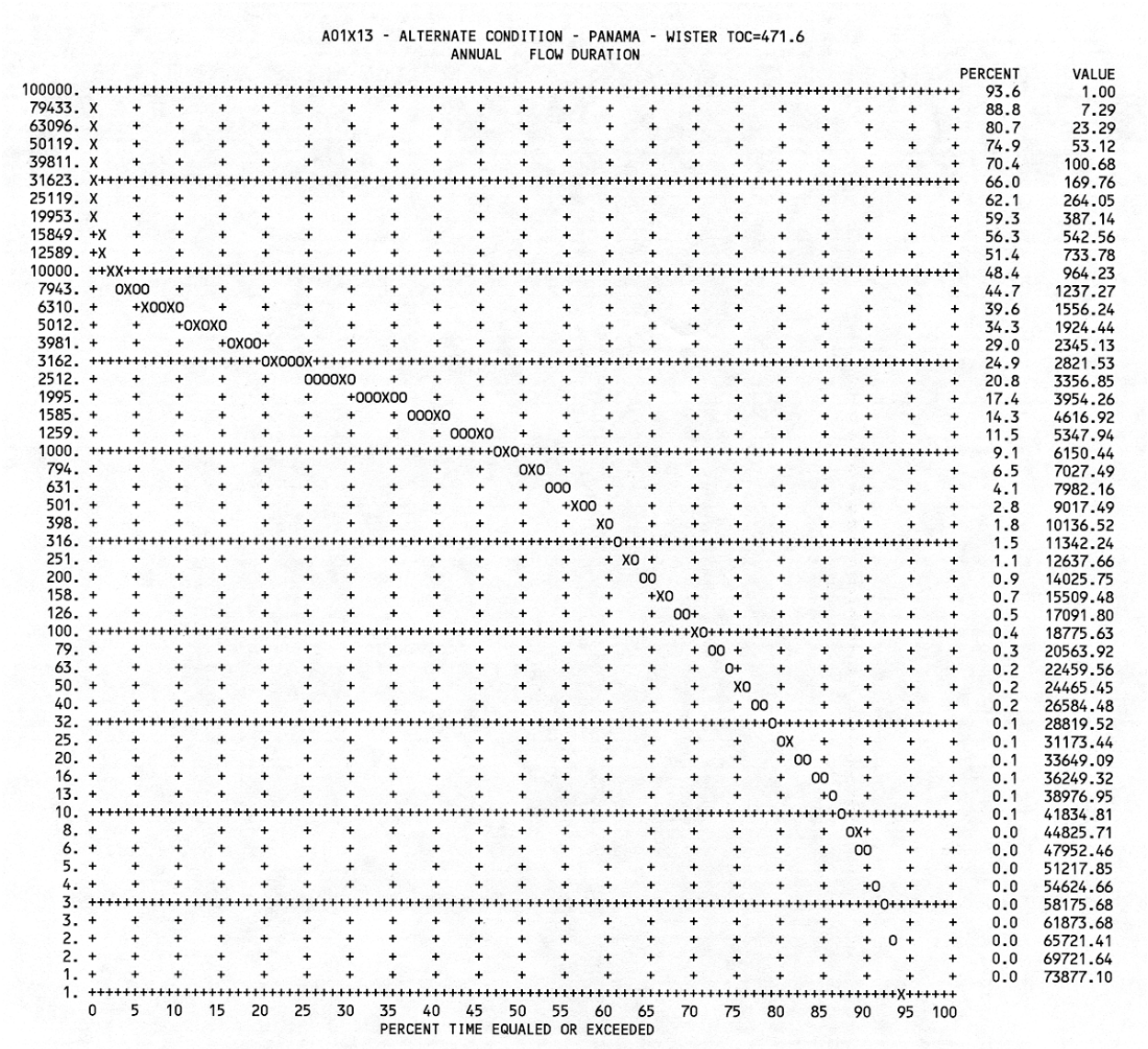
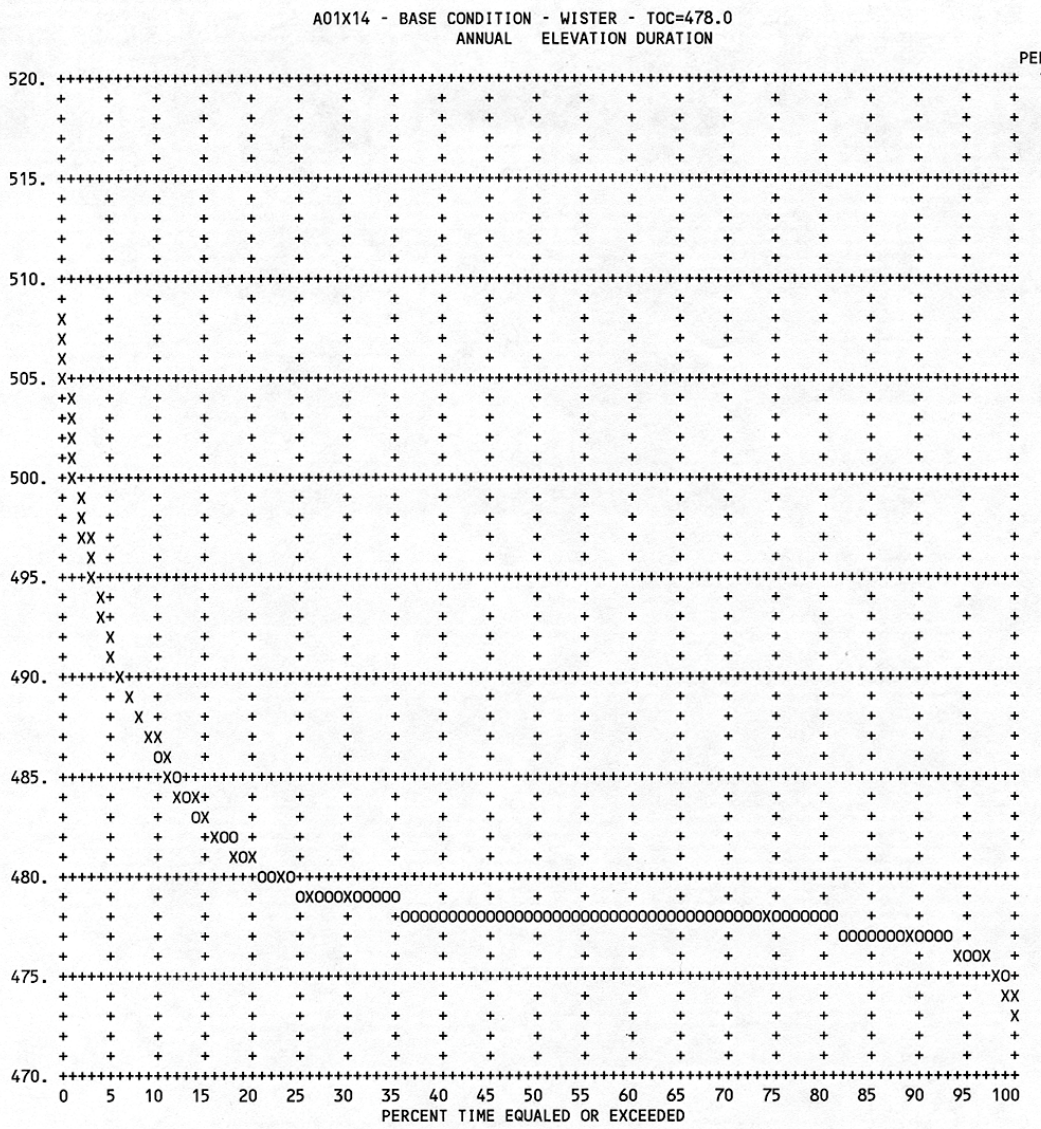
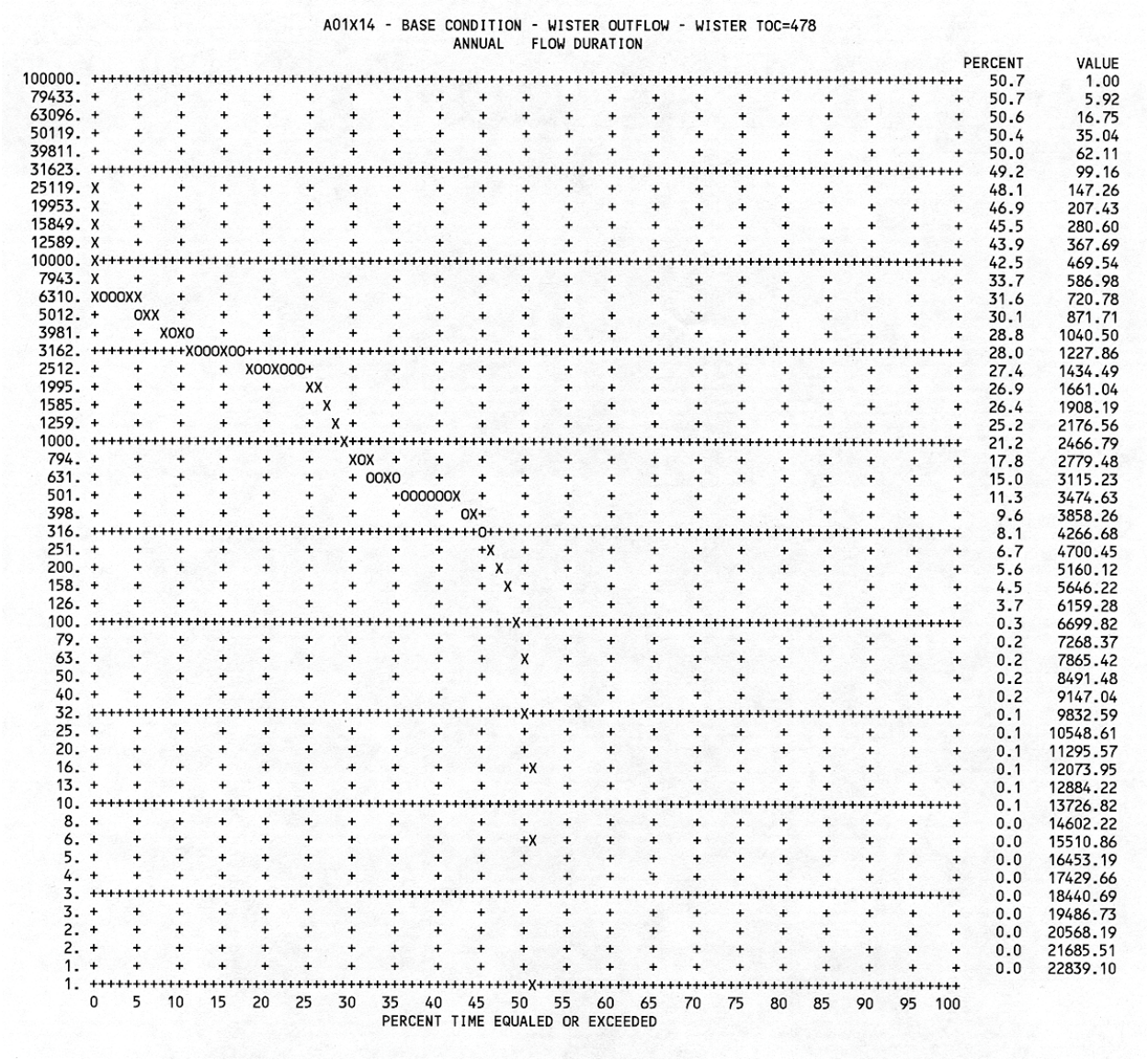

A01X13 - ALTERNATE CONDITION - WISTER - TOC=471.6
ANNUAL ELEVATION DURATION
PERCENT
VALUE
515.
510.
505.
500.
495.
490.
485.
480.
475.
470.
465.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED

