REPUBLIC OF TURKEY
MINISTRY OF ENERGY AND NATURAL RESOURCES
GENERAL DIRECTORATE OF STATE HYDRAULIC WORKS

FEASIBILITY REPORT

KELKIT-KARATAS HYDROELECTRIC PROJECT

VOLUME II

MARCH 1969

GOVERNMENT OF JAPAN

REPUBLIC OF TURKEY
MINISTRY OF ENERGY AND NATURAL RESOURCES
GENERAL DIRECTORATE OF STATE HYDRAULIC WORKS

FEASIBILITY REPORT
KELKIT-KARATAS HYDROELECTRIC PROJECT

(VOLUME II)

MARCH 1969

GOVERNMENT OF JAPAN

Volume II Basic Studies and Data

CONTENTS

II 1 Hydrology

Contents

Tables

Figures

II 1 HYDROLOGY

II 1.1 Hydrological Study and Data

II 1-1-1 Runoff Gaging Stations and Meteorological Stations in the Yesilirmak Basin

There are 22 active gaging stations controlled by DSI and 16 by EIE, and 7 of them are located along the Kelkit and Yesilirmak Rivers downstream of Kale.

Of these stations, Fatıl and Kale have records covering the longest periods since they were both built in 1938

Water surface level is generally measured by staff gage once or twice a day, except at Carsamba where it is made by a Limnigraf automatic water level recorder as well as staff gage. Kale gaging station is located at the confluence of the Yesilirmak and Kelkit, and about 60km upstream, Fatli gaging station is located along the Kelkit River. The catchment area of these gaging stations is 33,900 sq.km and 10,050 sq.km respectively. There are also rather new gaging stations on the proposed dam sites, which are controlled by DSI, such as Guvercinlik which was established on October 1, 1963 for the Kilickaya dam and Ayvacık which started on December 1, 1963 for the Ayvacık dam

Monthly total precipitation and monthly mean temperature records are available for the project area. First class meteorological stations controlled by the Turkish State Meteorological Service (DMI) in the Yesilirmak basin –– Amasya, Corum, Mezifon, Samsun and Tokat –– have recorded daily precipitation, daily temperature, and daily evaporation.

Locations and observation periods of each meterological and guaging stations within and near the basin area are illustrated in Fig. II 1-1, II 1-2 and II 1-3

Other stations which provide monthly total precipitation and monthly mean temperature records are shown in Table II 1-1 – II 1-13.

II 1-1-2 Verification of Data

EIEI engineers in charge of hydrology have annually revised the rating curves to compensate for changes in river beds due to flood flow. It can be seen that the rating curves of Fatli and Kale gaging stations have been revised by repeated direct measurement with a current meter. In Fig. II 1-4 although there are not a great difference between the 1953, 1960 and 1965 curves, the cross section of the river bed at Kale have changed due to flood flow.

Daily runoff records at Fatli and Kale are available from Apr. 1, 1938 to March 31, 1967 and Oct. 1, 1938 to March 31, 1967 respectively. Hydrographs of daily runoff of these gaging station are shown in Fig. II 1-5–II 1-33. It was found that these hydrographs are similar and also that their quantitative and time-lag relations are quite reasonable. Therefore, the data of both stations can be considered reliable for our studies.

Using these data, the amount of runoff at Kilickaya from April 1960 to March 1967 was adjusted, and it was found that the monthly runoff data at Guvercinlik which is located a few kilometers upstream from Kilickaya was too large. Adjusted figures are shown in Table II 1-17 – II 1-20.

The correlation between annual runoff and annual average rainfall within the catchament area is shown in Fig. II 1-42. According to these figures, there seems to be a good correlation between rainfall and runoff.

II 1-1-3 Evaporation Loss from Reservoir Surface

Evaporation loss for a newly constructed reservoir can be estimated by deducting the evapotranspiration of original ground surface from the evaporation of reservoir water surface.

a) Evaporation

Kilickaya Reservoir is located inland, and Ayvacik Reservoir is located along the Black Sea coast downstream of the confluence of the Kelkit and Yesilirmak Rivers. Samsun and Merzifon stations are first class Turkish State Meteorological Service (DMI) meteorological stations measuring evaporation loss and having records in the annual meteorological bulletin on areas located in and around the project area.

