

THE EFFECTS OF RESERVOIRS  
ON FLOODS

Eric A. Marchegiani  
Technical Paper  
CE 695 C  
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## I. ACKNOWLEDGEMENT

First, I wish to thank my advisor, Dr. Yevjevich for his guidance over the past year and the technical advice in the development of this report. Other conversations with Eric P. Yould of the Alaska Power Authority and George P. Claggett of the Soil Conservation Service proved to be extremely valuable. Along with these the State of Alaska and the U.S. Army Corps of Engineers, Alaska District provided financial assistance which has made my education possible. Finally I wish to thank my parents and brother for their continued psychological support which has kept me at my task.

## II. OBJECTIVES

The major objective of this study is to illustrate what the effects of constructing a reservoir will have on flood waves that would have occurred naturally without the reservoir. The study examines two conditions; accidental flood control by a reservoir being operated for hydroelectric power and the second condition where there is a specific storage allocated for flood control along with the storage required for power generation.. The first mode of operation (accidental flood control) will consist of a single purpose project for hydroelectric power which will begin operation at some storage level less than maximum storage (full pool). The difference between this operation and normal reservoir regulation studies is that the beginning storage for a normal study is full pool.. The objective is to see how well the accidental flood control storage compares to the second mode of operation (flood control & hydroelectric power) which has a specific storage for flood control. This second mode of operation is a multiple purpose project which begins its operation at the bottom of the flood control pool.. Both of these modes of operation are to be operated with and without forecast of the April through September runoff and will be discussed in more detail in section V.

## III. INTRODUCTION

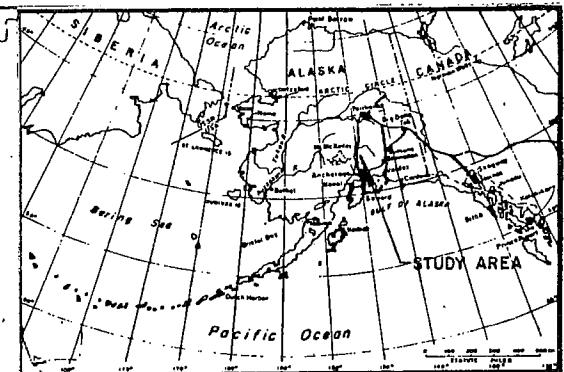
Since the methodology is of major importance in this study the region which is studied is inconsequential, although various regions will have different seasonal distributions.

of runoff.. The author is more familiar with Alaskan water-sheds and had data available from various reports, consequently used this data to facilitate the study. The general vicinity map (Figure 1) was taken from Reference (1)\* which was a completely different type of study that analyzed a series of dams with various purposes.. It shows the Upper Susitna Basin which will be studied along with the various climatological stations, snow courses, and U.S.G.S.. gaging stations. In order to illustrate the effects of a reservoir on a flood wave a large assumption was made to facilitate extrapolation of the data.. It was assumed that the Watana Dam with all of its characteristics (area-capacity curve, etc.) was built at the Gold Creek gauging station (U.S.G.S.. No. 15292000) (5) and not approximately forty miles upstream as illustrated by Figure 1.. Physically this assumption could not be accomplished but for simplicity in the use of the stream discharge measurements it will be assumed.

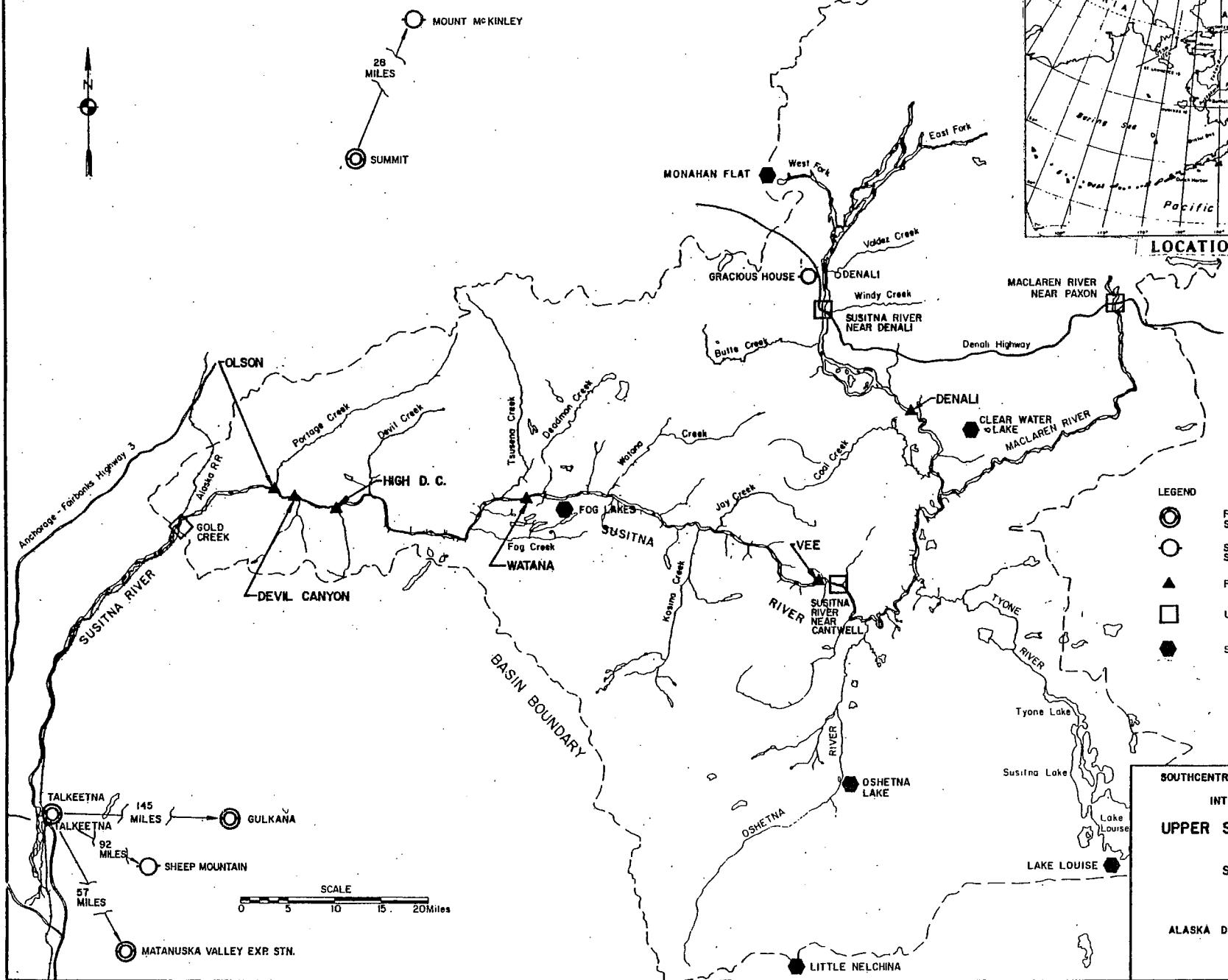
#### IV.. BASIN DESCRIPTION (1)

"The Upper Susitna River Basin contains several topographic features which provide a conglomerate streamflow heavily influenced by specific meteorological events. The basin was shaped by volcanism and diastrophism, subsidence and uplifting, block faulting and intrusion by batholiths, lateral slipping, glacial erosion, and marine deposition which provided the shells and sandstone.. The basin is a fan shaped area comprising about 6,160 square miles and is bordered by

(1)\* Refers to reference number in the Bibliograph



LOCATION MAP



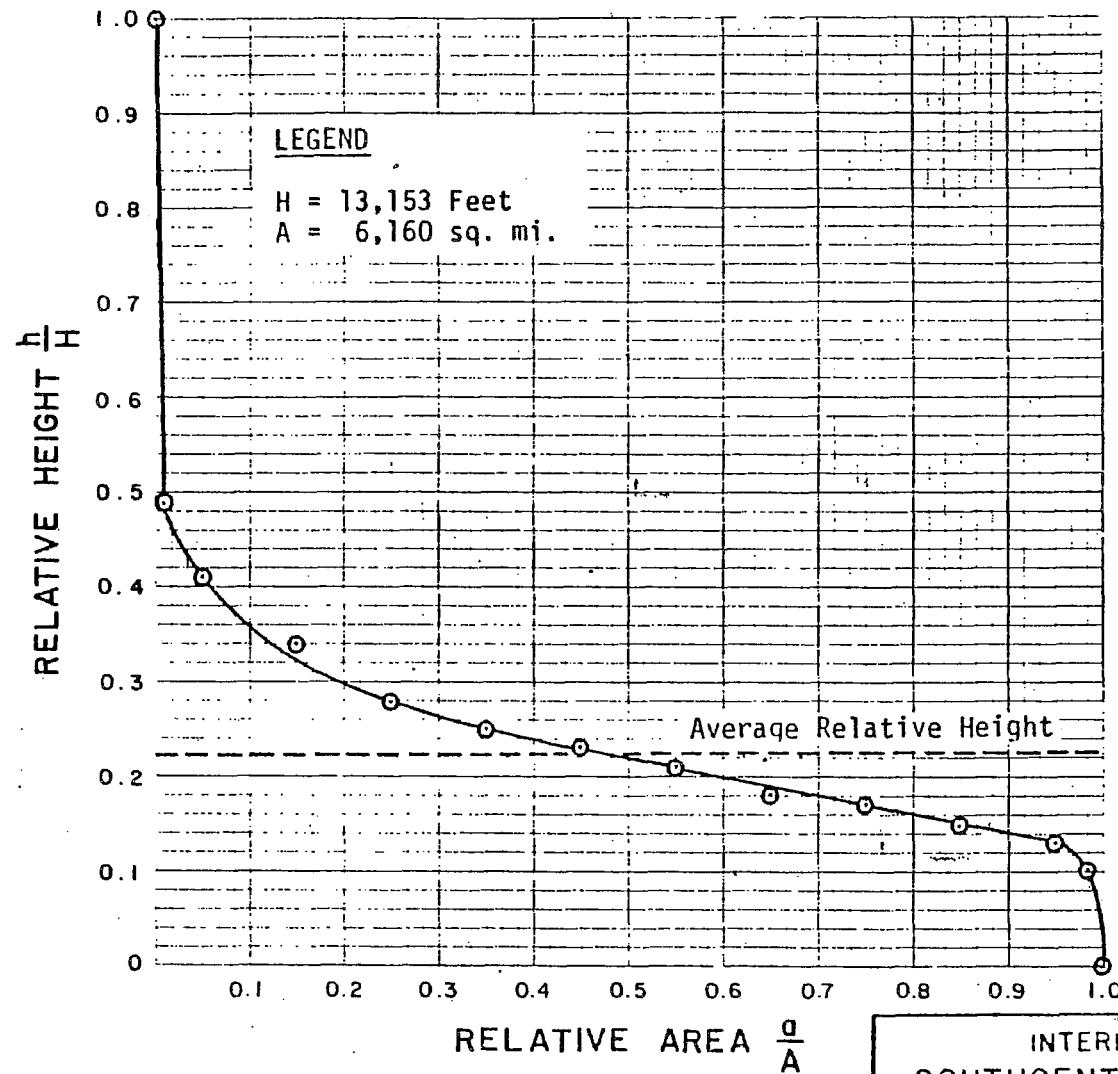
the Alaska Range to the north, the Talkeetna Mountains to the southeast, and flat, low-relief areas to the southwest.

Most of the basin has a well-defined dendritic stream pattern with a main channel emanating from glacial headwaters in the extreme northern segment of the divide. Below the glaciers, the braided channel traverses a high plateau deposited by aggraded alluvial sediment and then meanders several miles south to the confluence of the Oshetna River. It then takes a sharp turn to the west and flows through a steeply cut, degrading channel until it exits the basin at Gold Creek. The contributing glacial area comprises only four percent of the entire basin, but summer glacial melt provides a considerable portion of the total streamflow.

The mountains within the basin reflect the influence of the Pleistocene Ice Age, during which glacial advancement over the topography planed the mountains and gave the basin surface a rounded and smoothed appearance. The highest elevation within the basin is 13,326 feet, and the lowest elevation is 740 feet. The hypsometric curve for the area above Gold Creek (Figure 2) shows that the basin has reached a mature stage of development. The basin relief implies a steep channel slope; however variability of the slope compared to other mountain streams is somewhat reversed. The aggrading channel in the upper reaches of the basin has channel slopes in the range of only 4 to 7 feet per mile, while the lower basin channel drops as much as 37 feet per mile.

FIGURE 2

## Susitna Drainage Basin Hypsometric Curve



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INTERIM REPORT  
SOUTHCENTRAL RAILBELT  
AREA, ALASKA  
ALASKA DISTRICT  
CORPS OF ENGINEERS  
JUNE 1975

The flow regime of the Susitna River is seasonal, with the majority of the yearly volume occurring between May and September (See Figure 6). Summer streamflow consist mainly of snow and glacial melt combined with surface runoff from rainfall. Winter flows are restricted almost entirely to groundwater inflow."

#### V. PROCEDURE

##### VIA.. Monthly Operation - No Forecast

A computer model was developed to regulate the reservoir on a monthly basis. The basic data requirements (See Appendix B) are:

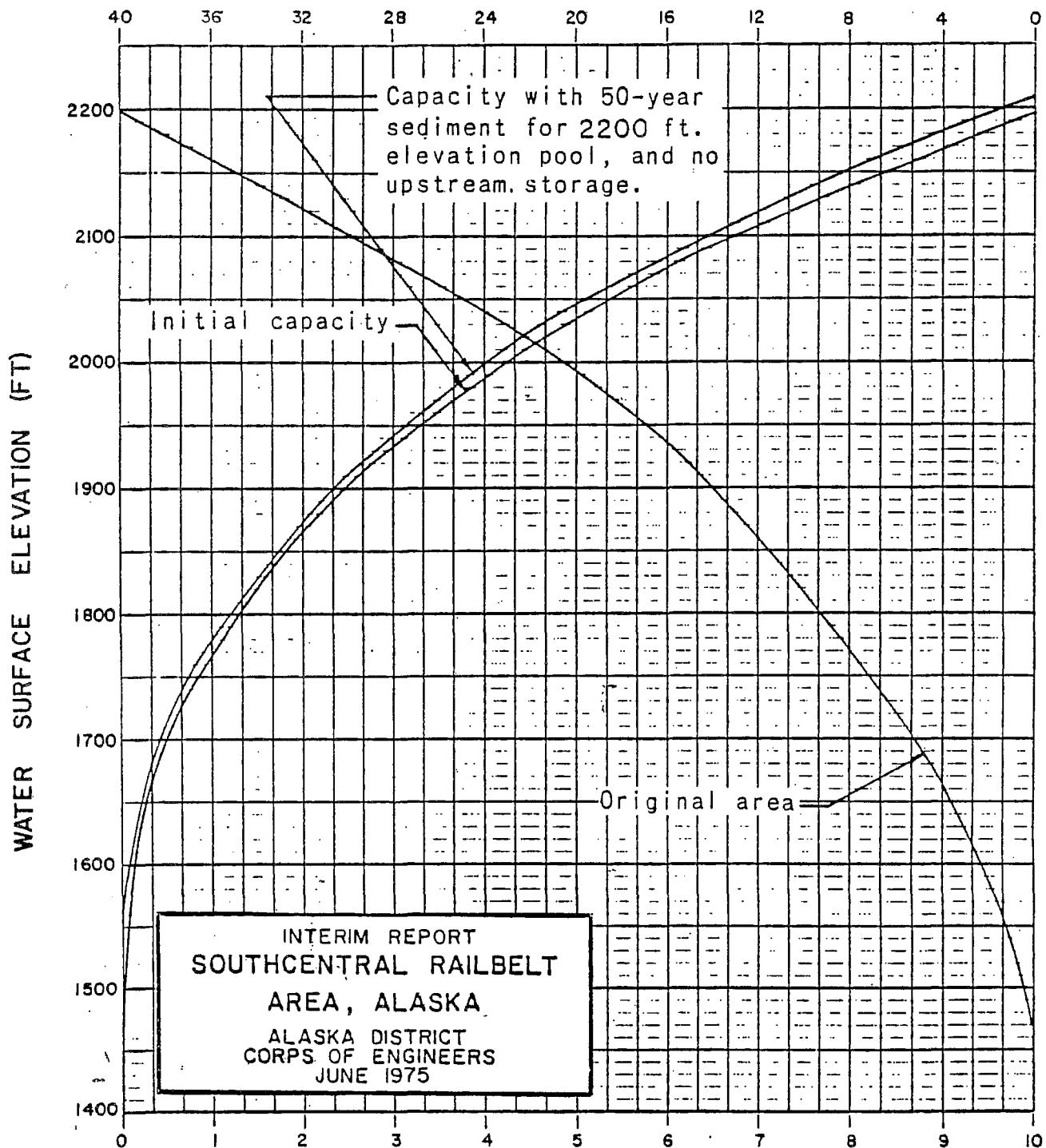
- 1.. Area-Capacity curve (See Figure 3)- The 50 year sediment curve was used for this study
2. Maximum Storage of the reservoir (9,624,000 Acre-Ft.)
3. Lower Limit for storage (1,300,000 Acre-Ft.)
4. Estimate for the beginning firm annual energy (kwh)
5. Assume an overall efficiency of the complete system (.80)
6. Tailwater Elevation (1480 Ft.)
7. Beginning Storage (Hydroelectric- 8,000,000 Acre-Ft., Flood Control- 9,000,000 Acre-Ft.)
8. The upper and lower limit estimates of the firm annual energy
9. Plant Factor (0.50)
10. The number of years of data (27)
11. The monthly distribution of firm annual energy (See Table 1)
12. The number of days for each month of the year
13. A flood control rule curve, if operating for flood control.
14. A May 1 water content index for the years of forecasting the runoff
15. The coefficients for the forecasting equation
16. Mean monthly discharge for the historic period of record

The computer model optimizes the inflow and the storage available to find the installed capacity of the optimum generator along with determining the firm annual energy for the historic period of record. Then the reservoir is operated

# AREA AND CAPACITY CURVES

## WATANA RESERVOIR

RESERVOIR AREA (1000 ACRES)



STORAGE CAPACITY (MILLION AC. FT.)

FIGURE 3

TABLE 1  
MONTHLY ENERGY REQUIREMENT (1)

Months	Energy Requirement (Percent)
January	10.6
February	9.0
March	9.4
April	8.1
May	7.5
June	6.9
July	6.9
August	7.4
September	7.7
October	8.0
November	8.8
December	9.7

to determine the maximum regulated discharge for each year and which years have spills.. The years that contain spills are analyzed on a daily basis as indicated in section W.E.. The model was constructed in a manner such that it would be flexible enough to handle the four modes of operation:

1. Single Purpose - Hydroelectric Power - No Forecast (Appendix B-1)
2. Single Purpose - Hydroelectric Power - Forecast (Appendix B-2)
3. Multiple Purpose - Hydroelectric & Flood Control - No Forecast (Appendix B-3)
4. Multiple Purpose - Hydroelectric & Flood Control - Forecast (Appendix B-4)

Two assumptions that may be noted are that no evaporation was considered and the overall efficiency of the system was assumed to be eighty percent.. It was felt that the amount of evaporation would have a neglectable effect on the flood peaks although it would have some effect on the energy produced. It would be relatively easy to modify the model to incorporate this effect but the data available was sparse and therefore neglected.. The head loss in each individual

system would be different depending on the head and length of penstock, along with the turbomachinery, therefore it was simplified by assuming a representative efficiency of eighty percent.

Figure 4 is a diagram of the Single Purpose - Hydroelectric Power = No Forecast operation. Figure 5 is a diagram of Multiple Purpose - Hydroelectric & Flood Control - No Forecast operation..

#### V.B. Forecasting of Discharges

In approaching a method to forecast the discharges during the critical time for floods a large amount of data was researched to determine the best available.. Table 2A and 2B show some of the available data for the Susitna Basin. The average monthly volume of runoff for the period of record (1950-1976) at Gold Creek U.S.G.S. gauging station (5) is shown in Figure 6.

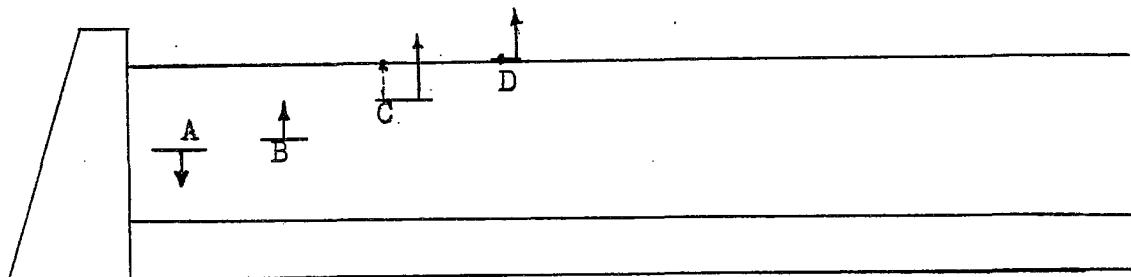
TABLE 2A  
CLIMATOLOGICAL DATA (3)

Climatological Station	Elevation (Feet)	Temperature (No. of Years)	Precipitation (No. of Years)
Talkeetna	345	56	49
Gulkana	1570	35	35
Summit	2401	35	36

TABLE 2B  
SNOW SURVEY DATA (7)

Snow Course	Elevation (Feet)	Water Content (No. of Years)
Little Nelchina	4160	8
Clearwater Lake	3100	11
Fog Lakes	2250	7
Lake Louise	2400	11
Monahan Flat	2710	11
Oshetna Lake	2950	11
Gulkana Glacier	6360	3

Maximum Water Surface Elevation (2200 ft.)



Minimum Water Surface Elevation (1810 ft.)

#### Operation

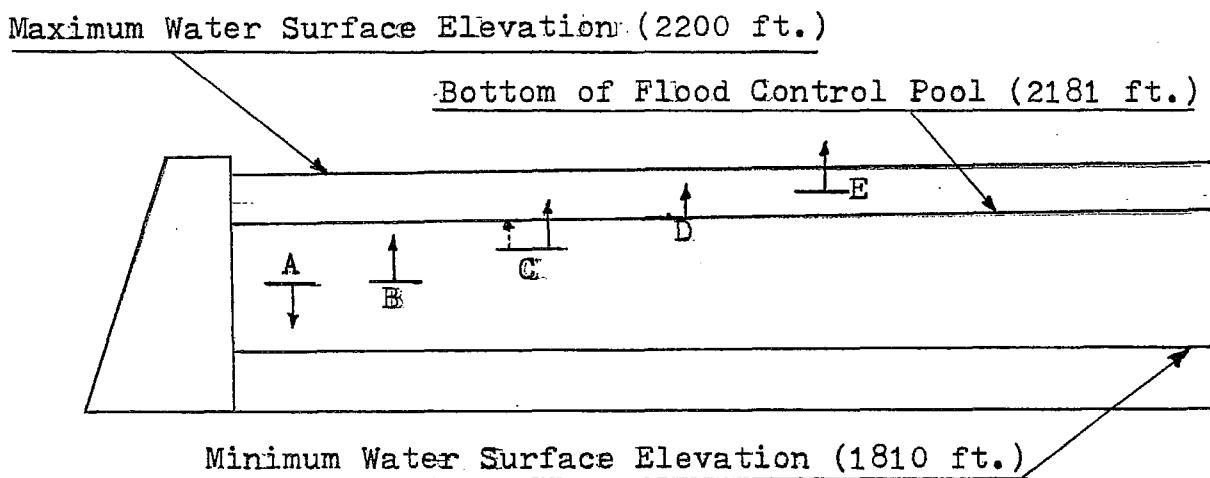
A.. If the inflow is less than that required for firm energy-- Generate firm energy and draw on the storage of the reservoir.

B.. If the inflow is greater than that required for firm energy and will not increase storage above maximum storage-- Generate firm energy and add the excess to storage.

C.. If the inflow is greater than that required for firm energy and will increase storage above maximum storage-- Generate firm energy and secondary energy up to the overload capacity of the generators. The secondary energy should reduce the storage to the maximum storage of the reservoir unless the overload capacity is not capable of doing this in which case there will be spilled water.

D.. If the reservoir is at maximum storage and the inflow is less than the overload capacity but more than enough to supply firm energy then the reservoir will be drawn down to the maximum storage. If the inflow is greater than the overload capacity of the generators then the remaining water will be spilled..

FIGURE 4 Operation-Single Purpose-Hydroelectric Energy-No Forecast



### Operation

A.

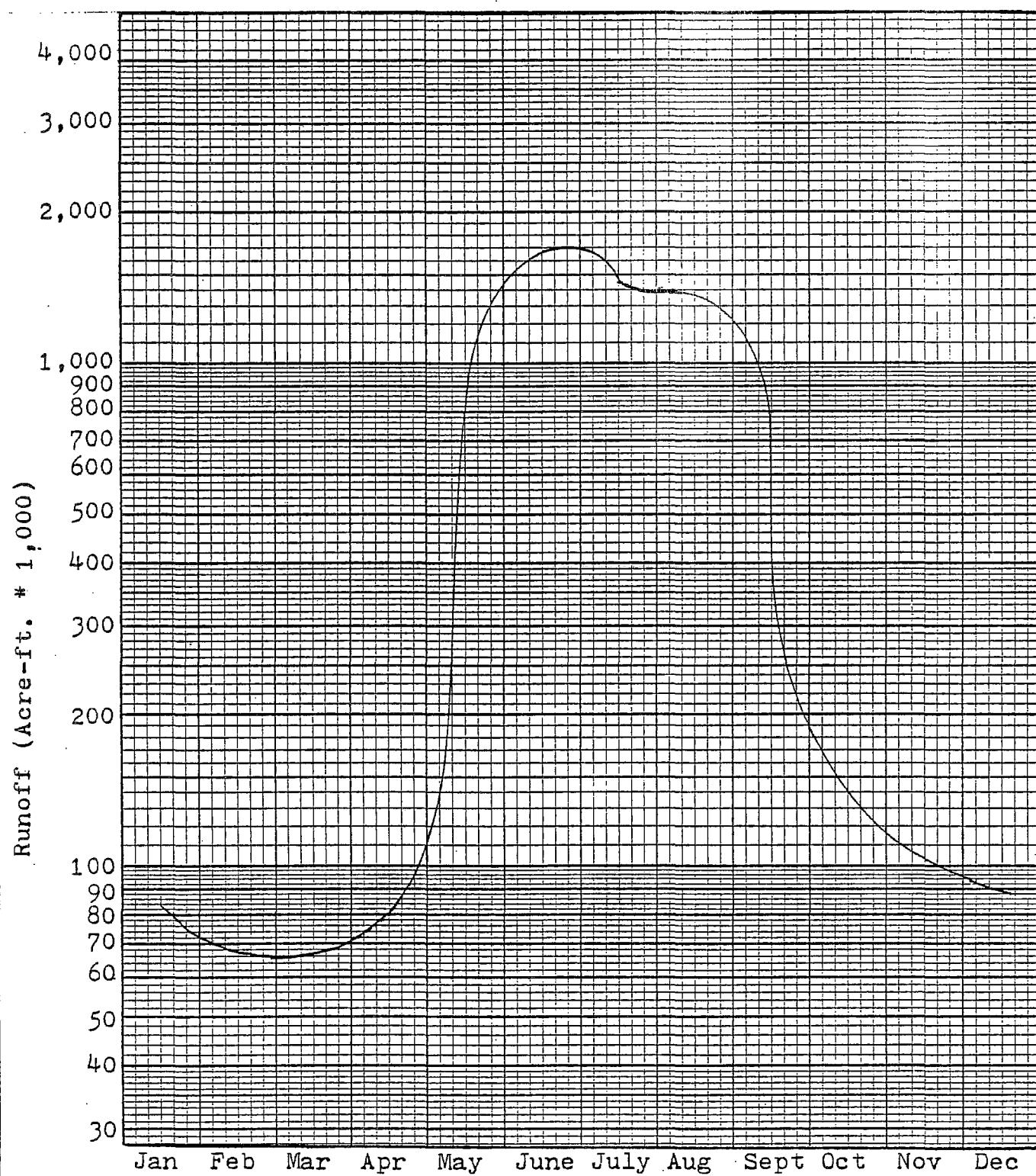
B.. Both will be operated as under the single purpose mode but instead of optimizing the maximum storage as the upper limit of operation now it will be the bottom of the flood control pool.

C. If inflow is greater than that required for firm energy and will increase storage above the bottom of the flood control pool-- Generate firm energy and secondary energy up to the overload capacity of the generator to reduce the storage to the bottom of the flood control pool. If the overload capacity is not capable of doing this then the excess water will be stored in the flood control pool.

D.. If the reservoir storage is within the flood control pool the generators will be operated at overload capacity to reduce the level to the bottom of the flood control pool as soon as possible.

E. If the flood control pool is completely filled and the inflow is in excess of the overload capacity then the excess will be spilled.

FIGURE 5 Operation-Multiple Purpose-Hydroelectric & Flood Control-No Forecast



Average Monthly Runoff  
FIGURE 6

Since the maximum number of years with snow survey data is eleven years (1966-1976) there will only be forecasts for that period. The snow courses of Clearwater Lake, Lake Louise, Monahan Flat, and Oshetna Lake were weighted thirty percent, fifteen percent, twenty-five percent, and thirty percent respectively to calculate the April 1 water content index (See Table 3). The relative weights were based on the premise that higher elevations would have higher water contents.

TABLE 3  
SNOW COURSE (7)  
APRIL 1 WATER CONTENT (Inches)

Year	Monahan Flat	Clearwater Lake	Oshetna Lake	Lake Louise	Weighted Value
1966	6.1	5.9	2.9	3.9	4.75
1967	5.2	4.2	4.6	6.0	4.84
1968	8.2	4.8	3.3	4.6	5.19
1969	3.2	2.7	2.6	2.7	2.79
1970	4.0	1.9*	1.9	2.1	2.46
1971	10.1	6.2	3.7	3.6	6.04
1972	9.0	9.0	5.7	7.0	7.71
1973	7.5	5.9	4.6	4.2	5.66
1974	4.2	5.5	3.8	4.7	4.54
1975	10.0	6.9	5.1	4.9	6.84
1976	5.9	3.8	2.8	2.9	3.89

\* Since no value for Clearwater Lake it was assumed the same as Oshetna Lake.

The snow courses utilized have a range in elevations between 2400 feet and 3100 feet. Therefore only the two climatological stations of Gulkana (Elevation 1570 Ft.) and Summit (Elevation 2401 Ft.) were initial utilized in the forecasting of runoff. Through the analysis it was found that the Summit station resulted in better predictions as would be expected since it closer approximates the elevations of the snow courses and also approximates the average elevation of the total basin (From the hypsometric curve - Figure 2,(0.22 x

13,326Ft. = 2932 Ft.). Therefore the April precipitation from the Summit station (3) for the period of forecast (1966-1976) was utilized to calculate the May 1 Index by adding it to the weighted water content of April 1.

The May 1 Index (Table 4) was then correlated with the April through September runoff in Acre<sup>2</sup>Ft. as outlined by the Soil Conservation Service (6). This reference refers to other refinements but due to the lack of data it would be impossible to incorporate those into the analysis. Conversation with George P. Glagget (2) indicated that the normal procedure was to correlate the May 1 Index with the April through September runoff. A linear regression was at first attempted along with other trials that included some form of adjusting for antecedent conditions. The product of the analysis found that just utilizing the May 1 Index and the runoff in a power curve fit yeilded the best results. The data along with the power curve fit is illustrated in Figure 7. The equation of the line is below:

$$\text{Runoff} = 1,955,840.32(\text{Index})^{0.62933}$$
$$r^2 = 0.70$$
$$r = 0.837$$

Table 4 also gives a comparison of the predicted runoff to the actual runoff.

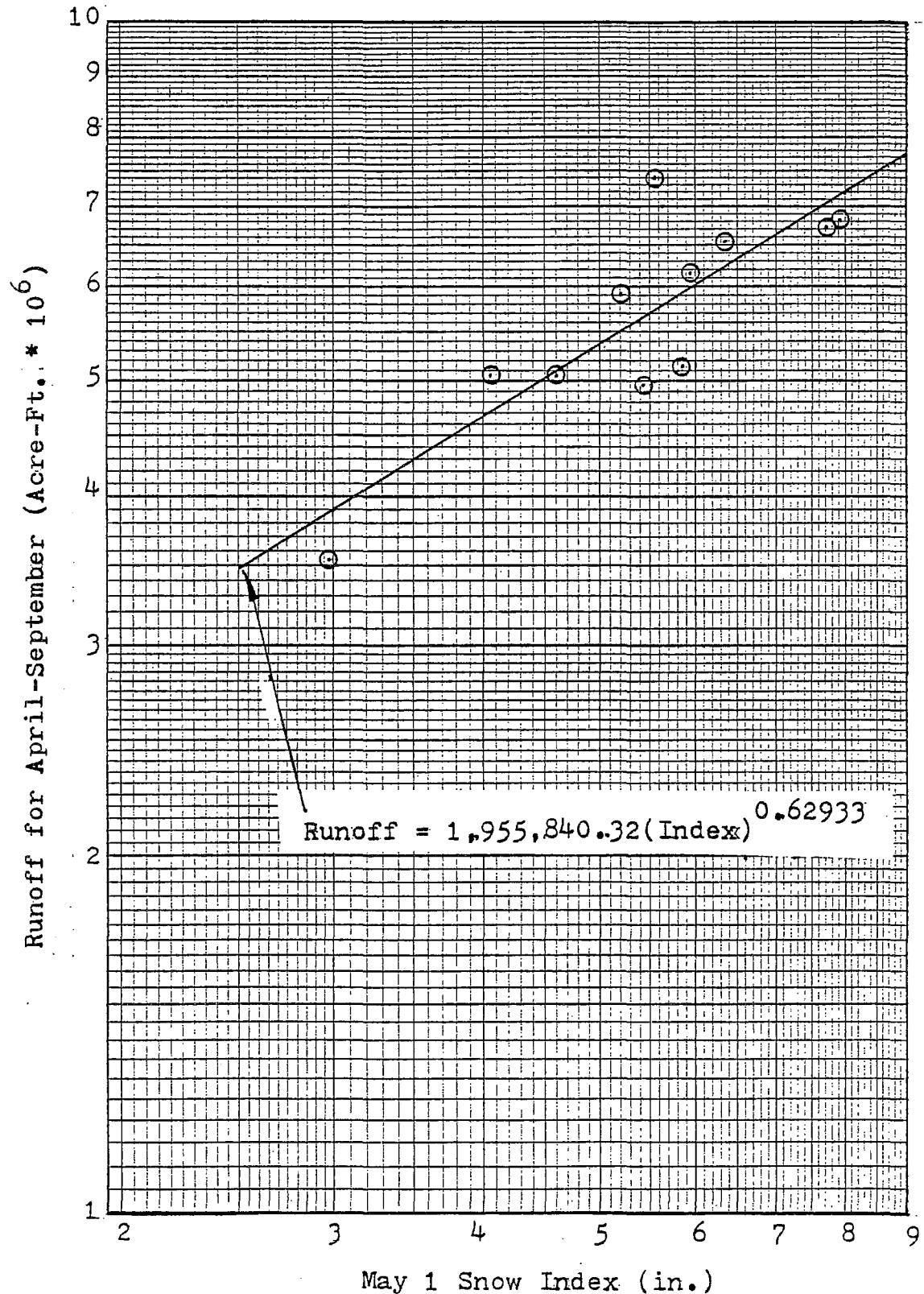
#### V.C. Monthly Operation - Forecast

The reservoir operation by forecast was only operated in the forecast mode for the period of 1966-1976 and only for the months of April through September. Initially the computer model would estimate the volume of water required for firm

TABLE 4

## PREDICTED RUNOFF

Water year (yr.)	April 1 Weighted Water Content (in.)	April Precipitation (in.)	May 1 Index (in.)	April- September Runoff (Acre-ft.)	Predicted Runoff (Acre-ft.)	Error (Percent)
1966	4.75	0.46	5.21	5,922,100	5,526,633	-6
1967	4.84	0.70	5.54	7,435,320	5,744,419	-23
1968	5.19	0.72	5.91	6,191,000	5,982,962	-3
1969	2.79	0.22	2.98	3,530,850	3,888,407	+10
1970	2.46	2.14	4.60	5,036,870	5,110,066	+1
1971	6.04	0.33	6.37	6,549,060	6,271,944	-4
1972	7.71	0.23	7.94	6,820,900	7,204,720	+6
1973	5.66	0.18	5.84	5,131,490	5,938,267	+16
1974	4.54	0.89	5.43	4,998,810	5,672,372	+13
1975	6.84	0.88	7.72	6,749,210	7,078,435	+5
1976	3.89	0.14	4.03	5,099,320	4,701,861	-8



Runoff Forecast  
FIGURE 7

energy for the April through September period and subtract it from the forecasted volume. If there was any additional water it generated secondary energy up to the overload capacity of the generators to utilize this excess water.. As time elapsed the model corrected its estimate of the future water volume by subtracting out the actual mean monthly inflow. If the corrected volume became negative at any time due to an error in forecasting the model would return to the original mode of operation without a forecast.. The only difference between the Single Purpose - Hydroelectric Operation - Forecast and the Multiple Purpose --Hydroelectric & Flood Control - Forecast Operation is that the multiple purpose project has more storage for flood control before a spill will occur.

#### V.D. Results of the Monthly Operation

The monthly operation for all four modes of operation (as indicated in V.A.) yeilded results which are tabulated in Appendix B.. The output indicated the years which had spills and would be analyzed later by daily regulation.. It also produces the maximum flows required for the non-spill years which will be used in the development of the frequency curves as stated in section VI.

#### V.E. Daily Operation for the Spill Years

The years that had spills in them for the four modes of operation were operated on a daily basis by a modified computer model (See Appemdix C) similar to the one utilized for the monthly regulation. The procedure utilized, found the

month (or months) which had spills occurring in the monthly model and from that obtain the previous month's, end of the month storage.. With this previous month's storage and the daily discharges for the month (or months) of the spill which were found in Reference 5., there was enough data to utilize the daily operation model for each of the years.. The daily operation resulted in much higher discharges than the monthly operation which can be seen by Table 5.

#### VII. COMBINED RESULTS OF DAILY AND MONTHLY REGULATION

The data in Table 5 was plotted according to the Weibull plotting position on Figures 8,9., and 10.. It is apparent from Figures 8 and 9 that the difference between No Forecast and Forecasting for each of the two modes of operation 1) Hydroelectric and, 2) Hydroelectric & Flood Control made only a small difference.. This could be attributed to two possible causes.. The first being that since only an eleven year period was utilized and if a full period of record was used in the forecasting better results may have occurred.. The second possibility is that the forecasting equation may not have been accurate enough.. A good example of this was the year of 1967.. The equation had a -23 percent error (See Table 4) and this was one of the years that had a spill, consequently the maximum discharge was not reduced as much as it could have been if a better estimate was made..