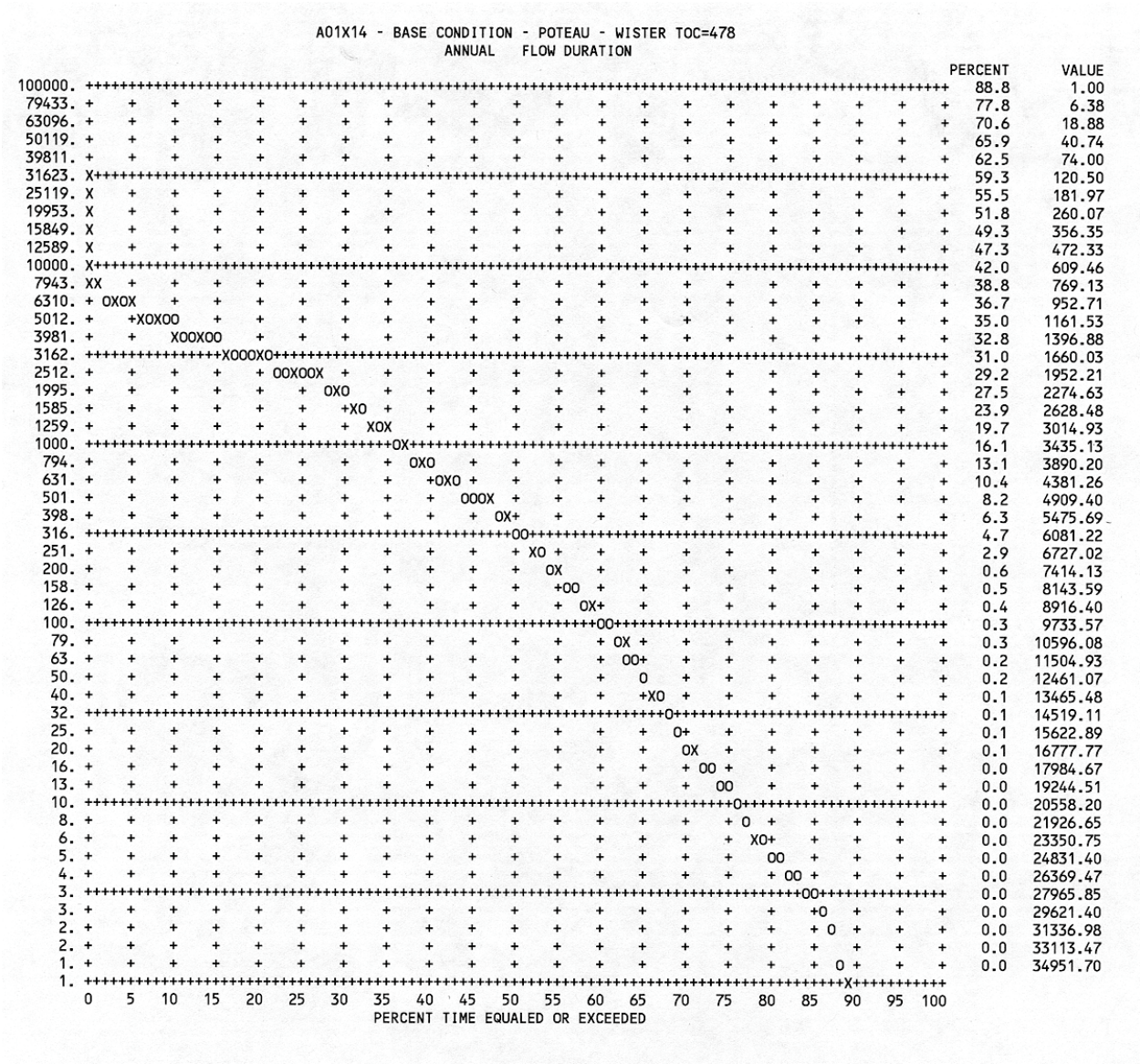

A01X13 - ALTERNATE CONDITION - WISTER OUTFLOW - TOC=471.6
ANNUAL FLOW DURATION
PERCENT
VALUE
100000. 59.6 1.00
79433. 59.5 5.86
63096. 59.5 16.49
50119. 59.1 34.34
39811. 58.3 60.68
31623. 57.4 96.62
25119. 56.4 143.17
19953. 55.1 201.27
15849. 53.8 271.81
12589. 52.6 355.63
10000. 51.4 453.51
7943. 44.5 566.22
6310. 42.6 694.48
5012. 41.7 839.00
3981. 39.5 1000.46
3162. 34.8 1179.51
2512. 30.7 1376.78
1995. 26.7 1592.91
1585. 23.2 1828.48
1259. 20.2 2084.10
1000. 17.6 2360.32
794. 15.4 2657.72
631. 13.2 2976.85
501. 10.2 3318.24
398. 8.7 3682.43
316. 7.4 4069.92
251. 6.2 4481.24
200. 5.3 4916.87
158. 4.3 5377.32
126. 3.5 5863.07
100. 2.9 6374.59
79. 0.2 6912.36
63. 0.2 7476.83
50. 0.2 8068.47
40. 0.1 8687.72
32. 0.1 9335.03
25. 0.1 10010.84
20. 0.1 10715.58
16. 0.1 11449.69
13. 0.1 12213.57
10. 0.1 13007.66
8. 0.1 13832.37
6. 0.0 14688.10
5. 0.0 15575.26
4. 0.0 16494.25
3. 0.0 17445.46
3. 0.0 18429.30
2. 0.0 19446.15
2. 0.0 20496.39
1. 0.0 21580.40
1.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED

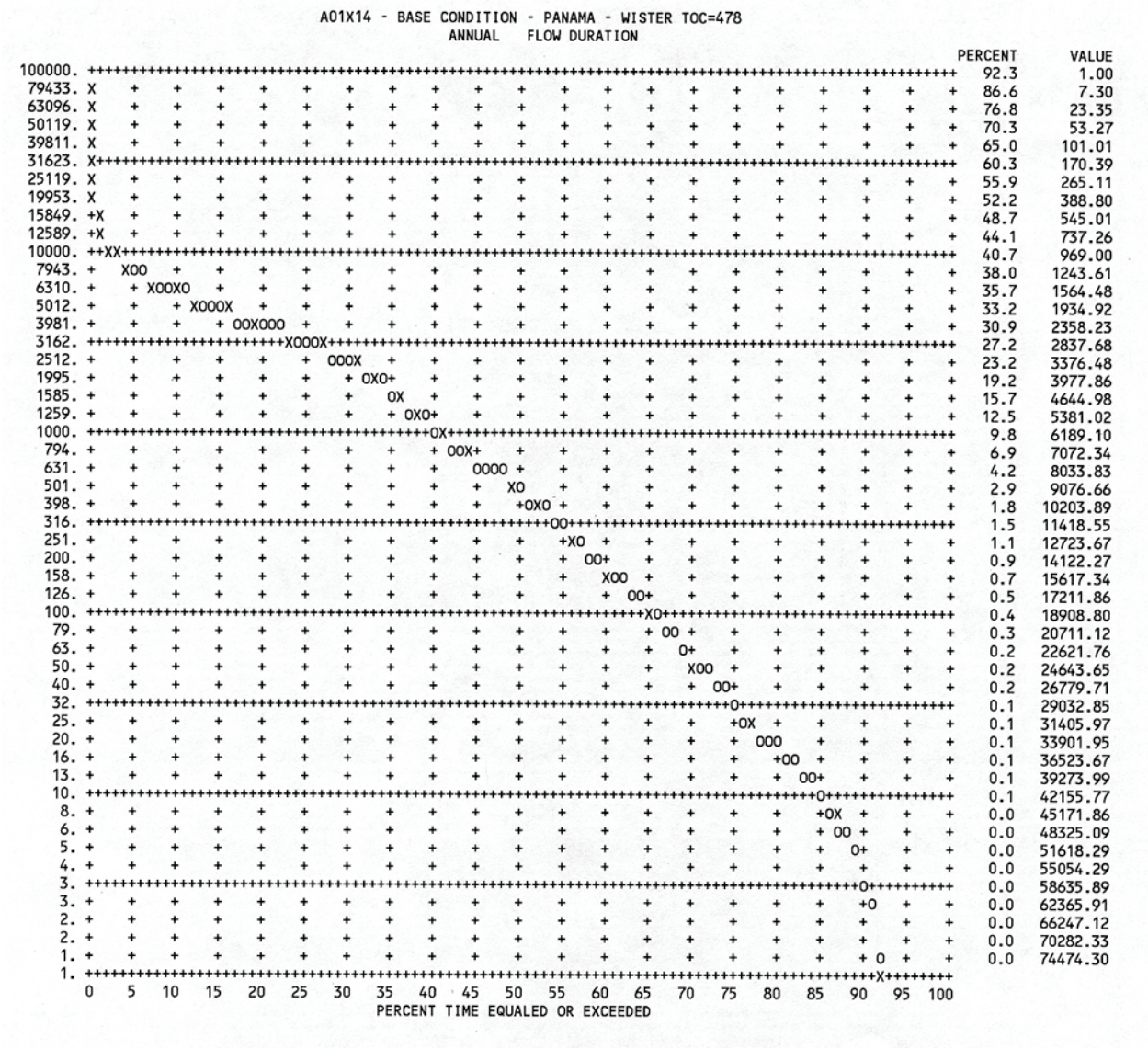

A01X13 - ALTERNATE CONDITION - POTEAU - WISTER TOC=471.6
ANNUAL FLOW DURATION
PERCENT
VALUE
100000. 90.7 1.00
79433. 81.8 6.36
63096. 76.5 18.77
50119. 72.2 40.44
39811. 68.9 73.36
31623. 65.5 119.34
25119. 62.3 180.08
19953. 59.6 257.17
15849. 57.5 352.17
12589. 56.0 466.52
10000. 50.5 601.64
7943. 47.9 758.91
6310. 45.6 939.65
5012. 42.2 1145.16
3981. 37.2 1376.68
3162. 32.6 1635.45
2512. 27.8 1922.68
1995. 23.9 2239.53
1585. 20.4 2587.17
1259. 17.3 2966.73
1000. 14.3 3379.32
794. 11.5 3826.04
631. 9.3 4307.96
501. 7.4 4826.16
398. 5.7 5381.68
316. 4.3 5975.54
251. 3.1 6608.78
200. 0.6 7282.39
158. 0.5 7997.38
126. 0.4 8754.71
100. 0.3 9555.38
79. 0.2 10400.32
63. 0.2 11290.51
50. 0.2 12226.87
40. 0.1 13210.34
32. 0.1 14241.84
25. 0.1 15322.29
20. 0.1 16452.59
16. 0.1 17633.63
13. 0.0 18866.31
10. 0.0 20151.51
8. 0.0 21490.10
6. 0.0 22882.95
5. 0.0 24330.92
4. 0.0 25834.87
3. 0.0 27395.64
3. 0.0 29014.08
2. 0.0 30691.01
2. 0.0 32427.28
1. 0.0 34223.70
1.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED


A01X13 - ALTERNATE CONDITION - PANAMA - WISTER TOC=471.6
ANNUAL FLOW DURATION
PERCENT
VALUE
100000. 93.6 1.00
79433. 88.8 7.29
63096. 80.7 23.29
50119. 74.9 53.12
39811. 70.4 100.68
31623. 66.0 169.76
25119. 62.1 264.05
19953. 59.3 387.14
15849. 56.3 542.56
12589. 51.4 733.78
10000. 48.4 964.23
7943. 44.7 1237.27
6310. 39.6 1556.24
5012. 34.3 1924.44
3981. 29.0 2345.13
3162. 24.9 2821.53
2512. 20.8 3356.85
1995. 17.4 3954.26
1585. 14.3 4616.92
1259. 11.5 5347.94
1000. 9.1 6150.44
794. 6.5 7027.49
631. 4.1 7982.16
501. 2.8 9017.49
398. 1.8 10136.52
316. 1.5 11342.24
251. 1.1 12637.66
200. 0.9 14025.75
158. 0.7 15509.48
126. 0.5 17091.80
100. 0.4 18775.63
79. 0.3 20563.92
63. 0.2 22459.56
50. 0.2 24465.45
40. 0.2 26584.48
32. 0.1 28819.52
25. 0.1 31173.44
20. 0.1 33649.09
16. 0.1 36249.32
13. 0.1 38976.95
10. 0.1 41834.81
8. 0.0 44825.71
6. 0.0 47952.46
5. 0.0 51217.85
4. 0.0 54624.66
3. 0.0 58175.68
3. 0.0 61873.68
2. 0.0 65721.41
2. 0.0 69721.64
1. 0.0 73877.10
1.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED


A01X14 - BASE CONDITION - WISTER - TOC=478.0
ANNUAL ELEVATION DURATION
PERCENT VALUE
520. 100.0 472.82
99.6 473.54
99.4 474.26
98.4 474.98
97.2 475.70
515. 94.1 476.42
89.0 477.14
74.0 477.86
30.3 478.58
25.9 479.30
510. 22.6 480.02
20.2 480.74
18.1 481.46
16.5 482.18
15.1 482.90
505. 13.7 483.62
12.5 484.34
11.4 485.06
10.6 485.78
9.8 486.50
500. 9.1 487.22
8.4 487.94
7.5 488.66
6.7 489.38
6.1 490.10
495. 5.5 490.83
5.0 491.55
4.6 492.27
4.2 492.99
3.9 493.71
490. 3.6 494.43
3.2 495.15
2.9 495.87
2.6 496.59
2.3 497.31
485. 2.1 498.03
1.8 498.75
1.6 499.47
1.5 500.19
1.3 500.91
480. 1.1 501.63
0.9 502.35
0.7 503.07
0.5 503.79
0.3 504.51
475. 0.1 505.23
0.1 505.95
0.0 506.67
0.0 507.39
0.0 508.11
470.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED


A01X14 - BASE CONDITION - WISTER OUTFLOW - WISTER TOC=478
ANNUAL FLOW DURATION
PERCENT
VALUE
100000. 50.7 1.00
79433. 50.7 5.92
63096. 50.6 16.75
50119. 50.4 35.04
39811. 50.0 62.11
31623. 49.2 99.16
25119. 48.1 147.26
19953. 46.9 207.43
15849. 45.5 280.60
12589. 43.9 367.69
10000. 42.5 469.54
7943. 33.7 586.98
6310. 31.6 720.78
5012. 30.1 871.71
3981. 28.8 1040.50
3162. 28.0 1227.86
2512. 27.4 1434.49
1995. 26.9 1661.04
1585. 26.4 1908.19
1259. 25.2 2176.56
1000. 21.2 2466.79
794. 17.8 2779.48
631. 15.0 3115.23
501. 11.3 3474.63
398. 9.6 3858.26
316. 8.1 4266.68
251. 6.7 4700.45
200. 5.6 5160.12
158. 4.5 5646.22
126. 3.7 6159.28
100. 0.3 6699.82
79. 0.2 7268.37
63. 0.2 7865.42
50. 0.2 8491.48
40. 0.2 9147.04
32. 0.1 9832.59
25. 0.1 10548.61
20. 0.1 11295.57
16. 0.1 12073.95
13. 0.1 12884.22
10. 0.1 13726.82
8. 0.0 14602.22
6. 0.0 15510.86
5. 0.0 16453.19
4. 0.0 17429.66
3. 0.0 18440.69
3. 0.0 19486.73
2. 0.0 20568.19
2. 0.0 21685.51
1. 0.0 22839.10
1.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED


A01X14 - BASE CONDITION - POTEAU - WISTER TOC=478
ANNUAL FLOW DURATION
PERCENT
VALUE
100000. 88.8 1.00
79433. 77.8 6.38
63096. 70.6 18.88
50119. 65.9 40.74
39811. 62.5 74.00
31623. 59.3 120.50
25119. 55.5 181.97
19953. 51.8 260.07
15849. 49.3 356.35
12589. 47.3 472.33
10000. 42.0 609.46
7943. 38.8 769.13
6310. 36.7 952.71
5012. 35.0 1161.53
3981. 32.8 1396.88
3162. 31.0 1660.03
2512. 29.2 1952.21
1995. 27.5 2274.63
1585. 23.9 2628.48
1259. 19.7 3014.93
1000. 16.1 3435.13
794. 13.1 3890.20
631. 10.4 4381.26
501. 8.2 4909.40
398. 6.3 5475.69
316. 4.7 6081.22
251. 2.9 6727.02
200. 0.6 7414.13
158. 0.5 8143.59
126. 0.4 8916.40
100. 0.3 9733.57
79. 0.3 10596.08
63. 0.2 11504.93
50. 0.2 12461.07
40. 0.1 13465.48
32. 0.1 14519.11
25. 0.1 15622.89
20. 0.1 16777.77
16. 0.0 17984.67
13. 0.0 19244.51
10. 0.0 20558.20
8. 0.0 21926.65
6. 0.0 23350.75
5. 0.0 24831.40
4. 0.0 26369.47
3. 0.0 27965.85
3. 0.0 29621.40
2. 0.0 31336.98
2. 0.0 33113.47
1. 0.0 34951.70
1.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED


A01X14 - BASE CONDITION - PANAMA - WISTER TOC=478
ANNUAL FLOW DURATION
PERCENT
VALUE
100000. 92.3 1.00
79433. 86.6 7.30
63096. 76.8 23.35
50119. 70.3 53.27
39811. 65.0 101.01
31623. 60.3 170.39
25119. 55.9 265.11
19953. 52.2 388.80
15849. 48.7 545.01
12589. 44.1 737.26
10000. 40.7 969.00
7943. 38.0 1243.61
6310. 35.7 1564.48
5012. 33.2 1934.92
3981. 30.9 2358.23
3162. 27.2 2837.68
2512. 23.2 3376.48
1995. 19.2 3977.86
1585. 15.7 4644.98
1259. 12.5 5381.02
1000. 9.8 6189.10
794. 6.9 7072.34
631. 4.2 8033.83
501. 2.9 9076.66
398. 1.8 10203.89
316. 1.5 11418.55
251. 1.1 12723.67
200. 0.9 14122.27
158. 0.7 15617.34
126. 0.5 17211.86
100. 0.4 18908.80
79. 0.3 20711.12
63. 0.2 22621.76
50. 0.2 24643.65
40. 0.2 26779.71
32. 0.1 29032.85
25. 0.1 31405.97
20. 0.1 33901.95
16. 0.1 36523.67
13. 0.1 39273.99
10. 0.1 42155.77
8. 0.0 45171.86
6. 0.0 48325.09
5. 0.0 51618.29
4. 0.0 55054.29
3. 0.0 58635.89
3. 0.0 62365.91
2. 0.0 66247.12
2. 0.0 70282.33
1. 0.0 74474.30
1.
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
PERCENT TIME EQUALED OR EXCEEDED

RESERVOIR NO. 24 WISTER A01X14

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK ELEVATION DATA

<----------ANNUAL SERIES DATA---------->					<----------PARTIAL DURATION SERIES DATA---------->				
<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->			<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->		
DATE	ELEVATION (FEET)	DATE	ELEVATION (FEET)	PLOTTING POSITION	DATE	ELEVATION (FEET)	DATE	ELEVATION (FEET)	PLOTTING POSITION
13 APR 1940	481.24	4 MAY 1990	508.11	0.012	23 MAY 1943	503.53	4 MAY 1990	508.11	0.012
26 NOV 1941	489.11	1 APR 1945	507.18	0.030	1 APR 1945	507.18	1 APR 1945	507.18	0.030
30 APR 1942	490.00	2 NOV 1984	504.79	0.048	3 JUN 1946	497.31	2 NOV 1984	504.79	0.048
23 MAY 1943	503.53	5 JUN 1957	504.67	0.066	12 NOV 1946	491.91	5 JUN 1957	504.67	0.066
5 MAY 1944	489.81	26 APR 1973	504.45	0.083	15 DEC 1946	499.27	26 APR 1973	504.45	0.083
1 APR 1945	507.18	10 JUN 1979	503.65	0.101	31 JAN 1949	502.26	10 JUN 1979	503.65	0.101
15 DEC 1946	499.27	23 MAY 1943	503.53	0.119	15 JAN 1950	492.20	23 MAY 1943	503.53	0.119
25 MAY 1947	490.20	22 MAY 1960	502.80	0.136	14 FEB 1950	493.52	22 MAY 1960	502.80	0.136
3 MAR 1948	488.23	15 DEC 1971	502.55	0.154	31 JUL 1950	491.78	15 DEC 1971	502.55	0.154
31 JAN 1949	502.26	31 JAN 1949	502.26	0.172	22 FEB 1951	494.82	31 JAN 1949	502.26	0.172
14 FEB 1950	493.52	30 NOV 1985	499.41	0.190	24 APR 1952	491.95	30 NOV 1985	499.41	0.190
22 FEB 1951	494.82	19 MAY 1968	499.37	0.207	20 MAR 1953	492.95	19 MAY 1968	499.37	0.207
24 APR 1952	491.95	15 DEC 1946	499.27	0.225	26 APR 1953	491.50	15 DEC 1946	499.27	0.225
30 APR 1953	496.16	30 DEC 1987	498.30	0.243	30 APR 1953	496.16	4 APR 1968	498.50	0.243
3 MAY 1954	485.59	1 JAN 1988	497.59	0.261	14 MAY 1953	495.96	30 DEC 1987	498.30	0.261
22 MAR 1955	491.62	26 MAY 1993	497.42	0.278	22 MAR 1955	491.62	26 MAY 1993	497.42	0.278
19 FEB 1956	481.79	14 NOV 1974	496.65	0.296	6 APR 1957	491.98	3 JUN 1946	497.31	0.296
5 JUN 1957	504.67	19 FEB 1989	496.40	0.314	5 JUN 1957	504.67	14 NOV 1974	496.65	0.314
4 MAY 1958	491.93	30 APR 1953	496.16	0.332	4 MAY 1958	491.93	10 JUN 1974	496.49	0.332
20 DEC 1959	484.09	1 JAN 1972	495.80	0.349	10 MAY 1958	491.52	19 FEB 1989	496.40	0.349
22 MAY 1960	502.80	17 NOV 1994	495.66	0.367	22 MAY 1960	502.80	30 APR 1953	496.16	0.367
25 NOV 1961	487.97	19 DEC 1992	495.25	0.385	4 APR 1968	498.50	14 MAY 1953	495.96	0.385
25 FEB 1962	482.00	22 FEB 1951	494.82	0.402	19 MAY 1968	499.37	17 NOV 1994	495.66	0.402
29 APR 1963	479.55	2 NOV 1991	494.44	0.420	30 DEC 1968	493.32	3 APR 1979	495.40	0.420
20 NOV 1964	485.26	2 MAY 1970	494.28	0.438	2 MAY 1970	494.28	5 DEC 1973	495.29	0.438
12 FEB 1965	484.07	14 FEB 1950	493.52	0.456	15 DEC 1971	502.55	6 JUN 1973	495.26	0.456
27 APR 1966	489.82	9 JUN 1981	492.90	0.473	13 MAR 1973	492.95	19 DEC 1992	495.25	0.473
23 DEC 1967	488.07	22 MAY 1983	492.80	0.491	26 APR 1973	504.45	22 FEB 1951	494.82	0.491
19 MAY 1968	499.37	20 JAN 1995	492.74	0.509	6 JUN 1973	495.26	2 NOV 1991	494.44	0.509
1 JAN 1969	492.19	30 MAR 1977	492.70	0.527	5 DEC 1973	495.29	2 MAY 1970	494.28	0.527
2 MAY 1970	494.28	11 JUN 1986	492.28	0.544	10 JUN 1974	496.49	29 MAR 1990	493.98	0.545
15 DEC 1971	502.55	1 JAN 1969	492.19	0.562	14 NOV 1974	496.65	14 FEB 1950	493.52	0.563
1 JAN 1972	495.80	24 APR 1952	491.95	0.580	30 MAR 1977	492.70	30 DEC 1968	493.32	0.580
26 APR 1973	504.45	4 MAY 1958	491.93	0.598	3 APR 1979	495.40	13 MAR 1973	492.95	0.598
14 NOV 1974	496.65	5 JUN 1982	491.66	0.615	10 JUN 1979	503.65	20 MAR 1953	492.95	0.616
6 FEB 1975	488.03	22 MAR 1955	491.62	0.633	9 JUN 1981	492.90	9 JUN 1981	492.90	0.634
22 APR 1976	484.75	25 MAY 1947	490.20	0.651	3 FEB 1982	491.55	22 MAY 1983	492.80	0.652
30 MAR 1977	492.70	30 APR 1942	490.00	0.668	17 MAY 1982	491.50	20 JAN 1995	492.74	0.670
26 MAR 1978	485.40	27 APR 1966	489.82	0.686	5 JUN 1982	491.66	30 MAR 1977	492.70	0.688
10 JUN 1979	503.65	5 MAY 1944	489.81	0.704	22 MAY 1983	492.80	11 MAY 1995	492.52	0.705
4 MAY 1980	481.55	26 NOV 1941	489.11	0.722	2 NOV 1984	504.79	17 FEB 1990	492.47	0.723
9 JUN 1981	492.90	3 MAR 1948	488.23	0.739	30 NOV 1985	499.41	11 JUN 1986	492.28	0.741
5 JUN 1982	491.66	23 DEC 1967	488.07	0.757	11 JUN 1986	492.28	15 JAN 1950	492.20	0.759
22 MAY 1983	492.80	6 FEB 1975	488.03	0.775	30 DEC 1987	498.30	6 APR 1957	491.98	0.777
2 NOV 1984	504.79	25 NOV 1961	487.97	0.793	19 FEB 1989	496.40	24 APR 1952	491.95	0.795
30 NOV 1985	499.41	3 MAY 1954	485.59	0.810	17 FEB 1990	492.47	4 MAY 1958	491.93	0.813
11 JUN 1986	492.28	26 MAR 1978	485.40	0.828	29 MAR 1990	493.98	12 NOV 1946	491.91	0.830
30 DEC 1987	498.30	20 NOV 1964	485.26	0.846	4 MAY 1990	508.11	8 MAY 1994	491.79	0.848
1 JAN 1988	497.59	22 APR 1976	484.75	0.864	2 NOV 1991	494.44	31 JUL 1950	491.78	0.866
19 FEB 1989	496.40	20 DEC 1959	484.09	0.881	19 DEC 1992	495.25	6 JAN 1993	491.73	0.884
4 MAY 1990	508.11	12 FEB 1965	484.07	0.899	6 JAN 1993	491.73	5 JUN 1982	491.66	0.902
2 NOV 1991	494.44	25 FEB 1962	482.00	0.917	26 MAY 1993	497.42	22 MAR 1955	491.62	0.920
19 DEC 1992	495.25	19 FEB 1956	481.79	0.934	8 MAY 1994	491.79	3 FEB 1982	491.55	0.938
26 MAY 1993	497.42	4 MAY 1980	481.55	0.952	17 NOV 1994	495.66	10 MAY 1958	491.52	0.955
17 NOV 1994	495.66	13 APR 1940	481.24	0.970	20 JAN 1995	492.74	26 APR 1953	491.50	0.973
20 JAN 1995	492.74	29 APR 1963	479.55	0.988	11 MAY 1995	492.52	17 MAY 1982	491.50	0.991