Samsun and Merzifon are the only stations which have reliable evaporation records. Although evaporation data from Corum, Amasya and Carsamba stations for January 1962 to December 1967 are supplied by the Meteorological Section of DSI, they cannot be used because they are about 30% incomplete for each year.

DMI data from 1950 to 1965, are shown in Table II 1-15–II 1-16 but there are no records prior to 1960 for the Merzifon station. The missing Merzifon evaporation data was estimated according to temperature data at the same site.

For estimation of evaporation loss from proposed reservoir surface, monthly maximum evaporation data from a pan covering a period of five years (1961 – 1965) which is common to both Merzifon and Samsun stations was employed, and 70% of the evaporation value was used.

The result of these studies is shown in Table II 1-15–16.b

b) Evapotranspiration

The Blaney Criddle Formula is used for estimation of evapotranspiration. In this formula, crop coefficient "K" should be calculated on the basis of tests made of the crops or vegetation covering the proposed reservoir. In this study, a coefficient of 0.65, which is generally applied to a region covėred with trees and bushes, was used.

As for the mean temperature, the average value of Erbaa and Tokat (value adjusted according to the difference of elevation between Tokat and Susehir) was used, and the monthly precipitation of Erbaa and Susehir was used.

The results of calculation are shown in Table II 1-14.

II 1.2 Flood Discharge at Kilickaya

The spillway flood discharge at Kilickaya dam site was assessed by employing the following five methods.

1. Historical flood values
2. Enveloped curve flood in Turkey
3. Design flood curve in Turkey
4. Statistical method
5. Physical method

II 1-2-1 Historical Flood Values

At Fatli Gaging Station on the Kelkit River, the two biggest floods ever recorded were in 1940 and 1952.

(1) 1940

Peak discharge	April 27, 1940	802 cms (640)
Daily maximum discharge	April 27, 1940	772 cms (620)
Total discharge	March–June, 1940	2.506 million cu.m. (2,000)
Annual total discharge	Oct. 1939–Sept. 1940	3,091 million cu.m. (2,470)

(2) 1952

Peak discharge	April 4, 1952	700 cms (560)
Daily maximum discharge	April 4, 1952	680 cms (546)
Total discharge	March–June 1940	1,981 million cu.m. (1,580)
Annual total discharge	Oct. 1951–Sept. 1952	2,686 million cu.m. (2,150)

Note: The figures in parenthesis indicate values at Kilickaya obtained by multiplying the first number stated by 0.80 which is the ratio of the catchment area at Fatli to that of Kilickaya.

According to the above, the maximum peak discharge ever recorded at Kilickaya is estimated to be 640 cms.

II 1-2-2 Enveloped Curve Flood in Turkey

An enveloped curve of the maximum peak discharge was developed based on the maximum peak discharge records at many gaging stations on many rivers in Turkey from 1952 through 1967, as shown in Fig. II 1-34. From this enveloped curve, the maximum flood flow at Kilickaya which has a catchment area of about 8,202 sq.km is estimated to be about 3,000 cms.

II 1-2-3 Design Flood Curve in Turkey

The correlation between design flood discharge and catchment area in Turkey based on. design flood discharge for spillways of 18 dams which already have been constructed or are under construction is shown in Fig. II 1-35 and Table 1-21. In this figure, the solid line (——) indicates the average of all points and the dotted line (- - - -) indicates the value near the project site. From both lines in this figure the maximum design flood flow at Kilickaya which has a catchment area of about 8,202 sq.km is estimated to be 2,200 to 3,700 c.m.s.

II 1-2-4 Statistical Method

The probability calculation was made based on flood records of Fatli Gaging Station from 1939 through 1967, employing Gumbel's Method.

The daily maximum discharge records and the frequency curve of Fatli are shown in Fig. II 1-35, and the correlation between the daily maximum discharge and peak discharge, which was obtained from data at Fatli, is shown in Fig. II 1-36.