There was a very marked difference between the natural flow, Hydroelectric - No Forecast, and Hydroelectric & Flood Control - No Forecast as indicated by Figure 10.. One can

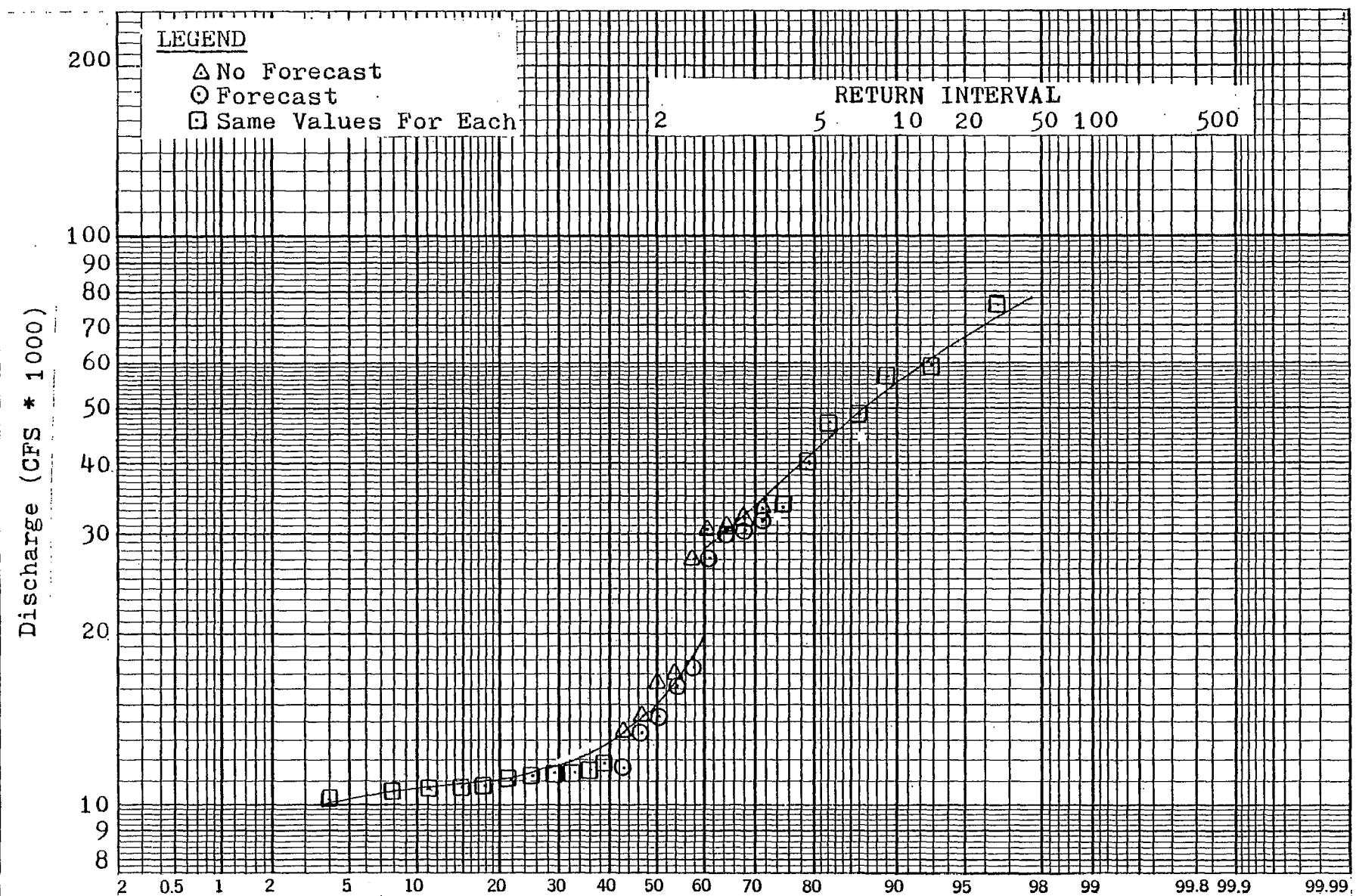
TABLE 5  
MAXIMUM DISCHARGE (CFS)

Water Year	Natural Discharge	Hydroelectric @ Accidental Storage No Forecast	Hydroelectric & Flood Control No Forecast	Hydroelectric & Flood Control No Forecast
1950	34,000	10,777	10,777	9,762
1951	37,400	11,351	11,351	16,688
1952	44,700	11,272	11,272	16,688
1953	38,400	10,967	10,967	16,688
1954	42,400	10,594	10,594	16,688
1955	58,100	56,900*	56,900*	16,688
1956	51,700	32,000*	32,000*	26,000*
1957	42,200	27,000*	27,000*	16,688
1958	49,600	47,800*	47,800*	16,688
1959	62,300	59,700*	59,700*	46,000*
1960	41,900	40,100*	40,100*	16,688
1961	54,000	30,300*	30,300*	16,688
1962	80,600	30,600*	30,600*	30,600*
1963	49,000	49,000*	49,000*	25,900*
1964	90,700	16,440	16,440	16,688
1965	43,600	33,600*	33,600*	16,688
1966	63,600	33,500*	12,731	16,688
1967	80,200	76,000*	76,000*	57,500*
1968	41,800	17,167	17,415	16,688
1969	28,400	10,044	10,044	9,896
1970	33,400	11,171	11,171	11,061
1971	87,400	11,862	11,862	11,830
1972	82,600	11,615	11,615	11,522
1973	54,100	10,890	10,890	10,722
1974	37,200	11,447	11,447	11,233
1975	47,300	13,234	13,234	13,174
1976	35,700	14,393	14,393	13,950

\*Months with spill and daily regulation used.

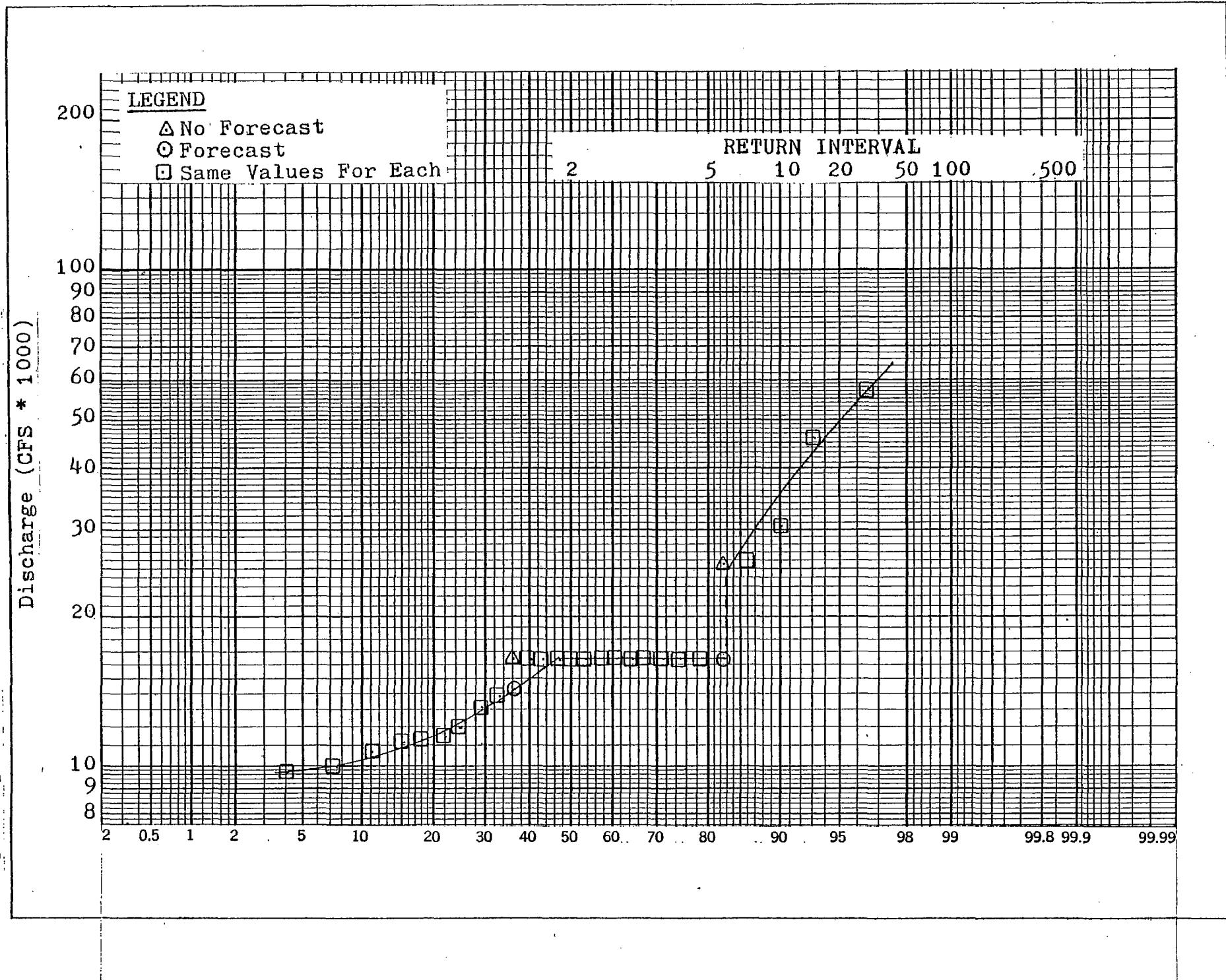
Maximum discharge for generators under flood control = 16,688CFS

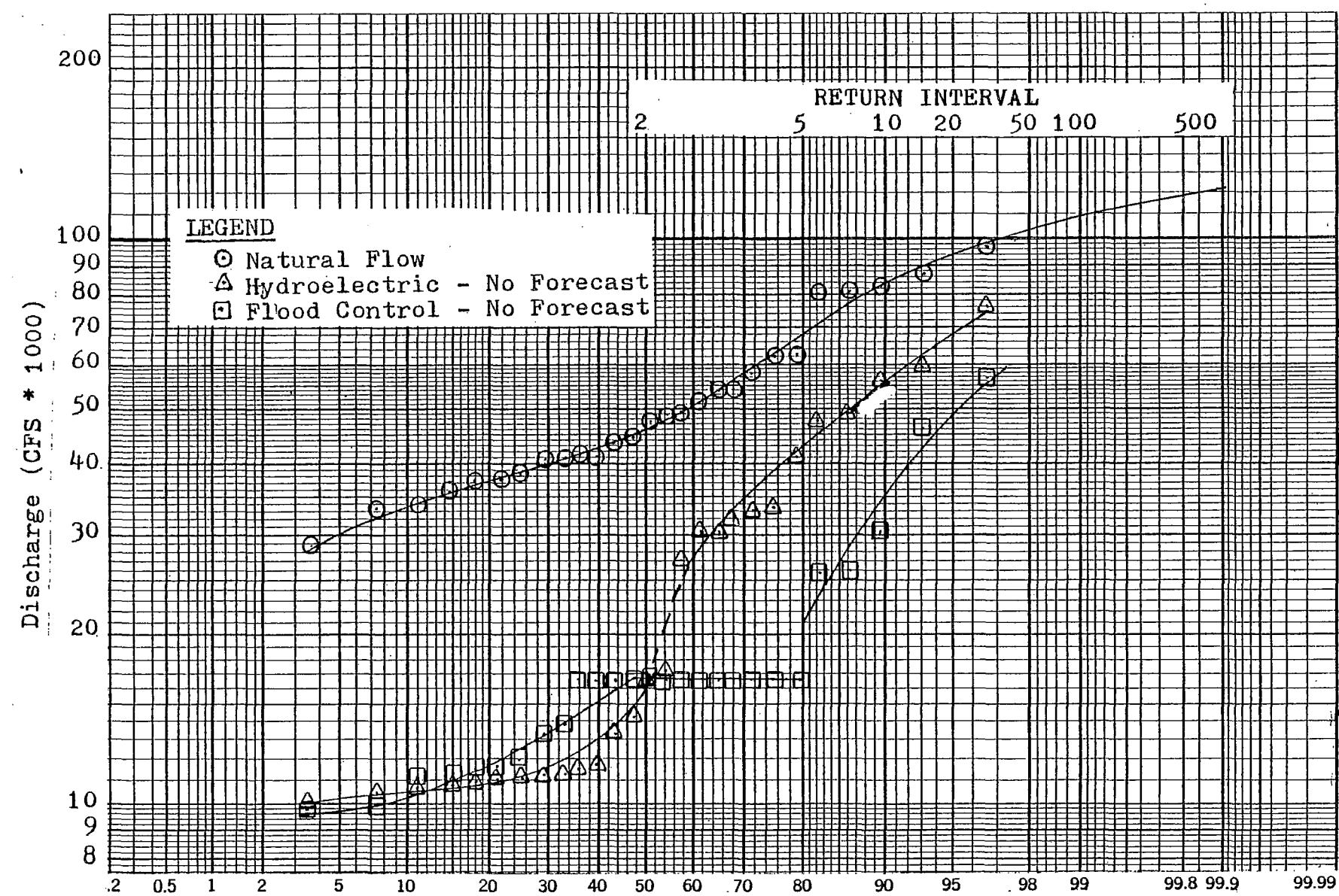
Maximum discharge for generators under hydroelectric = 17,415CFS



Accidental Flood Control  
Frequency Curve  
FIGURE 8

Flood Control  
Frequency Curve





Natural Flow, Accidental  
Flood Control, & Flood Control  
Frequency Curve

observe a drop in the discharge for the same frequency flood going from the natural flow to the Hydroelectric mode to the Hydroelectric & Flood Control mode which could be expected. Within the two operational modes there is a break in the frequency curve (Figure 10) indicated by a dashed line. This break can be explained by the fact that all the points above the break were the years that had spills and consequently were regulated daily and resulted in higher values of discharge. The values below the break were the discharge values from the monthly operation and indicate a lower discharge due to the major effects of the reservoir. The flat portion of the Flood Control Curve in Figure 10 (16,688 CFS) was due to the operational criteria. Whenever the storage was above the minimum flood control pool and could not return to that point the generators worked at overload capacity and resulted in a maximum discharge of 16,688 CFS which became the maximum discharge for that year.

#### VIII. EXTRAPOLATION OF THE FREQUENCY CURVES

As can be seen by the frequency curves of Figure 10 the limits of the data are approximately at the twenty year return interval. Since most major projects require a design analysis of at least a 100 to 500 year return interval it would be desirable to address the potential solution of this problem. An analysis to fit a gamma distribution (8,9) to the largest hydrograph (mean daily discharge for June 1964) did not result in satisfactory results. It was finally decided to use this maximum hydrograph only for the two modes of operation without

forecast as characteristic of the larger flood hydrographs, using the ratio of daily discharge to the peak instantaneous discharge. Extrapolating the natural flow curve (Figure 10) was necessary to find the 100 year discharge (109,000) and the 500 year discharge (118,000).. These values were multiplied by the ratio(daily discharge/peak instantaneous discharge) to obtain the 100 year and 500 year daily hydrographs (see Table 6).. These values were inputed into the daily regulation model and the results are shown in Appendix D-5..

TABLE 6  
100 & 500 YEAR PROJECTED HYDROGRAPHS\*

Day	June 1964 Discharge (CFS)	$Q/Q_p$	$(Q_{100})(Q/Q_p)$ (CFS)	$(Q_{500})(Q/Q_p)$ (CFS)
1	49,300	0.544	59,300	64,190
2	63,400	0.699	76,190	82,480
3	68,000	0.75	81,750	88,500
4	64,500	0.711	77,500	83,900
5	75,000	0.827	90,140	97,590
6	78,800	0.869	94,720	102,540
7	85,900	0.947	103,220	111,750
8	81,000	0.893	97,340	105,370
9	72,000	0.794	86,550	93,690
10	64,100	0.707	77,060	83,420
11	57,300	0.632	68,890	74,580
12	51,900	0.572	62,350	67,500
13	46,000	0.507	55,260	59,830
14	46,500	0.513	55,920	60,530
15	48,300	0.533	58,100	62,890
16	46,600	0.513	55,920	60,530
17	43,200	0.476	51,880	56,170
18	43,800	0.484	52,760	57,1100
19	46,100	0.508	55,372	59,940
20	53,800	0.593	64,640	69,970
21	45,100	0.497	54,170	58,650
22	36,100	0.398	43,380	46,960
23	32,800	0.362	39,458	42,720
24	29,800	0.329	35,860	38,820
25	28,400	0.313	34,120	36,930
26	33,800	0.373	40,660	44,010
27	31,300	0.343	37,390	40,470
28	30,800	0.340	37,060	40,120
29	30,600	0.337	36,730	39,770
30	33,200	0.336	36,620	39,650

$$*Q_{100} = 109,000 \quad Q_{500} = 118,000$$

The peak values from the model for the 100 year and 500 year interval were 103,220 CFS and 111,750 CFS for both modes of operation. Since the natural flow values are close to these values it can be hypothesized that as the return interval increases that the effect of the reservoir decreases and approaches the natural flow values (See Table 7).

TABLE 7  
DISCHARGE FREQUENCY COMPARISON

<u>Return Interval (years)</u>	Natural Flow (CFS)	Accidental Flood Control (CFS)	Flood Control (CFS)
20	90,400	68,000	48,700
100	109,000	103,220	103,220
500	118,000	111,750	111,750

As a check on the assumption that the maximum discharge hydrograph was characteristic of the higher return interval hydrographs, a check on the coefficient of skewness was made. Below are the five largest hydrographs of record with their skew coefficients in Table 8.

TABLE 8  
HYDROGRAPH STATISTICS

Year	Month	Instantaneous Discharge (CFS)	Mean (CFS)	Standard Deviation (CFS)	Skew Coefficient
1964	June	90,700	50,576	16,957	0.552
1971	August	87,400	31,906	16,289	1.846
1972	June	82,600	34,430	14,624	1.365
1962	June	80,600	43,273	14,335	1.238
1967	August	80,200	32,622	14,717	1.872

Along with the above analysis a one-way variance analysis (4) was made on the five peak hydrographs and the results of the analysis is shown in Table 9. At the 95% level ( $F(4,145,5\%)$ )

TABLE 9  
ANALYSIS OF VARIANCE

<u>Source of Variation</u>	<u>Variation</u>	<u>Degrees of Freedom</u>	<u>Mean Square</u>	<u>F</u>
Between Hydrographs	$7.974 \times 10^9$	4	$1.993 \times 10^9$	8.6
Within Hydrographs	$3.408 \times 10^{10}$	147	$0.231 \times 10^9$	
Total Variation	$4.206 \times 10^{10}$	151		

the table value of the F statistic was equal to 2.37 which is less than the calculated value of 8.60 . Therefore the hypothesis that each of the hydrographs have the same characteristics is false.. The skew coefficients form Table 8 seemed to indicate that the hydrographs were different but the test of the variance confirms the fact that as the return interval increases the hydrographs do not follow the same distribution as the lower return intervals.. Therefore the analysis for the higher return intervals (100 & 500 Year) probably is in error.. The objective of this study was to indicate the effects of reservoirs on flood waves and not the extrapolation of these flood waves to higher return intervals. Another research topic could address this problem in the future..

#### VIII. CONCLUSIONS

It has been shown that reservoirs for hydroelectric power or a combination of hydroelectric and flood control will decrease a natural flow flood wave progressively to a lower discharge for a given frequency.. The available data was limited to only twenty-seven years of data and therefore, it

was difficult to project what the effects would be for higher return intervals.. It is felt that if further research is done in this area it will be found that reservoirs will have a decreasing effect on the higher return interval flood waves unless the reservoirs are specifically designed for them. Ultimately for the rare frequencies flood waves, the effect of reservoirs would be close to neglectable is the author's hypothesis.. The effect of forecast on the frequency curves (Figure 8 & 9) indicated a slight decrease in the discharge values for the same frequency.. No specific conclusion was made in this area. Since there was a short period of forecast (1966-1976) and the full extent of a forecast over the entire period of record would be expected to have a more marked effect on the frequency curve.

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**APPENDIX**

**A.**

**MONTHLY REGULATION PROGRAM**

```

1      PROGRAM ERIC(INPUT,TAPE7=INPUT,OUTPUT,TAPE6=OUTPUT)
2      DIMENSION-AF(800),AS(12),XDAY(12),ELE(10),STG(10),TITLE(24),D(8),D
3      1T(8,14,65),FLDRC(12),HF(12),YRMAX(2,65),RINDEX(12),RPER(13)
4      C AF=FLOW VALUES(CFS),AS()=LOAD PERCENT FOR MONTHS,XDAY()=DAYS IN EACH
5      C MONTH,ELE()=ELEVATION CORRESPONDING TO STORAGE(FT),STG()=STORAGE
6      C (ACRE-FT),UPPER=MAX STORAGE(ACRE-FT),BELOW=MIN. STORAGE(ACRE-FT)
7      C STRT=AN ESTIMATE OF THE FIRM ANNUAL ENERGY(KWH),EFF=EFFICIENCY IN
8      C PERCENT,TWEL=TAILWATER ELEVATION,CAPP=INSTALLED CAPACITY(KW)
9      C P1=LOW LIMIT OF FIRM ANNUAL ENERGY(KWH),P2=UPPER LIMIT OF FIRM ENERGY
10     C PF=PLANT FACTOR(PERCENT),NYR=NUMBER OF YEARS OF RECORD,NS=BEGINNING
11     C YEAR-NFLO=THE NUMBER OF FLOW VALUES(12*NYR)
12     C NFLOM=THE NUMBER OF THE 1ST MONTH OF THE FLOWS(USUALLY1=OCTOBER)
13     C FLDRC()=FLOOD CONTROL RULE CURVE(ACRE-FT) WITH - 1 FOR OCTOBER
14     C RINDEX()=MAY 1-FORCAST INDEX,COEF=THE COEFFICIENT IN THE FORCAST
15     C EQUATION AND REXP=THE EXPONENT,NF=NUMBER OF YEARS OF FORCAST
16     READ(7,5)(TITLE(I),I=1,24)
17     READ(7,10)(ELE(I),I=1,10)
18     READ(7,10)(STG(I),I=1,10)
19     READ(7,15)UPPER,BELOW,STRT,EFF,TWEL,BSTOR,ARS,IFORC
20     READ(7,20)CAPP,P1,P2,PF,NYR,NS,NFLO,NFLOM
21     READ(7,25)(AS(I),I=1,12)
22     READ(7,30)(XDAY(I),I=1,12)
23     READ(7,31)(FLDRC(I),I=1,10)
24     READ(7,32)(FLDRC(I),I=11,12)
25     READ(7,25)(RINDEX(I),I=1,11)
26     READ(7,33)COEF,REXP,NF
27     READ(7,30)(AF(K),K=1,NFLO)
28     5 FORMAT(2X,A8,7A10)
29     10 FORMAT(1X,E7.0*9F8.0)
30     15 FORMAT(1X,F9.0*6F10.0,I10)
31     20 FORMAT(1X,F9.0*2F10.0,F10.2,4I10)
32     25 FORMAT(8X,12F6.3)
33     30 FORMAT(8X,12F6.0)
34     31 FORMAT(1X,F7.0*9F8.0)
35     32 FORMAT(1X,F7.0*1E8.0)
36     33 FORMAT(1X,F11.2,F8.6,I3)
37     C CONSTT=(ACRE/43560 FT**2)*(86400 SEC/DAY)=1.98(ACRE-SEC)/(FT**2-DAY)
38     C PCNST IS A CONSTANT IN THE POWER FORMULA,-1HP=550 FT-LB/SEC
39     C 1HP=745.7 WATTS OR 1.34 HP=1 KILOWATT,DENSITY OF WATER=62.4 LB/FT**3
40     DO 37 K=1,NFLO
41     AF(K)=AF(K)*ARS
42     37 CONTINUE
43     CONSTT=1.98346
44     PCNST=62.4*EFF/(550.0*1.34)
45     DO 38 K=1,9
46     IF(UPPER.LT.STG(K+1))GO TO 39
47     38 CONTINUE
48     K=9
49     39 HU=(UPPER-STG(K))*(ELE(K+1)-ELE(K))/(STG(K+1)-STG(K))+ELE(K)
50     DO 45 J=1,12
51     DO 40 K=1,9
52     IF(FLDRC(J).LT.STG(K+1))GO TO 45
53     40 CONTINUE
54     K=9
55     45 HF(J)=(FLDRC(J)-STG(K))*(ELE(K+1)-ELE(K))/(STG(K+1)-STG(K))+ELE(K)
56     J=12
57     DO 50 K=1,9
58     IF(BELOW.LT.STG(K+1))GO TO 55
59     50 CONTINUE

```

55  $HL = (BELOW - STG(K)) + (ELE(K+1) - ELE(K)) / (STG(K+1) - STG(K)) * ELE(K)$   
 C DO LOOP 100 - CALCULATES FIRM ANNUAL ENERGY BY AN ITERATIVE PROCESS  
 C ASSUMING A VALUE FOR POWER IN KWH AND THEN CHECKING TO SEE IF THE  
 C STORAGE WILL SUFFICE\*\*\* IF NOT IT DECREASES THE VALUE ASSUMED  
 65 C 20 ITERATIONS IS ARBITRARY  
 C SVOL=STORAGE IN (ACRE-FT), P IS IN (KWH), QQ IS TEH INFLOW AF()  
 C CONVERTED TO (ACRE-FT), SXXX=DUMMY VARIABLE STORAGE (ACRE-FT), SOSO=  
 C INITIAL ESTIMATE OF MINIMUM STORAGE (ACRE-FT)  
 WRITE(6,56)  
 70 WRITE(6,60)(TITLE(I),I=1:24)  
 WRITE(6,65)  
 56 FORMAT(1H1)  
 60 FORMAT(23X,A8,7A10,/) A-2  
 65 FORMAT(16X,#FIRM-ENERGY(KWH)#+4X,#MIN. STORAGE#+12X,#P3#,12X,#P4#,  
 75 16X,#NO. OF ITER.#)  
 DO 100 K=1,20  
 SVOL=FLDRG(1)  
 J=NFLOM-1  
 SOSO=100000000.  
 80 P3=P1  
 P4=P2  
 DO 95 L=1,NFLO  
 J=J+1  
 P=STRT#AS(J)  
 85 QQ=AF(L)\*XDAY(J)\*CONST  
 SXXX=SVOL  
 C ITERATES 5 TIMES TO FIND AVG HEAD FROM THE AVG STORAGE DURING PERIOD  
 DO 90 MM=1,5  
 DO 80 I=1,9  
 90 IF(SXXX.LT.STG(I+I))GO TO 85  
 80 CONTINUE  
 I=9  
 85 H=(SXXX-STG(I))\*(ELE(I+1)-ELE(I))/(STG(I+1)-STG(I))+ELE(I)  
 IF(H.GT.HF(J))H=HF(J)  
 95 IF(H.LT.HL)H=HL  
 H=H-TWEL  
 C Q=DISCHARGE REQUIRED FOR THE POWER IN (CFS)  
 C ACFT=IS-Q CONVERTED TO (ACRE-FT)  
 Q=P/(H\*PCNST\*XDAY(J)\*24.0)  
 100 ACFT=Q\*XDAY(J)\*CONST  
 SXXX=SVOL+QQ-ACFT  
 SAV=(SVOL+SXXX)/2.0  
 90 SXXX=SAV  
 SVOL=SVOL+QQ-ACFT  
 105 IF(SOSO.GT.SVOL)SOSO=SVOL  
 IF(SVOL.LE.BELOW)GO TO 97  
 IF(SVOL.LT.FLDRG(j))GO TO 95  
 SVOL=FLDRG(j)  
 C STATEMENTS 95 AND 97 ARE THE TWO ENDS OF FIRM ENERGY CONVERGING  
 G TOWARD EACH OTHER, -SOSO=MINIMUM STORAGE AT THE END OF THE ITERATIONS  
 95 IF(J.GT.11)J=0  
 PP=STRT  
 P1=STRT  
 STRT=(P1+P2)/2.0  
 GO TO 100  
 115 97 PP=STRT  
 P2=STRT  
 STRT=(P1+P2)/2.0  
 100 WRITE(6,110)PP,SOSO,P3,P4,L

C DO LOOP 200 USES THE UNREGULATED STREAMFLOW AND THE FIRM ANNUAL  
 C ENERGY TO COMPUTE THE AVERAGE ANNUAL ENERGY\*\*\*  
 C \*\*\* NOTE THAT THE SECONDARY ENERGY IS GENERATED ONLY BY ADDITIONAL  
 C WATER ABOVE MAXIMUM ELEVATION UP TO THE OVERLOAD CAPACITY OF THE POWER  
 125 C PLANT. THE REST IS SPILLED  
 C QC=MAXIMUM DISCHARGE CAPABLE OF POWER PLANT(CFS)

QA=0.0

JJ=0

CAP=(STRT\*1.15)/(8760.\*PF)

IF(CAPP.GT.0.0)CAP=CAPP\*1.15

QC=CAP/(PCNST\*(HU-TWEL))

NS=NS-1

SVOL=BSTOR

NX=0

DO 200 L=1,NYR

NS=NS+1

IF(NS.LE.1965)GO TO 119

NX=NX+1

VFOR=COEF\*(RINDEX(NX)\*\*REXP)

119 DO 120 K=1,j2

JJ=JJ+1

120 AF(K)=AF(JJ)

DO 125 K=2,j3

125 DT(1,K,L)=AF(K-1)

DO 130 K=1,8

DT(K,1,L)=NS

130 D(K)=0.0

CQQ=0.0

DO 190 K=1,j2

IF(NS.LE.1965)GO TO 131

IF(K.LE.6)GO TO 131

VFOR=VFOR-CQQ

CQQ=AF(K)\*XDAY(K)\*CONSTT

131 QQ=AF(K)\*XDAY(K)\*CONSTT

P=STRT\*AS(K)

AQ=AF(K)

P1=P

SXXX=SVOL

C DO LOOP 155 USES THE AVERAGE STORAGE AND HEAD OF THE MONTH TO CALCULAT

C THE AVERAGE MONTHLY ENERGY

DO 155 MM=1,5

P=P1

QS=0.0

DO 135 I=1,9

135 IF(SXXX.LT.STG(I+1))GO TO 136

135 CONTINUE

I=9

136 H=(SXXX-STG(I))\*(ELE(I+1)-ELE(I))/(STG(I+1)-STG(I))+ELE(I)

IF(H.GT.HU)H=HU

IF(H.LT.HL)H=HL

H=H-TWEL

Q=P/(H\*PCNST\*XDAY(K)\*24.0)

R=Q

S2=SVOL+QQ

C THE NEXT SET OF STATEMENTS UTILIZES THE FORCAST DATA TO DECIDE WHETHER  
 C OR NOT THE RESERVOIR WILL BE DRAWN DOWN

IF(IFORC.LT.1)GO TO 140

IF(NS.LE.1965)GO TO 140

IF(K.LE.6)GO TO 140

```

QZAF=0.0
DO 137 I=J,12
QZ= (STRT*AS(J))/(H*PCNST*XDAY(J)*24.0)
QZAF=QZAF+QZ*XDAY(J)*CONSTT
185 137 CONTINUE
XSTOR=FLDRG(K)-SVOL
IF(XSTOR.LE.0.0)XSTOR=0.0
WFOR=VFOR-XSTOR
XFOR=WFOR-QZAF
190 IF(XFOR.LE.0.0) GO TO 140
AQ=(XFOR/(XDAY(K)*CONSTT))1*Q
IF(AQ.LT.QC)GO TO 138
P=H*PCNST*QC*XDAY(K)*24.0
Q=QC
195 S3=S2-QC*XDAY(K)*CONSTT
IF(S3.LE.UPPER)GO TO 150
QS=(S3-UPPER)/(XDAY(K)*CONSTT)
GO TO 150
138 P=H*PCNST*AQ*XDAY(K)*24.0
Q=AQ
S3=S2-AQ*XDAY(K)*CONSTT
IF(S3.LE.UPPER)GO TO 150
QS=(S3-UPPER)/(XDAY(K)*CONSTT)
GO TO 150
200
205 C SVOL=STORAGE,QQ=INFLOW,QC=MAXIMUM DISCHARGE AT OVERLOAD CAPACITY
C AQ=WATER...GFS...FOR FIRM POWER-PLUS-SOME FOR SECONDARY,
C AQQ = THAT WATER ABOVE FLOOD CONTROL RULE CURVE WHICH MAY BE ABLE
C TO BE STORED OR POSSIBLY SPILLED
140 IF(S2.LT.FLDRG(K))GO TO 150
AQ=(S2-FLDRG(K))/(XDAY(K)*CONSTT)
IF(Q.GT.AQ)GO TO 150
IF(AQ.LT.QC)-GO TO 145
IF(S2.LE.UPPER)GO TO 143
142 AQQ=(S2-UPPER)/(XDAY(K)*CONSTT)
215 P=H*PCNST*QC*XDAY(K)*24.0
Q=QC
IF(AQQ.LE.QC)GO TO 150
QS=AQQ-QC
GO TO 150
220 143 P=H*PCNST*QC*XDAY(K)*24.0
Q=QC
GO TO 150
145 P=H*PCNST*AQ*XDAY(K)*24.0
Q=AQ
225 150 ACFT=Q*XDAY(K)*CONSTT
SXXX=SVOL+QQ-ACFT
IF(SXXX.GT.UPPER)SXXX=UPPER
SAV=(SVOL+SXXX)/2.0
155 SXXX=SAV
230 SVOL=SVOL+QQ-ACFT
IF(SVOL.GT.UPPER)SVOL=UPPER
Q=Q+QS
P2=P-P1
QA=QA+(R*XDAY(K)/365.0)
DO 160 I=1,9
IF(SVOL.LT.STG(I+1))GO TO 165
160 CONTINUE
I=9
235 165 HH=(SVOL-STG(I))*(ELE(I+1)-ELE(I))/(STG(I+1)-STG(I))+ELE(I)

```

C THE NEXT SET OF STATEMENTS EQUATE THE VARIOUS VALUES TO BE COMBINED  
 C INTO A THREE DIMENSIONAL MATRIX FOR EASY OUTPUT  
 C DT(1,N,L)=UNREGULATED DISCHARGE \*\* DT(2,N,L)=REGULATED DISCHARGE  
 C DT(3,N,L)=AVERAGE HEAD OF MONTH \*\* DT(4,N,L)=END OF MONTH STORAGE  
 245 C DT(5,N,L)=AVERAGE MONTHLY ENERGY\*\* DT(6,N,L)=SECONDARY MONTHLY ENERGY  
 C DT(7,N,L)=MONTHLY SPILL \*\* DT(8,N,L)=END OF MONTH WATER ELEV.  
 DT(2,N,L)=Q

250 DT(3,N,L)=H  
 DT(4,N,L)=SVOL  
 DT(5,N,L)=P/1000.0  
 DT(6,N,L)=P2/1000.0  
 DT(7,N,L)=QS  
 DT(8,N,L)=HH

C THE NEXT SET OF STATEMENTS CALCULATE THE AVERAGES AND SOME TOTALS FOR  
 255 C THE RIGHT HAND SIDE OF TABLES

D(1)=D(1)+(AF(K)/12.0)  
 D(2)=D(2)+(Q/12.0)  
 D(3)=D(3)+(H/12.0)  
 D(4)=D(4)+(SVOL/12.0)  
 260 D(5)=D(5)+(P/1000.0)  
 D(6)=D(6)+(P2/1000.0)  
 D(7)=D(7)+(DT(7,N,L)/12.0)  
 190 D(8)=D(8)+(HH/12.0)

DO 195 N=1,8  
 265 195 DT(N,14,L)=D(N)  
 N=8

200 CONTINUE  
 A=NYR  
 QA=QA/A

270 NYR=NYR  
 NYR=NYR+1  
 DO 205 J=1,8  
 DO 205 K=1,14  
 205 DT(J,K,NYR)=0.0

275 DO 210 J=1,8  
 DO 210 K=2,14  
 DO 210 L=1,NYY  
 210 DT(J,K,NYR)=DT(J,K,NYR)+(DT(J,K,L)/A)

C PROGRAM WRITES OUTPUT  
 280 C UNREGULATED STREAMFLOW -CFS-  
 WRITE(6,232)  
 WRITE(6,220)  
 WRITE(6,215)((DT(1,K,L),K=1,14),L=1,NYR)

C REGULATED STREAMFLOW -CFS-  
 285 WRITE(6,234)  
 WRITE(6,220)  
 WRITE(6,215)((DT(2,K,L),K=1,14),L=1,NYR)  
 C MONTHLY SPILL -CFS-  
 WRITE(6,236)

290 WRITE(6,220)  
 WRITE(6,215)((DT(7,K,L),K=1,14),L=1,NYR)  
 C END OF THE MONTH WATER SURFACE ELEVATION - FT  
 WRITE(6,238)  
 WRITE(6,220)

295 WRITE(6,215)((DT(8,K,L),K=1,14),L=1,NYR)  
 C END OF THE MONTH ACTIVE STORAGE - ACRE-FT  
 WRITE(6,240)  
 WRITE(6,220)  
 WRITE(6,215)((DT(4,K,L),K=1,14),L=1,NYR)

```

        WRITE(6,242)
        WRITE(6,220)
        WRITE(6,215)((DT(3,K,L),K=1,14),L=1,NYR)
C AVERAGE MONTHLY ENERGY -MWH

```

305     WRITE(6,244)

```

        WRITE(6,230)
        WRITE(6,215)((DT(5,K,L),K=1,14),L=1,NYR)

```

G-SECONDARY-MONTHLY-ENERGY --MWH

```

        WRITE(6,246)
        WRITE(6,230)

```

310     WRITE(6,215)((DT(6,K,L),K=1,14),L=1,NYR)

215 FORMAT(1X,14F9.0)

220 FORMAT(1X,126H YEAR OCT NOV DEC JAN FEB

1 MAR APR MAY JUN JUL AUG SEP

315     2 AVERAGE/,1X,14(9H ----- )

230 FORMAT(1X,126H YEAR OCT NOV DEC JAN FEB

1 MAR APR MAY JUN JUL AUG SEP

2 TOTAL/,1X,14(9H ----- )

232 FORMAT(1H1,50X,#UNREGULATED STREAMFLOW - CFS#,///)

234 FORMAT(1H1,50X,#REGULATED STREAMFLOW - CFS#,///)

236 FORMAT(1H1,50X,#MONTHLY SPILL - CFS#,///)

238 FORMAT(1H1,50X,#END OF THE MONTH WATER SURFACE ELEVATION -FT#,///)

240 FORMAT(1H1,50X,#END OF THE MONTH ACTIVE STORAGE - ACRE-FT#,///)

242 FORMAT(1H1,50X,#AVERAGE HEAD DURING THE MONTH - FT#,///)

325     244 FORMAT(1H1,50X,#AVERAGE MONTHLY ENERGY -MWH#,///)

246 FORMAT(1H1,50X,#SECONDARY-MONTHLY-ENERGY --MWH#,///)

STRT=STRT/1000.0

C=CAP/1.15

CA=C\*PF

330     IF(CAPP.GT.0.0)CA=STRT/8.76

PF=PF\*100.