Base for partial duration series is 490.98

CONTROL POINT NO. 24 WISTER OUTFLOW A01X14

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK FLOW DATA

<----------ANNUAL SERIES DATA---------->					<----------PARTIAL DURATION SERIES DATA---------->				
<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->			<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->		
DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION	DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION
14 APR 1940	3191.	4 MAY 1990	22839.	0.012	2 JUN 1943	6600.	4 MAY 1990	22839.	0.012
29 NOV 1941	5584.	1 APR 1945	17662.	0.030	11 JUN 1943	6600.	1 APR 1945	17662.	0.030
2 MAY 1942	6372.	2 NOV 1984	6982.	0.048	13 JUN 1943	6600.	21 MAR 1945	15152.	0.048
2 JUN 1943	6600.	2 JUN 1943	6600.	0.066	17 JUN 1943	6600.	18 MAY 1945	11003.	0.066
7 MAY 1944	6345.	27 MAY 1946	6600.	0.083	6 MAR 1945	10156.	6 MAR 1945	10156.	0.083
1 APR 1945	17662.	1 FEB 1949	6600.	0.101	14 MAR 1945	7220.	15 JUN 1945	9906.	0.101
27 MAY 1946	6600.	17 JAN 1950	6600.	0.119	21 MAR 1945	15152.	14 MAR 1945	7220.	0.119
26 MAY 1947	6500.	24 FEB 1951	6600.	0.136	1 APR 1945	17662.	2 NOV 1984	6982.	0.136
4 MAR 1948	5635.	26 APR 1952	6600.	0.154	20 APR 1945	6600.	20 MAY 1990	6605.	0.154
1 FEB 1949	6600.	22 MAR 1953	6600.	0.172	30 APR 1945	6600.	23 MAY 1945	6600.	0.172
17 JAN 1950	6600.	24 MAR 1955	6600.	0.190	8 MAY 1945	6600.	6 NOV 1984	6600.	0.190
24 FEB 1951	6600.	8 APR 1957	6600.	0.207	13 MAY 1945	6600.	2 JUN 1943	6600.	0.207
26 APR 1952	6600.	7 MAY 1958	6600.	0.225	18 MAY 1945	11003.	11 JUN 1943	6600.	0.225
22 MAR 1953	6600.	22 MAY 1960	6600.	0.243	23 MAY 1945	6600.	13 JUN 1943	6600.	0.243
4 MAY 1954	4686.	26 MAR 1968	6600.	0.261	15 JUN 1945	9906.	17 JUN 1943	6600.	0.261
24 MAR 1955	6600.	1 JAN 1969	6600.	0.278	7 JUL 1945	6600.	20 APR 1945	6600.	0.278
20 FEB 1956	3363.	29 APR 1970	6600.	0.296	20 JUL 1945	6600.	30 APR 1945	6600.	0.296
8 APR 1957	6600.	17 DEC 1971	6600.	0.314	27 MAY 1946	6600.	8 MAY 1945	6600.	0.314
7 MAY 1958	6600.	1 JAN 1972	6600.	0.332	4 JUN 1946	6600.	13 MAY 1945	6600.	0.332
21 DEC 1959	4132.	16 MAR 1973	6600.	0.349	8 JUN 1946	6600.	7 JUL 1945	6600.	0.349
22 MAY 1960	6600.	12 JUN 1974	6600.	0.367	13 NOV 1946	6600.	20 JUL 1945	6600.	0.367
27 NOV 1961	5211.	1 APR 1977	6600.	0.385	15 DEC 1946	6600.	27 MAY 1946	6600.	0.385
26 FEB 1962	3455.	5 MAR 1979	6600.	0.402	1 FEB 1949	6600.	4 JUN 1946	6600.	0.402
30 APR 1963	2604.	12 JUN 1981	6600.	0.420	18 FEB 1949	6600.	8 JUN 1946	6600.	0.420
22 NOV 1964	4429.	6 FEB 1982	6600.	0.438	25 FEB 1949	6600.	13 NOV 1946	6600.	0.438
13 FEB 1965	4140.	23 MAY 1983	6600.	0.456	17 JAN 1950	6600.	15 DEC 1946	6600.	0.456
28 APR 1966	6434.	5 JAN 1985	6600.	0.473	16 FEB 1950	6600.	1 FEB 1949	6600.	0.473
24 DEC 1967	5501.	14 JUN 1986	6600.	0.491	3 AUG 1950	6600.	18 FEB 1949	6600.	0.491
26 MAR 1968	6600.	31 DEC 1987	6600.	0.509	6 AUG 1950	6600.	25 FEB 1949	6600.	0.509
1 JAN 1969	6600.	2 JAN 1988	6600.	0.527	24 FEB 1951	6600.	17 JAN 1950	6600.	0.527
29 APR 1970	6600.	22 FEB 1989	6600.	0.544	26 APR 1952	6600.	16 FEB 1950	6600.	0.545
17 DEC 1971	6600.	19 APR 1991	6600.	0.562	22 MAR 1953	6600.	3 AUG 1950	6600.	0.563
1 JAN 1972	6600.	27 DEC 1992	6600.	0.580	9 APR 1953	6600.	6 AUG 1950	6600.	0.580
16 MAR 1973	6600.	8 JAN 1993	6600.	0.598	2 MAY 1953	6600.	24 FEB 1951	6600.	0.598
12 JUN 1974	6600.	13 MAR 1994	6600.	0.615	17 MAY 1953	6600.	26 APR 1952	6600.	0.616
9 MAY 1975	5432.	23 JAN 1995	6600.	0.633	24 MAR 1955	6600.	22 MAR 1953	6600.	0.634
23 APR 1976	4368.	26 MAY 1947	6500.	0.651	8 APR 1957	6600.	9 APR 1953	6600.	0.652
1 APR 1977	6600.	28 APR 1966	6434.	0.668	2 MAY 1957	6600.	2 MAY 1953	6600.	0.670
27 MAR 1978	4590.	2 MAY 1942	6372.	0.686	4 MAY 1957	6600.	17 MAY 1953	6600.	0.688
5 MAR 1979	6600.	7 MAY 1944	6345.	0.704	21 MAY 1957	6600.	24 MAR 1955	6600.	0.705
5 MAY 1980	3250.	4 MAR 1948	5635.	0.722	23 JUN 1957	6600.	8 APR 1957	6600.	0.723
12 JUN 1981	6600.	29 NOV 1941	5584.	0.739	9 JUL 1957	6600.	2 MAY 1957	6600.	0.741
6 FEB 1982	6600.	24 DEC 1967	5501.	0.757	12 JUL 1957	6600.	4 MAY 1957	6600.	0.759
23 MAY 1983	6600.	9 MAY 1975	5432.	0.775	15 JUL 1957	6600.	21 MAY 1957	6600.	0.777
2 NOV 1984	6982.	27 NOV 1961	5211.	0.793	19 JUL 1957	6600.	23 JUN 1957	6600.	0.795
5 JAN 1985	6600.	4 MAY 1954	4686.	0.810	21 JUL 1957	6600.	9 JUL 1957	6600.	0.813
14 JUN 1986	6600.	27 MAR 1978	4590.	0.828	7 MAY 1958	6600.	12 JUL 1957	6600.	0.830
31 DEC 1987	6600.	22 NOV 1964	4429.	0.846	12 MAY 1958	6600.	15 JUL 1957	6600.	0.848
2 JAN 1988	6600.	23 APR 1976	4368.	0.864	22 MAY 1960	6600.	19 JUL 1957	6600.	0.866
22 FEB 1989	6600.	13 FEB 1965	4140.	0.881	9 JUN 1960	6600.	21 JUL 1957	6600.	0.884
4 MAY 1990	22839.	21 DEC 1959	4132.	0.899	26 MAR 1968	6600.	7 MAY 1958	6600.	0.902
19 APR 1991	6600.	26 FEB 1962	3455.	0.917	5 APR 1968	6600.	12 MAY 1958	6600.	0.920
27 DEC 1992	6600.	20 FEB 1956	3363.	0.934	2 NOV 1984	6982.	22 MAY 1960	6600.	0.938
8 JAN 1993	6600.	5 MAY 1980	3250.	0.952	6 NOV 1984	6600.	9 JUN 1960	6600.	0.955
13 MAR 1994	6600.	14 APR 1940	3191.	0.970	4 MAY 1990	22839.	26 MAR 1968	6600.	0.973
23 JAN 1995	6600.	30 APR 1963	2604.	0.988	20 MAY 1990	6605.	5 APR 1968	6600.	0.991

Base for partial duration series is 5944.
NHYPO 2
PHYPO 0.0050 0.0010
QHYPO 33981. 57268.