The daily maximum discharge frequency at Fatli obtained from Fig. II 1-36 could be converted into the peak discharge at Fatli utilizing Fig. II 1-37, and the peak discharge frequency also could be converted into that at Kilickaya with the ratio of the catchment area. The flood discharge frequency calculated according to the above are as follows.

Frequency	Daily maximum discharge at Fatli (a)	Peak discharge Fatli	Kilickaya
Year	cms	cms	cms
5	630	660	530
10	700	740	590
20	780	820	660
50	880	930	740
100	950	1,000	800
200	1,020	1,070	860
1,000	1,200	1,310	1,050
2,000	1,320	1,390	1,120
5,000	1,400	1,470	1,200
10,000	1,500	1,580	1,300

Note: (a) = See Fig. II 1-36
(b) = (a) x 1.05 (See Fig. II 1-37)
(c) = (b) x 0.80

The total discharge frequency in the stormy season (March–June) was studied as shown in Fig. II 1-38, and the correlation between the total discharge and the peak discharge mentioned above is shown in Fig. II 1-39. The peak discharge frequency at Kilickaya, swich was obtained on the basis of the total discharge frequency at Fatli employing the upper limit line in Fig. II 1-39, is as follows.

Frequency year	Total discharge at Fatli(a) million cu.m	Daily max. discharge at Fatli (b) cms	Peak discharge Fatli cms	Peak discharge Kilickaya cms
5	2,200	920	970	780
10	2,500	1,020	1,070	860
20	2,800	1,120	1,180	940
50	3,180	1,260	1,320	1,060
100	3,480	1,360	1,430	1,140
200	3,730	1,440	1,510	1,210
1,000	4,400	1,680	1,800	1,400
2,000	4,680	1,780	1,870	1,500
5,000	4,990	1,880	1,970	1,580
10,000	5,350	2,000	2,100	1,700

Note: (a) = See Fig. II 1-38
(b) = See Fig. II 1-39
(c) = (b) x 1.05
(d) = (c) x 0.80

The method for statistically estimating the probable maximum precipitation on proposed by David M. Hershfield, a meteorologist with the Hydro Service Div., U.S. Weather Bureau, was applied in Kilickaya Project.

According to this method the PMP is defined as the largest precipitation that will probably occur at the same time for a finite length of time "t", and this PMP can be estimated on the basis of mean and standard deviation by choosing an appropriate number "k", the standardized variance in the equation

$$Xt = X_N + K.SN$$

where Xt is the precipitation for return period t in years. This equation is applicable when a particular extreme-valued distribution is used. The terms X_N and S_N are the mean and standard deviation respectively for a series of N annual maximum;

At the point Xm, Km = K,and this calculation was based on 2,645 daily rainfall records in the U. S. A. The distribution of Km is shown in Fig. II 1-40. According to the figure, at the point 3.3 of Km (2,000 yrs. frequency), 50% of Km is included, and the maximum Km is 15. Since the probability that exceeds 10,000 years has practically no meaning, for the estimation of PMP in the Kilickaya Project, when K = 3.62 (10,000 years frequency), the PMP in March is estimated to be 267 mm.

The probable maximum peak flood flow calculated on the basis of the PMP, employing the unit-hydrograph in Fig. II 1-41, is 4,400 c.m.s., and the flood volume is about 2,800 million cu. m. as shown in Table II 1-22.

II 1-2-5 Physical Method

The maximum prbable flood at Kilickaya would result from the maximum probable rainfall flood in combination with the maximum probable simultaneous snowmelt flood. Therefore, the factors contributing to the probable maximum rainfall of snowmelt should be studied to physically estimate the flood flow.

In the study of maximum probable flood, it is customary to maximize the record storm by determining the precipitable water during a storm and the maximum precipitable water for the time of occurence. The rainfall increments are then increased in direct ratio of the maximum to the actual precipitable water.

It also is customary to consider dewpoint (or air temperature) and wind speed as factors which contribute to the generation of a flood.