IF(CAPP.GT.0.0)PF=(CA/CAPP)\*100.0

C SUMMARY INFORMATION WRITTEN

WRITE(6,250)STRT,DT(5,14,NYR),CA,C,CAP,DT(3,14,NYR),UPPER,BELOW,DT

335     1(1,14,NYR),DT(2,14,NYR),PF,QA

250 FORMAT(1H1,40X,#SUMMARY INFORMATION#/40X-----#)

1/40X,#FIRM ANNUAL ENERGY - MWH#,F14.0/40X,#AVERAGE ANNUAL ENERGY -

2 MWH#,F11.0/40X,#PRIME CAPACITY -- KW ----- #,F12.0/40X,#DEPENDABLE

3 CAPACITY - KW#,F14.0/40X,#OVERLOAD CAPACITY - KW #,F14.0/40X,#AV

4ERAGE HEAD - FEET #,F14.0/40X,#MAX. STORAGE CAPACITY- ACFT#,F1

51.0/40X,#DEAD STORAGE CAPACITY--ACFT#,F11.0/40X,#AVERAGE ANNUAL IN

6FLOW - CFS#,F11.0/40X,#AVERAGE ANNUAL OUTFLOW - CFS#,F10.0/40X,#PL

7ANT FACTOR- PERCENT #,F14.0/40X,#PRIME POWER FLOW - CFS #,F15.0)

DO-361-M=1,2

345     DO 360 L=1,NYR

X=DT(M,2,L)

DO 350 K=2,13

Y=DT(M,K,L)

IF(X.GE.Y)GO TO 350

X=Y

350 CONTINUE

K=13

YRMAX(M,L)=X

360 CONTINUE

361 CONTINUE

M=2

I=0

WRITE(6,363)

WRITE(6,365)

PROGRAM ERIC

73/73 OPT=1

FTN 4.6+452

79/06/11. 16.07.31

PAGE

7

```
363 FORMAT(1H1,33X,'MAXIMUM DISCHARGE#')
365 FORMAT(29X,'YEAR#',2X,'UNREGULATED#',2X,'REGULATED#')
370 FORMAT(23X,3F10.1)
STOP
END
```

365

A-7

**APPENDIX**

**B**

**DATA & OUTPUT**

**APPENDIX**

**B-1**

**HYDROELECTRIC - NO FORECAST**

A SINGLE RESERVOIR REGULATION MODEL  
 A HYDRO POWER AND FLOOD CONTROL OPTIONS  
 A SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA  
 B 1780 1810 1900 1950 2000 2050 2100 2150 2200 2210  
 C 1000000 1300000 2333000 3160000 4000000 5100000 6400000 8000000 9624000 9999999  
 D 9624000 1300000 30000000000 .80 1480 8000000 1. 0  
 E 0 5000000007000000000 .50 27 1950 324 1  
 F -0.080 0.088 -0.097 -0.106 -0.090 -0.094 -0.081 -0.075 -0.069 -0.069 -0.074 0.077  
 G 31 30 31 31 28 31 30 31 30 31 31 30  
 H 9624000 9624000 9624000 9624000 9624000 9624000 9624000 9624000 9624000 9624000 9624000 9624000  
 I 9624000 9624000 5.21 5.54 5.91 2.98 4.60 6.37 7.94 5.84 5.43 7.72 4.83  
 J 1955840.32 0.62933 11  
 M 1950 6634 2583 1439 1027 788 726 870 11510 19600 22600 19880 8301  
 M 1951 3848 1300 1100 960 820 740 1617 14090 20790 22570 19670 21240  
 M 1952 5571 2744 1900 1600 1000 880 920 5419 32370 26390 20920 14480  
 M 1953 8262 3497 1700 1100 820 820 1615 19270 27320 20200 20610 15270  
 M 1954 5604 2100 1500 1300 1000 780 1235 17280 25250 20360 26100 12920  
 M 1955 5370 2760 2045 1794 1400 1100 1200 9319 29860 27560 25750 14290  
 M 1956 4951 1900 1300 980 970 940 950 17660 33340 31090 24530 18330  
 M 1957 5806 3050 2142 1700 1500 1200 1200 13750 30160 23310 20540 19800  
 M 1958 8212 3954 3264 1965 1307 1148 1533 12900 25700 22880 22540 7550  
 M 1959 4811 2150 1513 1448 1307 980 1250 15990 23320 25000 31180 16920  
 M 1960 6558 2850 2200 1845 1452 1197 1300 15780 15530 22980 23590 20510  
 M 1961 7794 3000 2694 2452 1754 1810 2650 17360 29450 24570 22100 13370  
 M 1962 5916 2700 2100 1900 1500 1400 1700 12590 43270 25850 23550 15890  
 M 1963 6723 2800 2000 1600 1500 1000 830 19030 26000 34400 23670 12320  
 M 1964 6449 2250 1494 1048 966 713 745 4307 50580 22950 16440 9571  
 M 1965 6291 2799 1211 960 860 900 1360 12990 25720 27840 21120 19350  
 M 1966 7205 2098 1631 1400 1300 1300 1775 9645 32953 19864 21825 11753  
 M 1967 4162 1600 1500 1500 1400 1200 1166 15480 29513 26800 32622 16867  
 M 1968 4900 2353 2054 1980 1900 1900 1910 16177 31550 26422 17167 8815  
 M 1969 3822 1630 882 724 723 816 1510 11045 15503 16103 8879 5093  
 M 1970 3123 1215 866 824 767 775 1080 11380 18633 22661 19977 9121  
 M 1971 5288 3407 2290 1442 1036 950 1082 3745 32930 23950 31910 14440  
 M 1972 5847 3093 2510 2239 2028 1823 1710 21890 34430 22770 19290 12400  
 M 1973 4826 2253 1465 1200 1200 1000 1027 8235 27800 18250 20290 9074  
 M 1974 3733 1523 1034 874 777 724 992 16180 17870 18800 16220 12250  
 M 1975 3739 1700 1603 1516 1471 1400 1593 15350 32310 27720 18090 16310  
 M 1976 7739 1993 1081 974 950 900 1373 12620 24380 18940 19800 6881

B-1  
B-2

## SINGLE RESERVOIR REGULATON MODEL

## HYDRO POWER AND FLOOD CONTROL OPTIONS

## SUSETNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

FIRM ENERGY (KWH)	MIN. STORAGE	P3	P4	NO. OF ITER.
3000000000.	4828031.	500000000.	7000000000.	325
5000000000.	1216497.	300000000.	7000000000.	16
4000000000.	436678.	3000000000.	5000000000.	31
3500000000.	205589.	3000000000.	4000000000.	258
3250000000.	357578.	3000000000.	3500000000.	36
3125000000.	3730357.	3000000000.	3250000000.	325
3187500000.	3108481.	3125000000.	3250000000.	325
3218750000.	2771224.	3187500000.	3250000000.	325
3234375000.	1489937.	3218750000.	3250000000.	325
3242187500.	788705.	3234375000.	3250000000.	367
3238281250.	886234.	3234375000.	3242187500.	318
3236328125.	816190.	3234375000.	3238281250.	319
3235351563.	1216223.	3234375000.	3236328125.	319
3234863281.	1282846.	3234375000.	3235351563.	320
3234619141.	1389171.	3234375000.	3234863281.	325
3234741211.	1336463.	3234619141.	3234863281.	325
3234802246.	1309771.	3234741211.	3234863281.	325
3234832764.	1296338.	3234802246.	3234863281.	320
3234817505.	1303061.	3234802246.	3234832764.	325
3234825134.	1299701.	3234817505.	3234832764.	320

## UNREGULATED STREAMFLOW - CFS

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	AVERAGE
1950.	6634.	2583.	1439.	1027.	788.	726.	870.	11510.	19600.	22600.	19880.	8301.	7997.
1951.	3848.	1300.	1100.	960.	820.	740.	1617.	14090.	20790.	22570.	19670.	21240.	9062.
1952.	5571.	2744.	1900.	1600.	1000.	880.	920.	5419.	32370.	26390.	20920.	14480.	9516.
1953.	8202.	3497.	1700.	1100.	820.	820.	1615.	19270.	27320.	20200.	20610.	15270.	10035.
1954.	5604.	2100.	1500.	1300.	1000.	780.	1235.	17280.	25250.	20360.	26100.	12920.	9619.
1955.	5370.	2760.	2045.	1794.	1400.	1100.	1200.	9319.	29860.	27560.	25750.	14290.	10204.
1956.	4951.	1900.	1300.	980.	970.	940.	950.	17660.	33340.	31090.	24530.	18330.	11412.
1957.	5806.	3050.	2142.	1700.	1500.	1200.	1200.	13750.	30160.	23310.	20540.	19800.	10347.
1958.	8212.	3954.	3264.	1965.	1307.	1148.	1533.	12900.	25700.	22880.	22540.	7550.	9413.
1959.	4811.	2150.	1513.	1448.	1307.	980.	1250.	15990.	23320.	25000.	31180.	16920.	10489.
1960.	6558.	2850.	2200.	1845.	1452.	1197.	1300.	15780.	15530.	22980.	23590.	20510.	9649.
1961.	7794.	3000.	2694.	2452.	1754.	1810.	2650.	17360.	29450.	24570.	22100.	13370.	10750.
1962.	5916.	2700.	2100.	1900.	1500.	1400.	1700.	12590.	43270.	25850.	23550.	15890.	11531.
1963.	6723.	2800.	2000.	1600.	1500.	1000.	830.	19030.	26000.	34400.	23670.	12320.	10989.
1964.	6449.	2250.	1494.	1048.	966.	713.	745.	4307.	50580.	22950.	16440.	9571.	9793.
1965.	6291.	2799.	1211.	960.	860.	900.	1360.	12990.	25720.	27840.	21120.	19350.	10117.
1966.	7205.	2098.	1631.	1400.	1300.	1300.	1775.	9645.	32953.	19864.	21825.	11753.	9396.
1967.	4162.	1600.	1500.	1500.	1400.	1200.	1166.	15480.	29513.	26800.	32622.	16867.	11151.
1968.	4900.	2353.	2054.	1980.	1900.	1900.	1910.	16177.	31550.	26422.	17167.	8815.	9761.
1969.	3822.	1630.	882.	724.	723.	816.	1510.	11045.	15503.	16103.	8879.	5093.	5561.
1970.	3123.	1215.	866.	824.	767.	775.	1080.	11380.	18633.	22661.	19977.	9121.	7535.
1971.	5288.	3407.	2290.	1442.	1036.	950.	1082.	3745.	32930.	23950.	31910.	14440.	10206.
1972.	5847.	3093.	2510.	2239.	2028.	1823.	1710.	21890.	34430.	22770.	19290.	12400.	10836.
1973.	4826.	2253.	1465.	1200.	1200.	1000.	1027.	8235.	27800.	18250.	20290.	9074.	8052.
1974.	3733.	1523.	1034.	874.	777.	724.	992.	16180.	17870.	18800.	16220.	12250.	7581.
1975.	3739.	1700.	1603.	1516.	1471.	1400.	1593.	15350.	32310.	27720.	18090.	16310.	10234.
1976.	7739.	1993.	1081.	974.	950.	900.	1373.	12620.	24380.	18940.	19800.	6881.	8136.
0.	5671.	2419.	1723.	1420.	1204.	1079.	1340.	13370.	28005.	23809.	21787.	13449.	9606.

## REGULATED STREAMFLOW - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	7676.	8815.	9600.	10777.	10449.	10217.	9434.	8566.	7889.	7241.	7422.	7629.	8826.
1951.	7913.	9153.	10013.	11351.	11101.	10970.	10252.	9279.	8436.	7656.	7784.	8034.	9328.
1952.	7952.	9156.	9982.	11272.	10999.	10831.	10123.	9432.	8485.	7459.	7543.	7873.	9259.
1953.	7837.	8973.	9764.	10967.	10690.	10468.	9713.	8643.	7705.	7033.	7249.	7564.	8884.
1954.	7547.	8679.	9451.	10594.	10228.	9959.	9170.	8193.	7397.	6829.	6987.	7264.	8525.
1955.	7269.	8344.	9053.	10106.	9718.	9384.	8553.	7729.	7090.	6449.	18747.	14290.	9728.
1956.	7153.	8221.	8933.	9987.	9614.	9286.	8464.	7552.	6812.	18486.	24530.	18330.	11447.
1957.	7145.	8189.	8874.	9896.	9505.	9165.	8341.	7482.	6819.	8820.	20540.	19800.	10381.
1958.	8212.	8151.	8806.	9799.	9405.	9066.	8244.	7398.	6795.	7515.	22540.	7550.	9457.
1959.	7154.	8221.	8928.	9972.	9587.	9254.	8429.	7536.	6911.	6373.	27282.	16920.	10547.
1960.	7138.	8175.	8859.	9876.	9483.	9143.	8320.	7438.	6900.	6448.	14400.	20510.	9724.
1961.	7794.	8161.	8835.	9834.	9428.	9075.	8232.	7326.	6655.	18548.	22100.	13370.	10780.
1962.	7144.	8191.	8880.	9901.	9567.	9164.	8332.	7481.	6708.	23604.	23550.	15890.	11529.
1963.	7136.	8172.	8858.	9882.	9491.	9154.	8338.	7423.	6756.	21240.	23670.	12320.	11037.
1964.	7139.	8184.	8884.	9927.	9551.	9225.	8411.	7661.	6874.	15505.	16440.	9571.	9781.
1965.	7140.	8181.	8879.	9925.	9552.	9225.	8401.	7543.	6925.	6340.	20574.	19350.	10170.
1966.	7205.	8170.	8869.	9902.	9517.	9179.	8347.	7527.	6873.	6303.	19466.	11753.	9426.
1967.	7160.	8242.	8958.	10006.	9621.	9284.	8456.	7567.	6884.	8658.	32622.	16867.	11194.
1968.	7153.	8217.	8914.	9941.	9541.	9187.	8345.	7450.	6755.	15978.	17167.	8815.	9789.
1969.	7164.	8249.	8973.	10044.	9679.	9358.	8527.	7681.	7176.	6767.	7142.	7688.	8204.
1970.	7811.	9040.	9887.	11171.	10915.	10733.	10020.	9131.	8410.	7668.	7790.	8182.	9230.
1971.	8252.	9533.	10454.	11861.	11709.	11668.	11202.	10733.	9586.	8185.	8018.	8153.	9946.
1972.	8151.	9385.	10274.	11615.	11345.	11196.	10492.	9264.	7992.	7131.	7334.	7698.	9323.
1973.	7721.	8896.	9698.	10890.	10581.	10343.	9573.	8770.	7970.	7262.	7485.	7881.	8923.
1974.	7960.	9208.	10081.	11447.	11206.	11107.	10438.	9433.	8560.	7874.	8104.	9512.	9494.
1975.	8579.	10006.	11093.	12782.	12878.	13234.	13096.	12397.	10330.	8559.	8509.	8807.	10856.
1976.	8743.	10118.	11261.	13039.	13330.	13868.	14393.	14378.	12699.	10733.	10621.	11187.	12031.
0.	7602.	8668.	9447.	10621.	10320.	10102.	9394.	8556.	7718.	10025.	15023.	11556.	9919.

## MONTHLY SPILL - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1951.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1952.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1953.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1954.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1955.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1331.	0.	111.
1956.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1070.	7115.	915.	758.
1957.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3125.	2385.	459.
1958.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5125.	0.	427.
1959.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9867.	0.	822.
1960.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3095.	258.
1961.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1133.	4685.	0.	485.
1962.	0.	0.	0.	0.	0.	0.	0.	0.	0.	6189.	6135.	0.	1027.
1963.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3825.	6255.	0.	840.
1964.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3159.	1935.	424.
1966.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2050.	0.	171.
1967.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	15207.	0.	1267.
1968.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976.	0.	0.	0.	0.	0.	0.	0.	0.	0.	452.	2372.	308.	261.
n.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

## END OF THE MONTH WATER SURFACE ELEVATION -FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	2148.	2136.	2121.	2102.	2082.	2059.	2038.	2046.	2074.	2108.	2132.	2133.	2098.
1951.	2125.	2110.	2092.	2067.	2044.	2016.	1990.	2006.	2039.	2076.	2103.	2128.	2066.
1952.	2123.	2112.	2095.	2072.	2051.	2023.	1998.	1983.	2051.	2096.	2123.	2135.	2072.
1953.	2136.	2125.	2110.	2089.	2068.	2044.	2022.	2052.	2096.	2122.	2148.	2162.	2098.
1954.	2159.	2146.	2131.	2113.	2097.	2075.	2057.	2078.	2116.	2142.	2178.	2188.	2123.
1955.	2185.	2174.	2161.	2145.	2131.	2115.	2101.	2104.	2147.	2187.	2200.	2200.	2154.
1956.	2196.	2184.	2170.	2153.	2138.	2122.	2108.	2127.	2176.	2200.	2200.	2200.	2164.
1957.	2197.	2188.	2175.	2160.	2146.	2131.	2117.	2130.	2173.	2200.	2200.	2200.	2168.
1958.	2200.	2192.	2182.	2167.	2153.	2138.	2125.	2136.	2171.	2200.	2200.	2200.	2172.
1959.	2196.	2184.	2170.	2154.	2140.	2124.	2111.	2127.	2157.	2193.	2200.	2200.	2163.
1960.	2199.	2189.	2177.	2161.	2148.	2132.	2119.	2135.	2151.	2183.	2200.	2200.	2166.
1961.	2200.	2191.	2179.	2165.	2152.	2138.	2128.	2147.	2189.	2200.	2200.	2200.	2174.
1962.	2198.	2188.	2175.	2160.	2146.	2131.	2119.	2128.	2196.	2200.	2200.	2200.	2170.
1963.	2199.	2189.	2176.	2161.	2147.	2131.	2117.	2140.	2175.	2200.	2200.	2200.	2170.
1964.	2199.	2188.	2174.	2157.	2142.	2126.	2112.	2105.	2186.	2200.	2200.	2200.	2166.
1965.	2198.	2189.	2174.	2157.	2142.	2126.	2113.	2123.	2158.	2199.	2200.	2200.	2165.
1966.	2200.	2189.	2175.	2159.	2145.	2130.	2118.	2122.	2170.	2196.	2200.	2200.	2167.
1967.	2194.	2182.	2168.	2152.	2138.	2122.	2109.	2124.	2166.	2200.	2200.	2200.	2163.
1968.	2196.	2185.	2172.	2157.	2144.	2130.	2118.	2135.	2180.	2200.	2200.	2200.	2168.
1969.	2194.	2182.	2166.	2149.	2133.	2117.	2104.	2110.	2126.	2143.	2147.	2142.	2143.
1970.	2133.	2118.	2101.	2077.	2055.	2028.	2004.	2010.	2038.	2075.	2103.	2105.	2071.
1971.	2099.	2085.	2066.	2040.	2013.	1978.	1942.	1916.	1999.	2043.	2101.	2112.	2033.
1972.	2108.	2095.	2077.	2055.	2032.	2006.	1977.	2017.	2083.	2116.	2139.	2148.	2071.
1973.	2142.	2130.	2114.	2094.	2074.	2052.	2030.	2028.	2077.	2102.	2127.	2129.	2092.
1974.	2121.	2107.	2087.	2062.	2038.	2009.	1978.	2002.	2027.	2057.	2076.	2084.	2054.
1975.	2073.	2054.	2028.	1996.	1958.	1914.	1860.	1876.	1962.	2025.	2051.	2069.	1989.
1976.	2066.	2047.	2019.	1980.	1939.	1887.	1820.	1810.	1871.	1910.	1944.	1929.	1935.
0.	2162.	2150.	2135.	2115.	2096.	2074.	2053.	2064.	2109.	2140.	2155.	2158.	2118.

## END OF THE MONTH ACTIVE STORAGE - ACRE-FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950	7935930.	7565128.	7063311.	6463809.	5927276.	5343724.	4834122.	5015146.	5711988.	6656388.	7422382.	7450479.	6449140.
1951	7200564.	6733216.	6185191.	5546296.	4975333.	4346319.	3832500.	4128312.	4A63432.	5780467.	6511296.	7297126.	5616666.
1952	7150701.	6769152.	6272213.	5677523.	5122226.	4510377.	3962772.	3716048.	5137294.	6301326.	7123866.	7517035.	5771711.
1953	7539480.	7213641.	6717791.	6111127.	5562999.	4969754.	4487870.	5141306.	6308499.	7118119.	7939652.	8398170.	6459034.
1954	8278691.	7887219.	7398353.	6826892.	6314378.	5749965.	5277816.	5836529.	6898867.	7730858.	8906037.	9242568.	7195681.
1955	9125805.	8793533.	8362645.	7851577.	7389598.	6880208.	6442676.	6540422.	7895345.	9193383.	9624000.	9624000.	8143599.
1956	9488607.	9112500.	8643174.	8089333.	7609271.	7096087.	6648968.	7270486.	8848985.	9624000.	9624000.	8473284.	
1957	9541678.	9235865.	8821952.	8317944.	7873431.	7383710.	6958767.	7344194.	8733078.	9624000.	9624000.	8590222.	
1958	9624000.	9374291.	9033524.	8551859.	8102114.	7615285.	7215972.	7554297.	8679243.	9624000.	9624000.	8718549.	
1959	9479916.	9118659.	8662742.	8138631.	7678770.	7170008.	6742812.	7262623.	8239001.	9384326.	9624000.	9624000.	8427124.
1960	9588355.	9271506.	8862065.	8368241.	7922216.	7433627.	7015920.	7528852.	8042369.	9058906.	9624000.	9624000.	8528338.
1961	9624000.	9316925.	8939318.	8485444.	8059229.	7612506.	7280383.	7897348.	9253737.	9624000.	9624000.	8778408.	
1962	9548506.	9221790.	8804922.	8312951.	7868275.	7390878.	6996224.	7310366.	9485928.	9624000.	9624000.	8650987.	
1963	9598597.	9278958.	8857251.	8348023.	7904203.	7402852.	6956090.	7669748.	8814852.	9624000.	9624000.	8641881.	
1964	9581590.	9228516.	8774098.	8228158.	7751374.	7227969.	6771790.	6565548.	9166221.	9624000.	9624000.	8513939.	
1965	9571782.	9251515.	8780043.	8228783.	7746053.	7234158.	6815181.	7150074.	8268453.	9590437.	9624000.	9624000.	8490373.
1966	9624000.	9262685.	8817621.	8294832.	7838470.	7354032.	6962996.	7093246.	8645108.	9478934.	9624000.	9624000.	8551660.
1967	9439631.	9044429.	8585875.	8062842.	7606292.	7109233.	6675459.	7162000.	8508517.	9624000.	9624000.	9624000.	8422190.
1968	9485441.	9136510.	8714702.	8225213.	7800871.	7352804.	6969870.	7506455.	8981839.	9624000.	9624000.	9624000.	8587142.
1969	9418525.	9024673.	8527161.	7954073.	7456659.	6931460.	6513921.	6720775.	7216247.	7790265.	7897083.	7742694.	7766128.
1970	7454456.	6988826.	6434121.	5797894.	5234317.	4622036.	4090052.	4228326.	4836631.	5758497.	6507818.	6563705.	5709723.
1971	6381429.	6016886.	5514909.	4874245.	4281512.	3622507.	3020307.	2590659.	3979725.	4949053.	6418121.	6792194.	4870129.
1972	6650551.	6276175.	5798805.	5222275.	4704856.	4128545.	3606007.	4382319.	5955464.	6917079.	7652196.	7932003.	5768856.
1973	7753993.	7358704.	6852491.	6256702.	5735690.	5161238.	4652706.	4619782.	5799718.	6475339.	7262714.	7333703.	6271898.
1974	7073787.	6616500.	6060210.	5410131.	4830952.	4192541.	3630473.	4045310.	4599271.	5271086.	5770147.	5992595.	5261084.
1975	5695020.	5200808.	4617323.	3924594.	3291065.	2563404.	1878931.	2060516.	3368418.	4546561.	5135660.	5582145.	3988704.
1976	5520415.	5036920.	4410958.	3669092.	2981565.	2184225.	1409492.	1301382.	1996428.	2501042.	3065411.	2809166.	3073841.
0.	8421311.	8049464.	7574547.	7008834.	6502555.	5947758.	5468521.	5764521.	6971654.	7819188.	8235125.	8347762.	7175937.

## AVERAGE HEAD DURING THE MONTH - FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	669.	662.	649.	631.	612.	591.	569.	562.	580.	612.	640.	652.	619.
1951.	649.	638.	622.	599.	576.	550.	524.	519.	543.	579.	610.	636.	587.
1952.	646.	637.	624.	604.	582.	557.	531.	510.	539.	594.	630.	649.	592.
1953.	655.	651.	638.	620.	598.	576.	553.	557.	594.	630.	655.	675.	617.
1954.	680.	673.	659.	642.	625.	606.	586.	588.	619.	649.	680.	703.	642.
1955.	706.	700.	688.	673.	658.	643.	628.	623.	646.	687.	713.	720.	674.
1956.	718.	710.	697.	681.	665.	650.	635.	637.	672.	708.	720.	720.	684.
1957.	719.	713.	702.	688.	673.	658.	644.	643.	671.	706.	720.	720.	688.
1958.	720.	716.	707.	694.	680.	666.	652.	651.	674.	705.	720.	720.	692.
1959.	718.	710.	697.	682.	667.	652.	637.	639.	662.	695.	716.	720.	683.
1960.	719.	714.	703.	689.	674.	660.	646.	647.	663.	687.	711.	720.	686.
1961.	720.	715.	705.	692.	678.	665.	653.	657.	688.	714.	720.	720.	694.
1962.	719.	713.	701.	687.	673.	658.	645.	644.	682.	718.	720.	720.	690.
1963.	720.	714.	703.	689.	674.	659.	644.	649.	677.	708.	720.	720.	690.
1964.	719.	713.	701.	685.	670.	654.	639.	628.	666.	713.	720.	720.	686.
1965.	719.	713.	701.	686.	670.	654.	640.	638.	661.	699.	719.	720.	685.
1966.	720.	714.	702.	687.	672.	657.	644.	640.	666.	703.	718.	720.	687.
1967.	717.	708.	695.	680.	665.	650.	635.	636.	665.	703.	720.	720.	683.
1968.	718.	710.	698.	684.	670.	657.	644.	646.	678.	710.	720.	720.	688.
1969.	717.	708.	694.	677.	661.	645.	630.	627.	638.	654.	665.	664.	665.
1970.	657.	646.	630.	609.	586.	562.	536.	527.	544.	578.	610.	624.	592.
1971.	622.	612.	596.	574.	546.	517.	480.	449.	477.	541.	592.	626.	553.
1972.	630.	622.	606.	586.	564.	539.	512.	520.	573.	621.	648.	664.	590.
1973.	665.	656.	642.	625.	604.	583.	561.	549.	574.	610.	635.	648.	613.
1974.	645.	634.	618.	594.	571.	543.	515.	510.	535.	563.	586.	600.	576.
1975.	599.	583.	561.	532.	497.	456.	410.	388.	443.	517.	558.	580.	510.
1976.	587.	577.	553.	522.	480.	435.	373.	335.	360.	413.	447.	457.	462.
0.	684.	676.	663.	645.	626.	605.	584.	578.	607.	645.	667.	676.	638.

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## AVERAGE MONTHLY ENERGY -MWH

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YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1950.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1951.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1952.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1953.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1954.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1955.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	626080.	501770.	3874213.
1956.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	621427.	631898.	611514.	4388000.
1957.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	313943.	631898.	611514.	4080516.
1958.	297962.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	267162.	631898.	265106.	3726503.
1959.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	628660.	594118.	3969141.
1960.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	516159.	611514.	3874036.
1961.	282796.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	626896.	631898.	469465.	4275430.
1962.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	630033.	631898.	557951.	4343042.
1963.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	620966.	631898.	432596.	4208621.
1964.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	557070.	596505.	336070.	4012805.
1965.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	631445.	611514.	3989322.
1966.	261425.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	629938.	412687.	3791627.
1967.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	306663.	631898.	592257.	4053979.
1968.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	571789.	622884.	309524.	4027358.
1969.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1970.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1971.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1972.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1973.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1974.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1975.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1976.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
n. 261224.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	316059.	436550.	376135.	3654343.	

## SECONDARY MONTHLY ENERGY - MWH

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1950.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1951.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1952.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1953.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1954.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1955.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	386703.	252688.	639392.
1956.	0.	0.	0.	0.	0.	0.	0.	0.	0.	398225.	392521.	362433.	1153179.
1957.	0.	0.	0.	0.	0.	0.	0.	0.	0.	90741.	392521.	362433.	845695.
1958.	39177.	0.	0.	0.	0.	0.	0.	0.	0.	43959.	392521.	16024.	491681.
1959.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	389283.	345036.	734319.
1960.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	276782.	362433.	639215.
1961.	24010.	0.	0.	0.	0.	0.	0.	0.	0.	403693.	392521.	220384.	1040608.
1962.	0.	0.	0.	0.	0.	0.	0.	0.	0.	406830.	392521.	308870.	1108221.
1963.	0.	0.	0.	0.	0.	0.	0.	0.	0.	397763.	392521.	183515.	973800.
1964.	0.	0.	0.	0.	0.	0.	0.	0.	0.	333867.	357129.	86988.	777984.
1965.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	392068.	362433.	754501.
1966.	2639.	0.	0.	0.	0.	0.	0.	0.	0.	0.	390561.	163606.	556806.
1967.	0.	0.	0.	0.	0.	0.	0.	0.	0.	83461.	392521.	343175.	819157.
1968.	0.	0.	0.	0.	0.	0.	0.	0.	0.	348587.	383507.	60443.	792536.
1969.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	2438.	0.	0.	0.	0.	0.	0.	0.	0.	92856.	197173.	127054.	419522.

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SUMMARY INFORMATION

FIRM ANNUAL ENERGY - MWH	3234821.
AVERAGE ANNUAL ENERGY - MWH	3654343.
PRIME CAPACITY - KW	369272.
DEPENDABLE CAPACITY - KW	738544.
OVERLOAD CAPACITY - KW	849325.
AVERAGE HEAD - FEET	638.
MAX. STORAGE CAPACITY - ACFT	9624000.
DEAD STORAGE CAPACITY - ACFT	1300000.
AVERAGE ANNUAL INFLOW - CFS	9606.
AVERAGE ANNUAL OUTFLOW - CFS	9919.
PLANT FACTOR - PERCENT	50.
PRIME POWER FLOW - CFS	8671.

## MAXIMUM DISCHARGE

YEAR UNREGULATED REGULATED

1950.0	22600.0	10777.0
1951.0	22570.0	11350.7
1952.0	32370.0	11271.8
1953.0	27320.0	10966.5
1954.0	26100.0	10594.0
1955.0	29860.0	18746.6
1956.0	33340.0	24530.0
1957.0	30160.0	20540.0
1958.0	25700.0	22540.0
1959.0	31180.0	27282.1
1960.0	23590.0	20510.0
1961.0	29450.0	22100.0
1962.0	43270.0	23604.5
1963.0	34400.0	23670.0
1964.0	50580.0	16440.0
1965.0	27840.0	20574.1
1966.0	32953.0	19465.7
1967.0	32622.0	32622.0
1968.0	31550.0	17167.0
1969.0	16103.0	10044.4
1970.0	22661.0	11171.3
1971.0	32930.0	11861.5
1972.0	34430.0	11615.4
1973.0	27800.0	10889.6
1974.0	18800.0	11446.6
1975.0	32310.0	13234.3
1976.0	24380.0	14392.9

**APPENDIX**

**B-2**

**HYDROELECTRIC - FORECAST**

A  
A    SINGLE RESERVOIR REGULATION MODEL  
A    HYDRO POWER AND FLOOD CONTROL OPTIONS  
A    SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

B	1780	1810	1900	1950	2000	2050	2100	2150	2200	2210
C	1000000	1300000	2333000	3160000	4000000	5100000	6400000	8000000	9624000	9999999
D	9624000	1300000	3000000	000000	.80	1480	8000000	1.	1	
E	0	5000000	00007000000000	.50	27	1950		324	1	
F	-	-	-	-	-	-	-	-	-	-
G	-	-	-	-	-	-	-	-	-	-
H	9624000	9624000	9624000	9624000	9624000	9624000	9624000	9624000	9624000	9624000
I	-	-	-	-	-	-	-	-	-	-
J	1955840.32	0.62933	11							
M	1950	6634	2583	1439	1027	788	726	870	11510	19600
M	1951	3848	1300	1100	960	820	740	1617	14090	20790
M	1952	5571	2744	1900	1600	1000	880	920	5419	32370
M	1953	8202	3497	1700	1100	820	820	1615	19270	27320
M	1954	5604	2100	1500	1300	1000	780	1235	17280	25250
M	1955	5370	2760	2045	1794	1400	1100	1200	9319	29860
M	1956	4951	1900	1300	980	970	940	950	17660	33340
M	1957	5806	3050	2142	1700	1500	1200	1200	13750	30160
M	1958	8212	3954	3264	1965	1307	1148	1533	12900	25700
M	1959	4811	2150	1513	1448	1367	980	1250	15990	23320
M	1960	6558	2850	2200	1845	1452	1197	1300	15780	15530
M	1961	7794	3000	2694	2452	1754	1810	2650	17360	29450
M	1962	5916	2700	2100	1900	1500	1400	1700	12590	43270
M	1963	6723	2800	2000	1600	1500	1000	830	19030	26000
M	1964	6449	2250	1494	1048	966	713	745	4307	50580
M	1965	6291	2799	1211	960	860	900	1360	12990	25720
M	1966	7205	2098	1631	1400	1300	1300	1775	9645	32953
M	1967	4162	1600	1500	1500	1400	1200	1166	15480	29513
M	1968	4900	2353	2054	1980	1900	1900	1910	16177	31550
M	1969	3822	1630	882	724	723	816	1510	11045	15503
M	1970	3123	1215	866	824	767	775	1080	11380	18633
M	1971	5288	3407	2290	1442	1036	950	1082	3745	32930
M	1972	5847	3093	2510	2239	2028	1823	1710	21890	34430
M	1973	4826	2253	1465	1200	1200	1000	1027	8235	27800
M	1974	3733	1523	1034	874	777	724	992	16180	17870
M	1975	3739	1700	1603	1516	1471	1400	1593	15350	32310
M	1976	7739	1993	1081	974	950	900	1373	12620	24380
										18940
										19800
										6881

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## SINGLE RESERVOIR REGULATON MODEL

## HYDRO POWER AND FLOOD CONTROL OPTIONS

## SU SITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

FIRM ENERGY(KWH)	MIN. STORAGE	P3	P4	NO. OF ITER.
3000000000.	4828031.	500000000.	7000000000.	325
5000000000.	1216497.	300000000.	7000000000.	16
4000000000.	436678.	3000000000.	5000000000.	31
3500000000.	205589.	3000000000.	4000000000.	258
3250000000.	357578.	3000000000.	3500000000.	306
3125000000.	3730357.	3000000000.	3250000000.	325
3187500000.	3108481.	3125000000.	3250000000.	325
3218750000.	2771224.	3187500000.	3250000000.	325
3234375000.	148937.	3218750000.	3250000000.	325
3242187500.	788705.	3234375000.	3250000000.	307
3238281250.	886234.	3234375000.	3242187500.	318
3236328125.	816190.	3234375000.	3238281250.	319
3235351563.	1216223.	3234375000.	3236328125.	319
3234863281.	1282846.	3234375000.	3235351563.	320
3234619141.	1389171.	3234375000.	3234863281.	325
3234741211.	1336463.	3234619141.	3234863281.	325
3234802246.	1309771.	3234741211.	3234863281.	325
3234832764.	1296338.	3234802246.	3234863281.	320
3234817505.	1303061.	3234802246.	3234832764.	325
3234825134.	1299701.	3234817505.	3234832764.	320

## UNREGULATED STREAMFLOW - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	6634.	2583.	1439.	1027.	788.	726.	870.	11510.	19600.	22600.	19880.	8301.	7997.
1951.	3848.	1300.	1100.	960.	820.	740.	1617.	14090.	20790.	22570.	19670.	21240.	9062.
1952.	5571.	2744.	1900.	1600.	1000.	880.	920.	5419.	32370.	26390.	20920.	14480.	9516.
1953.	8262.	3497.	1700.	1190.	820.	820.	1615.	19270.	27320.	20200.	20610.	15270.	10035.
1954.	5604.	2100.	1500.	1300.	1000.	780.	1235.	17280.	25250.	20360.	26100.	12920.	9619.
1955.	5370.	2760.	2045.	1794.	1400.	1100.	1200.	9319.	29860.	27560.	25750.	14290.	10204.
1956.	4951.	1900.	1300.	980.	970.	940.	950.	17660.	33340.	31090.	24530.	18330.	11412.
1957.	5806.	3050.	2142.	1700.	1500.	1200.	1200.	13750.	30160.	23310.	20540.	19800.	10347.
1958.	8212.	3954.	3264.	1965.	1307.	1148.	1533.	12900.	25700.	22880.	22540.	7550.	9413.
1959.	4811.	2150.	1513.	1448.	1307.	980.	1250.	15990.	23320.	25000.	31180.	16920.	10489.
1960.	6558.	2850.	2200.	1845.	1452.	1197.	1300.	15780.	15530.	22980.	23590.	20510.	9649.
1961.	7794.	3000.	2694.	2452.	1754.	1810.	2650.	17360.	29450.	24570.	22100.	13370.	10750.
1962.	5916.	2700.	2100.	1900.	1500.	1400.	1700.	12590.	43270.	25850.	23550.	15890.	11531.
1963.	6723.	2800.	2000.	1600.	1500.	1000.	830.	19030.	26000.	34400.	23670.	12320.	10989.
1964.	6449.	2250.	1494.	1048.	966.	713.	745.	4307.	50580.	22950.	16440.	9571.	9793.
1965.	6291.	2799.	1211.	960.	860.	900.	1360.	12990.	25720.	27840.	21120.	19350.	10117.
1966.	7205.	2098.	1631.	1400.	1300.	1300.	1775.	9645.	32953.	19864.	21825.	11753.	9396.
1967.	4162.	1600.	1500.	1500.	1400.	1200.	1166.	15480.	29513.	26800.	32622.	16867.	11151.
1968.	4900.	2353.	2054.	1980.	1900.	1900.	1910.	16177.	31550.	26422.	17167.	8815.	9761.
1969.	3822.	1630.	882.	724.	723.	816.	1510.	11045.	15503.	16103.	8879.	5093.	5561.
1970.	3123.	1215.	866.	824.	767.	775.	1080.	11380.	18633.	22661.	19977.	9121.	7535.
1971.	5288.	3407.	2290.	1442.	1036.	950.	1082.	3745.	32930.	23950.	31910.	14440.	10206.
1972.	5847.	3093.	2510.	2239.	2029.	1823.	1710.	21890.	34430.	22770.	19290.	12400.	10836.
1973.	4826.	2253.	1465.	1200.	1200.	1000.	1027.	8235.	27800.	18250.	20290.	9074.	8052.
1974.	3733.	1523.	1034.	874.	777.	724.	992.	16180.	17870.	18800.	16220.	12250.	7581.
1975.	3739.	1700.	1603.	1516.	1471.	1400.	1593.	15350.	32310.	27720.	18090.	16310.	10234.
1976.	7739.	1993.	1081.	974.	950.	900.	1373.	12620.	24380.	18940.	19800.	6881.	8136.
0.	5671.	2419.	1723.	1420.	1204.	1079.	1340.	13370.	28005.	23809.	21787.	13449.	9606.

## REGULATED STREAMFLOW - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	7676.	8815.	9600.	10777.	10449.	10217.	9434.	8566.	7889.	7241.	7422.	7829.	8826.
1951.	7913.	9153.	10013.	11351.	11101.	10970.	10252.	9279.	8436.	7656.	7784.	8034.	9328.
1952.	7952.	9156.	9982.	11272.	10999.	10831.	10123.	9432.	8485.	7459.	7543.	7873.	9259.
1953.	7837.	8973.	9764.	10967.	10690.	10468.	9713.	8643.	7705.	7033.	7249.	7564.	8884.
1954.	7547.	8679.	9451.	10594.	10228.	9959.	9170.	8193.	7397.	6829.	6987.	7264.	8525.
1955.	7269.	8344.	9053.	10106.	9718.	9384.	8553.	7729.	7090.	6449.	18747.	14290.	9728.
1956.	7153.	8221.	8933.	9987.	9614.	9286.	8464.	7552.	6812.	18486.	24530.	18330.	11447.
1957.	7145.	8189.	8874.	9896.	9505.	9165.	8341.	7482.	6819.	8820.	20540.	19800.	10381.
1958.	8212.	8151.	8806.	9799.	9405.	9066.	8244.	7398.	6795.	7515.	22540.	7550.	9457.
1959.	7154.	8221.	8926.	9972.	9587.	9254.	8429.	7536.	6911.	6373.	27282.	16920.	10547.
1960.	7138.	8175.	8859.	9876.	9483.	9143.	8320.	7438.	6900.	6448.	14400.	20510.	9724.
1961.	7794.	8161.	8835.	9834.	9428.	9075.	8232.	7326.	6655.	18548.	22100.	13370.	10780.
1962.	7144.	8191.	8880.	9901.	9507.	9164.	8332.	7481.	6708.	23604.	23550.	15890.	11529.
1963.	7136.	8172.	8858.	9882.	9491.	9154.	8338.	7423.	6756.	21240.	23670.	12320.	11037.
1964.	7139.	8184.	8884.	9927.	9551.	9225.	8411.	7661.	6874.	15505.	16440.	9571.	9781.
1965.	7140.	8181.	8879.	9925.	9552.	9225.	8401.	7543.	6925.	6340.	20574.	19350.	10170.
1966.	7205.	8170.	8869.	9902.	9517.	9179.	12731.	10032.	10495.	7470.	8044.	11753.	9447.
1967.	7160.	8242.	8958.	10006.	9621.	9284.	11790.	10416.	10591.	7530.	24087.	16867.	11213.
1968.	7153.	8217.	8914.	9941.	9541.	9187.	17415.	12668.	10656.	7591.	7785.	8815.	9824.
1969.	7164.	8249.	8973.	10044.	9679.	9358.	8527.	7681.	7176.	6767.	7142.	7688.	8204.
1970.	7811.	9040.	9887.	11171.	10915.	10733.	10020.	9131.	8410.	7668.	7790.	8182.	9230.
1971.	8252.	9533.	10454.	11861.	11709.	11668.	11202.	10733.	9586.	8185.	8018.	8153.	9946.
1972.	8151.	9385.	10274.	11615.	11345.	11196.	10492.	9264.	7992.	7131.	7334.	7698.	9323.
1973.	7721.	8896.	9698.	10890.	10581.	10343.	9573.	8770.	7970.	7262.	7485.	7681.	8923.
1974.	7960.	9208.	10081.	11447.	11206.	11107.	10438.	9433.	8560.	7874.	8104.	8512.	9494.
1975.	8579.	10006.	11093.	12762.	12078.	13234.	13096.	12397.	10330.	8559.	8509.	8807.	10856.
1976.	8743.	10118.	11261.	13039.	13330.	13868.	14393.	14378.	12699.	10733.	10621.	11187.	12031.
0.	7602.	8668.	9447.	10621.	10320.	10102.	10016.	8948.	8134.	9715.	13936.	11556.	9922.

## END OF THE MONTH WATER SURFACE ELEVATION -FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	2148.	2136.	2121.	2102.	2082.	2059.	2038.	2046.	2074.	2108.	2132.	2133.	2098.
1951.	2125.	2110.	2092.	2067.	2044.	2016.	1990.	2006.	2039.	2076.	2103.	2128.	2066.
1952.	2123.	2112.	2095.	2072.	2051.	2023.	1998.	1983.	2051.	2096.	2123.	2135.	2072.
1953.	2136.	2125.	2110.	2089.	2068.	2044.	2022.	2052.	2096.	2122.	2148.	2162.	2098.
1954.	2159.	2146.	2131.	2113.	2097.	2075.	2057.	2078.	2116.	2142.	2178.	2188.	2123.
1955.	2185.	2174.	2161.	2145.	2131.	2115.	2101.	2104.	2147.	2187.	2200.	2200.	2154.
1956.	2196.	2184.	2170.	2153.	2138.	2122.	2108.	2127.	2176.	2200.	2200.	2200.	2164.
1957.	2197.	2188.	2175.	2160.	2146.	2131.	2117.	2130.	2173.	2200.	2200.	2200.	2168.
1958.	2200.	2192.	2182.	2167.	2153.	2138.	2125.	2136.	2171.	2200.	2200.	2200.	2172.
1959.	2196.	2184.	2170.	2154.	2140.	2124.	2111.	2127.	2157.	2193.	2200.	2200.	2163.
1960.	2199.	2189.	2177.	2161.	2148.	2132.	2119.	2135.	2151.	2183.	2200.	2200.	2166.
1961.	2200.	2191.	2179.	2165.	2152.	2138.	2128.	2147.	2189.	2200.	2200.	2200.	2174.
1962.	2198.	2188.	2175.	2160.	2146.	2131.	2119.	2128.	2196.	2200.	2200.	2200.	2170.
1963.	2199.	2189.	2176.	2161.	2147.	2131.	2117.	2140.	2175.	2200.	2200.	2200.	2170.
1964.	2199.	2188.	2174.	2157.	2142.	2126.	2112.	2105.	2186.	2200.	2200.	2200.	2166.
1965.	2198.	2189.	2174.	2157.	2142.	2126.	2113.	2123.	2158.	2199.	2200.	2200.	2165.
1966.	2200.	2189.	2175.	2159.	2145.	2130.	2109.	2109.	2150.	2174.	2200.	2200.	2162.
1967.	2194.	2182.	2168.	2152.	2138.	2122.	2102.	2112.	2147.	2184.	2200.	2200.	2159.
1968.	2196.	2185.	2172.	2157.	2144.	2130.	2101.	2108.	2147.	2182.	2200.	2200.	2160.
1969.	2194.	2182.	2166.	2149.	2133.	2117.	2104.	2110.	2126.	2143.	2147.	2142.	2143.
1970.	2133.	2118.	2101.	2077.	2055.	2028.	2004.	2010.	2038.	2075.	2103.	2105.	2071.
1971.	2099.	2085.	2066.	2040.	2013.	1978.	1942.	1916.	1999.	2043.	2101.	2112.	2033.
1972.	2108.	2095.	2077.	2055.	2032.	2006.	1977.	2017.	2083.	2116.	2139.	2148.	2071.
1973.	2142.	2130.	2114.	2094.	2074.	2052.	2030.	2028.	2077.	2102.	2127.	2129.	2092.
1974.	2121.	2107.	2087.	2062.	2038.	2009.	1978.	2002.	2027.	2057.	2076.	2084.	2054.
1975.	2073.	2054.	2028.	1996.	1958.	1914.	1860.	1876.	1962.	2025.	2051.	2069.	1989.
1976.	2066.	2047.	2019.	1980.	1939.	1887.	1820.	1810.	1871.	1910.	1944.	1929.	1935.
0.	2162.	2150.	2135.	2115.	2096.	2074.	2052.	2062.	2107.	2138.	2155.	2158.	2117.