CONTROL POINT NO. 46 POTEAU A01X14

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK FLOW DATA

<----------ANNUAL SERIES DATA---------->					<----------PARTIAL DURATION SERIES DATA---------->				
<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->			<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->		
DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION	DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION
14 APR 1940	3504.	3 MAY 1990	41136.	0.012	11 MAY 1943	8710.	3 MAY 1990	41136.	0.012
21 APR 1941	5754.	16 SEP 1950	26043.	0.030	1 APR 1945	17816.	16 SEP 1950	26043.	0.030
3 MAY 1942	6467.	18 MAY 1945	25288.	0.048	18 MAY 1945	25288.	18 MAY 1945	25288.	0.048
11 MAY 1943	8710.	14 MAY 1968	25080.	0.066	12 JUN 1945	17226.	14 MAY 1968	25080.	0.066
8 MAY 1944	6578.	11 DEC 1971	24328.	0.083	6 NOV 1946	9170.	11 DEC 1971	24328.	0.083
18 MAY 1945	25288.	26 APR 1957	21903.	0.101	10 DEC 1946	17056.	26 APR 1957	21903.	0.101
10 DEC 1946	17056.	24 APR 1953	19886.	0.119	11 APR 1947	8620.	24 APR 1953	19886.	0.119
17 MAY 1947	8803.	20 MAY 1960	17202.	0.136	17 MAY 1947	8803.	1 APR 1945	17816.	0.136
27 FEB 1948	6943.	24 APR 1973	17195.	0.154	11 MAY 1950	8515.	12 JUN 1945	17226.	0.154
14 FEB 1949	7598.	10 DEC 1946	17056.	0.172	29 JUL 1950	16978.	20 MAY 1960	17202.	0.172
16 SEP 1950	26043.	14 JAN 1995	14877.	0.190	16 SEP 1950	26043.	24 APR 1973	17195.	0.190
18 FEB 1951	9537.	10 MAY 1993	14534.	0.207	18 FEB 1951	9537.	10 DEC 1946	17056.	0.207
12 APR 1952	9091.	23 FEB 1985	13387.	0.225	11 JUN 1951	8489.	29 JUL 1950	16978.	0.225
24 APR 1953	19886.	26 DEC 1987	12894.	0.243	12 APR 1952	9091.	3 APR 1957	15196.	0.243
5 MAY 1954	4847.	3 MAY 1958	12391.	0.261	14 MAR 1953	12104.	21 MAY 1990	15121.	0.261
21 MAR 1955	8384.	4 NOV 1959	11378.	0.278	18 MAR 1953	13152.	14 JAN 1995	14877.	0.278
18 FEB 1956	4470.	15 DEC 1992	11115.	0.296	24 APR 1953	19886.	10 MAY 1993	14534.	0.296
26 APR 1957	21903.	30 OCT 1991	11057.	0.314	29 APR 1953	9353.	23 FEB 1985	13387.	0.314
3 MAY 1958	12391.	16 FEB 1989	10765.	0.332	13 MAY 1953	10087.	18 MAR 1953	13152.	0.332
4 NOV 1959	11378.	2 NOV 1984	10587.	0.349	3 APR 1957	15196.	26 DEC 1987	12894.	0.349
20 MAY 1960	17202.	15 NOV 1988	10245.	0.367	26 APR 1957	21903.	25 MAY 1957	12702.	0.367
19 MAY 1961	8108.	18 FEB 1951	9537.	0.385	25 MAY 1957	12702.	27 NOV 1985	12427.	0.385
27 FEB 1962	4655.	20 APR 1986	9320.	0.402	5 JUN 1957	9436.	3 MAY 1958	12391.	0.402
30 APR 1963	3057.	12 APR 1952	9091.	0.420	3 MAY 1958	12391.	14 MAR 1953	12104.	0.420
22 NOV 1964	4737.	23 MAY 1979	8909.	0.438	4 NOV 1959	11378.	25 NOV 1973	11985.	0.438
27 MAY 1965	5595.	17 MAY 1947	8803.	0.456	6 MAY 1960	11048.	21 APR 1990	11679.	0.456
1 MAY 1966	7153.	7 MAY 1975	8803.	0.473	20 MAY 1960	17202.	4 NOV 1959	11378.	0.473
25 DEC 1967	5620.	11 MAY 1943	8710.	0.491	21 MAR 1968	10983.	15 DEC 1992	11115.	0.491
14 MAY 1968	25080.	5 NOV 1994	8671.	0.509	14 MAY 1968	25080.	30 OCT 1991	11057.	0.509
1 JAN 1969	7121.	28 MAR 1977	8437.	0.527	11 DEC 1971	24328.	2 FEB 1990	11055.	0.527
18 APR 1970	7235.	21 MAR 1955	8384.	0.544	24 APR 1973	17195.	6 MAY 1960	11048.	0.545
11 DEC 1971	24328.	19 MAY 1961	8108.	0.562	25 NOV 1973	11985.	21 MAR 1968	10983.	0.563
15 NOV 1972	6870.	15 MAY 1982	7623.	0.580	7 MAY 1975	8803.	16 FEB 1989	10765.	0.580
24 APR 1973	17195.	14 FEB 1949	7598.	0.598	14 JAN 1995	14877.	26 OCT 1991	10752.	0.598
25 NOV 1974	7200.	18 APR 1970	7235.	0.615	5 NOV 1994	8671.	2 NOV 1984	10587.	0.616
7 MAY 1975	8803.	25 NOV 1974	7200.	0.633	23 MAY 1979	8909.	15 NOV 1988	10245.	0.634
24 APR 1976	4483.	1 MAY 1966	7153.	0.651	21 OCT 1984	9439.	13 MAY 1953	10087.	0.652
28 MAR 1977	8437.	23 MAY 1983	7139.	0.668	2 NOV 1984	10587.	19 NOV 1985	9858.	0.670
25 MAR 1978	6525.	1 JAN 1969	7121.	0.686	23 FEB 1985	13387.	2 APR 1988	9739.	0.688
23 MAY 1979	8909.	27 FEB 1948	6943.	0.704	19 NOV 1985	9858.	18 FEB 1951	9537.	0.705
6 MAY 1980	3557.	15 NOV 1972	6870.	0.722	27 NOV 1985	12427.	21 OCT 1984	9439.	0.723
13 JUN 1981	6774.	13 JUN 1981	6774.	0.739	20 APR 1986	9320.	5 JUN 1957	9436.	0.741
15 MAY 1982	7623.	8 MAY 1944	6578.	0.757	6 JUN 1986	8760.	29 APR 1953	9353.	0.759
23 MAY 1983	7139.	25 MAR 1978	6525.	0.775	26 DEC 1987	12894.	20 APR 1986	9320.	0.777
2 NOV 1984	10587.	3 MAY 1942	6467.	0.793	2 APR 1988	9739.	6 NOV 1946	9170.	0.795
23 FEB 1985	13387.	21 APR 1941	5754.	0.810	15 NOV 1988	10245.	12 APR 1952	9091.	0.813
20 APR 1986	9320.	25 DEC 1967	5620.	0.828	16 FEB 1989	10765.	23 MAY 1979	8909.	0.830
26 DEC 1987	12894.	27 MAY 1965	5595.	0.846	2 FEB 1990	11055.	17 MAY 1947	8803.	0.848
15 NOV 1988	10245.	5 MAY 1954	4847.	0.864	21 APR 1990	11679.	7 MAY 1975	8803.	0.866
16 FEB 1989	10765.	22 NOV 1964	4737.	0.881	3 MAY 1990	41136.	14 APR 1991	8796.	0.884
3 MAY 1990	41136.	27 FEB 1962	4655.	0.899	21 MAY 1990	15121.	6 JUN 1986	8760.	0.902
30 OCT 1991	11057.	24 APR 1976	4483.	0.917	14 APR 1991	8796.	11 MAY 1943	8710.	0.920
15 DEC 1992	11115.	18 FEB 1956	4470.	0.934	26 OCT 1991	10752.	5 NOV 1994	8671.	0.938
10 MAY 1993	14534.	6 MAY 1980	3557.	0.952	30 OCT 1991	11057.	11 APR 1947	8620.	0.955
5 NOV 1994	8671.	14 APR 1940	3504.	0.970	15 DEC 1992	11115.	11 MAY 1950	8515.	0.973
14 JAN 1995	14877.	30 APR 1963	3057.	0.988	10 MAY 1993	14534.	11 JUN 1951	8489.	0.991

Base for partial duration series is 5484.
NHYPO 2
PHYPO 0.0050 0.0010
QHYPO 106467. 138374.

CONTROL POINT NO. 47 PANAMA A01X14

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK FLOW DATA

<-----ANNUAL SERIES DATA----->					<-----PARTIAL DURATION SERIES DATA----->				
<-CHRONOLOGICAL DATA->		<---ORDERED DATA--->			<-CHRONOLOGICAL DATA->		<---ORDERED DATA--->		
DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION	DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION
11 APR 1940	6212.	3 MAY 1990	80886.	0.012	11 MAY 1943	22818.	3 MAY 1990	80886.	0.012
31 OCT 1941	10691.	16 SEP 1950	68884.	0.030	19 MAR 1945	25200.	16 SEP 1950	68884.	0.030
30 DEC 1942	12464.	14 MAY 1968	65810.	0.048	31 MAR 1945	21903.	14 MAY 1968	65810.	0.048
11 MAY 1943	22818.	11 DEC 1971	61336.	0.066	18 MAY 1945	48354.	11 DEC 1971	61336.	0.066
5 MAY 1944	10327.	26 APR 1957	57935.	0.083	12 JUN 1945	39045.	26 APR 1957	57935.	0.083
18 MAY 1945	48354.	24 APR 1953	52977.	0.101	6 NOV 1946	24255.	24 APR 1953	52977.	0.101
10 DEC 1946	45420.	18 MAY 1945	48354.	0.119	10 DEC 1946	45420.	18 MAY 1945	48354.	0.119
17 MAY 1947	23416.	10 DEC 1946	45420.	0.136	11 APR 1947	22848.	10 DEC 1946	45420.	0.136
27 FEB 1948	18594.	20 MAY 1960	39302.	0.154	29 APR 1947	20583.	29 JUL 1950	45409.	0.154
14 FEB 1949	20560.	24 APR 1973	36067.	0.172	17 MAY 1947	23416.	3 APR 1957	40520.	0.172
16 SEP 1950	68884.	3 MAY 1958	32575.	0.190	14 FEB 1949	20560.	20 MAY 1960	39302.	0.190
18 FEB 1951	25225.	4 NOV 1959	29914.	0.207	11 MAY 1950	22881.	12 JUN 1945	39045.	0.207
12 APR 1952	24303.	30 OCT 1991	28966.	0.225	23 JUL 1950	21067.	24 APR 1973	36067.	0.225
24 APR 1953	52977.	27 DEC 1987	25589.	0.243	29 JUL 1950	45409.	18 MAR 1953	34789.	0.243
2 MAY 1954	8812.	18 FEB 1951	25225.	0.261	16 SEP 1950	68884.	3 MAY 1958	32575.	0.261
21 MAR 1955	22186.	21 OCT 1984	24768.	0.278	18 FEB 1951	25225.	14 MAR 1953	32096.	0.278
18 FEB 1956	8450.	16 DEC 1992	24744.	0.296	11 JUN 1951	22560.	25 NOV 1973	31450.	0.296
26 APR 1957	57935.	12 APR 1952	24303.	0.314	12 APR 1952	24303.	25 MAY 1957	30982.	0.314
3 MAY 1958	32575.	25 FEB 1985	23660.	0.332	14 MAR 1953	32096.	4 NOV 1959	29914.	0.332
4 NOV 1959	29914.	7 MAY 1975	23648.	0.349	18 MAR 1953	34789.	6 MAY 1960	29202.	0.349
20 MAY 1960	39302.	17 MAY 1947	23416.	0.367	24 APR 1953	52977.	30 OCT 1991	28966.	0.367
19 MAY 1961	21275.	15 JAN 1995	23383.	0.385	29 APR 1953	25429.	21 MAR 1968	28821.	0.385
24 FEB 1962	10341.	23 MAY 1979	23378.	0.402	13 MAY 1953	26681.	26 OCT 1991	28167.	0.402
28 APR 1963	4738.	11 MAY 1943	22818.	0.420	21 MAR 1955	22186.	13 MAY 1953	26681.	0.420
12 MAY 1964	13458.	21 MAR 1955	22186.	0.438	3 APR 1957	40520.	27 DEC 1987	25589.	0.438
27 MAY 1965	14681.	28 MAR 1977	22139.	0.456	26 APR 1957	57935.	29 APR 1953	25429.	0.456
25 APR 1966	16340.	16 FEB 1989	21354.	0.473	25 MAY 1957	30982.	18 FEB 1951	25225.	0.473
22 DEC 1967	13829.	19 MAY 1961	21275.	0.491	3 MAY 1958	32575.	19 MAR 1945	25200.	0.491
14 MAY 1968	65810.	14 FEB 1949	20560.	0.509	4 NOV 1959	29914.	21 OCT 1984	24768.	0.509
23 FEB 1969	16539.	15 MAY 1982	20002.	0.527	6 MAY 1960	29202.	16 DEC 1992	24744.	0.527
18 APR 1970	19151.	18 APR 1970	19151.	0.544	20 MAY 1960	39302.	12 APR 1952	24303.	0.545
11 DEC 1971	61336.	27 FEB 1948	18594.	0.562	19 MAY 1961	21275.	6 NOV 1946	24255.	0.563
7 NOV 1972	14620.	11 MAY 1993	17268.	0.580	23 NOV 1961	19948.	25 FEB 1985	23660.	0.580
24 APR 1973	36067.	25 MAR 1978	17122.	0.598	21 MAR 1968	28821.	7 MAY 1975	23648.	0.598
1 MAY 1974	15613.	23 FEB 1969	16539.	0.615	14 MAY 1968	65810.	17 MAY 1947	23416.	0.616
7 MAY 1975	23648.	6 NOV 1994	16492.	0.633	28 DEC 1968	22024.	15 JAN 1995	23383.	0.634
20 APR 1976	7855.	25 APR 1966	16340.	0.651	11 DEC 1971	61336.	23 MAY 1979	23378.	0.652
28 MAR 1977	22139.	7 JUN 1981	16038.	0.668	24 APR 1973	36067.	14 APR 1991	23044.	0.670
25 MAR 1978	17122.	7 JUN 1986	15890.	0.686	25 NOV 1973	31450.	11 MAY 1950	22881.	0.688
23 MAY 1979	23378.	1 MAY 1974	15613.	0.704	28 MAR 1975	20499.	11 APR 1947	22848.	0.705
3 MAY 1980	10062.	22 NOV 1988	14692.	0.722	7 MAY 1975	23648.	11 MAY 1943	22818.	0.723
7 JUN 1981	16038.	27 MAY 1965	14681.	0.739	28 MAR 1977	22139.	11 JUN 1951	22560.	0.741
15 MAY 1982	20002.	7 NOV 1972	14620.	0.757	23 MAY 1979	23378.	21 MAR 1955	22186.	0.759
16 MAY 1983	12914.	22 DEC 1967	13829.	0.775	15 MAY 1982	20002.	28 MAR 1977	22139.	0.777
21 OCT 1984	24768.	12 MAY 1964	13458.	0.793	9 MAY 1995	20687.	28 DEC 1968	22024.	0.795
25 FEB 1985	23660.	16 MAY 1983	12914.	0.810	21 OCT 1984	24768.	31 MAR 1945	21903.	0.813
7 JUN 1986	15890.	30 DEC 1942	12464.	0.828	25 FEB 1985	23660.	16 FEB 1989	21354.	0.830
27 DEC 1987	25589.	31 OCT 1941	10691.	0.846	27 DEC 1987	25589.	19 MAY 1961	21275.	0.848
22 NOV 1988	14692.	24 FEB 1962	10341.	0.864	16 FEB 1989	21354.	23 JUL 1950	21067.	0.866
16 FEB 1989	21354.	5 MAY 1944	10327.	0.881	3 MAY 1990	80886.	2 DEC 1991	20697.	0.884
3 MAY 1990	80886.	3 MAY 1980	10062.	0.899	14 APR 1991	23044.	9 MAY 1995	20687.	0.902
30 OCT 1991	28966.	2 MAY 1954	8812.	0.917	26 OCT 1991	28167.	29 APR 1947	20583.	0.920
16 DEC 1992	24744.	18 FEB 1956	8450.	0.934	30 OCT 1991	28966.	14 FEB 1949	20560.	0.938
11 MAY 1993	17268.	20 APR 1976	7855.	0.952	2 DEC 1991	20697.	28 MAR 1975	20499.	0.955
6 NOV 1994	16492.	11 APR 1940	6212.	0.970	16 DEC 1992	24744.	15 MAY 1982	20002.	0.973
15 JAN 1995	23383.	28 APR 1963	4738.	0.988	15 JAN 1995	23383.	23 NOV 1961	19948.	0.991