Dewpoint is the determination of precipitable water, which is the maximum amount of moisture that can be retained in a vertical column of air, and which has been found by reliable research observations to vary almost directly with surface dewpoint (or air temperature). For the estimation of precipitable water it is convenient to use the diagrams and tables prepared by the U.S. Weather Bureau.

Wind factor is the measurement of the time required to replace moisture that has been precipitated from the air with a new moisture supply. The product of precipitable water in the atmosphere and wind speed in defined as "Moisture Inflow Index". Ordinarily, in the study of depressive storms such as the monsoon, a maximum persisting 12-hour dewpoint and a maximum 24-hour average wind speed are used. Furthermore, in the study of such storms as the typhoon, a maximum persisting dewpoint for the hours during the typhoon and a maximum average wind speed for twice the hours before the typhoon are used.

Regarding wind speed, upper troposphere wind should be considered in addition to ground wind speed.

For the Kilickaya Project, the above data exists, although it would be advisable to have more.

Basic to the snowmelt runoff calculation is the determination of the melt rate factor, the runoff resulting from a given temperature factor. The temperature factor which best correlates with runoff is the weighted degree day. The melt rate factor will be calculated by analysis of records of floods which resulted primarily from snowmelt. The second way to analyze snowmelt is the estimation of the elevation covered by snow.

For the Kilickaya Project, there is not enough of the abovementioned data, however a melt rate factor of 3–5 mm/degree-day and a snow-line of about 1,500 m above M.S.L. may be applied in this project area, according to the hydrological survey of the Tigris River in Iraq and the results of investigation in the field.

The first step in flood studies is to analyze the correlation between annual precipitation in the basin and annual runoff.

Fig. II 1-42 shows the correlation between the annual runoff at Fatli and the average annual precipitation in the basin. The average annual precipitation in the basin was obtained on the basis of precipitation data at Kelkit, Susehri, Tokat. The application ratios of the these observatories, which were calculated by the Thiessen Method, are as below.

Kelkit : 0.46
Susehri : 0.54

For the years for which no data are available of Kelkit and Susehri the ratio for Tokat which is 1.00 were applied for the whole basin.

According to Fig. II 1-42, the correlation between annual runoff at Fatli and annual precipitation in the basin is good. This means that runoff is mainly caused by precipitation.

The correlation between precipitation and runoff in the stormy season (March - June) was studied with the same precedures and the result was good as shown in Fig. II 1-43. It was considered from this that the runoff in the stormy season is primarily caused by precipitation.

Base flow was separated in every year by approximating the ground water recession in July and August, extending it backward to the point of peak discharge and then connecting the resultant base flow peak with the first point on the flood hydrograph. The estimated base flow varied from about 40mm to 90mm. Therefore, the base flow which has increased in direct ratio of the maximum to the actual snowmelt perhaps can be adopted as the base flow for the probable maximum flood flow. Surface flow can be defined as total discharge minus base flow, and loss water is surface flow subtracted from precipitation.

The correlation between loss water and precipitation in the stormy season is very good as shown in Fig. II 1-44, and the runoff coefficient varied from 20% to 80%.

The flood flows in 1952 and 1967 were selected as models for study of the maximum probable flood. The flood flow in 1952 was recorded as the second maximum peak discharge in the period for which flood data exist.

The procedure of deriving the probable maximum flood based on the 1952 and 1967 flood flow records is shown in Table II 1-23. In this table, the probable maximum surface daily peak flow was obtained by multiplying total runoff (10) by 18% which is the ratio of peak flow to surface flow derived from the hydrograph shown in Fig. II 1-45. The unit-hydrograph was estimated from 5 past flood hydrographs at Fatli. The recession curve of the unit-hydrograph was made on the basis of a recession curve which was prepared from 7 examples as shown in Fig. II 1-46.

Since the duration from beginning to peak of a unit-hydrograph is 6 days, a precipitation period for about 6 days should be applied in the design flood hydrograph; however, in view of safety and taking into consideration that data is inadequate and referring to the daily precipitation distribution as shown in Fig. II 1-47 and II 1-48, it was decided to apply a precipitation period for one month in March and April. The storm period should usually be used for snowmelt estimations. In this calculation for estimating the maximizing factor of base flow, it was assumed that a maximum temperature in March and April could be applied as the representation in a flood.