## END OF THE MONTH ACTIVE STORAGE - ACRE-FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	7935930.	7565128.	7063311.	6463809.	5927276.	5343724.	4834122.	5015146.	5711988.	6656388.	7422382.	7450479.	6449140.
1951.	7200504.	6733216.	6185191.	5546296.	4975333.	4346319.	3832500.	4128312.	4863432.	5780467.	6511296.	7297126.	5616666.
1952.	7150701.	6769152.	6272213.	5677523.	5122226.	4510377.	3962772.	3716048.	5137294.	6301326.	7123866.	7517035.	5771711.
1953.	7539480.	7213641.	6717791.	6111127.	5562999.	4969754.	4487870.	5141306.	6308499.	7118119.	7939652.	8398170.	6459034.
1954.	8278691.	7887219.	7398353.	6826892.	6314378.	5749965.	5277816.	5836529.	6898867.	7730858.	8906037.	9242568.	7195681.
1955.	9125805.	8793533.	8362645.	7851577.	7389598.	6880208.	6442676.	6540422.	7895345.	9193383.	9624000.	9624000.	8143599.
1956.	9488607.	9112500.	8643174.	8089333.	7609271.	7096087.	6648968.	7270486.	8848985.	9624000.	9624000.	8473284.	
1957.	9541678.	9235865.	8821952.	8317984.	7873431.	7383710.	6958767.	7344194.	8733078.	9624000.	9624000.	8590222.	
1958.	9624000.	9374291.	9033524.	8551859.	8102114.	7615205.	7215972.	7554297.	8679243.	9624000.	9624000.	8718549.	
1959.	9479916.	9118659.	8662742.	8138631.	7678770.	7170008.	6742812.	7262623.	8239001.	9384326.	9624000.	9624000.	8427124.
1960.	9588355.	9271506.	8862065.	8368241.	7922216.	7433627.	7015920.	7528852.	8642369.	9058906.	9624000.	9624000.	8528338.
1961.	9624000.	9316925.	8939318.	8485444.	8059229.	7612506.	7280383.	7897348.	9253737.	9624000.	9624000.	9624000.	8778408.
1962.	9548506.	9221790.	8804922.	8312951.	7868275.	7390878.	6996224.	7311366.	9485928.	9624000.	9624000.	9624000.	8650987.
1963.	9598597.	9278958.	8857251.	8348023.	7904203.	7402852.	6956090.	7669748.	8814852.	9624000.	9624000.	9624000.	8641881.
1964.	9581590.	9228516.	8774098.	8228158.	7751374.	7227969.	6771790.	6565548.	9166221.	9624000.	9624000.	9624000.	8513939.
1965.	9571782.	9251515.	8780043.	8228763.	7746053.	7234158.	6815181.	7150074.	8268453.	9590437.	9624000.	9624000.	8490373.
1966.	9624000.	9262685.	8817621.	8294832.	7838470.	7354032.	6702083.	6678285.	8614610.	8776666.	9624000.	9624000.	8384274.
1967.	9439631.	9044429.	8585875.	8062842.	7606292.	7109233.	6477073.	6788424.	7914371.	9099217.	9624000.	9624000.	8281282.
1968.	9485441.	9136510.	8714702.	8225213.	7800871.	7352804.	6430172.	6645955.	7889253.	9047147.	9624000.	9624000.	8331339.
1969.	9418525.	9024673.	8527161.	7954073.	7456659.	6931460.	6513921.	6720775.	7216247.	7790265.	7897083.	7742694.	7766128.
1970.	7454456.	6988826.	6434121.	5797894.	5234317.	4622036.	4090052.	4228326.	4836631.	5758497.	6507818.	6563705.	5709723.
1971.	6381429.	6016886.	5514909.	4874245.	4281512.	3622507.	3020307.	2590659.	3979725.	4949053.	6418121.	6792194.	4870129.
1972.	6650551.	6276175.	5798805.	5222275.	4704856.	4128545.	3606007.	4382319.	5955464.	6917079.	7652196.	7932003.	5768856.
1973.	7753993.	7358704.	6852491.	6256702.	5735690.	5161238.	4652706.	4619782.	5799718.	6475339.	7262714.	7333703.	6271898.
1974.	7573787.	6616500.	6060210.	5410131.	4830952.	4192541.	3630473.	4045310.	4599271.	5271086.	5770147.	5992595.	5291084.
1975.	5695020.	5200808.	4617323.	3924594.	3291065.	2563404.	1878931.	2060516.	3368418.	4546561.	5135660.	5582145.	3988704.
1976.	5520415.	5036920.	4410958.	3669092.	2981565.	2184225.	1409492.	1301382.	1994428.	2501042.	3065411.	2809166.	3073841.
0.	8421311.	8049464.	7574547.	7008834.	6502555.	5947758.	5431522.	5703446.	6885831.	7752376.	8235125.	8347762.	7155044.

## AVERAGE HEAD DURING THE MONTH - FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	669.	662.	649.	631.	612.	591.	569.	562.	580.	612.	640.	652.	619.
1951.	649.	638.	622.	599.	576.	550.	524.	519.	543.	579.	610.	636.	587.
1952.	646.	637.	624.	614.	582.	557.	531.	510.	539.	594.	630.	649.	592.
1953.	655.	651.	638.	620.	598.	576.	553.	557.	594.	630.	655.	675.	617.
1954.	680.	673.	659.	642.	625.	606.	586.	588.	619.	649.	680.	703.	642.
1955.	706.	700.	688.	673.	658.	643.	628.	623.	646.	687.	713.	720.	674.
1956.	718.	710.	697.	681.	665.	650.	635.	637.	672.	708.	720.	720.	684.
1957.	719.	713.	702.	688.	673.	658.	644.	643.	671.	706.	720.	720.	688.
1958.	720.	716.	707.	694.	680.	666.	652.	651.	674.	705.	720.	720.	692.
1959.	718.	710.	697.	682.	667.	652.	637.	639.	662.	695.	716.	720.	683.
1960.	719.	714.	703.	689.	674.	660.	646.	647.	663.	687.	711.	720.	686.
1961.	720.	715.	705.	692.	678.	665.	653.	657.	688.	714.	720.	720.	694.
1962.	719.	713.	701.	687.	673.	658.	645.	644.	682.	718.	720.	720.	690.
1963.	720.	714.	703.	689.	674.	659.	644.	649.	677.	708.	720.	720.	690.
1964.	719.	713.	701.	685.	670.	654.	639.	628.	666.	713.	720.	720.	686.
1965.	719.	713.	701.	686.	670.	654.	640.	638.	661.	699.	719.	720.	685.
1966.	720.	714.	702.	687.	672.	657.	640.	629.	650.	682.	707.	720.	682.
1967.	717.	708.	695.	680.	665.	650.	632.	627.	650.	686.	712.	720.	679.
1968.	718.	710.	698.	684.	670.	657.	635.	624.	647.	684.	711.	720.	680.
1969.	717.	708.	694.	677.	661.	645.	630.	627.	638.	654.	665.	664.	665.
1970.	657.	646.	630.	609.	586.	562.	536.	527.	544.	578.	610.	624.	592.
1971.	622.	612.	596.	574.	546.	517.	480.	449.	477.	541.	592.	626.	553.
1972.	630.	622.	606.	586.	564.	539.	512.	520.	573.	621.	648.	664.	590.
1973.	665.	656.	642.	625.	604.	583.	561.	549.	574.	610.	635.	648.	613.
1974.	645.	634.	618.	594.	571.	543.	515.	510.	535.	563.	586.	600.	576.
1975.	599.	583.	561.	532.	497.	456.	410.	388.	443.	517.	558.	580.	510.
1976.	587.	577.	553.	522.	480.	435.	373.	335.	360.	413.	447.	457.	462.
0.	684.	676.	663.	645.	626.	605.	583.	577.	605.	643.	666.	676.	637.

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## AVERAGE MONTHLY ENERGY -MWH

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1950.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1951.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1952.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1953.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1954.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1955.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	626080.	501770.	3874213.
1956.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	621427.	631898.	611514.	4388000.
1957.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	313943.	631898.	611514.	4080516.
1958.	297962.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	267162.	631898.	265106.	3726503.
1959.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	628660.	594118.	3969141.
1960.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	516159.	611514.	3874036.
1961.	282796.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	626896.	631898.	469465.	4275430.
1962.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	630633.	631898.	557951.	4343042.
1963.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	620966.	631898.	432596.	4208621.
1964.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	557070.	596505.	336070.	4012805.
1965.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	631445.	611514.	3969322.
1966.	261425.	284664.	313778.	342891.	291134.	304073.	397139.	318030.	332476.	256813.	286592.	412687.	3801701.
1967.	258786.	284664.	313778.	342891.	291134.	304073.	363548.	329270.	335583.	260172.	624808.	592257.	4300963.
1968.	258786.	284664.	313778.	342891.	291134.	304073.	539626.	398546.	336276.	261802.	278997.	309524.	3920097.
1969.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1970.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1971.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1972.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1973.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1974.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1975.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
1976.	258786.	284664.	313778.	342891.	291134.	304073.	262021.	242612.	223203.	223203.	239377.	249081.	3234821.
0.	261224.	284664.	313778.	342891.	291134.	304073.	281067.	254390.	235600.	304101.	410835.	376135.	3659891.

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## SECONDARY MONTHLY ENERGY - MWH

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1950.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1951.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1952.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1953.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1954.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1955.	0.	0.	0.	0.	0.	0.	0.	0.	0.	386703.	252688.	639392.	
1956.	0.	0.	0.	0.	0.	0.	0.	0.	398225.	392521.	362433.	1153179.	
1957.	0.	0.	0.	0.	0.	0.	0.	0.	90741.	392521.	362433.	845695.	
1958.	39177.	0.	0.	0.	0.	0.	0.	0.	0.	43959.	392521.	16024.	491681.
1959.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	389283.	345036.	734319.
1960.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	276782.	362433.	639215.
1961.	24010.	0.	0.	0.	0.	0.	0.	0.	0.	403693.	392521.	220384.	1040608.
1962.	0.	0.	0.	0.	0.	0.	0.	0.	0.	406830.	392521.	308870.	1108221.
1963.	0.	0.	0.	0.	0.	0.	0.	0.	0.	397763.	392521.	183515.	973800.
1964.	0.	0.	0.	0.	0.	0.	0.	0.	0.	333867.	357129.	86988.	777984.
1965.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	392068.	362433.	754501.
1966.	2639.	0.	0.	0.	0.	135119.	75418.	109273.	33610.	47215.	163606.	566880.	
1967.	0.	0.	0.	0.	0.	101528.	86658.	112380.	36970.	385431.	343175.	1066142.	
1968.	0.	0.	0.	0.	0.	277606.	155934.	113074.	38599.	39621.	60443.	685276.	
1969.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	2438.	0.	0.	0.	0.	0.	19046.	11778.	12397.	80898.	171458.	127054.	425070.

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SUMMARY INFORMATION

FIRM ANNUAL ENERGY - MWH	3234821.
AVERAGE ANNUAL ENERGY - MWH	3659891.
PRIME CAPACITY - KW	369272.
DEPENDABLE CAPACITY - KW	738544.
OVERLOAD CAPACITY - KW	849325.
AVERAGE HEAD - FEET	637.
MAX. STORAGE CAPACITY - ACFT	9624000.
DEAD STORAGE CAPACITY - ACFT	1300000.
AVERAGE ANNUAL INFLOW - CFS	9606.
AVERAGE ANNUAL OUTFLOW - CFS	9922.
PLANT FACTOR - PERCENT	50.
PRIME POWER FLOW - CFS	8678.

MAXIMUM DISCHARGE  
YEAR UNREGULATED REGULATED

1950.0	22600.0	10777.0
1951.0	22570.0	11350.7
1952.0	32370.0	11271.8
1953.0	27320.0	10966.5
1954.0	26100.0	10594.0
1955.0	29860.0	18746.6
1956.0	33340.0	24530.0
1957.0	30160.0	20540.0
1958.0	25700.0	22540.0
1959.0	31180.0	27282.1
1960.0	23590.0	20510.0
1961.0	29450.0	22100.0
1962.0	43270.0	23604.5
1963.0	34400.0	23670.0
1964.0	50580.0	16440.0
1965.0	27840.0	20574.1
1966.0	32953.0	12731.4
1967.0	32622.0	24087.2
1968.0	31550.0	17415.4
1969.0	16103.0	10044.4
1970.0	22661.0	11171.3
1971.0	32930.0	11861.5
1972.0	34430.0	11615.4
1973.0	27800.0	10889.6
1974.0	18800.0	11446.6
1975.0	32310.0	13234.3
1976.0	24380.0	14392.9

APPENDIX

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HYDROELECTRIC & FLOOD CONTROL - NO FORECAST

A SINGLE RESERVOIR REGULATION MODEL  
 A HYDRO POWER AND FLOOD CONTROL OPTIONS  
 A SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA  
 B 1780 1810 1900 1950 2000 2050 2100 2150 2200 2210  
 C 1000000 1300000 2333000 3160000 4000000 5100000 6400000 8000000 9624000 9999999  
 D 9624000 13000003000000000 .80 1480 9000000 1. 0  
 E 0 5000000007000000000 .50 27 1950 324 1  
 F 0.080 0.088 0.097 0.106 0.090 0.094 0.081 0.075 0.069 0.069 0.074 0.077  
 G 31 30 31 31 28 31 30 31 30 31 31 30  
 H 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000  
 I 9000000 9000000  
 I 5.21 5.54 5.91 2.98 4.60 6.37 7.94 5.84 5.43 7.72 4.63  
 J 1955840.32 0.62933 11  
 M 1950 6634 2583 1439 1027 788 726 870 11510 19600 22600 19880 8301  
 M 1951 3848 1300 1100 960 820 740 1617 14090 20790 22570 19670 21240  
 M 1952 5571 2744 1900 1600 1000 880 920 5419 32370 26390 20920 14480  
 M 1953 8202 3497 1700 1100 820 820 1615 19270 27320 20200 20610 15270  
 M 1954 5604 2100 1500 1300 1000 780 1235 17280 25250 20360 26100 12920  
 M 1955 5370 2760 2045 1794 1400 1100 1200 9319 29860 27560 25750 14290  
 M 1956 4951 1900 1300 980 970 940 950 17660 33340 31090 24530 18330  
 M 1957 5806 3050 2142 1700 1500 1200 1200 13750 30160 23310 20540 19800  
 M 1958 8212 3954 3264 1965 1307 1148 1533 12900 25700 22880 22540 7550  
 M 1959 4811 2150 1513 1448 1307 980 1250 15990 23320 25000 31180 16920  
 M 1960 6558 2850 2200 1845 1452 1197 1300 15780 15530 22980 23590 20510  
 M 1961 7794 3000 2694 2452 1754 1810 2650 17360 29450 24570 22100 13370  
 M 1962 5916 2700 2100 1900 1500 1400 1700 12590 43270 25850 23550 15890  
 M 1963 6723 2800 2000 1600 1500 1000 830 19030 26000 34400 23670 12320  
 M 1964 6449 2250 1494 1048 966 713 745 4307 50580 22950 16440 9571  
 M 1965 6291 2799 1211 960 860 900 1360 12990 25720 27840 21120 19350  
 M 1966 7205 2098 1631 1400 1300 1300 1775 9645 32953 19864 21825 11753  
 M 1967 4162 1600 1500 1500 1400 1200 1166 15480 29513 26800 32622 16867  
 M 1968 4900 2353 2054 1980 1900 1900 1910 16177 31550 26422 17167 8815  
 M 1969 3822 1630 882 724 723 816 1510 11045 15503 16103 8879 5093  
 M 1970 3123 1215 866 824 767 775 1080 11380 18633 22661 19977 9121  
 M 1971 5288 3407 2290 1442 1036 950 1082 3745 32930 23950 31910 14440  
 M 1972 5847 3093 2510 2239 2028 1823 1710 21890 34430 22770 19290 12400  
 M 1973 4826 2253 1465 1200 1200 1000 1027 8235 27800 18250 20290 9074  
 M 1974 3733 1523 1034 874 777 724 992 16180 17870 18800 16220 12250  
 M 1975 3739 1700 1603 1516 1471 1400 1593 15350 32310 27720 18090 16310  
 M 1976 7739 1993 1081 974 950 900 1373 12620 24380 18940 19800 6881

## SINGLE RESERVOIR REGULATON MODEL

## HYDRO POWER AND FLOOD CONTROL OPTIONS

## SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

FIRM ENERGY (KWH)	MIN. STORAGE	P3	P4	NO. OF ITER.
3000000000.	3244995.	500000000.	7000000000.	325
5000000000.	804474.	3000000000.	7000000000.	15
4000000000.	4988.	3000000000.	5000000000.	28
3500000000.	1163586.	3000000000.	4000000000.	248
3250000000.	1195389.	3000000000.	3500000000.	258
3125000000.	485062.	3000000000.	3250000000.	295
3062500000.	2547072.	3000000000.	3125000000.	325
3093750000.	2154402.	3062500000.	3125000000.	325
3109375000.	470930.	3093750000.	3125000000.	306
3101562500.	1215710.	3093750000.	3109375000.	318
3097656250.	1990417.	3093750000.	3101562500.	325
3099609375.	1377617.	3097656250.	3101562500.	325
3100585938.	913370.	3099609375.	3101562500.	319
3100097656.	1196568.	3099609375.	3100585938.	319
3099853516.	1236931.	3099609375.	3100097656.	320
3099731445.	1305636.	3099609375.	3099853516.	325
3099792480.	1268902.	3099731445.	3099853516.	320
3099761963.	1287326.	3099731445.	3099792480.	320
3099746704.	1296495.	3099731445.	3099761963.	320
3099739075.	1301069.	3099731445.	3099746704.	325

## UNREGULATED STREAMFLOW - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	6634.	2583.	1439.	1027.	788.	726.	870.	11510.	19600.	22600.	19880.	8301.	7997.
1951.	3848.	1300.	1100.	960.	820.	740.	1617.	14090.	20790.	22570.	19670.	21240.	9062.
1952.	5571.	2744.	1900.	1600.	1000.	880.	920.	5419.	32370.	26390.	20920.	14480.	9516.
1953.	8202.	3497.	1700.	1100.	820.	820.	1615.	19270.	27320.	20200.	20610.	15270.	10035.
1954.	5604.	2100.	1500.	1300.	1000.	780.	1235.	17280.	25250.	20360.	26100.	12920.	9619.
1955.	5370.	2760.	2045.	1794.	1400.	1100.	1200.	9319.	29860.	27560.	25750.	14290.	10204.
1956.	4951.	1900.	1300.	980.	970.	940.	950.	17660.	33340.	31090.	24530.	18330.	11412.
1957.	5806.	3050.	2142.	1700.	1500.	1200.	1200.	13750.	30160.	23310.	20540.	19800.	10347.
1958.	8212.	3954.	3264.	1965.	1367.	1148.	1533.	12900.	25700.	22880.	22540.	7550.	9413.
1959.	4811.	2150.	1513.	1448.	1307.	980.	1250.	15990.	23320.	25000.	31180.	16920.	10489.
1960.	6558.	2850.	2200.	1845.	1452.	1197.	1300.	15780.	15530.	22980.	23590.	20510.	9649.
1961.	7794.	3000.	2694.	2452.	1754.	1810.	2650.	17360.	29450.	24570.	22100.	13370.	10750.
1962.	5916.	2700.	2100.	1900.	1500.	1400.	1700.	12590.	43270.	25850.	23550.	15890.	11531.
1963.	6723.	2800.	2000.	1600.	1500.	1000.	830.	19030.	26000.	34400.	23670.	12320.	10989.
1964.	6449.	2256.	1494.	1048.	966.	713.	745.	4307.	50580.	22950.	16440.	9571.	9793.
1965.	6291.	2799.	1211.	960.	860.	900.	1360.	12990.	25720.	27840.	21120.	19350.	10117.
1966.	7205.	2098.	1631.	1400.	1300.	1300.	1775.	9645.	32953.	19864.	21825.	11753.	9396.
1967.	4162.	1600.	1500.	1500.	1400.	1200.	1166.	15480.	29513.	26800.	32622.	16867.	11151.
1968.	4900.	2353.	2054.	1980.	1900.	1900.	1910.	16177.	31550.	26422.	17167.	8815.	9761.
1969.	3822.	1630.	882.	724.	723.	816.	1510.	11045.	15503.	16103.	8879.	5093.	5561.
1970.	3123.	1215.	866.	824.	767.	775.	1080.	11380.	18633.	22661.	19977.	9121.	7535.
1971.	5288.	3407.	2290.	1442.	1036.	950.	1082.	3745.	32930.	23950.	31910.	14440.	10206.
1972.	5847.	3093.	2510.	2239.	2028.	1823.	1710.	21890.	34430.	22770.	19290.	12400.	10836.
1973.	4826.	2253.	1465.	1200.	1200.	1000.	1027.	8235.	27800.	18250.	20290.	9074.	8052.
1974.	3733.	1523.	1034.	874.	777.	724.	992.	16180.	17870.	18800.	16220.	12250.	7581.
1975.	3739.	1700.	1603.	1516.	1471.	1400.	1593.	15350.	32310.	27720.	18090.	16310.	10234.
1976.	7739.	1993.	1081.	974.	950.	900.	1373.	12620.	24380.	18940.	19800.	6881.	8136.
0.	5671.	2419.	1723.	1420.	1204.	1079.	1340.	13370.	28005.	23809.	21787.	13449.	9606.

## REGULATED STREAMFLOW - CFS

YEAR	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG	SEP.	AVERAGE
1950.	7026.	8047.	8734.	9762.	9399.	9083.	8282.	7461.	6914.	6414.	7374.	8301.	8066.
1951.	7052.	8124.	8841.	9895.	9535.	9220.	8427.	7552.	6942.	6430.	6617.	16688.	8777.
1952.	9681.	8037.	8715.	9724.	9351.	9029.	8227.	7486.	6866.	6227.	16688.	16688.	9727.
1953.	10250.	8029.	8699.	9716.	9351.	9033.	8223.	7306.	6623.	9879.	16688.	16688.	10040.
1954.	8153.	8044.	8735.	9758.	9389.	9069.	8264.	7369.	6719.	6211.	16688.	16688.	9591.
1955.	9015.	8037.	8713.	9717.	9336.	9006.	8199.	7402.	6783.	10266.	16688.	16688.	9987.
1956.	11692.	8046.	8742.	9774.	9410.	9089.	8284.	7387.	6653.	16688.	19829.	18330.	11160.
1957.	15954.	8034.	8705.	9707.	9326.	8993.	8186.	7339.	6679.	11429.	16688.	16688.	10644.
1958.	15075.	8024.	8669.	9648.	9264.	8933.	8125.	7289.	6686.	8514.	16688.	13597.	10043.
1959.	7043.	8093.	8790.	9821.	9447.	9121.	8312.	7427.	6802.	6260.	18358.	16920.	9700.
1960.	16688.	8036.	8708.	9709.	9326.	8994.	8185.	7314.	6779.	6324.	16236.	16688.	10249.
1961.	11493.	8034.	8699.	9683.	9288.	8943.	8113.	7217.	6543.	16688.	16688.	16688.	10673.
1962.	10978.	8038.	8713.	9716.	9332.	8996.	8180.	7341.	6807.	16688.	22563.	16688.	11170.
1963.	16099.	8036.	8712.	9720.	9340.	9010.	8209.	7305.	6637.	16688.	19565.	16688.	11334.
1964.	12370.	8042.	8732.	9758.	9393.	9074.	8275.	7561.	6751.	16688.	16688.	9946.	10273.
1965.	7029.	8053.	8740.	9773.	9411.	9092.	8282.	7434.	6816.	6911.	16688.	16688.	9576.
1966.	14213.	8044.	8733.	9753.	9379.	9048.	8230.	7420.	6766.	6192.	16688.	15757.	10019.
1967.	7049.	8114.	8820.	9857.	9481.	9151.	8345.	7463.	6775.	9756.	22474.	16867.	10346.
1968.	15048.	8041.	8722.	9725.	9336.	8988.	8164.	7284.	6594.	16688.	16688.	12413.	10641.
1969.	7053.	8121.	8836.	9896.	9541.	9226.	8435.	7606.	7072.	6662.	7025.	7559.	8086.
1970.	7680.	8889.	9748.	11061.	10828.	10719.	10069.	9239.	8418.	7636.	7711.	8077.	9173.
1971.	8150.	9424.	10339.	11797.	11679.	11830.	11436.	11060.	9835.	8226.	7957.	8054.	9982.
1972.	8036.	9281.	10172.	11522.	11326.	11224.	10680.	9435.	7982.	7056.	7206.	7555.	9289.
1973.	7575.	8726.	9512.	10722.	10441.	10224.	9514.	8721.	7899.	7152.	7324.	7704.	8793.
1974.	7778.	8995.	9892.	11232.	11045.	10957.	10408.	9408.	8443.	7748.	7929.	8318.	9346.
1975.	8378.	9767.	10862.	12515.	12700.	13074.	13174.	12524.	10220.	8417.	8297.	8551.	10707.
1976.	8479.	9803.	10921.	12658.	12933.	13429.	13950.	13846.	12127.	10181.	10066.	10555.	11579.
0.	10187.	8369.	9119.	10245.	9948.	9724.	9044.	8229.	7412.	9779.	14078.	13410.	9962.

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## MONTHLY SPILL - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1951.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1952.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1953.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1954.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1955.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1956.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3141.	1642.	399.
1957.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1958.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1959.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1670.	232.	159.
1960.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1961.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1962.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5875.	0.	490.
1963.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2877.	0.	240.
1964.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1965.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1966.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1967.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5785.	179.	497.
1968.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1969.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	717.	76.	66.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.			

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## END OF THE MONTH WATER SURFACE ELEVATION -FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	2180.	2170.	2156.	2140.	2125.	2109.	2094.	2103.	2126.	2157.	2181.	2181.	2143.
1951.	2175.	2162.	2148.	2130.	2115.	2099.	2083.	2099.	2125.	2156.	2180.	2189.	2138.
1952.	2181.	2171.	2158.	2143.	2128.	2113.	2099.	2094.	2142.	2181.	2189.	2185.	2149.
1953.	2181.	2172.	2159.	2143.	2128.	2112.	2100.	2123.	2161.	2181.	2188.	2186.	2153.
1954.	2181.	2170.	2156.	2140.	2125.	2110.	2096.	2116.	2150.	2177.	2195.	2188.	2150.
1955.	2181.	2171.	2158.	2143.	2130.	2114.	2101.	2105.	2148.	2181.	2198.	2194.	2152.
1956.	2181.	2170.	2155.	2139.	2124.	2108.	2093.	2114.	2164.	2191.	2200.	2200.	2153.
1957.	2181.	2172.	2159.	2144.	2130.	2115.	2102.	2115.	2158.	2181.	2188.	2194.	2153.
1958.	2181.	2173.	2163.	2149.	2135.	2120.	2108.	2118.	2154.	2181.	2192.	2181.	2154.
1959.	2177.	2166.	2152.	2136.	2122.	2106.	2091.	2109.	2140.	2176.	2200.	2200.	2148.
1960.	2181.	2171.	2159.	2144.	2130.	2115.	2103.	2119.	2135.	2167.	2181.	2188.	2149.
1961.	2181.	2172.	2160.	2146.	2133.	2120.	2110.	2129.	2171.	2186.	2196.	2190.	2158.
1962.	2181.	2171.	2158.	2144.	2130.	2115.	2103.	2113.	2181.	2198.	2200.	2199.	2158.
1963.	2181.	2171.	2158.	2143.	2129.	2114.	2100.	2123.	2159.	2192.	2200.	2192.	2155.
1964.	2181.	2170.	2156.	2140.	2125.	2109.	2094.	2086.	2170.	2182.	2181.	2181.	2148.
1965.	2179.	2176.	2156.	2139.	2124.	2108.	2094.	2106.	2141.	2181.	2189.	2194.	2148.
1966.	2181.	2170.	2156.	2140.	2124.	2112.	2099.	2104.	2153.	2178.	2188.	2181.	2149.
1967.	2175.	2163.	2150.	2133.	2119.	2104.	2089.	2106.	2149.	2181.	2200.	2200.	2147.
1968.	2181.	2170.	2158.	2143.	2130.	2116.	2105.	2122.	2168.	2186.	2187.	2181.	2154.
1969.	2175.	2163.	2148.	2130.	2115.	2098.	2082.	2091.	2108.	2126.	2130.	2125.	2124.
1970.	2116.	2102.	2082.	2057.	2033.	2006.	1975.	1983.	2015.	2056.	2085.	2087.	2050.
1971.	2080.	2067.	2047.	2018.	1989.	1949.	1912.	1877.	1967.	2019.	2080.	2095.	2008.
1972.	2090.	2076.	2057.	2033.	2009.	1978.	1946.	1992.	2063.	2100.	2123.	2132.	2050.
1973.	2127.	2115.	2099.	2077.	2057.	2033.	2010.	2008.	2060.	2087.	2114.	2117.	2075.
1974.	2109.	2094.	2073.	2048.	2022.	1991.	1958.	1983.	2012.	2043.	2064.	2073.	2039.
1975.	2062.	2042.	2016.	1981.	1944.	1901.	1841.	1856.	1949.	2015.	2042.	2061.	1976.
1976.	2059.	2040.	2013.	1974.	1934.	1882.	1816.	1810.	1873.	1914.	1950.	1937.	1934.
0.	2157.	2145.	2130.	2111.	2093.	2072.	2052.	2063.	2109.	2140.	2156.	2157.	2115.

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## END OF THE MONTH ACTIVE STORAGE - ACRE-FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	8975926.	8655771.	8202221.	7665153.	7186901.	6673047.	6232009.	6480980.	7235851.	8231062.	9000000.	9000000.	7794494.
1951.	8802975.	8396906.	7920957.	7371588.	6887590.	6366161.	5960912.	6362899.	7186880.	8179306.	8981893.	9252742.	7639234.
1952.	9000000.	8685043.	8266023.	7766490.	7302714.	6801660.	6366839.	6239768.	7757323.	8997111.	9257312.	9125915.	7963850.
1953.	9000000.	8730328.	8299963.	7770203.	7296398.	6791431.	6398224.	7133861.	8365405.	9000000.	9241140.	9156751.	8098642.
1954.	9000000.	8646312.	8201450.	7681385.	7215466.	6705771.	6287544.	6896924.	7999609.	8869619.	9448324.	9224101.	8014709.
1955.	9000000.	8686005.	8276033.	7788873.	7348150.	6862053.	6445588.	6563476.	7936644.	9000000.	9557184.	9414482.	8073207.
1956.	9000000.	8634284.	8176678.	7635951.	7167194.	6666133.	6229742.	6861430.	8449427.	9334953.	9624000.	9624000.	8116983.
1957.	9000000.	8703446.	8299935.	7807579.	7372945.	6893758.	6478071.	6872270.	8269451.	9000000.	9236836.	9421999.	8113024.
1958.	9000000.	8757811.	8425443.	7953065.	7511183.	7032495.	6640238.	6985238.	8116655.	9000000.	9359810.	9000000.	8148495.
1959.	8862758.	8509120.	8061983.	7546845.	7094770.	6594180.	6173960.	6700489.	7683364.	8835638.	9624000.	9624000.	7942567.
1960.	9001121.	8692563.	8292397.	7808871.	7371571.	6892158.	6482456.	7002984.	7523721.	8547840.	9000000.	9227411.	7986924.
1961.	9000000.	8700439.	8331209.	7886596.	7468206.	7029614.	6704554.	7328248.	8691313.	9175942.	9508698.	9311252.	8261339.
1962.	9000000.	8682397.	8275760.	7795200.	7360258.	6893189.	6507605.	6830339.	9000000.	9563333.	9624000.	9576503.	8259049.
1963.	9000000.	8688411.	8275697.	7776433.	7341022.	6848497.	6409412.	7130378.	8282573.	9371622.	9624000.	9364075.	8176010.
1964.	9000000.	8655334.	8210319.	7674791.	7206793.	6692681.	6244605.	6044554.	8452553.	9037573.	9022312.	9000000.	7953460.
1965.	8954634.	8642013.	8179057.	7637150.	7162237.	6658544.	6246665.	6588278.	7713152.	9000000.	9272498.	9430885.	7957093.
1966.	9000000.	8646192.	8209480.	769580.	7247198.	6770796.	6386717.	6523520.	8081756.	8922425.	9238272.	9000000.	7976853.
1967.	8822468.	8434871.	7984776.	7470955.	7022162.	6533247.	6106043.	6599004.	7952020.	9000000.	9624000.	9624000.	7931129.
1968.	9000000.	8661528.	8251519.	7775273.	7362324.	6926475.	6554351.	7101177.	8586163.	9184667.	9214106.	9000000.	8134799.
1969.	8801360.	8415107.	7926043.	7362099.	6872396.	6355272.	5943204.	6154635.	6656330.	7236835.	7350831.	7204067.	7189848.
1970.	6923885.	6467250.	5921133.	5291704.	4732926.	4121507.	3586631.	3718262.	4326115.	5249967.	6004153.	6066303.	5200820.
1971.	5890328.	5532288.	5037406.	4400700.	3809608.	3140634.	2524553.	2074747.	3448994.	4415848.	5888624.	6268594.	4369360.
1972.	6134009.	5765824.	5294699.	4723910.	4207555.	3629527.	3095784.	3861631.	5435418.	6401614.	7144627.	7432903.	5260625.
1973.	7263894.	6878714.	6383899.	5798440.	5285201.	4718045.	4213061.	4183203.	5367408.	6049780.	6847045.	6928544.	5826436.
1974.	6679809.	6235173.	5690544.	5053630.	4483397.	3854170.	3293867.	3710267.	4271215.	4950766.	5460559.	5694516.	4948159.
1975.	5409306.	4929280.	4359974.	3683695.	3060089.	2342312.	1653186.	1826921.	3141378.	4328241.	4930390.	5392086.	3754738.
1976.	5346593.	4881843.	4276813.	3558398.	2892952.	2122543.	1374177.	1298783.	2027903.	2566479.	3165024.	2946427.	3038157.
0.	8254410.	7900343.	7445597.	6902995.	6417376.	5885774.	5427407.	5743491.	6968838.	7831504.	8305542.	8307835.	7115926.

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## AVERAGE HEAD DURING THE MONTH - FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	700.	695.	683.	668.	652.	637.	622.	618.	634.	662.	689.	701.	663.
1951.	698.	688.	675.	659.	643.	627.	611.	611.	632.	660.	688.	704.	658.
1952.	705.	696.	685.	671.	655.	640.	626.	616.	639.	682.	705.	707.	669.
1953.	703.	697.	686.	671.	655.	640.	626.	631.	662.	691.	705.	707.	673.
1954.	703.	695.	683.	668.	653.	638.	623.	626.	653.	683.	706.	711.	670.
1955.	704.	696.	685.	671.	657.	642.	628.	623.	647.	684.	709.	716.	672.
1956.	707.	695.	682.	667.	651.	636.	621.	625.	659.	697.	716.	720.	673.
1957.	710.	696.	685.	672.	657.	643.	629.	629.	657.	690.	704.	711.	674.
1958.	707.	697.	688.	676.	662.	647.	634.	633.	656.	687.	706.	706.	675.
1959.	699.	691.	679.	664.	649.	634.	619.	621.	645.	678.	708.	720.	667.
1960.	710.	696.	685.	672.	657.	643.	629.	631.	647.	671.	694.	704.	670.
1961.	704.	696.	686.	673.	660.	647.	635.	639.	670.	699.	711.	713.	678.
1962.	706.	696.	685.	671.	657.	643.	629.	628.	667.	709.	719.	719.	677.
1963.	710.	696.	685.	671.	656.	642.	627.	632.	661.	695.	716.	716.	676.
1964.	706.	695.	683.	668.	653.	637.	622.	610.	650.	696.	702.	701.	669.
1965.	700.	695.	683.	667.	651.	636.	622.	621.	643.	681.	705.	712.	668.
1966.	707.	695.	683.	669.	653.	639.	626.	622.	648.	685.	703.	704.	670.
1967.	698.	689.	676.	661.	646.	632.	617.	618.	647.	685.	710.	720.	667.
1968.	710.	696.	684.	670.	657.	643.	631.	633.	665.	697.	707.	704.	675.
1969.	698.	689.	675.	659.	642.	627.	610.	606.	620.	637.	648.	647.	647.
1970.	641.	629.	612.	589.	566.	539.	511.	499.	521.	556.	590.	606.	572.
1971.	604.	594.	577.	553.	525.	489.	450.	417.	446.	516.	572.	608.	529.
1972.	612.	603.	587.	566.	541.	515.	482.	489.	549.	601.	632.	648.	569.
1973.	650.	641.	627.	608.	587.	566.	541.	529.	555.	593.	622.	635.	596.
1974.	633.	622.	603.	580.	555.	528.	495.	490.	519.	548.	574.	588.	561.
1975.	587.	573.	549.	521.	483.	442.	391.	368.	429.	504.	549.	572.	497.
1976.	580.	571.	546.	515.	474.	431.	369.	333.	362.	417.	452.	464.	459.
0.	681.	671.	658.	641.	622.	603.	582.	578.	607.	645.	668.	677.	636.

## AVERAGE MONTHLY ENERGY -MWH

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1950.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	256031.	283698.	3171411.
1951.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	573283.	3434345.
1952.	343806.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	592648.	575144.	3895301.
1953.	362980.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	344528.	592476.	575328.	4044633.
1954.	288931.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	593471.	578768.	3844872.
1955.	319926.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	354084.	596568.	582517.	4022914.
1956.	416667.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	586563.	601769.	585979.	4360799.
1957.	571164.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	397134.	592421.	578597.	4309137.
1958.	537325.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	294832.	594013.	468364.	4064354.
1959.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	595305.	585979.	3812966.
1960.	597447.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	567699.	573192.	4122041.
1961.	407892.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	587636.	598218.	580616.	4344182.
1962.	390347.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	221553.	596648.	604726.	585384.	4354595.
1963.	575745.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	584878.	602244.	582722.	4515409.
1964.	440353.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	585343.	590130.	340084.	4125729.
1965.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	237178.	592882.	579155.	3827015.
1966.	506682.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	591435.	541347.	4023166.
1967.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	336613.	597433.	585979.	3937824.
1968.	538730.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	586388.	594517.	426234.	4315688.
1969.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
1970.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
1971.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
1972.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
1973.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
1974.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
1975.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
1976.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.
0.	352657.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	214166.	322206.	459941.	447845.	3752753.

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## SECONDARY MONTHLY ENERGY - MWH

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1950.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	26650.	45018.	71668.
1951.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	334603.	334603.
1952.	95826.	0.	0.	0.	0.	0.	0.	0.	0.	0.	363267.	336464.	795558.
1953.	115000.	0.	0.	0.	0.	0.	0.	0.	0.	130146.	363095.	336648.	944890.
1954.	40952.	0.	0.	0.	0.	0.	0.	0.	0.	0.	364090.	340087.	745129.
1955.	71946.	0.	0.	0.	0.	0.	0.	0.	0.	140202.	367187.	343837.	923172.
1956.	168688.	0.	0.	0.	0.	0.	0.	0.	0.	372681.	372388.	347299.	1261056.
1957.	323185.	0.	0.	0.	0.	0.	0.	0.	0.	183252.	363040.	339917.	1209394.
1958.	289346.	0.	0.	0.	0.	0.	0.	0.	0.	80950.	364632.	229684.	964611.
1959.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	365924.	347299.	713223.
1960.	349468.	0.	0.	0.	0.	0.	0.	0.	0.	0.	338318.	334512.	1022298.
1961.	159913.	0.	0.	0.	0.	0.	0.	0.	0.	373754.	368837.	341936.	1244439.
1962.	142368.	0.	0.	0.	0.	0.	0.	0.	7670.	382765.	375345.	346704.	1254852.
1963.	327766.	0.	0.	0.	0.	0.	0.	0.	0.	370995.	372863.	344042.	1415667.
1964.	192374.	0.	0.	0.	0.	0.	0.	0.	0.	371461.	360749.	101404.	1025986.
1965.	0.	0.	0.	0.	0.	0.	0.	0.	0.	23295.	363501.	340475.	727272.
1966.	258702.	0.	0.	0.	0.	0.	0.	0.	0.	0.	362054.	302667.	923423.
1967.	0.	0.	0.	0.	0.	0.	0.	0.	0.	122730.	368052.	347299.	838081.
1968.	290750.	0.	0.	0.	0.	0.	0.	0.	0.	372505.	365136.	187553.	1215945.
1969.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	104677.	0.	0.	0.	0.	0.	0.	0.	284.	108324.	230560.	209165.	653010.