Base for partial duration series is 9000.
NHYPO 2
PHYPO 0.0050 0.0010
QHYPO 179318. 231207.

RESERVOIR NO. 24 WISTER A01X13

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK ELEVATION DATA

<----------ANNUAL SERIES DATA---------->					<----------PARTIAL DURATION SERIES DATA---------->				
<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->			<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->		
DATE	ELEVATION (FEET)	DATE	ELEVATION (FEET)	PLOTTING POSITION	DATE	ELEVATION (FEET)	DATE	ELEVATION (FEET)	PLOTTING POSITION
14 APR 1940	478.47	4 MAY 1990	508.01	0.012	31 MAY 1943	503.21	4 MAY 1990	508.01	0.012
26 NOV 1941	487.35	1 APR 1945	507.18	0.030	1 APR 1945	507.18	1 APR 1945	507.18	0.030
30 APR 1942	489.07	5 JUN 1957	504.67	0.048	3 JUN 1946	497.38	5 JUN 1957	504.67	0.048
31 MAY 1943	503.21	3 NOV 1984	504.43	0.066	15 DEC 1946	498.96	3 NOV 1984	504.43	0.066
5 MAY 1944	489.01	26 APR 1973	504.19	0.083	31 JAN 1949	501.41	26 APR 1973	504.19	0.083
1 APR 1945	507.18	10 JUN 1979	503.48	0.101	15 JAN 1950	491.12	10 JUN 1979	503.48	0.101
15 DEC 1946	498.96	31 MAY 1943	503.21	0.119	14 FEB 1950	493.31	31 MAY 1943	503.21	0.119
25 MAY 1947	489.81	22 MAY 1960	502.16	0.136	2 AUG 1950	490.26	22 MAY 1960	502.16	0.136
3 MAR 1948	486.90	31 JAN 1949	501.41	0.154	22 FEB 1951	492.59	31 JAN 1949	501.41	0.154
31 JAN 1949	501.41	15 DEC 1971	501.20	0.172	24 APR 1952	491.38	15 DEC 1971	501.20	0.172
14 FEB 1950	493.31	19 MAY 1968	499.09	0.190	20 MAR 1953	491.29	19 MAY 1968	499.09	0.190
22 FEB 1951	492.59	15 DEC 1946	498.96	0.207	7 APR 1953	489.90	15 DEC 1946	498.96	0.207
24 APR 1952	491.38	30 NOV 1985	497.53	0.225	30 APR 1953	495.80	30 NOV 1985	497.53	0.225
30 APR 1953	495.80	30 DEC 1987	497.19	0.243	14 MAY 1953	495.65	3 JUN 1946	497.38	0.243
4 MAY 1954	483.08	26 MAY 1993	496.96	0.261	22 MAR 1955	490.59	30 DEC 1987	497.19	0.261
22 MAR 1955	490.59	1 JAN 1988	496.49	0.278	6 APR 1957	491.45	4 APR 1968	497.18	0.278
19 FEB 1956	479.05	30 APR 1953	495.80	0.296	5 JUN 1957	504.67	26 MAY 1993	496.96	0.296
5 JUN 1957	504.67	10 JUN 1974	495.74	0.314	4 MAY 1958	491.66	6 JUN 1973	496.11	0.314
4 MAY 1958	491.66	19 FEB 1989	495.46	0.332	22 MAY 1960	502.16	30 APR 1953	495.80	0.332
20 DEC 1959	481.02	1 JAN 1972	494.32	0.349	4 APR 1968	497.18	10 JUN 1974	495.74	0.349
22 MAY 1960	502.16	19 DEC 1992	493.83	0.367	19 MAY 1968	499.09	14 MAY 1953	495.65	0.367
25 NOV 1961	484.63	17 NOV 1994	493.81	0.385	30 DEC 1968	492.51	19 FEB 1989	495.46	0.385
28 FEB 1962	479.27	13 JUN 1986	493.47	0.402	2 MAY 1970	492.34	3 APR 1979	495.14	0.402
30 APR 1963	475.31	14 FEB 1950	493.31	0.420	15 DEC 1971	501.20	15 NOV 1974	495.11	0.420
20 NOV 1964	481.76	22 FEB 1951	492.59	0.438	13 MAR 1973	492.16	5 DEC 1973	493.94	0.438
31 MAR 1965	480.62	2 MAY 1970	492.34	0.456	26 APR 1973	504.19	19 DEC 1992	493.83	0.456
27 APR 1966	487.13	2 NOV 1991	492.24	0.473	6 JUN 1973	496.11	17 NOV 1994	493.81	0.473
23 DEC 1967	485.07	9 JUN 1981	492.13	0.491	5 DEC 1973	493.94	13 JUN 1986	493.47	0.491
19 MAY 1968	499.09	22 MAY 1983	492.01	0.509	10 JUN 1974	495.74	14 FEB 1950	493.31	0.509
1 JAN 1969	491.38	11 MAY 1995	491.76	0.527	15 NOV 1974	495.11	29 MAR 1990	493.14	0.527
2 MAY 1970	492.34	4 MAY 1958	491.66	0.544	30 MAR 1977	491.01	22 FEB 1951	492.59	0.545
15 DEC 1971	501.20	1 JAN 1969	491.38	0.562	3 APR 1979	495.14	30 DEC 1968	492.51	0.563
1 JAN 1972	494.32	24 APR 1952	491.38	0.580	10 JUN 1979	503.48	2 MAY 1970	492.34	0.580
26 APR 1973	504.19	30 MAR 1977	491.01	0.598	9 JUN 1981	492.13	2 NOV 1991	492.24	0.598
10 JUN 1974	495.74	22 MAR 1955	490.59	0.615	5 JUN 1982	490.40	13 MAR 1973	492.16	0.616
28 MAR 1975	487.76	5 JUN 1982	490.40	0.633	22 MAY 1983	492.01	9 JUN 1981	492.13	0.634
22 APR 1976	481.40	25 MAY 1947	489.81	0.651	3 NOV 1984	504.43	22 MAY 1983	492.01	0.652
30 MAR 1977	491.01	30 APR 1942	489.07	0.668	6 MAR 1985	490.19	11 MAY 1995	491.76	0.670
26 MAR 1978	482.79	5 MAY 1944	489.01	0.686	30 NOV 1985	497.53	4 MAY 1958	491.66	0.688
10 JUN 1979	503.48	28 MAR 1975	487.76	0.704	13 JUN 1986	493.47	6 APR 1957	491.45	0.705
20 MAY 1980	478.42	26 NOV 1941	487.35	0.722	30 DEC 1987	497.19	24 APR 1952	491.38	0.723
9 JUN 1981	492.13	27 APR 1966	487.13	0.739	19 FEB 1989	495.46	20 MAR 1953	491.29	0.741
5 JUN 1982	490.40	3 MAR 1948	486.90	0.757	17 FEB 1990	489.89	15 JAN 1950	491.12	0.759
22 MAY 1983	492.01	23 DEC 1967	485.07	0.775	29 MAR 1990	493.14	30 MAR 1977	491.01	0.777
3 NOV 1984	504.43	25 NOV 1961	484.63	0.793	4 MAY 1990	508.01	20 JAN 1995	490.94	0.795
30 NOV 1985	497.53	4 MAY 1954	483.08	0.810	18 APR 1991	489.93	22 MAR 1955	490.59	0.813
13 JUN 1986	493.47	26 MAR 1978	482.79	0.828	2 NOV 1991	492.24	5 JUN 1982	490.40	0.830
30 DEC 1987	497.19	20 NOV 1964	481.76	0.846	4 DEC 1991	490.18	8 MAY 1994	490.29	0.848
1 JAN 1988	496.49	22 APR 1976	481.40	0.864	19 DEC 1992	493.83	2 AUG 1950	490.26	0.866
19 FEB 1989	495.46	20 DEC 1959	481.02	0.881	6 JAN 1993	490.17	6 MAR 1985	490.19	0.884
4 MAY 1990	508.01	31 MAR 1965	480.62	0.899	26 MAY 1993	496.96	4 DEC 1991	490.18	0.902
2 NOV 1991	492.24	28 FEB 1962	479.27	0.917	11 MAR 1994	489.97	6 JAN 1993	490.17	0.920
19 DEC 1992	493.83	19 FEB 1956	479.05	0.934	8 MAY 1994	490.29	11 MAR 1994	489.97	0.938
26 MAY 1993	496.96	14 APR 1940	478.47	0.952	17 NOV 1994	493.81	18 APR 1991	489.93	0.955
17 NOV 1994	493.81	20 MAY 1980	478.42	0.970	20 JAN 1995	490.94	7 APR 1953	489.90	0.973
11 MAY 1995	491.76	30 APR 1963	475.31	0.988	11 MAY 1995	491.76	17 FEB 1990	489.89	0.991