E-3?

SUMMARY INFORMATION

FIRM ANNUAL ENERGY - MWH	3099743.
AVERAGE ANNUAL ENERGY - MWH	3752753.
PRIME CAPACITY - KW	353852.
DEPENDABLE CAPACITY - KW	707704.
OVERLOAD CAPACITY - KW	813859.
AVERAGE HEAD - FEET	636.
MAX. STORAGE CAPACITY- ACFT	9624000.
DEAD STORAGE CAPACITY- ACFT	1300000.
AVERAGE ANNUAL INFLOW - CFS	9606.
AVERAGE ANNUAL OUTFLOW - CFS	9962.
PLANT FACTOR- PERCENT	50.
PRIME POWER FLOW - CFS	8343.

YEAR	MAXIMUM DISCHARGE UNREGULATED	REGULATED
1950.0	22600.0	9761.6
1951.0	22570.0	16688.2
1952.0	32370.0	16688.2
1953.0	27320.0	16688.2
1954.0	26100.0	16688.2
1955.0	29860.0	16688.2
1956.0	33340.0	19829.1
1957.0	30160.0	16688.2
1958.0	25700.0	16688.2
1959.0	31180.0	18358.4
1960.0	23590.0	16688.2
1961.0	29450.0	16688.2
1962.0	43270.0	22563.3
1963.0	34400.0	19565.4
1964.0	50580.0	16688.2
1965.0	27840.0	16688.2
1966.0	32953.0	16688.2
1967.0	32622.0	22473.6
1968.0	31550.0	16688.2
1969.0	16103.0	9895.7
1970.0	22661.0	11060.7
1971.0	32930.0	11829.9
1972.0	34430.0	11522.0
1973.0	27800.0	10721.6
1974.0	18800.0	11232.5
1975.0	32310.0	13174.2
1976.0	24380.0	13949.8

**APPENDIX**

**B-4**

**HYDROELECTRIC & FLOOD CONTROL - FORECAST**

A SINGLE RESERVOIR REGULATION MODEL  
 A HYDRO POWER AND FLOOD CONTROL OPTIONS  
 A SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA  
 B 1780 1810 1900 1950 2000 2050 2100 2150 2200 2210  
 C 1000000 1300000 2333000 3160000 4000000 5100000 6400000 8000000 9624000 9999999  
 D 9624000 13000003000000000 .80 1480 9000000 1. 1  
 E 0 5000000007000000000 .50 27 1950 324 1  
 F 0.080 0.088 0.097 0.106 0.090 0.094 0.081 0.075 0.069 0.069 0.074 0.077  
 G 31 30 31 31 28 31 30 31 30 31 31 30  
 H 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000 9000000  
 H 9000000 9000000  
 I 5.21 5.54 5.91 2.98 4.60 6.37 7.94 5.84 5.43 7.72 4.13  
 J 1955840.32 0.62933 11  
 M 1950 6634 2583 1439 1027 788 726 870 11510 19600 22600 19880 8301  
 M 1951 3848 1300 1100 960 820 740 1617 14090 20790 22570 19670 21240  
 M 1952 5571 2744 1900 1600 1000 880 920 5419 32370 26390 20920 14480  
 M 1953 8202 3497 1700 1100 820 820 1615 19270 27320 20200 20610 15270  
 M 1954 5664 2100 1500 1300 1000 780 1235 17280 25250 20360 26100 12920  
 M 1955 5370 2760 2045 1794 1400 1100 1200 9319 29860 27560 25750 14290  
 M 1956 4951 1900 1300 980 970 940 950 17660 33340 31090 24530 18330  
 M 1957 5806 3050 2142 1700 1500 1200 1200 13750 30160 23310 20540 19800  
 M 1958 8212 3954 3264 1965 1307 1148 1533 12900 25700 22880 22540 7550  
 M 1959 4811 2150 1513 1448 1307 980 1250 15990 23320 25000 31180 16920  
 M 1960 6558 2850 2200 1845 1452 1197 1300 15780 15530 22980 23590 20510  
 M 1961 7794 3000 2694 2452 1754 1810 2650 17360 29450 24570 22100 13370  
 M 1962 5916 2700 2100 1900 1500 1400 1700 12590 43270 25850 23550 15890  
 M 1963 6723 2800 2000 1600 1500 1000 830 19030 26000 34400 23670 12320  
 M 1964 6449 2250 1494 1048 966 713 745 4307 50580 22950 16440 9571  
 M 1965 6291 2799 1211 960 860 900 1360 12990 25720 27840 21120 19350  
 M 1966 7205 2098 1631 1400 1300 1300 1775 9645 32953 19864 21825 11753  
 M 1967 4162 1600 1500 1500 1400 1200 1166 15480 29513 26800 32622 16867  
 M 1968 4900 2353 2054 1980 1900 1900 1910 16177 31550 26422 17167 8815  
 M 1969 3822 1630 882 724 723 816 1510 11045 15503 16103 8879 5093  
 M 1970 3123 1215 866 824 767 775 1080 11380 18633 22661 19977 9121  
 M 1971 5288 3407 2290 1442 1036 950 1082 3745 32930 23950 31910 14440  
 M 1972 5847 3093 2510 2239 2028 1823 1710 21890 34430 22770 19290 12400  
 M 1973 4826 2253 1465 1200 1200 1000 1027 8235 27800 18250 20290 9074  
 M 1974 3733 1523 1034 874 777 724 992 16180 17870 18800 16220 12250  
 M 1975 3739 1700 1603 1516 1471 1400 1593 15350 32310 27720 18090 16310  
 M 1976 7739 1993 1081 974 950 900 1373 12620 24380 18940 19800 6881

## SINGLE RESERVOIR REGULATON MODEL

## HYDRO POWER AND FLOOD CONTROL OPTIONS

## SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

FIRM ENERGY (KWH)	MIN. STORAGE	P3	P4	NO. OF ITER.
30000000000.	3244995.	5000000000.	7000000000.	325
5000000000.	804474.	3000000000.	7000000000.	15
40000000000.	4988.	3000000000.	5000000000.	28
35000000000.	1163586.	3000000000.	4000000000.	248
32500000000.	1195389.	3000000000.	3500000000.	258
31250000000.	485062.	3000000000.	3250000000.	295
30625000000.	2547072.	3000000000.	3125000000.	325
30937500000.	2154402.	3062500000.	3125000000.	325
31093750000.	470930.	3093750000.	3125000000.	326
3101562500.	1215710.	3093750000.	3109375000.	318
3097656250.	1990417.	3093750000.	3101562500.	325
3099609375.	1377617.	3097656250.	3101562500.	325
3100585938.	913370.	3099609375.	3101562500.	319
3100097656.	1196568.	3099609375.	3100585938.	319
3099853516.	1236931.	3099609375.	3100097656.	320
3099731445.	1305636.	3099609375.	3099853516.	325
3099792480.	1268902.	3099731445.	3099853516.	320
3099761963.	1287326.	3099731445.	3099792480.	320
3099746704.	1296495.	3099731445.	3099761963.	320
3099739075.	1301069.	3099731445.	3099746704.	325

## UNREGULATED STREAMFLOW - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	6634.	2583.	1439.	1027.	788.	726.	870.	11510.	19600.	22600.	19880.	8301.	7997.
1951.	3848.	1300.	1100.	960.	820.	740.	1617.	14090.	20790.	22570.	19670.	21240.	9062.
1952.	5571.	2744.	1900.	1600.	1000.	880.	920.	5419.	32370.	26390.	20920.	14480.	9516.
1953.	8202.	3497.	1700.	1100.	820.	820.	1615.	19270.	27320.	20200.	20610.	15270.	10035.
1954.	5604.	2100.	1500.	1300.	1000.	780.	1235.	17280.	25250.	20360.	26100.	12920.	9619.
1955.	5370.	2760.	2045.	1794.	1400.	1100.	1200.	9319.	29860.	27560.	25750.	14290.	10204.
1956.	4951.	1900.	1300.	980.	970.	940.	950.	17660.	33340.	31090.	24530.	18330.	11412.
1957.	5806.	3050.	2142.	1700.	1500.	1200.	1200.	13750.	30160.	23310.	20540.	19800.	10347.
1958.	8212.	3954.	3264.	1965.	1307.	1148.	1533.	12900.	25700.	22880.	22540.	7550.	9413.
1959.	4811.	2150.	1513.	1448.	1307.	980.	1250.	15990.	23320.	25000.	31180.	16920.	10489.
1960.	6558.	2850.	2200.	1845.	1452.	1197.	1300.	15780.	15530.	22980.	23590.	20510.	9649.
1961.	7794.	3000.	2694.	2452.	1754.	1810.	2650.	17360.	29450.	24570.	22100.	13370.	10750.
1962.	5916.	2700.	2100.	1900.	1500.	1400.	1700.	12590.	43270.	25850.	23550.	15890.	11531.
1963.	6723.	2800.	2000.	1600.	1500.	1000.	830.	19030.	26000.	34400.	23670.	12320.	10989.
1964.	6449.	2250.	1494.	1048.	966.	713.	745.	4307.	50580.	22950.	16440.	9571.	9793.
1965.	6291.	2799.	1211.	960.	860.	900.	1360.	12990.	25720.	27840.	21120.	19350.	10117.
1966.	7205.	2098.	1631.	1400.	1300.	1300.	1775.	9645.	32953.	19864.	21825.	11753.	9396.
1967.	4162.	1600.	1500.	1500.	1400.	1200.	1166.	15480.	29513.	26800.	32622.	16867.	11151.
1968.	4900.	2353.	2054.	1980.	1900.	1900.	1910.	16177.	31550.	26422.	17167.	8815.	9761.
1969.	3822.	1630.	882.	724.	723.	816.	1510.	11045.	15503.	16103.	8879.	5093.	5561.
1970.	3123.	1215.	866.	824.	767.	775.	1080.	11380.	18633.	22661.	19977.	9121.	7535.
1971.	5288.	3407.	2290.	1442.	1036.	950.	1082.	3745.	32930.	23950.	31910.	14440.	10206.
1972.	5847.	3093.	2510.	2239.	2028.	1823.	1710.	21890.	34430.	22770.	19290.	12400.	10836.
1973.	4826.	2253.	1465.	1200.	1200.	1000.	1027.	8235.	27800.	18250.	20290.	9074.	8052.
1974.	3733.	1523.	1034.	874.	777.	724.	992.	16180.	17870.	18800.	16220.	12250.	7581.
1975.	3739.	1700.	1603.	1516.	1471.	1400.	1593.	15350.	32310.	27720.	18090.	16310.	10234.
1976.	7739.	1993.	1081.	974.	950.	900.	1373.	12620.	24380.	18940.	19800.	6881.	8136.
0.	5671.	2419.	1723.	1420.	1204.	1079.	1340.	13370.	28005.	23809.	21787.	13449.	9606.

W  
W  
W

## REGULATED STREAMFLOW - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	7026.	8047.	8734.	9742.	9399.	9083.	8282.	7461.	6914.	6414.	7374.	8301.	8066.
1951.	7052.	8124.	8841.	9895.	9535.	9220.	8427.	7552.	6942.	6430.	6617.	16688.	8777.
1952.	9681.	8037.	8715.	9724.	9351.	9029.	8227.	7486.	6866.	6227.	16688.	16688.	9727.
1953.	10250.	8029.	8699.	9716.	9351.	9033.	8223.	7306.	6623.	9879.	16688.	16688.	10040.
1954.	8153.	8044.	8735.	9758.	9389.	9069.	8264.	7369.	6719.	6211.	16688.	16688.	9591.
1955.	9015.	8037.	8713.	9717.	9336.	9006.	8199.	7402.	6783.	10266.	16688.	16688.	9987.
1956.	11692.	8046.	8742.	9774.	9410.	9089.	8284.	7387.	6653.	16688.	19829.	18330.	11160.
1957.	15954.	8034.	8705.	9707.	9326.	8993.	8186.	7339.	6679.	11429.	16688.	16688.	10644.
1958.	15075.	8024.	8669.	9648.	9244.	8933.	8125.	7289.	6686.	8514.	16688.	13597.	10043.
1959.	7043.	8093.	8790.	9821.	9447.	9121.	8312.	7427.	6802.	6260.	18358.	16920.	9700.
1960.	16688.	8036.	8708.	9709.	9326.	8994.	8185.	7314.	6779.	6324.	16236.	16688.	10249.
1961.	11493.	8034.	8699.	9683.	9288.	8943.	8113.	7217.	6543.	16688.	16688.	16688.	10673.
1962.	10978.	8038.	8713.	9716.	9332.	8996.	8180.	7341.	6807.	16688.	22563.	16688.	11170.
1963.	16099.	8036.	8712.	9720.	9340.	9010.	8209.	7305.	6637.	16688.	19565.	16688.	11334.
1964.	12370.	8042.	8732.	9758.	9393.	9074.	8275.	7561.	6751.	16688.	16688.	9946.	10273.
1965.	7029.	8053.	8740.	9773.	9411.	9092.	8282.	7434.	6816.	6911.	16688.	16688.	9576.
1966.	14213.	8044.	8733.	9753.	9379.	9048.	13916.	9729.	10551.	7408.	7872.	11753.	10033.
1967.	7049.	8114.	8820.	9857.	9481.	9151.	12993.	10196.	10665.	7469.	16688.	16688.	10598.
1968.	12298.	8041.	8722.	9725.	9336.	8988.	16688.	16688.	10794.	7528.	7612.	8815.	10436.
1969.	7053.	8121.	8836.	9896.	9541.	9226.	8435.	7606.	7072.	6662.	7025.	7559.	8086.
1970.	7680.	8889.	9748.	11061.	10828.	10719.	10069.	9239.	8418.	7636.	7711.	8077.	9173.
1971.	8150.	9424.	10339.	11797.	11679.	11830.	11436.	11060.	9835.	8226.	7957.	8054.	9982.
1972.	8036.	9281.	10172.	11522.	11326.	11224.	10680.	9435.	7982.	7056.	7206.	7555.	9289.
1973.	7575.	8726.	9512.	10722.	10441.	10224.	9514.	8721.	7899.	7152.	7324.	7704.	8793.
1974.	7778.	8995.	9892.	11232.	11045.	10957.	10408.	9408.	8443.	7748.	7929.	8318.	9346.
1975.	8378.	9767.	10862.	12515.	12700.	13074.	13174.	12524.	10220.	8417.	8297.	8551.	10707.
1976.	8479.	9803.	10921.	12658.	12933.	13429.	13950.	13846.	12127.	10181.	10066.	10555.	11579.
0.	10085.	8369.	9119.	10245.	9948.	9724.	9742.	8765.	7852.	9400.	13201.	13122.	9964.

## MONTHLY SPILL - CFS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1951.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1952.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1953.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1954.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1955.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1956.	0.	0.	0.	0.		0.		0.	0.	3141.	1642.	399.	
1957.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1958.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1959.	0.	0.	0.	0.		0.		0.	0.	1670.	232.	159.	
1960.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1961.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1962.	0.	0.	0.	0.		0.		0.	0.	5875.	0.	490.	
1963.	0.	0.	0.	0.		0.		0.	0.	2877.	0.	240.	
1964.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1965.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1966.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1967.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1968.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1969.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1970.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1971.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1972.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1973.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1974.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1975.	0.	0.	0.	0.		0.		0.	0.	0.	0.	0.	0.
1976.	0.	0.	0.	0.		0.		0.	0.	502.	69.	48.	
0.													

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## END OF THE MONTH WATER SURFACE ELEVATION -FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	2180.	2170.	2156.	2140.	2125.	2109.	2094.	2103.	2126.	2157.	2181.	2181.	2143.
1951.	2175.	2162.	2148.	2130.	2115.	2099.	2083.	2099.	2125.	2156.	2180.	2189.	2138.
1952.	2181.	2171.	2158.	2143.	2128.	2113.	2099.	2094.	2142.	2181.	2189.	2185.	2149.
1953.	2181.	2172.	2159.	2143.	2128.	2112.	2100.	2123.	2161.	2181.	2188.	2186.	2153.
1954.	2181.	2170.	2156.	2140.	2125.	2110.	2096.	2116.	2150.	2177.	2195.	2188.	2150.
1955.	2181.	2171.	2158.	2143.	2134.	2114.	2101.	2105.	2148.	2181.	2198.	2194.	2152.
1956.	2181.	2170.	2155.	2139.	2124.	2108.	2093.	2114.	2164.	2191.	2200.	2200.	2153.
1957.	2181.	2172.	2159.	2144.	2131.	2115.	2102.	2115.	2158.	2181.	2188.	2194.	2153.
1958.	2181.	2173.	2163.	2149.	2135.	2120.	2108.	2118.	2154.	2181.	2192.	2181.	2154.
1959.	2177.	2166.	2152.	2136.	2122.	2106.	2091.	2109.	2140.	2176.	2200.	2200.	2148.
1960.	2181.	2171.	2159.	2144.	2130.	2115.	2103.	2119.	2135.	2167.	2181.	2188.	2149.
1961.	2181.	2172.	2160.	2146.	2133.	2120.	2110.	2129.	2171.	2186.	2196.	2190.	2158.
1962.	2181.	2171.	2158.	2144.	2130.	2115.	2103.	2113.	2181.	2198.	2200.	2199.	2158.
1963.	2181.	2171.	2158.	2143.	2129.	2114.	2100.	2123.	2159.	2192.	2200.	2192.	2155.
1964.	2181.	2170.	2156.	2140.	2125.	2109.	2094.	2086.	2170.	2182.	2181.	2181.	2148.
1965.	2179.	2170.	2156.	2139.	2124.	2108.	2094.	2106.	2141.	2181.	2189.	2194.	2148.
1966.	2181.	2170.	2156.	2140.	2126.	2112.	2086.	2086.	2131.	2154.	2181.	2181.	2142.
1967.	2175.	2163.	2150.	2133.	2119.	2104.	2078.	2091.	2127.	2164.	2194.	2195.	2141.
1968.	2181.	2170.	2158.	2143.	2130.	2116.	2086.	2085.	2127.	2163.	2181.	2181.	2143.
1969.	2175.	2163.	2148.	2130.	2115.	2098.	2082.	2091.	2108.	2126.	2130.	2125.	2124.
1970.	2116.	2102.	2082.	2057.	2033.	2006.	1975.	1983.	2015.	2056.	2085.	2087.	2050.
1971.	2080.	2067.	2047.	2018.	1989.	1949.	1912.	1877.	1967.	2019.	2080.	2095.	2008.
1972.	2090.	2076.	2057.	2033.	2009.	1978.	1946.	1992.	2063.	2100.	2123.	2132.	2050.
1973.	2127.	2115.	2099.	2077.	2057.	2033.	2010.	2008.	2060.	2087.	2114.	2117.	2075.
1974.	2109.	2094.	2073.	2048.	2022.	1991.	1958.	1983.	2012.	2043.	2064.	2073.	2039.
1975.	2062.	2042.	2016.	1981.	1944.	1901.	1841.	1856.	1949.	2015.	2042.	2061.	1976.
1976.	2059.	2040.	2013.	1974.	1934.	1882.	1816.	1810.	1873.	1914.	1950.	1937.	1934.
0.	2157.	2145.	2130.	2111.	2093.	2072.	2050.	2061.	2106.	2137.	2156.	2156.	2115.

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## END OF THE MONTH ACTIVE STORAGE - ACRE-FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	8975926.	8650771.	8202221.	7665153.	7186901.	6673047.	6232009.	6480980.	7235851.	8231062.	9000000.	9000000.	7794494.
1951.	8802975.	8396906.	7920957.	7371588.	6887590.	6366161.	5960912.	6362899.	7186880.	8179306.	8981893.	9252742.	7639234.
1952.	9000000.	8685043.	8266023.	7766490.	7302714.	6801660.	6366839.	6239768.	7757323.	8997111.	9257312.	9125915.	7963850.
1953.	9000000.	8730328.	8299963.	7770203.	7296398.	6791431.	6398224.	7133861.	8365405.	9000000.	9241140.	9156751.	8098642.
1954.	9000000.	8646312.	8201450.	7681385.	7215466.	6705771.	6287544.	6896924.	7999609.	8869619.	9448324.	9224101.	8014709.
1955.	9000000.	8686005.	8276033.	7788873.	7348150.	6862053.	6445588.	6563476.	7936644.	9000000.	9557184.	9414482.	8073207.
1956.	9000000.	8634284.	8176678.	7635951.	7167194.	6666133.	6229742.	6861430.	8449427.	9334953.	9624000.	9624000.	8116983.
1957.	9000000.	8703446.	8299935.	7807579.	7372945.	6893758.	6478071.	6872270.	8269451.	9000000.	9236836.	9421999.	8113024.
1958.	9000000.	8757811.	8425443.	7953045.	7511183.	7432495.	6640238.	6985238.	8116655.	9000000.	9359810.	9000000.	8148495.
1959.	8862758.	8509120.	8061683.	7546845.	7094770.	6594180.	6173960.	6700489.	7683364.	8835638.	9624000.	9624000.	7942567.
1960.	9001121.	8692563.	8292397.	7808871.	7371571.	6892158.	6482456.	7002984.	7523721.	8547840.	9000000.	9227411.	7986924.
1961.	9000000.	8700439.	8331209.	7886596.	7468206.	7029614.	6704554.	7328248.	8491313.	9175942.	9508698.	9311252.	8261339.
1962.	9000000.	8682397.	8275760.	7795200.	7360258.	6893189.	6507605.	6830339.	9000000.	9563333.	9624000.	9576503.	8259049.
1963.	9000000.	8688411.	8275697.	7776433.	7341022.	6848497.	6409412.	7130378.	8282573.	9371622.	9624000.	9364075.	8176010.
1964.	9000000.	8655334.	8210319.	7674791.	7206793.	6692681.	6244605.	6044554.	8652553.	9037573.	9022312.	9000000.	7953460.
1965.	8954634.	8642013.	8179057.	7637150.	7162237.	6658544.	6246665.	6588278.	7713152.	9000000.	9272498.	9430885.	7957093.
1966.	9000000.	8646192.	8209480.	7695880.	7247198.	6770796.	6048344.	6043185.	7376176.	8142086.	9000000.	9000000.	7744945.
1967.	8822468.	8434871.	7984776.	7470955.	7022162.	6533247.	5829478.	6154352.	7275901.	8464516.	9444241.	9454879.	7740987.
1968.	9000000.	8661528.	8251519.	7775273.	7362324.	6926475.	6047115.	6015682.	7250766.	8412489.	9000000.	9000000.	7808597.
1969.	8801360.	8415107.	7926043.	7362099.	6872396.	6355272.	5943204.	6154635.	6656330.	7236835.	7350831.	7204067.	7189848.
1970.	6923885.	6467250.	5921133.	5291704.	4732926.	4121507.	3586631.	3718262.	4326115.	5249967.	6004153.	6066303.	5200820.
1971.	5890328.	5532288.	5037406.	4400700.	3809608.	3140634.	2524553.	2074747.	3448994.	4415848.	5888624.	6268594.	4369360.
1972.	6134009.	5765824.	5294699.	4723910.	4207555.	3629527.	3095784.	3861631.	5435418.	6401614.	7144627.	7432903.	5260625.
1973.	7263894.	6878714.	6383899.	5798440.	5285201.	4718045.	4213061.	4183203.	5367408.	6049780.	6847045.	6928544.	5826436.
1974.	6679809.	6235173.	5690544.	5053630.	4483397.	3854170.	3293867.	3710267.	4271215.	4950766.	5460559.	5694516.	4948159.
1975.	5469306.	4929280.	4359974.	3683695.	3060099.	2342312.	1653186.	1826921.	3141378.	4328241.	4930390.	5392086.	3754738.
1976.	5346593.	4881843.	4276813.	3558398.	2892902.	2122543.	1374177.	1298783.	2027903.	2566479.	3165024.	2946427.	3038157.
n.	8254410.	7900343.	7445597.	6902995.	6417376.	5885774.	5385845.	5669029.	6868205.	7754171.	8282130.	8301572.	7088954.

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## AVERAGE HEAD DURING THE MONTH - FT

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AVERAGE
1950.	700.	695.	683.	668.	652.	637.	622.	618.	634.	662.	689.	701.	663.
1951.	698.	688.	675.	659.	643.	627.	611.	611.	632.	660.	688.	704.	658.
1952.	705.	696.	685.	671.	655.	640.	626.	616.	639.	682.	705.	707.	669.
1953.	703.	697.	686.	671.	655.	640.	626.	631.	662.	691.	705.	707.	673.
1954.	703.	695.	683.	668.	653.	638.	623.	626.	653.	683.	706.	711.	670.
1955.	704.	696.	685.	671.	657.	642.	628.	623.	647.	684.	709.	716.	672.
1956.	707.	695.	682.	667.	651.	636.	621.	625.	659.	697.	716.	720.	673.
1957.	710.	696.	685.	672.	657.	643.	629.	629.	657.	690.	704.	711.	674.
1958.	707.	697.	688.	676.	667.	647.	634.	633.	656.	687.	706.	706.	675.
1959.	699.	691.	679.	664.	649.	634.	619.	621.	645.	678.	708.	720.	667.
1960.	710.	696.	685.	672.	657.	643.	629.	631.	647.	671.	694.	704.	670.
1961.	704.	696.	686.	673.	660.	647.	635.	639.	670.	699.	711.	713.	678.
1962.	706.	696.	685.	671.	657.	643.	629.	628.	667.	709.	719.	719.	677.
1963.	710.	696.	685.	671.	656.	642.	627.	632.	661.	695.	716.	716.	676.
1964.	706.	695.	683.	668.	653.	637.	622.	610.	650.	696.	702.	701.	669.
1965.	700.	695.	683.	667.	651.	636.	622.	621.	643.	681.	705.	712.	668.
1966.	707.	695.	683.	669.	653.	639.	620.	606.	630.	662.	688.	701.	663.
1967.	698.	689.	676.	661.	646.	632.	612.	604.	630.	666.	699.	715.	661.
1968.	708.	696.	684.	670.	657.	643.	623.	606.	627.	665.	692.	701.	664.
1969.	698.	689.	675.	659.	642.	627.	610.	606.	620.	637.	648.	647.	647.
1970.	641.	629.	612.	589.	566.	539.	511.	499.	521.	554.	590.	606.	572.
1971.	604.	594.	577.	553.	525.	489.	456.	417.	446.	516.	572.	608.	529.
1972.	612.	603.	587.	566.	541.	515.	482.	489.	549.	601.	632.	648.	569.
1973.	650.	641.	627.	608.	587.	566.	541.	529.	555.	593.	622.	635.	596.
1974.	633.	622.	603.	580.	555.	528.	495.	490.	519.	548.	574.	588.	561.
1975.	587.	573.	549.	521.	483.	442.	391.	368.	429.	504.	549.	572.	497.
1976.	580.	571.	546.	515.	474.	431.	369.	333.	362.	417.	452.	464.	459.
0.	681.	671.	658.	641.	622.	603.	582.	576.	604.	642.	667.	676.	635.

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## AVERAGE MONTHLY ENERGY -MWH

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	
1950.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	256031.	283698.	3171411.	
1951.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	573283.	3434345.	
1952.	343806.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	592648.	575144.	3895301.	
1953.	362980.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	344028.	592476.	575328.	4044633.	
1954.	288931.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	593471.	578768.	3844872.	
1955.	319926.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	354084.	596568.	582517.	4022914.	
1956.	416667.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	586563.	601769.	585979.	4360799.	
1957.	571164.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	397134.	592421.	578597.	4309137.	
1958.	537325.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	294832.	594013.	468364.	4064354.	
1959.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	595305.	585979.	3812966.	
1960.	597447.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	567699.	573192.	4122041.	
1961.	407892.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	587636.	598218.	580616.	4344182.	
1962.	390347.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	221553.	596648.	604726.	585384.	4354595.	
1963.	575745.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	584978.	602244.	582722.	4515409.	
1964.	440353.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	585343.	590130.	340084.	4125729.	
1965.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	237178.	592882.	579155.	3827015.	
1966.	506682.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	324011.	247301.	272775.	401675.	3943099.
1967.	247979.	272777.	300675.	328573.	278977.	291376.	387543.	310515.	327583.	250455.	588173.	581608.	4166435.	
1968.	438649.	272777.	300675.	328573.	278977.	291376.	506800.	509490.	330197.	252190.	265353.	301265.	4076322.	
1969.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
1970.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
1971.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
1972.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
1973.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
1974.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
1975.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
1976.	247979.	272777.	300675.	328573.	278977.	291376.	251079.	232481.	213882.	213882.	229381.	238680.	3099743.	
n.	348950.	272777.	300675.	328573.	278977.	291376.	271897.	248031.	226764.	307882.	435605.	437881.	3749389.	

## SECONDARY MONTHLY ENERGY - MWH

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1950.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	26650.	45018.	71668.
1951.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	334603.	334603.
1952.	95826.	0.	0.	0.	0.	0.	0.	0.	0.	0.	363267.	336464.	795558.
1953.	115000.	0.	0.	0.	0.	0.	0.	0.	0.	130146.	363095.	336648.	944890.
1954.	40952.	0.	0.	0.	0.	0.	0.	0.	0.	0.	364090.	340087.	745129.
1955.	71946.	0.	0.	0.	0.	0.	0.	0.	0.	140202.	367187.	343837.	923172.
1956.	168688.	0.	0.	0.	0.	0.	0.	0.	0.	372681.	372388.	347299.	1261056.
1957.	323185.	0.	0.	0.	0.	0.	0.	0.	0.	183252.	363040.	339917.	1209394.
1958.	289346.	0.	0.	0.	0.	0.	0.	0.	0.	80950.	364632.	229684.	964611.
1959.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	365924.	347299.	713223.
1960.	349468.	0.	0.	0.	0.	0.	0.	0.	0.	0.	338318.	334512.	1022298.
1961.	159913.	0.	0.	0.	0.	0.	0.	0.	0.	373754.	368837.	341936.	1244439.
1962.	142368.	0.	0.	0.	0.	0.	0.	0.	7670.	382765.	375345.	346704.	1254852.
1963.	327766.	0.	0.	0.	0.	0.	0.	0.	0.	370995.	372863.	344042.	1415667.
1964.	192374.	0.	0.	0.	0.	0.	0.	0.	0.	371461.	360749.	101404.	1025986.
1965.	0.	0.	0.	0.	0.	0.	0.	0.	0.	23295.	363501.	340475.	727272.
1966.	258702.	0.	0.	0.	0.	0.	169903.	64813.	110129.	33419.	43394.	162995.	843356.
1967.	0.	0.	0.	0.	0.	0.	136464.	78034.	113701.	36773.	358792.	342928.	1066692.
1968.	190670.	0.	0.	0.	0.	0.	255721.	277009.	116315.	38307.	35972.	62585.	976579.
1969.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1970.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1971.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1972.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1973.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1974.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1975.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1976.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	100971.	0.	0.	0.	0.	0.	20818.	15550.	12882.	94000.	206224.	199201.	649646.

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SUMMARY INFORMATION

FIRM ANNUAL ENERGY - MWH	3099743.
AVERAGE ANNUAL ENERGY - MWH	3749389.
PRIME CAPACITY - KW	353852.
DEPENDABLE CAPACITY - KW	707704.
OVERLOAD CAPACITY - KW	813859.
AVERAGE HEAD - FEET	635.
MAX. STORAGE CAPACITY- ACFT	9624000.
DEAD STORAGE CAPACITY- ACFT	1300000.
AVERAGE ANNUAL INFLOW - CFS	9606.
AVERAGE ANNUAL OUTFLOW - CFS	9964.
PLANT FACTOR- PERCENT	50.
PRIME POWER FLOW - CFS	8352.

MAXIMUM DISCHARGE

YEAR	UNREGULATED	REGULATED
1950.0	22600.0	9761.6
1951.0	22570.0	16688.2
1952.0	32370.0	16688.2
1953.0	27320.0	16688.2
1954.0	26100.0	16688.2
1955.0	29860.0	16688.2
1956.0	33340.0	19829.1
1957.0	30160.0	16688.2
1958.0	25700.0	16688.2
1959.0	31180.0	18358.4
1960.0	23590.0	16688.2
1961.0	29450.0	16688.2
1962.0	43270.0	22563.3
1963.0	34400.0	19565.4
1964.0	50580.0	16688.2
1965.0	27840.0	16688.2
1966.0	32953.0	14212.7
1967.0	32622.0	16688.2
1968.0	31550.0	16688.2
1969.0	16103.0	9895.7
1970.0	22661.0	11060.7
1971.0	32930.0	11829.9
1972.0	34430.0	11522.0
1973.0	27800.0	10721.6
1974.0	18800.0	11232.5
1975.0	32310.0	13174.2
1976.0	24380.0	13949.8

APPENDIX

C

DAILY REGULATION PROGRAM.

1 PROGRAM ERIC(INPUT,TAPE7=INPUT,OUTPUT,TAPE6=OUTPUT)  
2 DIMENSION XDAY(12),ELE(10),STG(10),AF(125),AS(12),TITLE(24),DT(6,3  
3 11),QMY(20),IYR(20)  
4 C AF=FLOW VALUES(CFS),AS()=LOAD PERCENT FOR MONTHS,XDAY()=DAYS IN EACH  
5 C MONTH,ELE()=ELEVATION CORRESPONDING TO STORAGE(FT),STG()=STORAGE  
C (ACRE-FT),UPPER=MAX STORAGE(ACRE-FT)  
C STRT=AN ESTIMATE OF THE FIRM ANNUAL ENERGY(MWH),EFF=EFFICIENCY IN  
C PERCENT,TWEL=TAILWATER ELEVATION,CAP= OVERLOAD CAPACITY (KW)  
10 C FLSTOR IS THE STORAGE ABOVE  
C WHICH IS USED FOR FLOOD CONTROL, NYRS IS THE NUMBER OF YEARS THERE WAS  
C SPILL, NOYR IS THE YEAR OF THE SPILL, NSMO IS THE NUMBER OF THE  
C STARTING MONTH EX. OCT=1),NEMO IS THE NUMBER OF THE ENDING MONTH  
C BSTOP-BEGINNING STORAGE, QMY() IS AN ARRAY OF THE MAXIMUM DISCHARGES  
C FOR THE RESPECTIVE YEARS GIVEN BY IYRC()  
15 READ(7,15)(TITLE(K),K=1,24)  
16 READ(7,5)(yDAY(K),K=1,12)  
17 PEAD(7,5)(AS(K),K=1,12)  
18 READ(7,10)(ELE(K),K=1,10)  
19 READ(7,10)(STG(K),K=1,10)  
20 READ(7,12)CAP,TWEL,UPPER,FLSTOR,EFF,STRT,NYRS  
21 WRITE(6,2)  
22 WRITE(6,4)(TITLE(K),K=1,24)  
23 DO 400 LL=1,NYRS  
24 IF(LL.EQ.1)GO TO 1  
25 WRITE(6,2)  
1 READ(7,20)NOYR,NSML,NEMO,BSTOR  
2 WRITE(6,3)NOYR  
3 QMAXYR=0.0  
4 SVOL=BSTOR  
30 DO 300 KK=NEMO,NEML  
31 NDAY=XDAY(KK)  
32 READ(7,5)(AF(K),K=1,NUAY)  
2 FORMAT(1H1)  
3 FORMAT(//,2UX,#WATER REGULATED DAILY IN THE YEAR#,15)  
4 FORMAT(23X,A8,7A10,/) C-1  
5 FORMAT(8X,1ZF6.0)  
10 FORMAT(1X,F7.0,9F8\_0)  
12 FORMAT(1X,FY=0,5F1\_0,I10)  
15 FORMAT(2X,A8,7A10)  
20 FORMAT(5X,3I5,F10.1)  
21 CONSTT=1.98346  
22 PCNST=(62.4\*EFF)/(550.0\*1.34)  
23 DO 40 I=1,9  
24 IF(UPPER.LT.STG(I+1))GO TO 45  
45 HU=(UPPER-STG(I))\*(ELE(I+1)-ELE(I))/(STG(I+1)-STG(I))+ELE(I)  
46 UC=CAP/(PCNST\*(HU-TWEL))  
47 NXXX=NEMO-NSML  
50 IF(NXXX.GT.0)BSTOR=SVOL  
51 IF(KK.EQ.NEMO) GO TO 46  
52 WRITE(6,112)  
46 IF(KK.EQ.10)GO TO 47  
47 IF(KK.LT.12)GO TO 48  
48 WRITE(6,122)  
49 DO 10 49  
50 WRITE(6,122)  
51 DO 10 49  
48 IPTII(6,12n)

```

      QMAX=0.0
      DO 140 J=1,NDAY
      QC=AF(J)*CONST1
      P=(SRT*1000.*AS(KK))/XDAY(KK)
      65   P1=P
      SXXX=SVOL
      C SVOL=STORAGE, QQ=INFLOW, QC=MAXIMUM DISCHARGE AT OVERLOAD CAPACITY
      C AQ=WATER ,CFS. FOR FIRM POWER PLUS SOME FOR SECONDARY,
      C AQG = THAT WATER ABOVE FLOOD CONTROL RULE CURVE WHICH MAY BE ABLE
      70   C TO BE STORED OR POSSIBLY SPILLED
          DO 80 MM=1,2
          F=P1
          GS=0.0
          75   DO 50 I=1,9
          IF(SXXX.LT.STG(I+1))GO TO 55
          50   CONTINUE
          I=9
          55   H=(SXXX-STG(I))*(ELE(I+1)-ELE(I))/(STG(I+1)-STG(I))+ELE(I)
          IF(H.GT.HU)H=HU
          80   H=H-TWEL
          G=P/(H*PCNST*24.0)
          S2=SVOL+QQ
          IF(S2.LT.FLSTOR)GO TO 75
          AQ=(S2-FLSTOR)/CONST1
          IF(AQ.GT.AQ)GO TO 76
          IF(S2.LE.UPPER)GO TO 65
          AQG=(S2-UPPER)/CONST1
          P=H*PCNST*QC*24.0
          90   Q=QC
          IF(AQG.LE.QC)GO TO 75
          QS=AQG-QC
          GO TO 75
          65   P=(H*PCNST*QC*24.0)
          Q=QC
          GO TO 75
          95   70   F=H*PCNST*QC*24.0
          O=AQ
          75   ACFT=Q*CONST1
          SXXX=SVOL+AQ-ACFT
          100   IF(SXXX.GT.UPPER)SVOL=UPPER
          SAV=(SVOL+SXXX)/2.0
          80   SXXX=SAV
          SVOL=SVOL+O-ACFT
          IF(SVOL.GT.UPPER)SVOL=UPPER
          Q=Q+QS
          DO 90 I=1,9
          IF(SVOL.LT.STG(I+1))GO TO 95
          90   CONTINUE
          I=9
          95   HH=(SVOL-STG(I))*(ELE(I+1)-ELE(I))/(STG(I+1)-STG(I))+ELE(I)
      C THE NEXT SET OF STATEMENTS EQUATE THE VARIOUS VALUES TO BE COMBINED
      C INTO A TWO DIMENSIONAL MATRIX FOR EASY OUTPUT
      C DT(1,J)=UNREGULATED DAY-CHANGE ** DT(2,J)=REGULATED DISCHARGE
      C DT(3,J)=AVERAGE HEAD OF DAY ** DT(4,J)=END OF DAY STORAGE
      115   C DT(5,J)=DAILY SPILL(CFS) ** DT(6,J)=END OF DAY WATER ELEVATION
          DT(1,J)=AF(J)
          DT(2,J)=0
          DT(3,J)=H
          DT(4,J)=SVOL

```

```
      I(6,J)=HH
      IF (QMAX.GT.DT(2,J)) GO TO 97
      QMAX=DT(2,J)
125    97 CONTINUE
      WRITE(6,114) J, (DT(I,J),I=1,6)
113    113 FORMAT(1H1)
114    114 FORMAT(3X;J6,6F20.0)
115    115 FORMAT(1X,5X,*DAY#,10X,*UNREGULATED#,11X,*REGULATED#,13X,*AVERAGE#
     1,10X,*END OF DAY #,13X,*DAILY#,8X,*END OF DAY #,/*21X,*DISCHARGE#
     2,11X,*DISCHARGE#,15X,*HEAD#,13X,*STORAGE#,15X,*SPILL#,7X,*WATER EL
     3EVALUATION#)
120    120 FORMAT(4UX,*MONTH OF SEPTEMBER#,//)
122    122 FORMAT(4UX,*MONTH OF JULY#,//)
124    124 FORMAT(4UX,*MONTH OF AUGUST#,//)
125    125 FORMAT(//,2UX,*MAXIMUM DISCHARGE FOR THE MONTH IS#,F10.0,*CFS#)
140    140 CONTINUE
      WRITE(6,125) QMAX
      C FINDS THE MAXIMUM DISCHARGE FOR THE YEAR
      IF (QMAXYR.GT.QMAX) GO TO 300
      QMAXYR=QMAX
140    300 CONTINUE
      QMY(LL)=QMAXYR
      IYR(LL)=NOYR
400    400 CONTINUE
      WRITE(6,405)
      WRITE(6,410)(IYR(LL),QMY(LL),LL=1,NYRS)
405    405 FORMAT(1H1,20X,*YEAR#,10X,*MAXIMUM#,/*30X,*DISCHARGE(CFS)#
410    410 FORMAT(2UX,I4,7X,F7.0)
      STOP
150    END
```

**APPENDIX.**

**D.**

**DATA & OUTPUT**

**APPENDIX**

**D-1**

**HYDROELECTRIC - NO FORECAST**

## A DAILY REGULATION FOR SPILL

A SUSITNA RIVER AT GOLD CREEK WITH NATANA DAM DATA  
 A ACCIDENTAL FLOOD CONTROL - NO FORCAST

	31	30	31	31	28	31	30	31	30	30	31	31	31	30
C	0.080	0.088	0.097	0.106	0.090	0.097	0.081	0.075	0.069	0.069	0.069	0.074	0.077	
D	1780	1810	1900	1950	2000	2050	2100	2150	2200	2200	2210			
E	1000000	1300000	2333000	3160000	4000000	5100000	6400000	8000000	9624000	9999999				
H	849325	1480	9624000	9624000		0.80	3234821	12						
I	1955	11	11	91933d3										
M11	1955	22000	21000	20000	19000	18000	17400	17100	18800	20800	25800	28400	27700	
M11	1955	26400	24000	22300	20700	15400	13600	14100	16200	18900	21300	24100	33600	
M11	1955	54300	56900	56700	42000	35200	28800	23800						
I	1956	10	12	8845985										
M10	1956	27400	28400	28900	29400	29900	29600	29800	29800	32000	32000	32000	32000	
M10	1956	32000	32000	32000	32000	32000	32000	32000	32000	32000	32000	32000	32000	
M10	1956	26600	32000	32000	32000	32000	32000	32000	32000	32000	32000	32000	32000	
M11	1956	31000	31000	31000	31000	31000	31000	30600	30800	26000	26000	26000	26000	
M11	1956	26000	26000	26000	25000	25000	25000	20000	20000	21100	18000	18000	18000	
M11	1956	18000	18000	18000	18000	18000	18000	18000	18000					
M12	1956	16000	16000	16000	16000	16000	16000	16000	16000	16000	16000	25000	25000	
M12	1956	25000	25000	25000	25000	25000	25000	25000	25000	25000	14000	14000	14000	
M12	1956	14000	14000	14000	14000	14000	14000	14000	14000	14000	14000	14000	14000	
I	1957	11	12	9624000										
M11	1957	20000	21600	21600	21300	22200	22100	20400	18600	19300	21000	23000	22700	
M11	1957	21900	19600	18400	19800	21500	21900	20500	18500	17600	19300	20800	19200	
M11	1957	17800	17200	16900	16700	23200	26600	25000						
M12	1957	22400	21600	21500	17900	16300	16600	18000	20700	18100	18700	20000	18100	
M12	1957	19200	26200	24200	21000	17000	19000	22000	25000	20000	16500	14700	14200	
M12	1957	16000	20000	27000	25800	23400	16100							
I	1958	11	11	9624000										
M11	1958	36800	42900	47800	47100	36000	29100	28600	27000	25000	24000	23000	22000	
M11	1958	21900	21200	21000	20000	18600	18000	13000	13000	18000	17000	16000	15000	
M11	1958	14000	13000	13000	12400	12000	11000	11000						
I	1959	11	11	9384326										
M11	1959	25400	25000	24000	24000	22000	19700	18600	16700	17000	17600	18800	20200	
M11	1959	21100	22800	23300	25000	25000	29000	38000	41400	40000	31000	40000	59700	
M11	1959	59100	51200	45000	43000	45000	37000	39000						
I	1960	12	12	9624000										
M12	1960	18000	18000	18000	18000	18000	18000	18800	19400	21100	21400	21200	30300	
M12	1960	40100	35600	32900	27900	24500	22000	19400	17300	16300	16200	17500	17300	
M12	1960	15800	14500	13900	14000	14300	15100							
I	1961	10	11	9253737										
M10	1961	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	25000	25000	
M10	1961	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	30300	
M10	1961	26000	25000	25000	25000	26500	25000	24000						
M11	1961	26000	26000	26000	26000	26000	26000	26000	25000	26000	26000	26000	26000	
M11	1961	26000	26000	26000	26000	17000	17400	18000	19000	19000	20000	22000	24800	
M11	1961	24700	20300	17400	15900	14800	14100	13800						
I	1962	10	11	9485928										
M10	1962	32700	28200	25000	24100	25900	27200	27200	27400	28000	26200	24900	25400	
M10	1962	28300	25600	23000	21700	20900	22600	23500	23000	27200	30500	28200	25200	
M10	1962	27800	28900	26000	23700	23400	24600	25200						
M11	1962	27100	28500	30600	23000	23000	23000	23000	23000	23000	23000	23000	23000	
M11	1962	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	
M11	1962	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	
I	1963	10	11	8814852										
M10	1963	29000	31000	30000	30000	30000	33000	32000	37900	38000	40000	42000	44000	
M10	1963	41000	39000	37600	43000	47000	49000	32000	30000	29000	28000	30000	38000	
M10	1963	39000	35000	31000	27000	24000	24000	23600						
M11	1963	26000	30000	35000	32000	31000	30000	28000	25000	21000	20000	21000	21000	
M11	1963	20000	20000	21701	22600	22800	24600	25900	24000	22300	21400	23300	23000	
M11	1963	21600	22800	23100	21700	19300	17300	16500						

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M11 1965 27500 28100 31700 32000 33600 32600 27700 25100 21300 19400 15900 16400  
M11 1965 16800 14600 12700 11900 10400 10000 10000  
M12 1965 9800 9480 9380 9280 11300 21500 26900 30100 26500 23800 23200 21000  
M12 1965 17700 16400 16300 16700 17100 18300 19400 20100 20200 20800 21500 22200  
M12 1965 22700 23400 26000 23100 20600 15800  
I 1966 11 11 9478934  
M11 1966 22200 25700 31000 33500 29600 24700 21500 20700 21000 21300 21600 21400  
M11 1966 19700 17700 16400 16500 20400 19700 20900 22700 24100 22400 21000 23300  
M11 1966 25400 22700 20100 17900 17400 17200 16800  
I 1967 11 11 9624000  
M11 1967 27400 30800 28900 25600 24200 23000 21800 21800 23800 28000 32700 33600  
M11 1967 40200 69400 76000 62400 57500 45000 37200 32600 30800 29700 29800 27900  
M11 1967 26200 23600 22100 21300 20000 19100 18900

## DAILY REGULATION FOR SPILL

SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

ACCIDENTAL FLOOD CONTROL - NO FORECAST

WATER REGULATED DAILY IN THE YEAR 1955  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	22000.	6717.	707.	9223697.	0.	2188.
2	21000.	6700.	708.	9252044.	0.	2189.
3	20000.	6700.	709.	9278424.	0.	2189.
4	19000.	6693.	710.	9302835.	0.	2190.
5	18000.	6686.	710.	9325276.	0.	2191.
6	17400.	6680.	711.	9346539.	0.	2191.
7	17100.	6674.	712.	9367220.	0.	2192.
8	18800.	6667.	712.	9391285.	0.	2193.
9	20800.	6660.	713.	9419332.	0.	2194.
10	25800.	6656.	714.	9457315.	0.	2195.
11	28400.	6639.	716.	9500478.	0.	2196.
12	27700.	6626.	717.	9542276.	0.	2197.
13	26400.	6615.	718.	9581519.	0.	2199.
14	24000.	6582.	719.	9624000.	0.	2200.
15	22300.	24300.	720.	9624000.	4885.	2200.
16	20700.	21700.	720.	9624000.	3285.	2200.
17	15400.	17415.	720.	9620002.	0.	2200.
18	13600.	17415.	720.	9612435.	0.	2200.
19	14100.	17415.	720.	9605859.	0.	2199.
20	16200.	17415.	719.	9603448.	0.	2199.
21	18900.	17415.	719.	9606392.	0.	2199.
22	21300.	17415.	720.	9614097.	0.	2200.
23	24100.	24100.	720.	9624000.	6685.	2200.
24	33600.	32600.	720.	9624000.	16185.	2200.
25	54300.	53300.	720.	9624000.	36885.	2200.
26	56900.	55900.	720.	9624000.	39485.	2200.
27	50700.	51700.	720.	9624000.	33285.	2200.
28	42000.	44000.	720.	9624000.	24585.	2200.
29	35200.	35200.	720.	9624000.	17785.	2200.
30	28800.	28800.	720.	9624000.	11385.	2200.
31	23300.	23800.	720.	9624000.	6385.	2200.

MAXIMUM DISCHARGE FOR THIS MONTH IS 56900 CFS

WATER REGULATED DAILY IN THE YEAR 1956  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27400.	6357.	697.	8890724.	0.	2177.
2	28400.	6345.	698.	8934470.	0.	2179.
3	28900.	6332.	699.	8979232.	0.	2180.
4	29400.	6320.	701.	9025011.	0.	2182.
5	29900.	6307.	702.	9071807.	0.	2183.
6	29600.	6294.	704.	9118034.	0.	2184.
7	29800.	6281.	705.	9164682.	0.	2186.
8	29800.	6268.	707.	9211356.	0.	2187.
9	32000.	6255.	708.	9262420.	0.	2189.
10	32000.	6241.	710.	9313512.	0.	2190.
11	32000.	6227.	711.	9364630.	0.	2192.
12	32000.	6214.	713.	9415776.	0.	2194.
13	32000.	6200.	714.	9466950.	0.	2195.
14	32000.	6186.	716.	9518150.	0.	2197.
15	32000.	6173.	718.	9569377.	0.	2198.
16	32000.	6461.	719.	9624000.	0.	2200.
17	32000.	32000.	720.	9624000.	14585.	2200.
18	32000.	34000.	720.	9624000.	14585.	2200.
19	32000.	34000.	720.	9624000.	14585.	2200.
20	32000.	34000.	720.	9624000.	14585.	2200.
21	32000.	34000.	720.	9624000.	14585.	2200.
22	32000.	34000.	720.	9624000.	14585.	2200.
23	32000.	34000.	720.	9624000.	14585.	2200.
24	32000.	34000.	720.	9624000.	14585.	2200.
25	26600.	26600.	720.	9624000.	9185.	2200.
26	32000.	32000.	720.	9624000.	14585.	2200.
27	32000.	34000.	720.	9624000.	14585.	2200.
28	32000.	34000.	720.	9624000.	14585.	2200.
29	32000.	34000.	720.	9624000.	14585.	2200.
30	32000.	34000.	720.	9624000.	14585.	2200.
31	32000.	34000.	720.	9624000.	14585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 32000.CFS

D-5

## MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	31000.	31000.	720.	9624000.	13585.	2200.
2	31000.	31000.	720.	9624000.	13585.	2200.
3	31000.	31000.	720.	9624000.	13585.	2200.
4	31000.	31000.	720.	9624000.	13585.	2200.
5	31000.	31000.	720.	9624000.	13585.	2200.
6	31000.	31000.	720.	9624000.	13585.	2200.
7	30600.	31000.	720.	9624000.	13185.	2200.
8	30800.	31000.	720.	9624000.	13385.	2200.
9	26000.	26000.	720.	9624000.	8585.	2200.
10	26000.	26000.	720.	9624000.	8585.	2200.
11	26000.	26000.	720.	9624000.	8585.	2200.
12	26000.	26000.	720.	9624000.	8585.	2200.
13	26000.	26000.	720.	9624000.	8585.	2200.
14	26000.	26000.	720.	9624000.	8585.	2200.
15	26000.	26000.	720.	9624000.	8585.	2200.
16	26000.	26000.	720.	9624000.	8585.	2200.
17	26000.	26000.	720.	9624000.	8585.	2200.
18	26000.	26000.	720.	9624000.	8585.	2200.
19	26000.	26000.	720.	9624000.	8585.	2200.
20	26000.	26000.	720.	9624000.	8585.	2200.
21	21100.	21100.	720.	9624000.	3685.	2200.
22	18000.	18000.	720.	9624000.	585.	2200.
23	18000.	18000.	720.	9624000.	585.	2200.
24	18000.	18000.	720.	9624000.	585.	2200.
25	18000.	18000.	720.	9624000.	585.	2200.
26	18000.	18000.	720.	9624000.	585.	2200.
27	18000.	18000.	720.	9624000.	585.	2200.
28	18000.	18000.	720.	9624000.	585.	2200.
29	18000.	18000.	720.	9624000.	585.	2200.
30	18000.	18000.	720.	9624000.	585.	2200.
31	18000.	18000.	720.	9624000.	585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 31000.CFS

D-6

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	16000.	17415.	720.	9621193.	0.	2200.
2	16000.	17415.	720.	9618385.	0.	2200.
3	16000.	17415.	720.	9615578.	0.	2200.
4	16000.	17415.	720.	9612770.	0.	2200.
5	16000.	17415.	720.	9609963.	0.	2200.
6	16000.	17415.	720.	9607155.	0.	2199.
7	16000.	17415.	719.	9604348.	0.	2199.
8	16000.	17415.	720.	9624000.	0.	2200.
9	16000.	17415.	720.	9621193.	0.	2200.
10	16000.	17415.	720.	9618385.	0.	2200.
11	25000.	25000.	720.	9624000.	7585.	2200.
12	25000.	25000.	720.	9624000.	7585.	2200.
13	25000.	25000.	720.	9624000.	7585.	2200.
14	25000.	25000.	720.	9624000.	7585.	2200.
15	25000.	25000.	720.	9624000.	7585.	2200.
16	25000.	25000.	720.	9624000.	7585.	2200.
17	25000.	25000.	720.	9624000.	7585.	2200.
18	25000.	25000.	720.	9624000.	7585.	2200.
19	25000.	25000.	720.	9624000.	7585.	2200.
20	25000.	25000.	720.	9624000.	7585.	2200.
21	14000.	17415.	720.	9617226.	0.	2200.
22	14000.	17415.	720.	9610451.	0.	2200.
23	14000.	17415.	719.	9603677.	0.	2199.
24	14000.	1754.	720.	9624000.	0.	2200.
25	14000.	17415.	720.	9617226.	0.	2200.
26	14000.	17415.	720.	9610451.	0.	2200.
27	14000.	17415.	719.	9603677.	0.	2199.
28	14000.	1754.	720.	9624000.	0.	2200.
29	14000.	17415.	720.	9617226.	0.	2200.
30	14000.	17415.	720.	9610451.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 25000 CFS

D-7

WATER REGULATED DAILY IN THE YEAR 1957  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	20000.	20000.	720.	9624000.	2585.	2200.
2	21600.	21600.	720.	9624000.	4185.	2200.
3	21600.	21600.	720.	9624000.	4185.	2200.
4	21800.	21800.	720.	9624000.	4385.	2200.
5	22200.	22200.	720.	9624000.	4785.	2200.
6	22100.	22100.	720.	9624000.	4685.	2200.
7	20400.	20400.	720.	9624000.	2985.	2200.
8	18600.	18600.	720.	9624000.	1185.	2200.
9	19300.	19300.	720.	9624000.	1885.	2200.
10	21000.	21000.	720.	9624000.	3585.	2200.
11	23000.	23000.	720.	9624000.	5585.	2200.
12	22700.	22700.	720.	9624000.	5285.	2200.
13	21900.	21900.	720.	9624000.	4485.	2200.
14	19600.	19600.	720.	9624000.	2185.	2200.
15	18400.	18400.	720.	9624000.	985.	2200.
16	19800.	19800.	720.	9624000.	2385.	2200.
17	21500.	21500.	720.	9624000.	4085.	2200.
18	21900.	21900.	720.	9624000.	4485.	2200.
19	20500.	20500.	720.	9624000.	3085.	2200.
20	18500.	18500.	720.	9624000.	1085.	2200.
21	17600.	17600.	720.	9624000.	185.	2200.
22	19300.	19300.	720.	9624000.	1885.	2200.
23	20800.	20800.	720.	9624000.	3385.	2200.
24	19200.	19200.	720.	9624000.	1785.	2200.
25	17800.	17800.	720.	9624000.	385.	2200.
26	17200.	17415.	720.	9623573.	0.	2200.
27	16900.	17415.	720.	9622550.	0.	2200.
28	16700.	17415.	720.	9621131.	0.	2200.
29	23200.	23200.	720.	9624000.	5785.	2200.
30	26600.	26600.	720.	9624000.	9185.	2200.
31	25000.	25000.	720.	9624000.	7585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 26600.CFS

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	22400.	22400.	720.	9624000.	4985.	2200.
2	21600.	21600.	720.	9624000.	4185.	2200.
3	21600.	21600.	720.	9624000.	4185.	2200.
4	17600.	17600.	720.	9624000.	185.	2200.
5	16300.	17415.	720.	9621788.	0.	2200.
6	16600.	17415.	720.	9620170.	0.	2200.
7	18000.	17415.	720.	9621330.	0.	2200.
8	20700.	20700.	720.	9624000.	3285.	2200.
9	18130.	19100.	720.	9624000.	685.	2200.
10	18700.	19700.	720.	9624000.	1285.	2200.
11	20000.	20000.	720.	9624000.	2585.	2200.
12	18100.	18100.	720.	9624000.	685.	2200.
13	19200.	19200.	720.	9624000.	1785.	2200.
14	26200.	26200.	720.	9624000.	8785.	2200.
15	24200.	24200.	720.	9624000.	6785.	2200.
16	21000.	21000.	720.	9624000.	3585.	2200.
17	17000.	17415.	720.	9623176.	0.	2200.
18	19000.	19000.	720.	9624000.	1585.	2200.
19	22000.	24000.	720.	9624000.	4585.	2200.
20	25000.	25000.	720.	9624000.	7585.	2200.
21	20300.	20000.	720.	9624000.	2585.	2200.
22	16500.	17415.	720.	9622184.	0.	2200.
23	14700.	17415.	720.	9616798.	0.	2200.
24	14200.	17415.	720.	9610421.	0.	2200.
25	16000.	17415.	720.	9607613.	0.	2199.
26	20000.	17415.	720.	9612740.	0.	2200.
27	27000.	26000.	720.	9624000.	9585.	2200.
28	25800.	25800.	720.	9624000.	8385.	2200.
29	20400.	21400.	720.	9624000.	2985.	2200.
30	16100.	17415.	720.	9621391.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 27000.CFS

D-6

WATER REGULATED DAILY IN THE YEAR 1958  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	36800.	36800.	720.	9624000.	19385.	2200.
2	42900.	42900.	720.	9624000.	25485.	2200.
3	47800.	47800.	720.	9624000.	30385.	2200.
4	47100.	47100.	720.	9624000.	29685.	2200.
5	36900.	36000.	720.	9624000.	18585.	2200.
6	29100.	27100.	720.	9624000.	11685.	2200.
7	28600.	26600.	720.	9624000.	11185.	2200.
8	27000.	27000.	720.	9624000.	9585.	2200.
9	25900.	25000.	720.	9624000.	7585.	2200.
10	24000.	24000.	720.	9624000.	6585.	2200.
11	23000.	23000.	720.	9624000.	5585.	2200.
12	22000.	22000.	720.	9624000.	4585.	2200.
13	21900.	21900.	720.	9624000.	4485.	2200.
14	21200.	21200.	720.	9624000.	3785.	2200.
15	21000.	21000.	720.	9624000.	3585.	2200.
16	20000.	20000.	720.	9624000.	2585.	2200.
17	18000.	18000.	720.	9624000.	585.	2200.
18	18000.	18000.	720.	9624000.	585.	2200.
19	18000.	18000.	720.	9624000.	585.	2200.
20	18000.	18000.	720.	9624000.	585.	2200.
21	18000.	18000.	720.	9624000.	585.	2200.
22	17000.	17415.	720.	9623176.	0.	2200.
23	16300.	17415.	720.	9620369.	0.	2200.
24	15600.	17415.	720.	9615578.	0.	2200.
25	14000.	17415.	720.	9608803.	0.	2200.
26	13000.	5338.	720.	9624000.	0.	2200.
27	13000.	17415.	720.	9615242.	0.	2200.
28	12400.	17415.	720.	9605294.	0.	2199.
29	12000.	2569.	720.	9624000.	0.	2200.
30	11000.	17415.	720.	9611275.	0.	2200.
31	11000.	2585.	720.	9624000.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 47800.CFS

D-10

WATER REGULATED DAILY IN THE YEAR 1959  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGL	REGULATED- DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	25400.	2660.	713.	9421495.	0.	2194.
2	25000.	2650.	714.	9457892.	0.	2195.
3	24000.	2640.	715.	9492326.	0.	2196.
4	24000.	2630.	716.	9526779.	0.	2197.
5	22000.	2621.	717.	9557284.	0.	2198.
6	19700.	2613.	718.	9583242.	0.	2199.
7	18600.	2606.	719.	9607033.	0.	2199.
8	16700.	17415.	719.	9605614.	0.	2199.
9	17000.	17415.	719.	9604790.	0.	2199.
10	17600.	17415.	719.	9605156.	0.	2199.
11	18800.	17415.	719.	9607902.	0.	2200.
12	20200.	17415.	720.	9613425.	0.	2200.
13	21100.	17415.	720.	9620733.	0.	2200.
14	22800.	22300.	720.	9624000.	5385.	2200.
15	23300.	22300.	720.	9624000.	5885.	2200.
16	25000.	25000.	720.	9624000.	7585.	2200.
17	26100.	26000.	720.	9624000.	8585.	2200.
18	29000.	27000.	720.	9624000.	11585.	2200.
19	38000.	35000.	720.	9624000.	20585.	2200.
20	41400.	41400.	720.	9624000.	23985.	2200.
21	40000.	40000.	720.	9624000.	22585.	2200.
22	31000.	31000.	720.	9624000.	13585.	2200.
23	40000.	40000.	720.	9624000.	22585.	2200.
24	59700.	59700.	720.	9624000.	42285.	2200.
25	59100.	59100.	720.	9624000.	41685.	2200.
26	51200.	51200.	720.	9624000.	33785.	2200.
27	45000.	45000.	720.	9624000.	27585.	2200.
28	43000.	43000.	720.	9624000.	25585.	2200.
29	46000.	45000.	720.	9624000.	28585.	2200.
30	37000.	37000.	720.	9624000.	19585.	2200.
31	39000.	37000.	720.	9624000.	21585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 59700.CFS

D-11

WATER REGULATED DAILY IN THE YEAR 1960  
MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	18000.	18000.	720.	9624000.	585.	2200.
2	18000.	18000.	720.	9624000.	585.	2200.
3	18000.	18000.	720.	9624000.	585.	2200.
4	18000.	18000.	720.	9624000.	585.	2200.
5	18000.	18000.	720.	9624000.	585.	2200.
6	18000.	18000.	720.	9624000.	585.	2200.
7	18800.	18800.	720.	9624000.	1385.	2200.
8	19400.	19400.	720.	9624000.	1985.	2200.
9	21100.	21100.	720.	9624000.	3685.	2200.
10	21400.	21400.	720.	9624000.	3985.	2200.
11	21200.	21200.	720.	9624000.	3785.	2200.
12	30300.	30300.	720.	9624000.	12885.	2200.
13	40100.	40100.	720.	9624000.	22685.	2200.
14	35600.	35600.	720.	9624000.	18185.	2200.
15	32900.	32900.	720.	9624000.	15485.	2200.
16	27900.	27900.	720.	9624000.	10485.	2200.
17	24500.	24500.	720.	9624000.	7085.	2200.
18	22000.	22000.	720.	9624000.	4585.	2200.
19	19400.	19400.	720.	9624000.	1985.	2200.
20	17309.	17415.	720.	9623771.	0.	2200.
21	16300.	17415.	720.	9621559.	0.	2200.
22	16200.	17415.	720.	9619148.	0.	2200.
23	17500.	17415.	720.	9619316.	0.	2200.
24	17300.	17415.	720.	9619087.	0.	2200.
25	15800.	17415.	720.	9615882.	0.	2200.
26	14500.	17415.	720.	9610100.	0.	2200.
27	13900.	6892.	720.	9624000.	0.	2200.
28	14000.	17415.	720.	9617226.	0.	2200.
29	14800.	17415.	720.	9612038.	0.	2200.
30	15100.	17415.	720.	9607445.	0.	2199.

MAXIMUM DISCHARGE FOR THE MONTH IS 40100-CFS

D-12

WATER REGULATED DAILY IN THE YEAR 1961  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	23000.	6246.	709.	9286968.	0.	2190.
2	23000.	6237.	710.	9320216.	0.	2191.
3	23000.	6228.	711.	9353483.	0.	2192.
4	23000.	6219.	712.	9386767.	0.	2193.
5	23000.	6210.	713.	9420069.	0.	2194.
6	23000.	6201.	714.	9453389.	0.	2195.
7	23000.	6192.	715.	9486726.	0.	2196.
8	23000.	6183.	716.	9520081.	0.	2197.
9	23000.	6175.	717.	9553454.	0.	2198.
10	23000.	6166.	718.	9586844.	0.	2199.
11	25000.	17415.	719.	9601887.	0.	2200.
12	25000.	17415.	720.	9616931.	0.	2200.
13	25000.	25000.	720.	9624000.	7585.	2200.
14	25000.	25000.	720.	9624000.	7585.	2200.
15	25000.	25000.	720.	9624000.	7585.	2200.
16	25000.	25000.	720.	9624000.	7585.	2200.
17	25000.	25000.	720.	9624000.	7585.	2200.
18	25000.	25000.	720.	9624000.	7585.	2200.
19	25000.	25000.	720.	9624000.	7585.	2200.
20	25000.	25000.	720.	9624000.	7585.	2200.
21	25000.	25000.	720.	9624000.	7585.	2200.
22	25000.	25000.	720.	9624000.	7585.	2200.
23	25000.	25000.	720.	9624000.	7585.	2200.
24	30300.	30300.	720.	9624000.	12885.	2200.
25	26000.	26000.	720.	9624000.	8585.	2200.
26	25000.	25000.	720.	9624000.	7585.	2200.
27	25000.	25000.	720.	9624000.	7585.	2200.
28	25000.	25000.	720.	9624000.	7585.	2200.
29	26500.	26500.	720.	9624000.	9085.	2200.
30	25000.	25000.	720.	9624000.	7585.	2200.
31	24000.	24000.	720.	9624000.	6585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30300.CFS

D-13

## MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	26000.	26000.	720.	9624000.	8585.	2200.
2	26000.	26000.	720.	9624000.	8585.	2200.
3	26000.	26000.	720.	9624000.	8585.	2200.
4	26000.	26000.	720.	9624000.	8585.	2200.
5	26000.	26000.	720.	9624000.	8585.	2200.
6	26000.	26000.	720.	9624000.	8585.	2200.
7	26000.	26000.	720.	9624000.	8585.	2200.
8	26000.	26000.	720.	9624000.	8585.	2200.
9	26000.	26000.	720.	9624000.	8585.	2200.
10	26000.	26000.	720.	9624000.	8585.	2200.
11	26000.	26000.	720.	9624000.	8585.	2200.
12	26000.	26000.	720.	9624000.	8585.	2200.
13	26000.	26000.	720.	9624000.	8585.	2200.
14	26000.	26000.	720.	9624000.	8585.	2200.
15	26000.	26000.	720.	9624000.	8585.	2200.
16	17000.	17415.	720.	9623176.	0.	2200.
17	17000.	17415.	720.	9622352.	0.	2200.
18	17400.	17415.	720.	9622321.	0.	2200.
19	18000.	17415.	720.	9623481.	0.	2200.
20	19000.	19000.	720.	9624000.	1585.	2200.
21	19000.	19000.	720.	9624000.	1585.	2200.
22	20000.	24000.	720.	9624000.	2585.	2200.
23	22000.	22000.	720.	9624000.	4585.	2200.
24	24800.	24800.	720.	9624000.	7385.	2200.
25	24700.	24700.	720.	9624000.	7285.	2200.
26	26300.	26300.	720.	9624000.	2885.	2200.
27	17400.	17415.	720.	9623969.	0.	2200.
28	15900.	17415.	720.	9620964.	0.	2200.
29	14800.	17415.	720.	9615776.	0.	2200.
30	14100.	17415.	720.	9609200.	0.	2200.
31	13800.	6338.	720.	9624000.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 26000.CFS

D-14

WATER REGULATED DAILY IN THE YEAR 1962  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	32700.	2181.	717.	9538527.	0.	2197.
2	26200.	2168.	718.	9582226.	0.	2199.
3	25000.	2039.	719.	9624000.	0.	2200.
4	24100.	2100.	720.	9624000.	6685.	2200.
5	25900.	25900.	720.	9624000.	8485.	2200.
6	27200.	27200.	720.	9624000.	9785.	2200.
7	27200.	27200.	720.	9624000.	9785.	2200.
8	27400.	27400.	720.	9624000.	9985.	2200.
9	28000.	28000.	720.	9624000.	10585.	2200.
10	26200.	29200.	720.	9624000.	8785.	2200.
11	24900.	24900.	720.	9624000.	7485.	2200.
12	25400.	25400.	720.	9624000.	7985.	2200.
13	28300.	28300.	720.	9624000.	10885.	2200.
14	25600.	25600.	720.	9624000.	8185.	2200.
15	23000.	23000.	720.	9624000.	5585.	2200.
16	21700.	21700.	720.	9624000.	4285.	2200.
17	20900.	24900.	720.	9624000.	3485.	2200.
18	22600.	26600.	720.	9624000.	5185.	2200.
19	23500.	22500.	720.	9624000.	6085.	2200.
20	23000.	23000.	720.	9624000.	5585.	2200.
21	27200.	27200.	720.	9624000.	9785.	2200.
22	30500.	34500.	720.	9624000.	13085.	2200.
23	28200.	28200.	720.	9624000.	10785.	2200.
24	25200.	25200.	720.	9624000.	7785.	2200.
25	27800.	27800.	720.	9624000.	10385.	2200.
26	28900.	28900.	720.	9624000.	11485.	2200.
27	26000.	26000.	720.	9624000.	8585.	2200.
28	23700.	23700.	720.	9624000.	6285.	2200.
29	23400.	23400.	720.	9624000.	5985.	2200.
30	24600.	24600.	720.	9624000.	7185.	2200.
31	25200.	25200.	720.	9624000.	7785.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30500.CFS

D-15

## MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27100.	27100.	720.	9624000.	9685.	2200.
2	28500.	29500.	720.	9624000.	11085.	2200.
3	39600.	36000.	720.	9624000.	13185.	2200.
4	23000.	23000.	720.	9624000.	5585.	2200.
5	23000.	23000.	720.	9624000.	5585.	2200.
6	23000.	23000.	720.	9624000.	5585.	2200.
7	23000.	23000.	720.	9624000.	5585.	2200.
8	23000.	23000.	720.	9624000.	5585.	2200.
9	23000.	23000.	720.	9624000.	5585.	2200.
10	23000.	23000.	720.	9624000.	5585.	2200.
11	23000.	23000.	720.	9624000.	5585.	2200.
12	23000.	23000.	720.	9624000.	5585.	2200.
13	23000.	23000.	720.	9624000.	5585.	2200.
14	23000.	23000.	720.	9624000.	5585.	2200.
15	23000.	23000.	720.	9624000.	5585.	2200.
16	23000.	23000.	720.	9624000.	5585.	2200.
17	23000.	23000.	720.	9624000.	5585.	2200.
18	23000.	23000.	720.	9624000.	5585.	2200.
19	23000.	23000.	720.	9624000.	5585.	2200.
20	23000.	23000.	720.	9624000.	5585.	2200.
21	23000.	23000.	720.	9624000.	5585.	2200.
22	23000.	23000.	720.	9624000.	5585.	2200.
23	23000.	23000.	720.	9624000.	5585.	2200.
24	23000.	23000.	720.	9624000.	5585.	2200.
25	23000.	23000.	720.	9624000.	5585.	2200.
26	23000.	23000.	720.	9624000.	5585.	2200.
27	23000.	23000.	720.	9624000.	5585.	2200.
28	23000.	23000.	720.	9624000.	5585.	2200.
29	23000.	23000.	720.	9624000.	5585.	2200.
30	23000.	23000.	720.	9624000.	5585.	2200.
31	23000.	23000.	720.	9624000.	5585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30600 CFS

D-16

WATER REGULATED DAILY IN THE YEAR 1963  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	29000.	6366.	696.	8859746.	0.	2176.
2	31000.	6353.	697.	8908633.	0.	2178.
3	30000.	6339.	699.	8955564.	0.	2179.
4	30000.	6326.	700.	9002520.	0.	2181.
5	30000.	6313.	702.	9049502.	0.	2182.
6	33000.	6294.	703.	9102462.	0.	2184.
7	35000.	6284.	705.	9159419.	0.	2186.
8	37800.	6268.	707.	9221962.	0.	2188.
9	38000.	6251.	709.	9284936.	0.	2190.
10	40000.	6233.	711.	9351911.	0.	2192.
11	42000.	6214.	713.	9422890.	0.	2194.
12	44000.	6195.	715.	9497875.	0.	2196.
13	41000.	6176.	717.	9566948.	0.	2198.
14	39000.	6141.	719.	9609760.	0.	2200.
15	37000.	6100.	720.	9624000.	19585.	2200.
16	43000.	6000.	720.	9624000.	25585.	2200.
17	47000.	6000.	720.	9624000.	29585.	2200.
18	49000.	6000.	720.	9624000.	31585.	2200.
19	32000.	6000.	720.	9624000.	14585.	2200.
20	30000.	6000.	720.	9624000.	12585.	2200.
21	29000.	6000.	720.	9624000.	11585.	2200.
22	28000.	6000.	720.	9624000.	10585.	2200.
23	30000.	6000.	720.	9624000.	12585.	2200.
24	38010.	6000.	720.	9624000.	20585.	2200.
25	39000.	6000.	720.	9624000.	21585.	2200.
26	35000.	6000.	720.	9624000.	17585.	2200.
27	31000.	6000.	720.	9624000.	13585.	2200.
28	27000.	6000.	720.	9624000.	9585.	2200.
29	24000.	6000.	720.	9624000.	6585.	2200.
30	24000.	6000.	720.	9624000.	6585.	2200.
31	23600.	6000.	720.	9624000.	6185.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 49000.CFS

## MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	26000.	25000.	720.	9624000.	8585.	2200.
2	30000.	30000.	720.	9624000.	12585.	2200.
3	35000.	35000.	720.	9624000.	17585.	2200.
4	32000.	32000.	720.	9624000.	14585.	2200.
5	31000.	31000.	720.	9624000.	13585.	2200.
6	30000.	30000.	720.	9624000.	12585.	2200.
7	28000.	28000.	720.	9624000.	10585.	2200.
8	25000.	25000.	720.	9624000.	7585.	2200.
9	21000.	21000.	720.	9624000.	3585.	2200.
10	20000.	20000.	720.	9624000.	2585.	2200.
11	21000.	21000.	720.	9624000.	3585.	2200.
12	21000.	21000.	720.	9624000.	3585.	2200.
13	20000.	20000.	720.	9624000.	2585.	2200.
14	20000.	20000.	720.	9624000.	2585.	2200.
15	21700.	21700.	720.	9624000.	4285.	2200.
16	22000.	22000.	720.	9624000.	5185.	2200.
17	22800.	22800.	720.	9624000.	5385.	2200.
18	24600.	24600.	720.	9624000.	7185.	2200.
19	25900.	25900.	720.	9624000.	8485.	2200.
20	24000.	24000.	720.	9624000.	6585.	2200.
21	22300.	22300.	720.	9624000.	4885.	2200.
22	21400.	21400.	720.	9624000.	3985.	2200.
23	23300.	23300.	720.	9624000.	5885.	2200.
24	23000.	23000.	720.	9624000.	5585.	2200.
25	21600.	21600.	720.	9624000.	4185.	2200.
26	22800.	22800.	720.	9624000.	5385.	2200.
27	23100.	23100.	720.	9624000.	5685.	2200.
28	21700.	21700.	720.	9624000.	4285.	2200.
29	19300.	19300.	720.	9624000.	1885.	2200.
30	17300.	17415.	720.	9623771.	0.	2200.
31	16500.	17415.	720.	9621955.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 35000.CFS

D-18

WATER REGULATED DAILY IN THE YEAR 1965  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	24200.	17415.	719.	9603894.	0.	2199.
2	23000.	17415.	720.	9614971.	0.	2200.
3	22900.	24900.	720.	9624000.	5485.	2200.
4	21900.	21900.	720.	9624000.	4485.	2200.
5	19700.	19700.	720.	9624000.	2285.	2200.
6	17500.	17500.	720.	9624000.	85.	2200.
7	16600.	17415.	720.	9622383.	0.	2200.
8	16700.	17415.	720.	9620964.	0.	2200.
9	18300.	17415.	720.	9622718.	0.	2200.
10	22600.	22600.	720.	9624000.	5185.	2200.
11	26300.	26300.	720.	9624000.	8885.	2200.
12	26400.	25400.	720.	9624000.	8985.	2200.
13	27500.	25500.	720.	9624000.	10085.	2200.
14	28100.	28100.	720.	9624000.	10685.	2200.
15	31700.	31700.	720.	9624000.	14285.	2200.
16	32600.	32600.	720.	9624000.	15185.	2200.
17	33600.	33600.	720.	9624000.	16185.	2200.
18	32800.	32800.	720.	9624000.	15385.	2200.
19	27700.	27700.	720.	9624000.	10285.	2200.
20	25100.	25100.	720.	9624000.	7685.	2200.
21	21300.	21300.	720.	9624000.	3885.	2200.
22	19400.	19400.	720.	9624000.	1985.	2200.
23	15900.	17415.	720.	9620994.	0.	2200.
24	16400.	17415.	720.	9618980.	0.	2200.
25	16800.	17415.	720.	9617759.	0.	2200.
26	14600.	17415.	720.	9612175.	0.	2200.
27	12700.	17415.	719.	9602822.	0.	2199.
28	11900.	1223.	720.	9624000.	0.	2200.
29	10400.	17415.	720.	9610085.	0.	2200.
30	10000.	2985.	720.	9624000.	0.	2200.
31	10900.	17415.	720.	9609292.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 33600.CFS

D-19

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	9800.	1385.	720.	9624000.	0.	2200.
2	9400.	1415.	720.	9608260.	0.	2200.
3	9300.	1445.	720.	9624000.	0.	2200.
4	9280.	1415.	720.	9607864.	0.	2200.
5	11300.	1165.	720.	9624000.	0.	2200.
6	21500.	21500.	720.	9624000.	4085.	2200.
7	26900.	26900.	720.	9624000.	9485.	2200.
8	30100.	30100.	720.	9624000.	12685.	2200.
9	26500.	26500.	720.	9624000.	9085.	2200.
10	23800.	23800.	720.	9624000.	6385.	2200.
11	23200.	23200.	720.	9624000.	5785.	2200.
12	21000.	21000.	720.	9624000.	3585.	2200.
13	17700.	17700.	720.	9624000.	285.	2200.
14	16400.	16400.	720.	9621986.	0.	2200.
15	16300.	16415.	720.	9619774.	0.	2200.
16	16700.	16415.	720.	9618354.	0.	2200.
17	17100.	16415.	720.	9617729.	0.	2200.
18	18300.	16415.	720.	9619483.	0.	2200.
19	19400.	17415.	720.	9623420.	0.	2200.
20	20100.	20100.	720.	9624000.	2685.	2200.
21	20200.	20200.	720.	9624000.	2785.	2200.
22	20800.	20800.	720.	9624000.	3385.	2200.
23	21500.	21500.	720.	9624000.	4085.	2200.
24	22200.	22200.	720.	9624000.	4785.	2200.
25	22700.	22700.	720.	9624000.	5285.	2200.
26	23400.	23400.	720.	9624000.	5985.	2200.
27	26000.	26000.	720.	9624000.	8585.	2200.
28	23100.	23100.	720.	9624000.	5685.	2200.
29	20600.	20600.	720.	9624000.	3185.	2200.
30	15800.	17415.	720.	9620796.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30100.CFS

WATER REGULATED DAILY IN THE YEAR 1966  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	22200.	6634.	716.	9509808.	0.	2196.
2	25710.	6624.	717.	9547644.	0.	2198.
3	31000.	6512.	718.	9596017.	0.	2199.
4	33510.	33500.	720.	9624000.	16085.	2200.
5	29600.	29600.	720.	9624000.	12185.	2200.
6	24700.	24700.	720.	9624000.	7285.	2200.
7	21500.	21500.	720.	9624000.	4085.	2200.
8	20700.	20700.	720.	9624000.	3285.	2200.
9	21000.	21000.	720.	9624000.	3585.	2200.
10	21300.	21300.	720.	9624000.	3885.	2200.
11	21600.	21600.	720.	9624000.	4185.	2200.
12	21400.	21400.	720.	9624000.	3985.	2200.
13	19700.	19700.	720.	9624000.	2285.	2200.
14	17700.	17700.	720.	9624000.	285.	2200.
15	16400.	17415.	720.	9621986.	0.	2200.
16	16600.	17415.	720.	9620369.	0.	2200.
17	20400.	20400.	720.	9624000.	2985.	2200.
18	19700.	19700.	720.	9624000.	2285.	2200.
19	20900.	20900.	720.	9624000.	3485.	2200.
20	22700.	22700.	720.	9624000.	5285.	2200.
21	24100.	24100.	720.	9624000.	6685.	2200.
22	22400.	22400.	720.	9624000.	4985.	2200.
23	21000.	21000.	720.	9624000.	3585.	2200.
24	23300.	23300.	720.	9624000.	5885.	2200.
25	25400.	25400.	720.	9624000.	7985.	2200.
26	22700.	22700.	720.	9624000.	5285.	2200.
27	20100.	20100.	720.	9624000.	2685.	2200.
28	17900.	17900.	720.	9624000.	485.	2200.
29	17400.	17415.	720.	9623969.	0.	2200.
30	17200.	17415.	720.	9623542.	0.	2200.
31	16800.	17415.	720.	9622321.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 33500.CFS

D-21

WATER REGULATED DAILY IN THE YEAR 1967  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGL	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27400.	27400.	720.	9624000.	9985.	2200.
2	30800.	30800.	720.	9624000.	13385.	2200.
3	28900.	28900.	720.	9624000.	11485.	2200.
4	25600.	25600.	720.	9624000.	8185.	2200.
5	24200.	24200.	720.	9624000.	6785.	2200.
6	23900.	23900.	720.	9624000.	5585.	2200.
7	21800.	21800.	720.	9624000.	4385.	2200.
8	21900.	21800.	720.	9624000.	4385.	2200.
9	23800.	23800.	720.	9624000.	6385.	2200.
10	28000.	28000.	720.	9624000.	10585.	2200.
11	32700.	32700.	720.	9624000.	15285.	2200.
12	33600.	33600.	720.	9624000.	16185.	2200.
13	40200.	44200.	720.	9624000.	22785.	2200.
14	69400.	67400.	720.	9624000.	51985.	2200.
15	70000.	70000.	720.	9624000.	58585.	2200.
16	62400.	62400.	720.	9624000.	44985.	2200.
17	57500.	57500.	720.	9624000.	40085.	2200.
18	45000.	45000.	720.	9624000.	27585.	2200.
19	37200.	37200.	720.	9624000.	19785.	2200.
20	32600.	32600.	720.	9624000.	15185.	2200.
21	30800.	30800.	720.	9624000.	13385.	2200.
22	29700.	29700.	720.	9624000.	12285.	2200.
23	29800.	29800.	720.	9624000.	12385.	2200.
24	27900.	27900.	720.	9624000.	10485.	2200.
25	26200.	26200.	720.	9624000.	8785.	2200.
26	23600.	23600.	720.	9624000.	6185.	2200.
27	22100.	22100.	720.	9624000.	4685.	2200.
28	21300.	21300.	720.	9624000.	3885.	2200.
29	20000.	20000.	720.	9624000.	2585.	2200.
30	19100.	19100.	720.	9624000.	1685.	2200.
31	18900.	18900.	720.	9624000.	1485.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 76000.CFS

D-22

YEAR	MAXIMUM DISCHARGE (CFS)
1955	56900.
1956	32000.
1957	27000.
1958	47800.
1959	59700.
1960	49100.
1961	30300.
1962	30600.
1963	49000.
1965	33600.
1966	33500.
1967	70000.