Base for partial duration series is 489.48

CONTROL POINT NO. 24 WISTER OUTFLOW A01X13

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK FLOW DATA

<----------ANNUAL SERIES DATA---------->					<----------PARTIAL DURATION SERIES DATA---------->				
<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->			<-CHRONOLOGICAL DATA->		<---------ORDERED DATA--------->		
DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION	DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION
15 APR 1940	2224.	4 MAY 1990	21580.	0.012	3 JUN 1943	6600.	4 MAY 1990	21580.	0.012
28 NOV 1941	4950.	1 APR 1945	17678.	0.030	14 JUN 1943	6600.	1 APR 1945	17678.	0.030
2 MAY 1942	5888.	3 JUN 1943	6600.	0.048	8 MAR 1945	8949.	21 MAR 1945	15152.	0.048
3 JUN 1943	6600.	28 MAY 1946	6600.	0.066	14 MAR 1945	7111.	15 JUN 1945	9792.	0.066
7 MAY 1944	5929.	2 FEB 1949	6600.	0.083	21 MAR 1945	15152.	19 MAY 1945	9498.	0.083
1 APR 1945	17678.	17 JAN 1950	6600.	0.101	1 APR 1945	17678.	8 MAR 1945	8949.	0.101
28 MAY 1946	6600.	24 FEB 1951	6600.	0.119	20 APR 1945	6600.	14 MAR 1945	7111.	0.119
26 MAY 1947	6422.	26 APR 1952	6600.	0.136	4 MAY 1945	6600.	20 MAY 1990	6617.	0.136
4 MAR 1948	5144.	22 MAR 1953	6600.	0.154	13 MAY 1945	6600.	3 JUN 1943	6600.	0.154
2 FEB 1949	6600.	24 MAR 1955	6600.	0.172	19 MAY 1945	9498.	14 JUN 1943	6600.	0.172
17 JAN 1950	6600.	8 APR 1957	6600.	0.190	24 MAY 1945	6600.	20 APR 1945	6600.	0.190
24 FEB 1951	6600.	7 MAY 1958	6600.	0.207	15 JUN 1945	9792.	4 MAY 1945	6600.	0.207
26 APR 1952	6600.	22 MAY 1960	6600.	0.225	7 JUL 1945	6600.	13 MAY 1945	6600.	0.225
22 MAR 1953	6600.	26 MAR 1968	6600.	0.243	20 JUL 1945	6600.	24 MAY 1945	6600.	0.243
4 MAY 1954	3794.	1 JAN 1969	6600.	0.261	28 MAY 1946	6600.	7 JUL 1945	6600.	0.261
24 MAR 1955	6600.	29 APR 1970	6600.	0.278	4 JUN 1946	6600.	20 JUL 1945	6600.	0.278
20 FEB 1956	2438.	17 DEC 1971	6600.	0.296	8 JUN 1946	6600.	28 MAY 1946	6600.	0.296
8 APR 1957	6600.	1 JAN 1972	6600.	0.314	15 DEC 1946	6600.	4 JUN 1946	6600.	0.314
7 MAY 1958	6600.	16 MAR 1973	6600.	0.332	2 FEB 1949	6600.	8 JUN 1946	6600.	0.332
21 DEC 1959	3097.	12 JUN 1974	6600.	0.349	18 FEB 1949	6600.	15 DEC 1946	6600.	0.349
22 MAY 1960	6600.	1 APR 1977	6600.	0.367	25 FEB 1949	6600.	2 FEB 1949	6600.	0.367
26 NOV 1961	4309.	5 APR 1979	6600.	0.385	17 JAN 1950	6600.	18 FEB 1949	6600.	0.385
1 MAR 1962	2514.	11 JUN 1981	6600.	0.402	16 FEB 1950	6600.	25 FEB 1949	6600.	0.402
1 MAY 1963	1474.	23 MAY 1983	6600.	0.420	24 FEB 1951	6600.	17 JAN 1950	6600.	0.420
21 NOV 1964	3371.	29 OCT 1984	6600.	0.438	26 APR 1952	6600.	16 FEB 1950	6600.	0.438
31 MAR 1965	2966.	5 JAN 1985	6600.	0.456	22 MAR 1953	6600.	24 FEB 1951	6600.	0.456
2 MAY 1966	5201.	16 JUN 1986	6600.	0.473	2 MAY 1953	6600.	26 APR 1952	6600.	0.473
24 DEC 1967	4474.	31 DEC 1987	6600.	0.491	17 MAY 1953	6600.	22 MAR 1953	6600.	0.491
26 MAR 1968	6600.	2 JAN 1988	6600.	0.509	24 MAR 1955	6600.	2 MAY 1953	6600.	0.509
1 JAN 1969	6600.	22 FEB 1989	6600.	0.527	8 APR 1957	6600.	17 MAY 1953	6600.	0.527
29 APR 1970	6600.	6 NOV 1991	6600.	0.544	30 APR 1957	6600.	24 MAR 1955	6600.	0.545
17 DEC 1971	6600.	28 DEC 1992	6600.	0.562	4 MAY 1957	6600.	8 APR 1957	6600.	0.563
1 JAN 1972	6600.	16 JUN 1993	6600.	0.580	21 MAY 1957	6600.	30 APR 1957	6600.	0.580
16 MAR 1973	6600.	20 NOV 1994	6600.	0.598	23 JUN 1957	6600.	4 MAY 1957	6600.	0.598
12 JUN 1974	6600.	14 MAY 1995	6600.	0.615	9 JUL 1957	6600.	21 MAY 1957	6600.	0.616
31 MAR 1975	5401.	7 JUN 1982	6500.	0.633	15 JUL 1957	6600.	23 JUN 1957	6600.	0.634
23 APR 1976	3237.	26 MAY 1947	6422.	0.651	7 MAY 1958	6600.	9 JUL 1957	6600.	0.652
1 APR 1977	6600.	7 MAY 1944	5929.	0.668	12 MAY 1958	6600.	15 JUL 1957	6600.	0.670
27 MAR 1978	3709.	2 MAY 1942	5888.	0.686	22 MAY 1960	6600.	7 MAY 1958	6600.	0.688
5 APR 1979	6600.	31 MAR 1975	5401.	0.704	9 JUN 1960	6600.	12 MAY 1958	6600.	0.705
21 MAY 1980	2219.	2 MAY 1966	5201.	0.722	26 MAR 1968	6600.	22 MAY 1960	6600.	0.723
11 JUN 1981	6600.	4 MAR 1948	5144.	0.739	5 APR 1968	6600.	9 JUN 1960	6600.	0.741
7 JUN 1982	6500.	28 NOV 1941	4950.	0.757	21 MAY 1968	6600.	26 MAR 1968	6600.	0.759
23 MAY 1983	6600.	24 DEC 1967	4474.	0.775	3 JUN 1968	6600.	5 APR 1968	6600.	0.777
29 OCT 1984	6600.	26 NOV 1961	4309.	0.793	1 JAN 1969	6600.	21 MAY 1968	6600.	0.795
5 JAN 1985	6600.	4 MAY 1954	3794.	0.810	29 APR 1970	6600.	3 JUN 1968	6600.	0.813
16 JUN 1986	6600.	27 MAR 1978	3709.	0.828	4 MAY 1970	6600.	1 JAN 1969	6600.	0.830
31 DEC 1987	6600.	21 NOV 1964	3371.	0.846	17 DEC 1971	6600.	29 APR 1970	6600.	0.848
2 JAN 1988	6600.	23 APR 1976	3237.	0.864	25 DEC 1971	6600.	4 MAY 1970	6600.	0.866
22 FEB 1989	6600.	21 DEC 1959	3097.	0.881	7 JAN 1972	6600.	17 DEC 1971	6600.	0.884
4 MAY 1990	21580.	31 MAR 1965	2966.	0.899	16 MAR 1973	6600.	25 DEC 1971	6600.	0.902
6 NOV 1991	6600.	1 MAR 1962	2514.	0.917	20 APR 1973	6600.	7 JAN 1972	6600.	0.920
28 DEC 1992	6600.	20 FEB 1956	2438.	0.934	29 APR 1973	6600.	16 MAR 1973	6600.	0.938
16 JUN 1993	6600.	15 APR 1940	2224.	0.952	3 MAY 1973	6600.	20 APR 1973	6600.	0.955
20 NOV 1994	6600.	21 MAY 1980	2219.	0.970	4 MAY 1990	21580.	29 APR 1973	6600.	0.973
14 MAY 1995	6600.	1 MAY 1963	1474.	0.988	20 MAY 1990	6617.	3 MAY 1973	6600.	0.991

Base for partial duration series is 5918.
NHYPO 2
PHYPO 0.0050 0.0010
QHYPO 32009. 56040.

CONTROL POINT NO. 46 POTEAU A01X13

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK FLOW DATA

<-----ANNUAL SERIES DATA----->					<-----PARTIAL DURATION SERIES DATA----->				
<-CHRONOLOGICAL DATA->		<---ORDERED DATA--->			<-CHRONOLOGICAL DATA->		<---ORDERED DATA--->		
DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION	DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION
11 APR 1940	2839.	3 MAY 1990	40408.	0.012	11 MAY 1943	8710.	3 MAY 1990	40408.	0.012
29 NOV 1941	4952.	16 SEP 1950	26043.	0.030	1 APR 1945	17831.	16 SEP 1950	26043.	0.030
3 MAY 1942	6003.	14 MAY 1968	25080.	0.048	18 MAY 1945	23773.	14 MAY 1968	25080.	0.048
11 MAY 1943	8710.	18 MAY 1945	23773.	0.066	12 JUN 1945	17156.	18 MAY 1945	23773.	0.066
8 MAY 1944	6179.	11 DEC 1971	23396.	0.083	6 NOV 1946	9170.	11 DEC 1971	23396.	0.083
18 MAY 1945	23773.	26 APR 1957	21903.	0.101	10 DEC 1946	17056.	26 APR 1957	21903.	0.101
10 DEC 1946	17056.	24 APR 1953	19886.	0.119	11 APR 1947	8620.	24 APR 1953	19886.	0.119
17 MAY 1947	8803.	10 DEC 1946	17056.	0.136	17 MAY 1947	8803.	1 APR 1945	17831.	0.136
27 FEB 1948	6943.	20 MAY 1960	16522.	0.154	11 MAY 1950	8515.	12 JUN 1945	17156.	0.154
14 FEB 1949	7598.	24 APR 1973	15913.	0.172	29 JUL 1950	16978.	10 DEC 1946	17056.	0.172
16 SEP 1950	26043.	14 JAN 1995	14877.	0.190	16 SEP 1950	26043.	29 JUL 1950	16978.	0.190
18 FEB 1951	9537.	10 MAY 1993	14534.	0.207	18 FEB 1951	9537.	20 MAY 1960	16522.	0.207
12 APR 1952	9091.	23 FEB 1985	13387.	0.225	11 JUN 1951	8489.	24 APR 1973	15913.	0.225
24 APR 1953	19886.	26 DEC 1987	12894.	0.243	12 APR 1952	9091.	3 APR 1957	15196.	0.243
5 MAY 1954	3991.	3 MAY 1958	12391.	0.261	14 MAR 1953	12104.	21 MAY 1990	15135.	0.261
21 MAR 1955	8384.	4 NOV 1959	11378.	0.278	18 MAR 1953	13152.	14 JAN 1995	14877.	0.278
18 FEB 1956	3376.	15 DEC 1992	11115.	0.296	24 APR 1953	19886.	10 MAY 1993	14534.	0.296
26 APR 1957	21903.	30 OCT 1991	11057.	0.314	29 APR 1953	9353.	23 FEB 1985	13387.	0.314
3 MAY 1958	12391.	16 FEB 1989	10765.	0.332	13 MAY 1953	10087.	18 MAR 1953	13152.	0.332
4 NOV 1959	11378.	15 NOV 1988	10245.	0.349	3 APR 1957	15196.	26 DEC 1987	12894.	0.349
20 MAY 1960	16522.	18 FEB 1951	9537.	0.367	26 APR 1957	21903.	25 MAY 1957	12566.	0.367
19 MAY 1961	8108.	21 OCT 1984	9439.	0.385	25 MAY 1957	12566.	27 NOV 1985	12427.	0.385
31 MAR 1962	3707.	20 APR 1986	9320.	0.402	5 JUN 1957	9427.	3 MAY 1958	12391.	0.402
29 APR 1963	2051.	12 APR 1952	9091.	0.420	3 MAY 1958	12391.	14 MAR 1953	12104.	0.420
20 NOV 1964	4566.	23 MAY 1979	8909.	0.438	4 NOV 1959	11378.	25 NOV 1973	11985.	0.438
27 MAY 1965	5595.	17 MAY 1947	8803.	0.456	6 MAY 1960	11048.	21 APR 1990	11679.	0.456
25 APR 1966	6227.	7 MAY 1975	8803.	0.473	20 MAY 1960	16522.	4 NOV 1959	11378.	0.473
24 APR 1967	5251.	11 MAY 1943	8710.	0.491	21 MAR 1968	10983.	15 DEC 1992	11115.	0.491
14 MAY 1968	25080.	5 NOV 1994	8671.	0.509	14 MAY 1968	25080.	30 OCT 1991	11057.	0.509
1 JAN 1969	7121.	28 MAR 1977	8437.	0.527	11 DEC 1971	23396.	2 FEB 1990	11055.	0.527
18 APR 1970	7235.	21 MAR 1955	8384.	0.544	24 APR 1973	15913.	6 MAY 1960	11048.	0.545
11 DEC 1971	23396.	19 MAY 1961	8108.	0.562	25 NOV 1973	11985.	21 MAR 1968	10983.	0.563
3 JAN 1972	6855.	15 MAY 1982	7623.	0.580	7 MAY 1975	8803.	16 FEB 1989	10765.	0.580
24 APR 1973	15913.	14 FEB 1949	7598.	0.598	23 MAY 1979	8909.	26 OCT 1991	10752.	0.598
25 NOV 1974	7200.	18 APR 1970	7235.	0.615	21 OCT 1984	9439.	15 NOV 1988	10245.	0.616
7 MAY 1975	8803.	25 NOV 1974	7200.	0.633	2 NOV 1984	9267.	13 MAY 1953	10087.	0.634
23 APR 1976	3478.	23 MAY 1983	7139.	0.651	23 FEB 1985	13387.	19 NOV 1985	9858.	0.652
28 MAR 1977	8437.	1 JAN 1969	7121.	0.668	19 NOV 1985	9858.	2 APR 1988	9739.	0.670
25 MAR 1978	6525.	27 FEB 1948	6943.	0.686	27 NOV 1985	12427.	18 FEB 1951	9537.	0.688
23 MAY 1979	8909.	3 JAN 1972	6855.	0.704	20 APR 1986	9320.	21 OCT 1984	9439.	0.705
4 MAY 1980	3243.	12 JUN 1981	6795.	0.722	6 JUN 1986	8760.	5 JUN 1957	9427.	0.723
12 JUN 1981	6795.	25 MAR 1978	6525.	0.739	26 DEC 1987	12894.	29 APR 1953	9353.	0.741
15 MAY 1982	7623.	25 APR 1966	6227.	0.757	2 APR 1988	9739.	20 APR 1986	9320.	0.759
23 MAY 1983	7139.	8 MAY 1944	6179.	0.775	15 NOV 1988	10245.	2 NOV 1984	9267.	0.777
21 OCT 1984	9439.	3 MAY 1942	6003.	0.793	16 FEB 1989	10765.	6 NOV 1946	9170.	0.795
23 FEB 1985	13387.	27 MAY 1965	5595.	0.810	2 FEB 1990	11055.	12 APR 1952	9091.	0.813
20 APR 1986	9320.	24 APR 1967	5251.	0.828	21 APR 1990	11679.	23 MAY 1979	8909.	0.830
26 DEC 1987	12894.	29 NOV 1941	4952.	0.846	3 MAY 1990	40408.	17 MAY 1947	8803.	0.848
15 NOV 1988	10245.	20 NOV 1964	4566.	0.864	21 MAY 1990	15135.	7 MAY 1975	8803.	0.866
16 FEB 1989	10765.	5 MAY 1954	3991.	0.881	14 APR 1991	8796.	14 APR 1991	8796.	0.884
3 MAY 1990	40408.	31 MAR 1962	3707.	0.899	26 OCT 1991	10752.	6 JUN 1986	8760.	0.902
30 OCT 1991	11057.	23 APR 1976	3478.	0.917	30 OCT 1991	11057.	11 MAY 1943	8710.	0.920
15 DEC 1992	11115.	18 FEB 1956	3376.	0.934	15 DEC 1992	11115.	5 NOV 1994	8671.	0.938
10 MAY 1993	14534.	4 MAY 1980	3243.	0.952	10 MAY 1993	14534.	11 APR 1947	8620.	0.955
5 NOV 1994	8671.	11 APR 1940	2839.	0.970	5 NOV 1994	8671.	11 MAY 1950	8515.	0.973
14 JAN 1995	14877.	29 APR 1963	2051.	0.988	14 JAN 1995	14877.	11 JUN 1951	8489.	0.991