A 1. RIVERVIEW GOLD CREEK WITH PATCHUM DAM DATA  
A ACCIDENTAL FLOOD CONTROL - WITH FORECAST

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**APPENDIX**  
**D-2**  
**HYDROELECTRIC - FORECAST**

M11	1965	27500	28100	31700	32000	33600	32800	27100	25100	21300	19400	15900	16400
M11	1965	16800	14600	12700	11900	10400	10000	10000	10000	10000	10000	10000	10000
M12	1965	9800	9480	9380	9280	11300	21500	26900	30100	26500	23800	23200	21000
M12	1965	17700	16400	16300	16700	17100	16300	19400	20100	20200	20800	21500	22200
M12	1965	22700	23400	25400	23100	20500	15600						
I	1967	11	11	9099217									
M11	1967	27400	30800	28900	25600	24200	23000	21800	21800	23800	28000	32700	33600
M11	1967	40200	69400	76400	62400	57500	45000	37200	32600	30800	29700	29800	27900
M11	1967	26200	23600	22100	21300	20000	19100	18900					

## DAILY REGULATION FOR SPILL

SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

ACCIDENTAL FLOOD CONTROL - WITH FORECAST

WATER REGULATED DAILY IN THE YEAR 1955  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	22000.	9717.	707.	9223697.	0.	2188.
2	21000.	9708.	708.	9252044.	0.	2189.
3	20000.	9700.	709.	9278424.	0.	2189.
4	19000.	9693.	710.	9302835.	0.	2190.
5	18000.	9686.	710.	9325276.	0.	2191.
6	17400.	9680.	711.	9346539.	0.	2191.
7	17160.	9674.	712.	9367220.	0.	2192.
8	18300.	9667.	712.	9391285.	0.	2193.
9	20800.	9660.	713.	9419332.	0.	2194.
10	25800.	9650.	714.	9457315.	0.	2195.
11	28400.	9639.	716.	9500478.	0.	2196.
12	27700.	9626.	717.	9542276.	0.	2197.
13	26400.	9615.	718.	9581519.	0.	2199.
14	24000.	9582.	719.	9624000.	0.	2200.
15	22300.	95300.	720.	9624000.	4885.	2200.
16	20700.	94700.	720.	9624000.	3285.	2200.
17	15400.	11415.	720.	9620002.	0.	2200.
18	13600.	11415.	720.	9612435.	0.	2200.
19	14100.	11415.	720.	9605859.	0.	2199.
20	16200.	11415.	719.	9603448.	0.	2199.
21	18900.	11415.	719.	9606392.	0.	2199.
22	21300.	11415.	720.	9614097.	0.	2200.
23	24100.	21100.	720.	9624000.	6685.	2200.
24	33600.	33600.	720.	9624000.	16185.	2200.
25	54300.	54300.	720.	9624000.	36885.	2200.
26	56900.	54900.	720.	9624000.	39485.	2200.
27	50700.	54700.	720.	9624000.	33285.	2200.
28	42000.	46000.	720.	9624000.	24585.	2200.
29	35200.	35200.	720.	9624000.	17785.	2200.
30	28800.	28800.	720.	9624000.	11385.	2200.
31	23800.	22800.	720.	9624000.	6385.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 56900.CFS .

D-27

WATER REGULATED DAILY IN THE YEAR 1956  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27400.	6357.	697.	8890724.	0.	2177.
2	28430.	6343.	698.	8934470.	0.	2179.
3	28900.	6332.	699.	8979232.	0.	2180.
4	29400.	6320.	701.	9025011.	0.	2182.
5	29900.	6307.	702.	9071807.	0.	2183.
6	29600.	6294.	704.	9118034.	0.	2184.
7	29800.	6281.	705.	9164682.	0.	2186.
8	29800.	6268.	707.	9211356.	0.	2187.
9	32000.	6255.	708.	9262420.	0.	2189.
10	32000.	6241.	710.	9313512.	0.	2190.
11	32000.	6227.	711.	9364630.	0.	2192.
12	32000.	6214.	713.	9415776.	0.	2194.
13	32000.	6200.	714.	9466950.	0.	2195.
14	32000.	6186.	716.	9518150.	0.	2197.
15	32000.	6173.	718.	9569377.	0.	2198.
16	32000.	6161.	719.	9624000.	0.	2200.
17	32000.	6200.	720.	9624000.	14585.	2200.
18	32000.	6200.	720.	9624000.	14585.	2200.
19	32000.	6200.	720.	9624000.	14585.	2200.
20	32000.	6200.	720.	9624000.	14585.	2200.
21	32000.	6200.	720.	9624000.	14585.	2200.
22	32000.	6200.	720.	9624000.	14585.	2200.
23	32000.	6200.	720.	9624000.	14585.	2200.
24	32000.	6200.	720.	9624000.	14585.	2200.
25	26600.	6200.	720.	9624000.	9185.	2200.
26	32000.	6200.	720.	9624000.	14585.	2200.
27	32000.	6200.	720.	9624000.	14585.	2200.
28	32000.	6200.	720.	9624000.	14585.	2200.
29	32000.	6200.	720.	9624000.	14585.	2200.
30	32000.	6200.	720.	9624000.	14585.	2200.
31	32000.	6200.	720.	9624000.	14585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 32000.CFS

## MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	31000.	31000.	720.	9624000.	13585.	2200.
2	31000.	31000.	720.	9624000.	13585.	2200.
3	31000.	31000.	720.	9624000.	13585.	2200.
4	31000.	31000.	720.	9624000.	13585.	2200.
5	31000.	31000.	720.	9624000.	13585.	2200.
6	31000.	31000.	720.	9624000.	13585.	2200.
7	30600.	30600.	720.	9624000.	13185.	2200.
8	30600.	30800.	720.	9624000.	13385.	2200.
9	26000.	25000.	720.	9624000.	8585.	2200.
10	26000.	25000.	720.	9624000.	8585.	2200.
11	26000.	25000.	720.	9624000.	8585.	2200.
12	26400.	25000.	720.	9624000.	8585.	2200.
13	26000.	25000.	720.	9624000.	8585.	2200.
14	26000.	25000.	720.	9624000.	8585.	2200.
15	26000.	25000.	720.	9624000.	8585.	2200.
16	26000.	25000.	720.	9624000.	8585.	2200.
17	26000.	25000.	720.	9624000.	8585.	2200.
18	26000.	25000.	720.	9624000.	8585.	2200.
19	26000.	25000.	720.	9624000.	8585.	2200.
20	26000.	25000.	720.	9624000.	8585.	2200.
21	21100.	21100.	720.	9624000.	3685.	2200.
22	18000.	19000.	720.	9624000.	585.	2200.
23	18000.	19000.	720.	9624000.	585.	2200.
24	18000.	19000.	720.	9624000.	585.	2200.
25	18000.	19000.	720.	9624000.	585.	2200.
26	18000.	19000.	720.	9624000.	585.	2200.
27	18000.	19000.	720.	9624000.	585.	2200.
28	18000.	19000.	720.	9624000.	585.	2200.
29	18000.	19000.	720.	9624000.	585.	2200.
30	18000.	19000.	720.	9624000.	585.	2200.
31	18000.	19000.	720.	9624000.	585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 31000,CFS

D-29

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	16000.	17415.	720.	9621193.	0.	2200.
2	16000.	17415.	720.	9618385.	0.	2200.
3	16000.	17415.	720.	9615578.	0.	2200.
4	16000.	17415.	720.	9612770.	0.	2200.
5	16000.	17415.	720.	9609963.	0.	2200.
6	16000.	17415.	720.	9607155.	0.	2199.
7	16005.	17415.	719.	9604348.	0.	2199.
8	16000.	17092.	720.	9624000.	0.	2200.
9	16000.	17415.	720.	9621193.	0.	2200.
10	16000.	17415.	720.	9618385.	0.	2200.
11	25000.	25000.	720.	9624000.	7585.	2200.
12	25000.	25000.	720.	9624000.	7585.	2200.
13	25000.	25000.	720.	9624000.	7585.	2200.
14	25000.	25000.	720.	9624000.	7585.	2200.
15	25000.	25000.	720.	9624000.	7585.	2200.
16	25000.	25000.	720.	9624000.	7585.	2200.
17	25000.	25000.	720.	9624000.	7585.	2200.
18	25000.	25000.	720.	9624000.	7585.	2200.
19	25000.	25000.	720.	9624000.	7585.	2200.
20	25000.	25000.	720.	9624000.	7585.	2200.
21	14000.	17415.	720.	9617226.	0.	2200.
22	14000.	17415.	720.	9610451.	0.	2200.
23	14000.	17415.	719.	9603677.	0.	2199.
24	14000.	17754.	720.	9624000.	0.	2200.
25	14000.	17415.	720.	9617226.	0.	2200.
26	14000.	17415.	720.	9610451.	0.	2200.
27	14000.	17415.	719.	9603677.	0.	2199.
28	14000.	17754.	720.	9624000.	0.	2200.
29	14000.	17415.	720.	9617226.	0.	2200.
30	14000.	17415.	720.	9610451.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 25000,CFS

OC-10

WATER REGULATED DAILY IN THE YEAR 1957  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	20000.	20000.	720.	9624000.	2585.	2200.
2	21600.	21600.	720.	9624000.	4185.	2200.
3	21600.	21600.	720.	9624000.	4185.	2200.
4	21800.	21800.	720.	9624000.	4385.	2200.
5	22200.	22200.	720.	9624000.	4785.	2200.
6	22100.	22100.	720.	9624000.	4685.	2200.
7	20400.	20400.	720.	9624000.	2985.	2200.
8	18600.	18500.	720.	9624000.	1185.	2200.
9	19300.	19300.	720.	9624000.	1885.	2200.
10	21000.	21000.	720.	9624000.	3585.	2200.
11	23000.	23000.	720.	9624000.	5585.	2200.
12	22700.	22700.	720.	9624000.	5285.	2200.
13	21900.	21900.	720.	9624000.	4485.	2200.
14	19600.	19600.	720.	9624000.	2185.	2200.
15	18400.	18400.	720.	9624000.	985.	2200.
16	19800.	19800.	720.	9624000.	2385.	2200.
17	21500.	21500.	720.	9624000.	4085.	2200.
18	21900.	21900.	720.	9624000.	4485.	2200.
19	20500.	20500.	720.	9624000.	3085.	2200.
20	18500.	18500.	720.	9624000.	1085.	2200.
21	17600.	17600.	720.	9624000.	185.	2200.
22	19300.	19300.	720.	9624000.	1885.	2200.
23	20800.	20800.	720.	9624000.	3385.	2200.
24	19200.	19200.	720.	9624000.	1785.	2200.
25	17800.	17800.	720.	9624000.	385.	2200.
26	17200.	17415.	720.	9623573.	0.	2200.
27	16900.	17415.	720.	9622550.	0.	2200.
28	16700.	17415.	720.	9621131.	0.	2200.
29	23200.	23200.	720.	9624000.	5785.	2200.
30	26600.	25600.	720.	9624000.	9185.	2200.
31	25000.	25000.	720.	9624000.	7585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 26600.CFS

D-31

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	22400.	22400.	720.	9624000.	4985.	2200.
2	21600.	21600.	720.	9624000.	4185.	2200.
3	21600.	21600.	720.	9624000.	4185.	2200.
4	17600.	17600.	720.	9624000.	185.	2200.
5	16300.	17415.	720.	9621788.	0.	2200.
6	16600.	17415.	720.	9620170.	0.	2200.
7	18000.	17415.	720.	9621330.	0.	2200.
8	20700.	21700.	720.	9624000.	3285.	2200.
9	18100.	19100.	720.	9624000.	685.	2200.
10	18700.	19700.	720.	9624000.	1285.	2200.
11	20000.	20000.	720.	9624000.	2585.	2200.
12	18100.	19100.	720.	9624000.	685.	2200.
13	19200.	19200.	720.	9624000.	1785.	2200.
14	26200.	26200.	720.	9624000.	8785.	2200.
15	24200.	25200.	720.	9624000.	6785.	2200.
16	21000.	21000.	720.	9624000.	3585.	2200.
17	17000.	17415.	720.	9623176.	0.	2200.
18	19000.	19000.	720.	9624000.	1585.	2200.
19	22000.	24000.	720.	9624000.	4585.	2200.
20	25000.	25000.	720.	9624000.	7585.	2200.
21	20000.	24000.	720.	9624000.	2585.	2200.
22	16500.	17415.	720.	9622184.	0.	2200.
23	14700.	17415.	720.	9616798.	0.	2200.
24	14200.	17415.	720.	9610421.	0.	2200.
25	16000.	17415.	720.	9607613.	0.	2199.
26	20000.	17415.	720.	9612740.	0.	2200.
27	27000.	27000.	720.	9624000.	9585.	2200.
28	25800.	29800.	720.	9624000.	8385.	2200.
29	20400.	26400.	720.	9624000.	2985.	2200.
30	16100.	17415.	720.	9621391.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 27000,CFS

D-32

WATER REGULATED DAILY IN THE YEAR 1958  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	36800.	39800.	720.	9624000.	19385.	2200.
2	42900.	42900.	720.	9624000.	25485.	2200.
3	47800.	47800.	720.	9624000.	30385.	2200.
4	47100.	47100.	720.	9624000.	29685.	2200.
5	36000.	39000.	720.	9624000.	18585.	2200.
6	29100.	29100.	720.	9624000.	11685.	2200.
7	28600.	29600.	720.	9624000.	11185.	2200.
8	27600.	27000.	720.	9624000.	9585.	2200.
9	25000.	25000.	720.	9624000.	7585.	2200.
10	24000.	24000.	720.	9624000.	6585.	2200.
11	23000.	23000.	720.	9624000.	5585.	2200.
12	22000.	22000.	720.	9624000.	4585.	2200.
13	21900.	21900.	720.	9624000.	4485.	2200.
14	21200.	21200.	720.	9624000.	3785.	2200.
15	21000.	21000.	720.	9624000.	3585.	2200.
16	20000.	20000.	720.	9624000.	2585.	2200.
17	18000.	18000.	720.	9624000.	585.	2200.
18	18600.	18000.	720.	9624000.	585.	2200.
19	18000.	18000.	720.	9624000.	585.	2200.
20	18000.	18000.	720.	9624000.	585.	2200.
21	18000.	18000.	720.	9624000.	585.	2200.
22	17000.	17415.	720.	9623176.	0.	2200.
23	16000.	17415.	720.	9620369.	0.	2200.
24	15000.	17415.	720.	9615578.	0.	2200.
25	14000.	17415.	720.	9608803.	0.	2200.
26	13000.	9338.	720.	9624000.	0.	2200.
27	13000.	17415.	720.	9615242.	0.	2200.
28	12400.	17415.	720.	9605294.	0.	2199.
29	12000.	17569.	720.	9624000.	0.	2200.
30	11000.	17415.	720.	9611275.	0.	2200.
31	11000.	17585.	720.	9624000.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 47800,CFS

D-W3

WATER REGULATED DAILY IN THE YEAR 1959  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	25400.	9660.	713.	9421495.	0.	2194.
2	25000.	9650.	714.	9457892.	0.	2195.
3	24000.	9640.	715.	9492326.	0.	2196.
4	24000.	9630.	716.	9526779.	0.	2197.
5	22000.	9621.	717.	9557284.	0.	2198.
6	19700.	9613.	718.	9583242.	0.	2199.
7	18600.	9606.	719.	9607033.	0.	2199.
8	16700.	17415.	719.	9605614.	0.	2199.
9	17000.	17415.	719.	9604790.	0.	2199.
10	17600.	17415.	719.	9605156.	0.	2199.
11	18800.	17415.	719.	9607902.	0.	2200.
12	20200.	17415.	720.	9613425.	0.	2200.
13	21100.	17415.	720.	9620733.	0.	2200.
14	22800.	22800.	720.	9624000.	5365.	2200.
15	23300.	23300.	720.	9624000.	5085.	2200.
16	25000.	25000.	720.	9624000.	7585.	2200.
17	26000.	26000.	720.	9624000.	8585.	2200.
18	29000.	29000.	720.	9624000.	11585.	2200.
19	38000.	39000.	720.	9624000.	20585.	2200.
20	41400.	41400.	720.	9624000.	23985.	2200.
21	40000.	40000.	720.	9624000.	22585.	2200.
22	31000.	31000.	720.	9624000.	13585.	2200.
23	40000.	40000.	720.	9624000.	22585.	2200.
24	59700.	59700.	720.	9624000.	42285.	2200.
25	59100.	59100.	720.	9624000.	41685.	2200.
26	51200.	51200.	720.	9624000.	33785.	2200.
27	45000.	45000.	720.	9624000.	27585.	2200.
28	43000.	43000.	720.	9624000.	25585.	2200.
29	46000.	46000.	720.	9624000.	28585.	2200.
30	37000.	37000.	720.	9624000.	19585.	2200.
31	39000.	39000.	720.	9624000.	21585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 59700.CFS

D-34

WATER REGULATED DAILY IN THE YEAR 1960  
MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	18000.	18000.	720.	9624000.	585.	2200.
2	18000.	18000.	720.	9624000.	585.	2200.
3	18000.	18000.	720.	9624000.	585.	2200.
4	18000.	18000.	720.	9624000.	585.	2200.
5	18000.	18000.	720.	9624000.	585.	2200.
6	18000.	18000.	720.	9624000.	585.	2200.
7	18800.	18800.	720.	9624000.	1385.	2200.
8	19400.	19400.	720.	9624000.	1985.	2200.
9	21100.	21100.	720.	9624000.	3685.	2200.
10	21400.	21400.	720.	9624000.	3985.	2200.
11	21200.	21200.	720.	9624000.	3785.	2200.
12	30300.	30300.	720.	9624000.	12885.	2200.
13	40100.	40100.	720.	9624000.	22685.	2200.
14	35600.	35600.	720.	9624000.	18185.	2200.
15	32910.	32900.	720.	9624000.	15485.	2200.
16	27900.	27900.	720.	9624000.	10485.	2200.
17	24500.	24500.	720.	9624000.	7085.	2200.
18	22000.	22000.	720.	9624000.	4585.	2200.
19	19400.	19400.	720.	9624000.	1985.	2200.
20	17300.	17415.	720.	9623771.	0.	2200.
21	16300.	17415.	720.	9621559.	0.	2200.
22	16200.	17415.	720.	9619148.	0.	2200.
23	17500.	17415.	720.	9619316.	0.	2200.
24	17300.	17415.	720.	9619087.	0.	2200.
25	15800.	17415.	720.	9615882.	0.	2200.
26	14500.	17415.	720.	9610100.	0.	2200.
27	13900.	9892.	720.	9624000.	0.	2200.
28	14000.	17415.	720.	9617226.	0.	2200.
29	14800.	17415.	720.	9612038.	0.	2200.
30	15100.	17415.	720.	9607445.	0.	2199.

MAXIMUM DISCHARGE FOR THE MONTH IS 40100,CFS

D-35

WATER REGULATED DAILY IN THE YEAR 1961  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	23000.	6246.	709.	9266968.	0.	2190.
2	23000.	6237.	710.	9320216.	0.	2191.
3	23000.	6228.	711.	9353483.	0.	2192.
4	23000.	6219.	712.	9386767.	0.	2193.
5	23000.	6210.	713.	9420069.	0.	2194.
6	23000.	6201.	714.	9453389.	0.	2195.
7	23000.	6192.	715.	9486726.	0.	2196.
8	23000.	6183.	716.	9520081.	0.	2197.
9	23000.	6175.	717.	9553454.	0.	2198.
10	23000.	6166.	718.	9586844.	0.	2199.
11	25000.	17415.	719.	9601887.	0.	2199.
12	25000.	17415.	720.	9616931.	0.	2200.
13	25000.	25000.	720.	9624000.	7585.	2200.
14	25000.	25000.	720.	9624000.	7585.	2200.
15	25000.	25000.	720.	9624000.	7585.	2200.
16	25000.	25000.	720.	9624000.	7585.	2200.
17	25000.	25000.	720.	9624000.	7585.	2200.
18	25000.	25000.	720.	9624000.	7585.	2200.
19	25000.	25000.	720.	9624000.	7585.	2200.
20	25000.	25000.	720.	9624000.	7585.	2200.
21	25000.	25000.	720.	9624000.	7585.	2200.
22	25000.	25000.	720.	9624000.	7585.	2200.
23	25000.	25000.	720.	9624000.	7585.	2200.
24	30300.	33300.	720.	9624000.	12885.	2200.
25	26000.	25000.	720.	9624000.	8585.	2200.
26	25000.	25000.	720.	9624000.	7585.	2200.
27	25000.	25000.	720.	9624000.	7585.	2200.
28	25000.	25000.	720.	9624000.	7585.	2200.
29	26500.	26500.	720.	9624000.	9085.	2200.
30	25000.	25000.	720.	9624000.	7585.	2200.
31	24000.	24000.	720.	9624000.	6585.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30300.CFS

D-36

## MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	26000.	25000.	720.	9624000.	8585.	2200.
2	26000.	25000.	720.	9624000.	8585.	2200.
3	26000.	25000.	720.	9624000.	8585.	2200.
4	26000.	25000.	720.	9624000.	8585.	2200.
5	26000.	25000.	720.	9624000.	8585.	2200.
6	26000.	25000.	720.	9624000.	8585.	2200.
7	26000.	25000.	720.	9624000.	8585.	2200.
8	26000.	25000.	720.	9624000.	8585.	2200.
9	26000.	25000.	720.	9624000.	8585.	2200.
10	26000.	25000.	720.	9624000.	8585.	2200.
11	26000.	25000.	720.	9624000.	8585.	2200.
12	26000.	25000.	720.	9624000.	8585.	2200.
13	26000.	25000.	720.	9624000.	8585.	2200.
14	26000.	25000.	720.	9624000.	8585.	2200.
15	26000.	25000.	720.	9624000.	8585.	2200.
16	17000.	17415.	720.	9623176.	0.	2200.
17	17000.	17415.	720.	9622352.	0.	2200.
18	17400.	17415.	720.	9622321.	0.	2200.
19	18000.	17415.	720.	9623481.	0.	2200.
20	19000.	19000.	720.	9624000.	1585.	2200.
21	19000.	19000.	720.	9624000.	1585.	2200.
22	20000.	20000.	720.	9624000.	2585.	2200.
23	22000.	22000.	720.	9624000.	4585.	2200.
24	24800.	24800.	720.	9624000.	7385.	2200.
25	24700.	24700.	720.	9624000.	7285.	2200.
26	20300.	21300.	720.	9624000.	2885.	2200.
27	17400.	17415.	720.	9623969.	0.	2200.
28	15900.	17415.	720.	9620964.	0.	2200.
29	14800.	17415.	720.	9615776.	0.	2200.
30	14100.	17415.	720.	9609200.	0.	2200.
31	13800.	13380.	720.	9624000.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 26000.CFS

WATER REGULATED DAILY IN THE YEAR 1962  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	32700.	5181.	717.	9538527.	0.	2197.
2	28200.	5168.	718.	9582226.	0.	2199.
3	25000.	5939.	719.	9624000.	0.	2200.
4	24100.	5100.	720.	9624000.	6685.	2200.
5	25900.	5900.	720.	9624000.	8485.	2200.
6	27200.	5200.	720.	9624000.	9785.	2200.
7	27200.	51200.	720.	9624000.	9785.	2200.
8	27400.	51400.	720.	9624000.	9985.	2200.
9	28000.	52000.	720.	9624000.	10585.	2200.
10	26200.	59200.	720.	9624000.	8785.	2200.
11	24900.	54900.	720.	9624000.	7485.	2200.
12	25400.	59400.	720.	9624000.	7985.	2200.
13	28300.	52300.	720.	9624000.	10885.	2200.
14	25600.	59600.	720.	9624000.	8185.	2200.
15	23000.	52000.	720.	9624000.	5585.	2200.
16	21700.	51700.	720.	9624000.	4285.	2200.
17	20900.	59900.	720.	9624000.	3485.	2200.
18	22600.	52600.	720.	9624000.	5185.	2200.
19	23500.	52500.	720.	9624000.	6085.	2200.
20	23000.	53000.	720.	9624000.	5585.	2200.
21	27200.	52200.	720.	9624000.	9785.	2200.
22	30500.	53500.	720.	9624000.	13085.	2200.
23	28200.	52200.	720.	9624000.	10785.	2200.
24	25200.	59200.	720.	9624000.	7785.	2200.
25	27800.	51800.	720.	9624000.	10385.	2200.
26	28900.	59900.	720.	9624000.	11485.	2200.
27	26000.	59000.	720.	9624000.	8585.	2200.
28	23700.	53700.	720.	9624000.	6285.	2200.
29	23400.	53400.	720.	9624000.	5985.	2200.
30	24600.	52600.	720.	9624000.	7185.	2200.
31	25200.	52200.	720.	9624000.	7785.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30500.CFS

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WATER REGULATED DAILY IN THE YEAR 1963  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	29000.	6366.	696.	8859746.	0.	2176.
2	31000.	6353.	697.	8908633.	0.	2178.
3	30000.	6339.	699.	8955564.	0.	2179.
4	30000.	6326.	700.	9002520.	0.	2181.
5	30000.	6313.	702.	9049502.	0.	2182.
6	33000.	6299.	703.	9102462.	0.	2184.
7	35000.	6284.	705.	9159419.	0.	2186.
8	37800.	6268.	707.	9221962.	0.	2188.
9	38000.	6251.	709.	9284936.	0.	2190.
10	40000.	6233.	711.	9351911.	0.	2192.
11	42000.	6214.	713.	9422890.	0.	2194.
12	44000.	6195.	715.	9497875.	0.	2196.
13	41000.	6176.	717.	9566948.	0.	2198.
14	39000.	6145.	719.	9609760.	0.	2200.
15	37000.	6100.	720.	9624000.	19585.	2200.
16	43000.	63000.	720.	9624000.	25585.	2200.
17	47000.	67000.	720.	9624000.	29585.	2200.
18	49000.	69000.	720.	9624000.	31585.	2200.
19	32000.	32000.	720.	9624000.	14585.	2200.
20	30000.	30000.	720.	9624000.	12585.	2200.
21	29000.	29000.	720.	9624000.	11585.	2200.
22	28000.	28000.	720.	9624000.	10585.	2200.
23	30000.	30000.	720.	9624000.	12585.	2200.
24	38000.	38000.	720.	9624000.	20585.	2200.
25	39000.	39000.	720.	9624000.	21585.	2200.
26	35000.	35000.	720.	9624000.	17585.	2200.
27	31000.	31000.	720.	9624000.	13585.	2200.
28	27000.	27000.	720.	9624000.	9585.	2200.
29	24000.	24000.	720.	9624000.	6585.	2200.
30	24000.	24000.	720.	9624000.	6585.	2200.
31	23600.	23600.	720.	9624000.	6185.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 49000,CFS

D-39

## MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	26000.	26000.	720.	9624000.	8585.	2200.
2	30000.	30000.	720.	9624000.	12585.	2200.
3	35000.	35000.	720.	9624000.	17585.	2200.
4	32000.	32000.	720.	9624000.	14585.	2200.
5	31000.	31000.	720.	9624000.	13585.	2200.
6	30000.	30000.	720.	9624000.	12585.	2200.
7	28000.	28000.	720.	9624000.	10585.	2200.
8	25000.	25000.	720.	9624000.	7585.	2200.
9	21000.	21000.	720.	9624000.	3585.	2200.
10	20000.	20000.	720.	9624000.	2585.	2200.
11	21000.	21000.	720.	9624000.	3585.	2200.
12	21000.	21000.	720.	9624000.	3585.	2200.
13	20000.	20000.	720.	9624000.	2585.	2200.
14	20000.	20000.	720.	9624000.	2585.	2200.
15	21700.	21700.	720.	9624000.	4285.	2200.
16	22600.	22600.	720.	9624000.	5185.	2200.
17	22800.	22800.	720.	9624000.	5385.	2200.
18	24600.	24600.	720.	9624000.	7185.	2200.
19	25900.	25900.	720.	9624000.	8485.	2200.
20	24000.	24000.	720.	9624000.	6585.	2200.
21	22300.	22300.	720.	9624000.	4885.	2200.
22	21400.	21400.	720.	9624000.	3985.	2200.
23	23300.	23300.	720.	9624000.	5885.	2200.
24	23000.	23000.	720.	9624000.	5585.	2200.
25	21600.	21600.	720.	9624000.	4185.	2200.
26	22800.	22800.	720.	9624000.	5385.	2200.
27	23100.	23100.	720.	9624000.	5685.	2200.
28	21700.	21700.	720.	9624000.	4285.	2200.
29	19300.	19300.	720.	9624000.	1885.	2200.
30	17300.	17415.	720.	9623771.	0.	2200.
31	16500.	17415.	720.	9621955.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 35000.CFS

WATER REGULATED DAILY IN THE YEAR 1965  
MONTH OF AUGUST

PAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	24200.	17415.	719	9603894.	0.	2199.
2	23000.	17415.	720	9614971.	0.	2200.
3	22900.	17415.	720	9624000.	5485.	2200.
4	21900.	17415.	720	9624000.	4485.	2200.
5	19700.	17415.	720	9624000.	2285.	2200.
6	17500.	17415.	720	9624000.	85.	2200.
7	16600.	17415.	720	9622383.	0.	2200.
8	16700.	17415.	720	9620964.	0.	2200.
9	18300.	17415.	720	9622718.	0.	2200.
10	22600.	22600.	720	9624000.	5185.	2200.
11	26300.	26300.	720	9624000.	8885.	2200.
12	26400.	26400.	720	9624000.	8985.	2200.
13	27500.	27500.	720	9624000.	10085.	2200.
14	28100.	28100.	720	9624000.	10685.	2200.
15	31700.	31700.	720	9624000.	14285.	2200.
16	32600.	32600.	720	9624000.	15185.	2200.
17	33600.	33600.	720	9624000.	16185.	2200.
18	32800.	32800.	720	9624000.	15385.	2200.
19	27700.	27700.	720	9624000.	10285.	2200.
20	25100.	25100.	720	9624000.	7685.	2200.
21	21300.	21300.	720	9624000.	3885.	2200.
22	19400.	19400.	720	9624000.	1985.	2200.
23	15900.	17415.	720	9620994.	0.	2200.
24	16400.	17415.	720	9618980.	0.	2200.
25	16800.	17415.	720	9617759.	0.	2200.
26	14600.	17415.	720	9612175.	0.	2200.
27	12700.	17415.	719	9602822.	0.	2199.
28	11900.	1223.	720	9624000.	0.	2200.
29	10400.	17415.	720	9610085.	0.	2200.
30	10000.	2985.	720	9624000.	0.	2200.
31	10000.	17415.	720	9609292.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 33600,CFS

D-41

## MONTH OF SEPTEMBER

PAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	9800.	2385.	720.	9624000.	0.	2200.
2	9480.	17415.	720.	9608260.	0.	2200.
3	9380.	1445.	720.	9624000.	0.	2200.
4	9280.	17415.	720.	9607864.	0.	2200.
5	11300.	3165.	720.	9624000.	0.	2200.
6	21500.	21500.	720.	9624000.	0.	2200.
7	26900.	26900.	720.	9624000.	4085.	2200.
8	30100.	30100.	720.	9624000.	9485.	2200.
9	26500.	26500.	720.	9624000.	12685.	2200.
10	23800.	23800.	720.	9624000.	9085.	2200.
11	23200.	23200.	720.	9624000.	6385.	2200.
12	21000.	21000.	720.	9624000.	5785.	2200.
13	17700.	17700.	720.	9624000.	3585.	2200.
14	16400.	17415.	720.	9621986.	285.	2200.
15	16300.	17415.	720.	9619774.	0.	2200.
16	16700.	17415.	720.	9618354.	0.	2200.
17	17100.	17415.	720.	9617729.	0.	2200.
18	18300.	17415.	720.	9619483.	0.	2200.
19	19400.	17415.	720.	9623420.	0.	2200.
20	20100.	20100.	720.	9624000.	2685.	2200.
21	20200.	20200.	720.	9624000.	2785.	2200.
22	20800.	20800.	720.	9624000.	3385.	2200.
23	21500.	21500.	720.	9624000.	4085.	2200.
24	22200.	22200.	720.	9624000.	4785.	2200.
25	22700.	22700.	720.	9624000.	5285.	2200.
26	23400.	23400.	720.	9624000.	5985.	2200.
27	26000.	26000.	720.	9624000.	8585.	2200.
28	23100.	23100.	720.	9624000.	5685.	2200.
29	20600.	20600.	720.	9624000.	3185.	2200.
30	15800.	17415.	720.	9620796.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30100,CFS

D-42

WATER REGULATED DAILY IN THE YEAR 1967  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27400.	6743.	704.	9140190.	0.	2185.
2	30800.	6730.	706.	9187932.	0.	2187.
3	28900.	6716.	707.	9231933.	0.	2188.
4	25600.	6704.	709.	9269412.	0.	2189.
5	24200.	6694.	710.	9304134.	0.	2190.
6	23000.	6684.	711.	9336496.	0.	2191.
7	21800.	6675.	712.	9366496.	0.	2192.
8	21800.	6666.	713.	9396512.	0.	2193.
9	23800.	6657.	714.	9430514.	0.	2194.
10	28000.	6646.	715.	9472868.	0.	2195.
11	32700.	6633.	716.	9524572.	0.	2197.
12	33600.	6618.	718.	9578089.	0.	2199.
13	40200.	7415.	719.	9623282.	0.	2200.
14	69400.	69400.	720.	9624000.	51985.	2200.
15	76000.	79000.	720.	9624000.	58585.	2200.
16	62400.	62400.	720.	9624000.	44985.	2200.
17	57500.	57500.	720.	9624000.	40085.	2200.
18	45000.	45000.	720.	9624000.	27585.	2200.
19	37200.	37200.	720.	9624000.	19785.	2200.
20	32600.	32600.	720.	9624000.	15185.	2200.
21	30800.	30800.	720.	9624000.	13385.	2200.
22	29700.	29700.	720.	9624000.	12285.	2200.
23	29800.	29800.	720.	9624000.	12385.	2200.
24	27900.	27900.	720.	9624000.	10485.	2200.
25	26200.	29200.	720.	9624000.	8785.	2200.
26	23600.	29600.	720.	9624000.	6185.	2200.
27	22100.	22100.	720.	9624000.	4685.	2200.
28	21300.	21300.	720.	9624000.	3885.	2200.
29	20000.	29000.	720.	9624000.	2585.	2200.
30	19100.	19100.	720.	9624000.	1685.	2200.
31	18900.	19900.	720.	9624000.	1485.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 76000.CFS

D-43

YEAR	MAXIMUM DISCHARGE (CFS)
1955	56900.
1956	32000.
1957	27000.
1958	47800.
1959	59700.
1960	40100.
1961	30300.
1962	30600.
1963	49000.
1965	33600.
1967	76000.

**APPENDIX**

**D-3**

**HYDROELECTRIC & FLOOD CONTROL - NO FORECAST**

## A DAILY REGULATION FOR SPILL

A SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

A HYDROPOWER + FLOOD CONTROL AT 900,000 ACRE-FT - NO FORECAST

	31	30	31	31	28	31	30	31	30	31	31	30
C	0,080	0,088	0,097	0,106	0,090	0,094	0,081	0,075	0,069	0,069	0,074	0,077
D	1780	1810	1900	1950	2000	2050	2100	2150	2200	2200	2210	
E	1000000	1300000	2333000	3160000	4000000	5100000	6400000	8000000	9624000	9999999		
H	813859	1480	9624000	9000000	0.80	3099743	5					
I	1956	11	12	9334953								
M11	1956	31000	31000	31000	31000	31000	30600	30800	26000	26000	26000	26000
M11	1956	26000	26000	26000	26000	26000	26000	26000	21100	18000	18000	18000
M11	1956	18000	18000	18000	18000	18000	18000	18000				
M12	1956	16000	16000	16000	16000	16000	16000	16000	16000	16000	25000	25000
M12	1956	25000	25000	25000	25000	25000	25000	25000	14000	14000	14000	14000
M12	1956	14000	14000	14000	14000	14000	14000	14000				
I	1959	11	12	8835638								
M11	1959	25400	25000	24000	24000	22000	19700	18600	16700	17000	17600	18800
M11	1959	21100	22800	23300	25000	26000	29000	38000	41400	40000	31000	40000
M11	1959	59100	51200	45000	43000	46000	37000	39000				
M12	1959	41000	38000	35000	32000	27400	24600	22600	21300	19800	16700	15100
M12	1959	13200	12700	12400	12200	12000	11300	11000	11000	10500	9960	10100
M12	1959	10800	11000	10400	10400	9650	11200					
I	1962	11	11	9563333								
M11	1962	27100	28500	30600	23000	23000	23000	23000	23000	23000	23000	23000
M11	1962	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000
M11	1962	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000
I	1963	11	11	9371622								
M11	1963	26000	30000	35000	32000	31000	30000	28000	25000	21000	20000	21000
M11	1963	20000	20000	21700	22600	22800	24600	25900	24000	22300	21400	23300
M11	1963	21600	22800	23100	21700	19300	17300	16500				
I	1967	11	12	9000000								
M11	1967	27400	30800	28900	25600	24200	23000	21800	21800	23800	28000	32700
M11	1967	40200	69400	76000	62400	57500	45000	37200	32600	30800	29700	29800
M11	1967	26200	23600	22100	21300	20000	19100	18900				
M12	1967	19300	25300	31800	31800	30900	30300	28400	25000	21900	19600	17800
M12	1967	15600	14400	14300	13800	13200	12500	12400	12400	11800	11200	10600
M12	1967	9760	9520	9340	9200	8860	8440					

DAILY REGULATION FOR SPILL  
 SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA  
 HYDROPOWER + FLOOD CONTROL AT 9000000 ACRE-FT - NO FORCAST

WATER REGULATED DAILY IN THE YEAR 1956  
 MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	31000.	16688.	712.	9363340.	0.	2192.
2	31000.	16688.	712.	9391727.	0.	2193.
3	31000.	16688.	713.	9420114.	0.	2194.
4	31000.	16688.	714.	9448501.	0.	2195.
5	31000.	16688.	715.	9476887.	0.	2195.
6	31000.	16688.	716.	9505274.	0.	2196.
7	30600.	16688.	717.	9532868.	0.	2197.
8	30800.	16688.	718.	9560858.	0.	2198.
9	26000.	16688.	718.	9579328.	0.	2199.
10	26000.	16688.	719.	9597797.	0.	2199.
11	26000.	16688.	719.	9616267.	0.	2200.
12	26000.	26000.	720.	9624000.	9312.	2200.
13	26000.	26000.	720.	9624000.	9312.	2200.
14	26000.	26000.	720.	9624000.	9312.	2200.
15	26000.	26000.	720.	9624000.	9312.	2200.
16	26000.	26000.	720.	9624000.	9312.	2200.
17	26000.	26000.	720.	9624000.	9312.	2200.
18	26000.	26000.	720.	9624000.	9312.	2200.
19	26000.	26000.	720.	9624000.	9312.	2200.
20	26000.	26000.	720.	9624000.	9312.	2200.
21	21100.	24100.	720.	9624000.	4412.	2200.
22	18000.	18000.	720.	9624000.	1312.	2200.
23	18000.	18000.	720.	9624000.	1312.	2200.
24	18000.	18000.	720.	9624000.	1312.	2200.
25	18000.	18000.	720.	9624000.	1312.	2200.
26	18000.	18000.	720.	9624000.	1312.	2200.
27	18000.	18000.	720.	9624000.	1312.	2200.
28	18000.	18000.	720.	9624000.	1312.	2200.
29	18000.	18000.	720.	9624000.	1312.	2200.
30	18000.	18000.	720.	9624000.	1312.	2200.
31	18000.	18000.	720.	9624000.	1312.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 26000.CFS

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	16000.	16688.	720.	9622635.	0.	2200.
2	16000.	16688.	720.	9621270.	0.	2200.
3	16000.	16688.	720.	9619905.	0.	2200.
4	16000.	16688.	720.	9618540.	0.	2200.
5	16000.	16688.	720.	9617175.	0.	2200.
6	16000.	16688.	720.	9615810.	0.	2200.
7	16000.	16688.	720.	9614445.	0.	2200.
8	16000.	16688.	720.	9613080.	0.	2200.
9	16000.	16688.	720.	9611715.	0.	2200.
10	16000.	16688.	720.	9610350.	0.	2200.
11	25000.	25000.	720.	9624000.	8312.	2200.
12	25000.	25000.	720.	9624000.	8312.	2200.
13	25000.	25000.	720.	9624000.	8312.	2200.
14	25000.	25000.	720.	9624000.	8312.	2200.
15	25000.	25000.	720.	9624000.	8312.	2200.
16	25000.	25000.	720.	9624000.	8312.	2200.
17	25000.	25000.	720.	9624000.	8312.	2200.
18	25000.	25000.	720.	9624000.	8312.	2200.
19	25000.	25000.	720.	9624000.	8312.	2200.
20	25000.	25000.	720.	9624000.	8312.	2200.
21	14000.	16688.	720.	9618668.	0.	2200.
22	14000.	16688.	720.	9613336.	0.	2200.
23	14000.	16688.	720.	9608004.	0.	2200.
24	14000.	16688.	719.	9602672.	0.	2199.
25	14000.	16688.	719.	9597340.	0.	2199.
26	14000.	16688.	719.	9592008.	0.	2199.
27	14000.	16688.	719.	9586676.	0.	2199.
28	14000.	16688.	719.	9581344.	0.	2199.
29	14000.	16688.	719.	9576013.	0.	2199.
30	14000.	16688.	718.	9570681.	0.	2198.

MAXIMUM DISCHARGE FOR THE MONTH IS 25000.CFS

87-8

WATER REGULATED DAILY IN THE YEAR 1959  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	25400.	6537.	696.	8873052.	0.	2177.
2	25000.	6526.	697.	8909694.	0.	2178.
3	24000.	6516.	699.	8944372.	0.	2179.
4	24000.	6506.	700.	8979071.	0.	2180.
5	22000.	65688.	700.	8989607.	0.	2180.
6	19700.	65688.	701.	8995580.	0.	2181.
7	18600.	65688.	701.	8999372.	0.	2181.
8	16700.	65688.	701.	8999396.	0.	2181.
9	17000.	65688.	701.	9000014.	0.	2181.
10	17600.	65688.	701.	9001823.	0.	2181.
11	18800.	65688.	701.	9006011.	0.	2181.
12	20200.	65688.	701.	9012977.	0.	2181.
13	21100.	65688.	701.	9021728.	0.	2181.
14	22800.	65688.	702.	9033850.	0.	2182.
15	23300.	65688.	702.	9046964.	0.	2182.
16	25000.	65688.	702.	9063450.	0.	2183.
17	26000.	65688.	703.	9081920.	0.	2183.
18	29000.	65688.	704.	9106340.	0.	2184.
19	38000.	65688.	705.	9148611.	0.	2185.
20	41400.	65688.	706.	9197626.	0.	2187.
21	40000.	65688.	708.	9243864.	0.	2188.
22	31000.	65688.	709.	9272251.	0.	2189.
23	40000.	65688.	710.	9318489.	0.	2191.
24	59700.	65688.	712.	9403801.	0.	2193.
25	59100.	65688.	715.	9487923.	0.	2196.
26	51200.	65688.	717.	9556376.	0.	2198.
27	45000.	65688.	719.	9612531.	0.	2200.
28	43000.	43000.	720.	9624000.	26312.	2200.
29	46000.	46000.	720.	9624000.	29312.	2200.
30	37000.	37000.	720.	9624000.	20312.	2200.
31	39000.	39000.	720.	9624000.	22312.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 46000,CFS

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	41000.	41000.	720.	9624000.	24312.	2200.
2	38000.	34000.	720.	9624000.	21312.	2200.
3	35000.	35000.	720.	9624000.	18312.	2200.
4	32000.	32000.	720.	9624000.	15312.	2200.
5	27400.	27400.	720.	9624000.	10712.	2200.
6	24600.	24600.	720.	9624000.	7912.	2200.
7	22600.	22500.	720.	9624000.	5912.	2200.
8	21300.	21300.	720.	9624000.	4612.	2200.
9	19800.	19800.	720.	9624000.	3112.	2200.
10	16700.	16700.	720.	9624000.	12.	2200.
11	15100.	15688.	720.	9620850.	0.	2200.
12	13900.	15688.	720.	9615320.	0.	2200.
13	13200.	15688.	720.	9608401.	0.	2200.
14	12700.	15688.	719.	9600490.	0.	2199.
15	12400.	15688.	719.	9591985.	0.	2199.
16	12200.	15688.	719.	9583083.	0.	2199.
17	12000.	15688.	719.	9573784.	0.	2198.
18	11300.	15688.	718.	9563097.	0.	2198.
19	11000.	15688.	718.	9551814.	0.	2198.
20	11000.	15688.	718.	9540532.	0.	2197.
21	10500.	15688.	717.	9528258.	0.	2197.
22	9960.	15688.	717.	9514913.	0.	2197.
23	10100.	15688.	716.	9501845.	0.	2196.
24	10500.	15688.	716.	9489571.	0.	2196.
25	10800.	15688.	716.	9477892.	0.	2196.
26	11000.	15688.	715.	9466610.	0.	2195.
27	10400.	15688.	715.	9454138.	0.	2194.
28	10400.	15688.	715.	9441665.	0.	2194.
29	9650.	15688.	714.	9427705.	0.	2194.
30	11200.	15688.	714.	9416820.	0.	2194.

MAXIMUM DISCHARGE FOR THE MONTH IS 41000.CFS

D-50

WATER REGULATED DAILY IN THE YEAR 1962  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27100.	16688.	718.	9583984.	0.	2199.
2	28500.	16688.	719.	9607413.	0.	2199.
3	30600.	30600.	720.	9624000.	13912.	2200.
4	23000.	23000.	720.	9624000.	6312.	2200.
5	23000.	23000.	720.	9624000.	6312.	2200.
6	23000.	23000.	720.	9624000.	6312.	2200.
7	23000.	23000.	720.	9624000.	6312.	2200.
8	23000.	23000.	720.	9624000.	6312.	2200.
9	23000.	23000.	720.	9624000.	6312.	2200.
10	23000.	23000.	720.	9624000.	6312.	2200.
11	23000.	23000.	720.	9624000.	6312.	2200.
12	23000.	23000.	720.	9624000.	6312.	2200.
13	23000.	23000.	720.	9624000.	6312.	2200.
14	23000.	23000.	720.	9624000.	6312.	2200.
15	23000.	23000.	720.	9624000.	6312.	2200.
16	23000.	23000.	720.	9624000.	6312.	2200.
17	23000.	23000.	720.	9624000.	6312.	2200.
18	23000.	23000.	720.	9624000.	6312.	2200.
19	23000.	23000.	720.	9624000.	6312.	2200.
20	23000.	23000.	720.	9624000.	6312.	2200.
21	23000.	23000.	720.	9624000.	6312.	2200.
22	23000.	23000.	720.	9624000.	6312.	2200.
23	23000.	23000.	720.	9624000.	6312.	2200.
24	23000.	23000.	720.	9624000.	6312.	2200.
25	23000.	23000.	720.	9624000.	6312.	2200.
26	23000.	23000.	720.	9624000.	6312.	2200.
27	23000.	23000.	720.	9624000.	6312.	2200.
28	23000.	23000.	720.	9624000.	6312.	2200.
29	23000.	23000.	720.	9624000.	6312.	2200.
30	23000.	23000.	720.	9624000.	6312.	2200.
31	23000.	23000.	720.	9624000.	6312.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30600.CFS

D-51

WATER REGULATED DAILY IN THE YEAR 1963  
MONTH OF AUGUST

PAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	26000.	19688.	713.	9390092.	0.	2193.
2	30000.	19688.	713.	9416495.	0.	2194.
3	35000.	19688.	714.	9452816.	0.	2195.
4	32000.	19688.	715.	9483186.	0.	2196.
5	31000.	19688.	716.	9511573.	0.	2197.
6	36000.	19688.	717.	9537976.	0.	2198.
7	28000.	19688.	718.	9560413.	0.	2199.
8	25000.	19688.	718.	9576899.	0.	2199.
9	21000.	19688.	719.	9585451.	0.	2199.
10	20000.	19688.	719.	9592020.	0.	2199.
11	21000.	19688.	719.	9600572.	0.	2199.
12	21000.	19688.	719.	9609125.	0.	2200.
13	20000.	19688.	720.	9615693.	0.	2200.
14	20000.	19688.	720.	9622262.	0.	2200.
15	21700.	21700.	720.	9624000.	5012.	2200.
16	22600.	22600.	720.	9624000.	5912.	2200.
17	22800.	22800.	720.	9624000.	6112.	2200.
18	24600.	24600.	720.	9624000.	7912.	2200.
19	25900.	25900.	720.	9624000.	9212.	2200.
20	24000.	24000.	720.	9624000.	7312.	2200.
21	22300.	22300.	720.	9624000.	5612.	2200.
22	21400.	21400.	720.	9624000.	4712.	2200.
23	23300.	23300.	720.	9624000.	6612.	2200.
24	23000.	23000.	720.	9624000.	6312.	2200.
25	21600.	21600.	720.	9624000.	4912.	2200.
26	22800.	22800.	720.	9624000.	6112.	2200.
27	23100.	23100.	720.	9624000.	6412.	2200.
28	21700.	21700.	720.	9624000.	5012.	2200.
29	19300.	19300.	720.	9624000.	2612.	2200.
30	17300.	17300.	720.	9624000.	612.	2200.
31	16500.	19688.	720.	9623627.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 25900.CFS

D-52

WATER REGULATED DAILY IN THE YEAR 1967  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27400.	19688.	701.	9021246.	0.	2181.
2	30800.	19688.	702.	9049237.	0.	2182.
3	28900.	19688.	703.	9073458.	0.	2183.
4	25600.	19688.	703.	9091134.	0.	2184.
5	24200.	19688.	704.	9106034.	0.	2184.
6	23000.	19688.	704.	9118553.	0.	2184.
7	21800.	19688.	705.	9128692.	0.	2185.
8	21800.	19688.	705.	9138831.	0.	2185.
9	23800.	19688.	705.	9152937.	0.	2185.
10	28000.	19688.	706.	9175373.	0.	2186.
11	32700.	19688.	707.	9207132.	0.	2187.
12	33600.	19688.	708.	9240676.	0.	2188.
13	40200.	19688.	709.	9287311.	0.	2190.
14	69400.	19688.	711.	9391863.	0.	2193.
15	76000.	19688.	715.	9509505.	0.	2196.
16	62400.	19688.	718.	9600173.	0.	2199.
17	57500.	5/500.	720.	9624000.	40812.	2200.
18	45000.	45000.	720.	9624000.	28312.	2200.
19	37200.	37200.	720.	9624000.	20512.	2200.
20	32600.	32600.	720.	9624000.	15912.	2200.
21	30800.	30800.	720.	9624000.	14112.	2200.
22	29700.	29700.	720.	9624000.	13012.	2200.
23	29800.	29800.	720.	9624000.	13112.	2200.
24	27900.	27900.	720.	9624000.	11212.	2200.
25	26200.	26200.	720.	9624000.	9512.	2200.
26	23600.	23600.	720.	9624000.	6912.	2200.
27	22100.	22100.	720.	9624000.	5412.	2200.
28	21300.	21300.	720.	9624000.	4612.	2200.
29	20000.	20000.	720.	9624000.	3312.	2200.
30	19100.	19100.	720.	9624000.	2412.	2200.
31	18900.	18900.	720.	9624000.	2212.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 57500,CFS

D-153

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	19300.	19300.	720.	9624000.	2612.	2200.
2	25300.	25300.	720.	9624000.	8612.	2200.
3	31800.	31800.	720.	9624000.	15112.	2200.
4	31800.	31800.	720.	9624000.	15112.	2200.
5	30900.	30900.	720.	9624000.	14212.	2200.
6	30300.	30300.	720.	9624000.	13612.	2200.
7	28400.	28400.	720.	9624000.	11712.	2200.
8	25000.	25000.	720.	9624000.	8312.	2200.
9	21900.	21900.	720.	9624000.	5212.	2200.
10	19600.	19600.	720.	9624000.	2912.	2200.
11	17800.	17800.	720.	9624000.	1112.	2200.
12	16500.	16688.	720.	9623627.	0.	2200.
13	15600.	16688.	720.	9621468.	0.	2200.
14	14400.	16688.	720.	9616930.	0.	2200.
15	14300.	16688.	720.	9612193.	0.	2200.
16	13800.	16688.	720.	9606464.	0.	2199.
17	13200.	16688.	719.	9599545.	0.	2199.
18	12500.	16688.	719.	9591238.	0.	2199.
19	12400.	16688.	719.	9582733.	0.	2199.
20	12400.	16688.	719.	9574227.	0.	2198.
21	11800.	16688.	718.	9564532.	0.	2198.
22	11200.	16688.	718.	9553646.	0.	2198.
23	10640.	16688.	718.	9541570.	0.	2197.
24	10100.	16688.	717.	9528503.	0.	2197.
25	9760.	16688.	717.	9514761.	0.	2197.
26	9520.	16688.	716.	9500543.	0.	2196.
27	9340.	16688.	716.	9485969.	0.	2195.
28	9200.	16688.	716.	9471116.	0.	2195.
29	8860.	16688.	715.	9455589.	0.	2195.
30	8440.	16688.	715.	9439229.	0.	2194.

MAXIMUM DISCHARGE FOR THE MONTH IS 31800.CFS

454

YEAR	MAXIMUM DISCHARGE (CFS)
1956	26000.
1959	46000.
1962	30600.
1963	25900.
1967	57500.

**APPENDIX**

**D-4**

**HYDROELECTRIC & FLOOD CONTROL - FORECAST**

## A DAILY REGULATION FOR SPILL

A SUSITNA RIVER AT GOLD CREEK WITH VATANA DAM DATA

A HYDROPOWER + FLOOD CONTROL AT 9000000 ACRE-FT - FORCAST

B 31 30 31 31 28 31 30 31 30 31 31 30

C 0.080 0.088 0.097 0.106 0.099 0.094 0.081 0.075 0.069 0.069 0.074 0.077

D 1780 1810 1900 1950 2000 2050 2100 2150 2200 2210

E 1000000 1300000 2333000 3160000 4000000 510000 6400000 8000000 9624000 9999999

H 813859 1480 9624000 9000000 0.80 3099743 4

I 1956 11 12 9334953

M11 1956 31000 31000 31000 31000 31000 30600 30800 26000 26000 26000 26000

M11 1956 26000 26000 26000 26000 26000 26000 26000 21100 18000 18000 18000

M11 1956 18000 18000 18000 18000 18000 18000 18000 21100 18000 18000 18000

M12 1956 16000 16000 16000 16000 16000 16000 16000 16000 16000 25000 25000

M12 1956 25000 25000 25000 25000 25000 25000 25000 14000 14000 14000 14000

M12 1956 14000 14000 14000 14000 14000 14000 14000 14000 14000 14000 14000

I 1959 11 12 8835638

M11 1959 25400 25000 24000 24000 22000 19700 18600 16700 17000 17600 18800 20200

M11 1959 21100 22800 23300 25000 26000 29000 38000 41400 40000 31000 40000 59700

M11 1959 59100 51200 45000 43000 46000 37000 39000

M12 1959 41000 38000 35000 32000 27400 24600 22600 21300 19800 16700 15100 13900

M12 1959 13200 12700 12400 12200 12000 11300 11000 11000 10500 9960 10100 10500

M12 1959 10800 11000 10400 9650 11200

I 1962 11 11 9563333

M11 1962 27100 28500 30600 23000 23000 23000 23000 23000 23000 23000 23000

M11 1962 23000 23000 23000 23000 23000 23000 23000 23000 23000 23000 23000

M11 1962 23000 23000 23000 23000 23000 23000 23000 23000 23000 23000 23000

I 1963 11 11 9371622

M11 1963 26000 30000 35000 32000 31000 30000 28000 25000 21000 20000 21000 21000

M11 1963 20000 20000 21700 22600 22800 24600 25900 24000 22300 21400 23300 23000

M11 1963 21600 22800 23100 21700 19300 17300 16500

DAILY REGULATION FOR SPILL  
 SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA  
 HYDROPOWER + FLOOD CONTROL AT 9000000 ACRE-FT - FORECAST

WATER REGULATED DAILY IN THE YEAR 1956  
 MONTH OF AUGUST

PAY.	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	31000.	16688.	712.	9363340.	0.	2192.
2	31000.	16688.	712.	9391727.	0.	2193.
3	31000.	16688.	713.	9420114.	0.	2194.
4	31000.	16688.	714.	9448501.	0.	2195.
5	31000.	16688.	715.	9476887.	0.	2195.
6	31000.	16688.	716.	9505274.	0.	2196.
7	30600.	16688.	717.	9532868.	0.	2197.
8	30800.	16688.	718.	9560858.	0.	2198.
9	26000.	16688.	718.	9579328.	0.	2199.
10	26000.	16688.	719.	9597797.	0.	2199.
11	26000.	16688.	719.	9616267.	0.	2200.
12	26000.	26000.	720.	9624000.	9312.	2200.
13	26000.	26000.	720.	9624000.	9312.	2200.
14	26000.	26000.	720.	9624000.	9312.	2200.
15	26000.	26000.	720.	9624000.	9312.	2200.
16	26000.	26000.	720.	9624000.	9312.	2200.
17	26000.	26000.	720.	9624000.	9312.	2200.
18	26000.	26000.	720.	9624000.	9312.	2200.
19	26000.	26000.	720.	9624000.	9312.	2200.
20	26000.	26000.	720.	9624000.	9312.	2200.
21	21100.	21100.	720.	9624000.	4412.	2200.
22	18000.	18000.	720.	9624000.	1312.	2200.
23	18000.	18000.	720.	9624000.	1312.	2200.
24	18000.	18000.	720.	9624000.	1312.	2200.
25	18000.	18000.	720.	9624000.	1312.	2200.
26	18000.	18000.	720.	9624000.	1312.	2200.
27	18000.	18000.	720.	9624000.	1312.	2200.
28	18000.	18000.	720.	9624000.	1312.	2200.
29	18000.	18000.	720.	9624000.	1312.	2200.
30	18000.	18000.	720.	9624000.	1312.	2200.
31	18000.	18000.	720.	9624000.	1312.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 26000,CFS

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	16000.	16688.	720.	9622635.	0.	2200.
2	16000.	16688.	720.	9621270.	0.	2200.
3	16000.	16688.	720.	9619905.	0.	2200.
4	16000.	16688.	720.	9618540.	0.	2200.
5	16000.	16688.	720.	9617175.	0.	2200.
6	16000.	16688.	720.	9615810.	0.	2200.
7	16000.	16688.	720.	9614445.	0.	2200.
8	16000.	16688.	720.	9613080.	0.	2200.
9	16000.	16688.	720.	9611715.	0.	2200.
10	16000.	16688.	720.	9610350.	0.	2200.
11	25000.	25000.	720.	9624000.	8312.	2200.
12	25000.	25000.	720.	9624000.	8312.	2200.
13	25000.	25000.	720.	9624000.	8312.	2200.
14	25000.	25000.	720.	9624000.	8312.	2200.
15	25000.	25000.	720.	9624000.	8312.	2200.
16	25000.	25000.	720.	9624000.	8312.	2200.
17	25000.	25000.	720.	9624000.	8312.	2200.
18	25000.	25000.	720.	9624000.	8312.	2200.
19	25000.	25000.	720.	9624000.	8312.	2200.
20	25000.	25000.	720.	9624000.	8312.	2200.
21	14000.	16688.	720.	9618668.	0.	2200.
22	14000.	16688.	720.	9613336.	0.	2200.
23	14000.	16688.	720.	9608004.	0.	2200.
24	14000.	16688.	719.	9602672.	0.	2199.
25	14000.	16688.	719.	9597340.	0.	2199.
26	14000.	16688.	719.	9592008.	0.	2199.
27	14000.	16688.	719.	9586676.	0.	2199.
28	14000.	16688.	719.	9581344.	0.	2199.
29	14000.	16688.	719.	9576013.	0.	2199.
30	14000.	16688.	718.	9570681.	0.	2198.

MAXIMUM DISCHARGE FOR THE MONTH IS 25000.CFS

D-50

WATER REGULATED DAILY IN THE YEAR 1959  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	25400.	6537.	696.	8873052.	0.	2177.
2	25000.	6526.	697.	8909694.	0.	2178.
3	24000.	6516.	699.	8944372.	0.	2179.
4	24000.	6506.	700.	8979071.	0.	2180.
5	22000.	16688.	700.	8989607.	0.	2180.
6	19700.	16688.	701.	8995580.	0.	2181.
7	18600.	16688.	701.	8999372.	0.	2181.
8	16700.	16688.	701.	8999396.	0.	2181.
9	17000.	16688.	701.	9000014.	0.	2181.
10	17600.	16688.	701.	9001823.	0.	2181.
11	18800.	16688.	701.	9006011.	0.	2181.
12	20200.	16688.	701.	9012977.	0.	2181.
13	21100.	16688.	701.	9021728.	0.	2181.
14	22800.	16688.	702.	9033850.	0.	2182.
15	23300.	16688.	702.	9046964.	0.	2182.
16	25000.	16688.	702.	9063450.	0.	2183.
17	26000.	16688.	703.	9081920.	0.	2183.
18	29000.	16688.	704.	9106340.	0.	2184.
19	38000.	16688.	705.	9148611.	0.	2185.
20	41400.	16688.	706.	9197626.	0.	2187.
21	40000.	16688.	708.	9243864.	0.	2188.
22	31000.	16688.	709.	9272251.	0.	2189.
23	40000.	16688.	710.	9318489.	0.	2191.
24	59700.	16688.	712.	9403801.	0.	2193.
25	59100.	16688.	715.	9487923.	0.	2196.
26	51200.	16688.	717.	9556376.	0.	2198.
27	45000.	16688.	719.	9612531.	0.	2200.
28	43000.	43000.	720.	9624000.	26312.	2200.
29	46000.	46000.	720.	9624000.	29312.	2200.
30	37000.	37000.	720.	9624000.	20312.	2200.
31	39000.	39000.	720.	9624000.	22312.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 46000.CFS

D-60

## MONTH OF SEPTEMBER

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	41000.	41000.	720.	9624000.	24312.	2200.
2	38000.	38000.	720.	9624000.	21312.	2200.
3	35000.	35000.	720.	9624000.	18312.	2200.
4	32000.	34000.	720.	9624000.	15312.	2200.
5	27400.	27400.	720.	9624000.	10712.	2200.
6	24600.	24600.	720.	9624000.	7912.	2200.
7	22600.	22600.	720.	9624000.	5912.	2200.
8	21300.	21300.	720.	9624000.	4612.	2200.
9	19800.	17800.	720.	9624000.	3112.	2200.
10	16700.	16700.	720.	9624000.	12.	2200.
11	15100.	16688.	720.	9620850.	0.	2200.
12	13900.	16688.	720.	9615320.	0.	2200.
13	13200.	16688.	720.	9608401.	0.	2200.
14	12700.	16688.	719.	9600490.	0.	2199.
15	12400.	16688.	719.	9591985.	0.	2199.
16	12200.	16688.	719.	9583083.	0.	2199.
17	12000.	16688.	719.	9573784.	0.	2198.
18	11300.	16688.	718.	9563097.	0.	2198.
19	11000.	16688.	718.	9551814.	0.	2198.
20	11000.	16688.	718.	9540532.	0.	2197.
21	10500.	16688.	717.	9528258.	0.	2197.
22	9960.	16688.	717.	9514913.	0.	2197.
23	10100.	16688.	716.	9501845.	0.	2196.
24	10500.	16688.	716.	9489571.	0.	2196.
25	10800.	16688.	716.	9477892.	0.	2196.
26	11000.	16688.	715.	9466610.	0.	2195.
27	10400.	16688.	715.	9454138.	0.	2195.
28	10400.	16688.	715.	9441665.	0.	2194.
29	9650.	16688.	714.	9427705.	0.	2194.
30	11200.	16688.	714.	9416820.	0.	2194.

MAXIMUM DISCHARGE FOR THE MONTH IS 41000.CFS

D-10

WATER REGULATED DAILY IN THE YEAR 1962  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	27100.	16688.	718.	9583984.	0.	2199.
2	28500.	16688.	719.	9607413.	0.	2199.
3	30600.	20600.	720.	9624000.	13912.	2200.
4	23000.	20000.	720.	9624000.	6312.	2200.
5	23000.	20000.	720.	9624000.	6312.	2200.
6	23000.	20000.	720.	9624000.	6312.	2200.
7	23000.	20000.	720.	9624000.	6312.	2200.
8	23000.	20000.	720.	9624000.	6312.	2200.
9	23000.	20000.	720.	9624000.	6312.	2200.
10	23000.	20000.	720.	9624000.	6312.	2200.
11	23000.	20000.	720.	9624000.	6312.	2200.
12	23000.	20000.	720.	9624000.	6312.	2200.
13	23000.	20000.	720.	9624000.	6312.	2200.
14	23000.	20000.	720.	9624000.	6312.	2200.
15	23000.	20000.	720.	9624000.	6312.	2200.
16	23000.	20000.	720.	9624000.	6312.	2200.
17	23000.	20000.	720.	9624000.	6312.	2200.
18	23000.	20000.	720.	9624000.	6312.	2200.
19	23000.	20000.	720.	9624000.	6312.	2200.
20	23000.	20000.	720.	9624000.	6312.	2200.
21	23000.	20000.	720.	9624000.	6312.	2200.
22	23000.	20000.	720.	9624000.	6312.	2200.
23	23000.	20000.	720.	9624000.	6312.	2200.
24	23000.	20000.	720.	9624000.	6312.	2200.
25	23000.	20000.	720.	9624000.	6312.	2200.
26	23000.	20000.	720.	9624000.	6312.	2200.
27	23000.	20000.	720.	9624000.	6312.	2200.
28	23000.	20000.	720.	9624000.	6312.	2200.
29	23000.	20000.	720.	9624000.	6312.	2200.
30	23000.	20000.	720.	9624000.	6312.	2200.
31	23000.	20000.	720.	9624000.	6312.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 30600,CFS

D-62

WATER REGULATED DAILY IN THE YEAR 1963  
MONTH OF AUGUST

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	26000.	16688.	713.	9390092.	0.	2193.
2	30000.	16688.	713.	9416495.	0.	2194.
3	35000.	16688.	714.	9452816.	0.	2195.
4	32000.	16688.	715.	9483186.	0.	2196.
5	31000.	16688.	716.	9511573.	0.	2197.
6	30000.	16688.	717.	9537976.	0.	2197.
7	28000.	16688.	718.	9560413.	0.	2198.
8	25000.	16688.	718.	9576899.	0.	2199.
9	21000.	16688.	719.	9585451.	0.	2199.
10	20000.	16688.	719.	9592020.	0.	2199.
11	21000.	16688.	719.	9600572.	0.	2199.
12	21000.	16688.	719.	9609125.	0.	2200.
13	20000.	16688.	720.	9615693.	0.	2200.
14	20000.	16688.	720.	9622262.	0.	2200.
15	21700.	21700.	720.	9624000.	5012.	2200.
16	22600.	22600.	720.	9624000.	5912.	2200.
17	22800.	22800.	720.	9624000.	6112.	2200.
18	24600.	24600.	720.	9624000.	7912.	2200.
19	25900.	25900.	720.	9624000.	9212.	2200.
20	24000.	24000.	720.	9624000.	7312.	2200.
21	22300.	22300.	720.	9624000.	5612.	2200.
22	21400.	21400.	720.	9624000.	4712.	2200.
23	23300.	23300.	720.	9624000.	6612.	2200.
24	23000.	23000.	720.	9624000.	6312.	2200.
25	21600.	21600.	720.	9624000.	4912.	2200.
26	22800.	22800.	720.	9624000.	6112.	2200.
27	23100.	23100.	720.	9624000.	6412.	2200.
28	21700.	21700.	720.	9624000.	5012.	2200.
29	19300.	19300.	720.	9624000.	2612.	2200.
30	17300.	17300.	720.	9624000.	612.	2200.
31	16500.	16688.	720.	9623627.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 25900.CFS

D-63

YEAR	MAXIMUM DISCHARGE(CFS)
1956	26000.
1959	46000.
1962	30600.
1963	25900.

**APPENDIX**

**D-5**

**100 & 500 YEAR HYDROELECTRIC,  
HYDROELECTRIC & FLOOD CONTROL - NO FORECAST**

A ACCIDENTAL FLOOD CONTROL - NO FORECAST 100 +500 YR PROJECTION  
 B 31 30 31 31 28 31 30 31 30 31 31 30  
 C 0.080 0.088 0.097 0.106 0.090 0.094 0.081 0.075 0.069 0.069 0.074 0.077  
 D 18 1810 1900 1950 2000 2050 2100 2150 2200 2210  
 E 1000000 1300000 2333000 3160000 4000000 5100000 6400000 8000000 9624000 9999999  
 H 849325 1480 9624000 9624000 0.80 3234821 2  
 I 100 10 10 9624000  
 M10 100 59300 76190 81750 77500 90140 94720 103220 97340 86550 77060 68890 62350  
 M10 100 55260 55920 58100 55920 51880 52760 55370 64640 54170 43380 39458 35860  
 M10 100 34120 40660 37390 37060 36730 36620  
 I 500 10 10 9624000  
 M10 500 64190 82480 88500 83900 97590 102540 111750 105370 93690 03420 74580 67500  
 M10 500 59830 60530 62890 60530 56170 57110 59940 69470 58650 46960 42720 38820  
 M10 500 36930 44010 40470 40120 39770 39650

## SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA

ACCIDENTAL FLOOD CONTROL - NO FORCAST 100 +500 YR PROJECTION

WATER REGULATED DAILY IN THE YEAR 100  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	59300.	59300.	720.	9624000.	41885.	2200.
2	76190.	76190.	720.	9624000.	58775.	2200.
3	81750.	81750.	720.	9624000.	64335.	2200.
4	77500.	77500.	720.	9624000.	60085.	2200.
5	90140.	90140.	720.	9624000.	72725.	2200.
6	94720.	94720.	720.	9624000.	77305.	2200.
7	103220.	103220.	720.	9624000.	85805.	2200.
8	97340.	97340.	720.	9624000.	79925.	2200.
9	86550.	86550.	720.	9624000.	69135.	2200.
10	77060.	77060.	720.	9624000.	59645.	2200.
11	68890.	68890.	720.	9624000.	51475.	2200.
12	62350.	62350.	720.	9624000.	44935.	2200.
13	55260.	55260.	720.	9624000.	37845.	2200.
14	55920.	55920.	720.	9624000.	38505.	2200.
15	58100.	58100.	720.	9624000.	40685.	2200.
16	55920.	55920.	720.	9624000.	38505.	2200.
17	51880.	51880.	720.	9624000.	34465.	2200.
18	52760.	52760.	720.	9624000.	35345.	2200.
19	55370.	55370.	720.	9624000.	37955.	2200.
20	64640.	64640.	720.	9624000.	47225.	2200.
21	54170.	54170.	720.	9624000.	36755.	2200.
22	43380.	43380.	720.	9624000.	25965.	2200.
23	39450.	39450.	720.	9624000.	22043.	2200.
24	35860.	35860.	720.	9624000.	18445.	2200.
25	34120.	34120.	720.	9624000.	16705.	2200.
26	40660.	40660.	720.	9624000.	2245.	2200.
27	37390.	37390.	720.	9624000.	19975.	2200.
28	37060.	37060.	720.	9624000.	19645.	2200.
29	36730.	36730.	720.	9624000.	19315.	2200.
30	36620.	36620.	720.	9624000.	19205.	2200.
31	0.	0.	720.	9624000.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 103220,CFS

D-67

WATER REGULATED DAILY IN THE YEAR 500  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	64190.	64190.	720.	9624000.	46775.	2200.
2	82480.	82480.	720.	9624000.	65065.	2200.
3	88500.	88500.	720.	9624000.	71085.	2200.
4	83900.	83900.	720.	9624000.	66485.	2200.
5	97590.	97590.	720.	9624000.	80175.	2200.
6	102540.	102540.	720.	9624000.	85125.	2200.
7	111750.	111750.	720.	9624000.	94335.	2200.
8	105370.	105370.	720.	9624000.	87955.	2200.
9	93690.	93690.	720.	9624000.	76275.	2200.
10	83420.	83420.	720.	9624000.	66005.	2200.
11	74580.	74580.	720.	9624000.	57165.	2200.
12	67500.	67500.	720.	9624000.	50085.	2200.
13	59830.	59830.	720.	9624000.	42415.	2200.
14	60530.	60530.	720.	9624000.	43115.	2200.
15	62890.	62890.	720.	9624000.	45475.	2200.
16	60530.	60530.	720.	9624000.	43115.	2200.
17	56170.	56170.	720.	9624000.	38755.	2200.
18	57110.	57110.	720.	9624000.	39695.	2200.
19	59940.	59940.	720.	9624000.	42525.	2200.
20	69970.	69970.	720.	9624000.	52555.	2200.
21	58650.	58650.	720.	9624000.	41235.	2200.
22	46960.	46960.	720.	9624000.	29545.	2200.
23	42720.	42720.	720.	9624000.	25305.	2200.
24	38820.	38820.	720.	9624000.	21405.	2200.
25	36930.	36930.	720.	9624000.	19515.	2200.
26	44010.	44010.	720.	9624000.	26595.	2200.
27	40470.	40470.	720.	9624000.	23055.	2200.
28	40120.	40120.	720.	9624000.	22705.	2200.
29	39770.	39770.	720.	9624000.	22355.	2200.
30	39650.	39650.	720.	9624000.	22235.	2200.
31	0.	0.	720.	9624000.	0.	2200.

MAXIMUM DISCHARGE FOR THE MONTH IS 111750,CFS

10  
D  
6  
00

100      103220.  
500      111750.

A HYDROPOWER + FLOOD CONTROL - NÜ FORECAST-100+500 YR PROJECTION  
 B 31 30 31 31 28 31 30 31 30 31 31 31 30  
 C 0.080 0.088 0.097 0.106 0.090 0.094 0.081 0.075 0.069 0.069 0.074 0.077  
 D 180 1810 1900 1950 2000 2050 2100 2150 2200 2210  
 E 1000000 13000000 23330000 31600000 40000000 51000000 64000000 80000000 96240000 9999999  
 H 813859 1480 9624000 9000000 0.80 3099743 2  
 I 100 10 10 9000000  
 M10 100 59300 76190 81750 77500 90140 94720103220 97340 86550 77060 68890 62350  
 M10 100 55260 55920 58100 55920 51880 52760 55370 64640 54170 43380 39458 35860  
 M10 100 34120 40660 37390 37060 36730 36620  
 I 500 10 10 9000000  
 M10 500 64190 82480 88500 83900 97590102540111750105370 93690 83420 74580 67500  
 M10 500 59830 60530 62890 60530 56170 57110 59940 69970 58650 46960 42720 38820  
 M10 500 36930 44010 40470 40120 39770 39650

SUSITNA RIVER AT GOLD CREEK WITH WATANA DAM DATA  
HYDROPOWER + FLOOD CONTROL - NO FORCAST-100+500 YR PROJECTION

WATER REGULATED DAILY IN THE YEAR 100  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	59300	16688.	702,	9084519.	0.	2183.
2	76190	16688.	705,	9202538.	0.	2187.
3	81750	16688.	709,	9331586.	0.	2191.
4	77500	16688.	713,	9452203.	0.	2195.
5	90140	16688.	717,	9597892.	0.	2199.
6	94720	94720.	720,	9624000.	78032.	2200.
7	103220	103220.	720,	9624000.	86532.	2200.
8	97340	97340.	720,	9624000.	80652.	2200.
9	86550	86550.	720,	9624000.	69862.	2200.
10	77060	77060.	720,	9624000.	60372.	2200.
11	68890	68890.	720,	9624000.	52202.	2200.
12	62350	62350.	720,	9624000.	45662.	2200.
13	55260	55260.	720,	9624000.	38572.	2200.
14	55920	55920.	720,	9624000.	34232.	2200.
15	58100	58100.	720,	9624000.	41412.	2200.
16	55920	55920.	720,	9624000.	39232.	2200.
17	51880	51880.	720,	9624000.	35192.	2200.
18	52760	52760.	720,	9624000.	36072.	2200.
19	55370	55370.	720,	9624000.	38682.	2200.
20	64640	64640.	720,	9624000.	47952.	2200.
21	54170	54170.	720,	9624000.	37482.	2200.
22	43380	43380.	720,	9624000.	26692.	2200.
23	39458	39458.	720,	9624000.	22770.	2200.
24	35860	35860.	720,	9624000.	19172.	2200.
25	34120	34120.	720,	9624000.	17432.	2200.
26	40660	40660.	720,	9624000.	23972.	2200.
27	37390	37390.	720,	9624000.	20702.	2200.
28	37060	37060.	720,	9624000.	20372.	2200.
29	36730	36730.	720,	9624000.	20042.	2200.
30	36620	36620.	720,	9624000.	19932.	2200.
31	0	16688.	719,	9590900.	0.	2199.

MAXIMUM DISCHARGE FOR THE MONTH IS 103220,CFS

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WATER REGULATED DAILY IN THE YEAR 500  
MONTH OF JULY

DAY	UNREGULATED DISCHARGE	REGULATED DISCHARGE	AVERAGE HEAD	END OF DAY STORAGE	DAILY SPILL	END OF DAY WATER ELEVATION
1	64190.	16688.	702.	9094218.	0.	2184.
2	82480.	16688.	706.	9224713.	0.	2188.
3	88500.	16688.	710.	9367149.	0.	2192.
4	83900.	16688.	714.	9500461.	0.	2196.
5	97590.	97590.	720.	9624000.	84902.	2200.
6	102540.	102540.	720.	9624000.	85852.	2200.
7	111750.	111750.	720.	9624000.	95062.	2200.
8	105370.	105370.	720.	9624000.	88682.	2200.
9	93690.	93690.	720.	9624000.	77002.	2200.
10	83420.	83420.	720.	9624000.	66732.	2200.
11	74580.	74580.	720.	9624000.	57892.	2200.
12	67500.	67500.	720.	9624000.	50812.	2200.
13	59830.	59830.	720.	9624000.	43142.	2200.
14	60530.	60530.	720.	9624000.	43842.	2200.
15	62890.	62890.	720.	9624000.	46202.	2200.
16	60530.	60530.	720.	9624000.	43842.	2200.
17	56170.	56170.	720.	9624000.	39482.	2200.
18	57110.	57110.	720.	9624000.	40422.	2200.
19	59940.	59940.	720.	9624000.	43252.	2200.
20	69970.	69970.	720.	9624000.	53282.	2200.
21	58650.	58650.	720.	9624000.	41962.	2200.
22	46960.	46960.	720.	9624000.	30272.	2200.
23	42720.	42720.	720.	9624000.	26032.	2200.
24	38820.	38820.	720.	9624000.	22132.	2200.
25	36930.	36930.	720.	9624000.	20242.	2200.
26	44010.	44010.	720.	9624000.	27322.	2200.
27	40470.	40470.	720.	9624000.	23782.	2200.
28	40120.	40120.	720.	9624000.	23432.	2200.
29	39770.	39770.	720.	9624000.	23082.	2200.
30	39650.	39650.	720.	9624000.	22962.	2200.
31	0.	16688.	719.	9590900.	0.	2199.

MAXIMUM DISCHARGE FOR THE MONTH IS 111750,CFS

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100 103220,  
500 111750.

D-73