Base for partial duration series is 5484.
NHYPO 2
PHYPO 0.0050 0.0010
QHYPO 105504. 137286.

CONTROL POINT NO. 47 PANAMA A01X13

ANNUAL SERIES AND PARTIAL DURATION SERIES PEAK FLOW DATA

<-----ANNUAL SERIES DATA----->					<-----PARTIAL DURATION SERIES DATA----->				
<-CHRONOLOGICAL DATA->		<---ORDERED DATA--->			<-CHRONOLOGICAL DATA->		<---ORDERED DATA--->		
DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION	DATE	DISCHARGE (CFS)	DATE	DISCHARGE (CFS)	PLOTTING POSITION
17 AUG 1940	6145.	3 MAY 1990	80289.	0.012	11 MAY 1943	22818.	3 MAY 1990	80289.	0.012
31 OCT 1941	10691.	16 SEP 1950	68884.	0.030	19 MAR 1945	25180.	16 SEP 1950	68884.	0.030
30 DEC 1942	12464.	14 MAY 1968	65810.	0.048	31 MAR 1945	21915.	14 MAY 1968	65810.	0.048
11 MAY 1943	22818.	11 DEC 1971	60213.	0.066	18 MAY 1945	46838.	11 DEC 1971	60213.	0.066
5 MAY 1944	10327.	26 APR 1957	57935.	0.083	12 JUN 1945	39003.	26 APR 1957	57935.	0.083
18 MAY 1945	46838.	24 APR 1953	52977.	0.101	6 NOV 1946	24255.	24 APR 1953	52977.	0.101
10 DEC 1946	45394.	18 MAY 1945	46838.	0.119	10 DEC 1946	45394.	18 MAY 1945	46838.	0.119
17 MAY 1947	23416.	10 DEC 1946	45394.	0.136	11 APR 1947	22871.	29 JUL 1950	45409.	0.136
27 FEB 1948	18538.	20 MAY 1960	38895.	0.154	29 APR 1947	20560.	10 DEC 1946	45394.	0.154
14 FEB 1949	20560.	24 APR 1973	34825.	0.172	17 MAY 1947	23416.	3 APR 1957	40486.	0.172
16 SEP 1950	68884.	3 MAY 1958	32575.	0.190	14 FEB 1949	20560.	12 JUN 1945	39003.	0.190
18 FEB 1951	25225.	4 NOV 1959	30078.	0.207	11 MAY 1950	22798.	20 MAY 1960	38895.	0.207
12 APR 1952	24244.	30 OCT 1991	28966.	0.225	23 JUL 1950	21067.	24 APR 1973	34825.	0.225
24 APR 1953	52977.	27 DEC 1987	25589.	0.243	29 JUL 1950	45409.	18 MAR 1953	34789.	0.243
2 MAY 1954	8173.	18 FEB 1951	25225.	0.261	16 SEP 1950	68884.	3 MAY 1958	32575.	0.261
21 MAR 1955	22186.	21 OCT 1984	24768.	0.278	18 FEB 1951	25225.	14 MAR 1953	32160.	0.278
18 FEB 1956	7469.	16 DEC 1992	24744.	0.296	11 JUN 1951	22545.	25 NOV 1973	31450.	0.296
26 APR 1957	57935.	12 APR 1952	24244.	0.314	12 APR 1952	24244.	25 MAY 1957	30901.	0.314
3 MAY 1958	32575.	25 FEB 1985	23660.	0.332	14 MAR 1953	32160.	4 NOV 1959	30078.	0.332
4 NOV 1959	30078.	7 MAY 1975	23607.	0.349	18 MAR 1953	34789.	6 MAY 1960	29149.	0.349
20 MAY 1960	38895.	17 MAY 1947	23416.	0.367	24 APR 1953	52977.	30 OCT 1991	28966.	0.367
19 MAY 1961	21275.	15 JAN 1995	23383.	0.385	29 APR 1953	25429.	21 MAR 1968	28821.	0.385
24 FEB 1962	10416.	23 MAY 1979	23378.	0.402	13 MAY 1953	26681.	26 OCT 1991	28167.	0.402
28 APR 1963	4308.	11 MAY 1943	22818.	0.420	21 MAR 1955	22186.	13 MAY 1953	26681.	0.420
12 MAY 1964	13458.	21 MAR 1955	22186.	0.438	3 APR 1957	40486.	27 DEC 1987	25589.	0.438
27 MAY 1965	14798.	28 MAR 1977	22139.	0.456	26 APR 1957	57935.	29 APR 1953	25429.	0.456
25 APR 1966	16340.	16 FEB 1989	21354.	0.473	25 MAY 1957	30901.	18 FEB 1951	25225.	0.473
22 DEC 1967	13707.	19 MAY 1961	21275.	0.491	3 MAY 1958	32575.	19 MAR 1945	25180.	0.491
14 MAY 1968	65810.	14 FEB 1949	20560.	0.509	4 NOV 1959	30078.	21 OCT 1984	24768.	0.509
23 FEB 1969	16539.	15 MAY 1982	20002.	0.527	6 MAY 1960	29149.	16 DEC 1992	24744.	0.527
18 APR 1970	19090.	18 APR 1970	19090.	0.544	20 MAY 1960	38895.	6 NOV 1946	24255.	0.545
11 DEC 1971	60213.	27 FEB 1948	18538.	0.562	19 MAY 1961	21275.	12 APR 1952	24244.	0.563
7 NOV 1972	14511.	11 MAY 1993	17268.	0.580	23 NOV 1961	19900.	25 FEB 1985	23660.	0.580
24 APR 1973	34825.	25 MAR 1978	17122.	0.598	21 MAR 1968	28821.	7 MAY 1975	23607.	0.598
1 MAY 1974	15486.	23 FEB 1969	16539.	0.615	14 MAY 1968	65810.	17 MAY 1947	23416.	0.616
7 MAY 1975	23607.	6 NOV 1994	16492.	0.633	28 DEC 1968	22024.	15 JAN 1995	23383.	0.634
20 APR 1976	7302.	25 APR 1966	16340.	0.651	11 DEC 1971	60213.	23 MAY 1979	23378.	0.652
28 MAR 1977	22139.	7 JUN 1981	16038.	0.668	24 APR 1973	34825.	14 APR 1991	23044.	0.670
25 MAR 1978	17122.	7 JUN 1986	15890.	0.686	25 NOV 1973	31450.	11 APR 1947	22871.	0.688
23 MAY 1979	23378.	1 MAY 1974	15486.	0.704	28 MAR 1975	20516.	11 MAY 1943	22818.	0.705
3 MAY 1980	10000.	27 MAY 1965	14798.	0.722	7 MAY 1975	23607.	11 MAY 1950	22798.	0.723
7 JUN 1981	16038.	22 NOV 1988	14789.	0.739	28 MAR 1977	22139.	11 JUN 1951	22545.	0.741
15 MAY 1982	20002.	7 NOV 1972	14511.	0.757	23 MAY 1979	23378.	21 MAR 1955	22186.	0.759
16 MAY 1983	12914.	22 DEC 1967	13707.	0.775	15 MAY 1982	20002.	28 MAR 1977	22139.	0.777
21 OCT 1984	24768.	12 MAY 1964	13458.	0.793	21 OCT 1984	24768.	28 DEC 1968	22024.	0.795
25 FEB 1985	23660.	16 MAY 1983	12914.	0.810	25 FEB 1985	23660.	31 MAR 1945	21915.	0.813
7 JUN 1986	15890.	30 DEC 1942	12464.	0.828	27 DEC 1987	25589.	16 FEB 1989	21354.	0.830
27 DEC 1987	25589.	31 OCT 1941	10691.	0.846	16 FEB 1989	21354.	19 MAY 1961	21275.	0.848
22 NOV 1988	14789.	24 FEB 1962	10416.	0.864	3 MAY 1990	80289.	23 JUL 1950	21067.	0.866
16 FEB 1989	21354.	5 MAY 1944	10327.	0.881	14 APR 1991	23044.	9 MAY 1995	20712.	0.884
3 MAY 1990	80289.	3 MAY 1980	10000.	0.899	26 OCT 1991	28167.	2 DEC 1991	20703.	0.902
30 OCT 1991	28966.	2 MAY 1954	8173.	0.917	30 OCT 1991	28966.	14 FEB 1949	20560.	0.920
16 DEC 1992	24744.	18 FEB 1956	7469.	0.934	2 DEC 1991	20703.	29 APR 1947	20560.	0.938
11 MAY 1993	17268.	20 APR 1976	7302.	0.952	16 DEC 1992	24744.	28 MAR 1975	20516.	0.955
6 NOV 1994	16492.	17 AUG 1940	6145.	0.970	15 JAN 1995	23383.	15 MAY 1982	20002.	0.973
15 JAN 1995	23383.	28 APR 1963	4308.	0.988	9 MAY 1995	20712.	23 NOV 1961	19900.	0.991

Base for partial duration series is 9000.
NHYPO 2
PHYPO 0.0050 0.0010
QHYPO 179023. 230533.