The temperature records at Tokat (EL. = 650m) were used for the calculation of a weighted degree day. The temperature at Tokat were converted into values at a weighted average location of about 1,900m over the snow-covered portion of the drainage area (1,500m–2,500m, about 8,000km^2). A lapse rate of 0.6°C per 100 meters of increase in elevation was used to convert the temperature.

A melt factor of 4mm/degree a day for recorded storms and 5mm/degree a day for a probable maximum storm were used.

From the result of the above studies, it was estimated that the probable maximum peak and flood volume are as below.

Probable maximum peak flood: 4,000 cms.
Probable maximum flood volume: 2,100 million cu.m.

II 1-2-6 Summary of the Results

The results are summarized as follows.

	Method	Peak Flood (c. m. s.)	Flood Volume (million cu.m)
(1)	Historical flood value Max. recorded flood (1940)	640	2,000
(2)	Enveloped curve in Turkey	3,000	Not determined
(3)	Design flood curve in Turkey	3,700	
(4)	Statistical method (10,000 year return period)		
	(Based on daily peak discharge)	1,300	-
	(Based on total volume)	1,700	5,350
	(Based on PMP derived from XN, SN)	4,400	2,800
(5)	Physical method	4,000	2,100

Note: Figures in parenthesis show the total discharge volume in the stormy season (March – June).

Estimates (3), (4) and (5) are considered to coincide with each other.

Therefore, the flood to be used for the spillway design study, was decided to be 4,000 c.m.s at peak discharge and 2,100 million cu.m. at volume, adopting the physical method. The design flood hydrograph is shown in Fig. II 1-49.

Table II 1-1

CARSAMBA STATION ____ CATCHMENT AREA ____ sq km Precipitation

____ RIVER, IN THE BASIN OF 35 ELEVATION ____ m UNIT ____ S. ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	87.2	49.7	126.8	47.9	63.9	33.9	18.2	74.2	32.8	75.8	194.4	64.4	869.2
1945	21.3	98.7	70.5	85.3	12.5	61.7	18.7	11.2	51.9	81.4	41.1	74.5	628.8
1946	98.4	125.6	133.0	22.5	45.5	92.8	75.9	88.3	145.6	163.8	11.0	55.6	1,058.0
1947	166.5	57.5	78.4	21.9	30.4	23.5	16.1	3.3	71.2	88.5	208.0	16.4	781.7
1948	13.2	177.3	141.7	67.1	31.0	125.7	95.8	9.0	85.4	192.9	153.9	118.1	1,211.1
1949	106.5	72.1	44.5	141.3	19.7	55.8	31.3	15.9	73.7	88.8	26.5	117.6	793.7
1950	192.0	117.8	82.7	5.0	47.6	85.3	37.6	49.5	18.0	58.8	95 0	21.0	810.3
1951	85.8	43.9	69.3	61.9	95.9	25.8	104.9	101.4	409.5	84.4	96.8	106.8	1,286.4
1952	107.7	109.3	135.6	48.9	58.4	56.6	18.4	23.8	61.1	41.5	52.0	36.1	749.4
1953	79.8	101.6	146.1	19.8	67.5	100.4	1.4	31.7	91.0	346.3	273.6	106.6	1,365.8
1954	169.7	64.3	55.7	76.9	33.5	50.8	35.8	5.8	12.0	72.6	136.4	173.2	887.7
1955	56.6	66.0	138.7	93.0	35.6	2.4	10.1	80.3	106.2	18.7	167.7	112.5	887.8
1956	72.5	132 8	120.2	46.8	53.6	37.8	17.1	0.3	49.2	51.4	107.0	119.3	808.0
1957	79.8	55.1	100.2	30.3	61.3	16.5	0.5	0.0	43.6	59.2	64.3	90.8	601.6
1958	169.6	53.9	128.1	44.9	17.7	40.5	69.1	19.6	129.7	73.9	77.7	131.7	956.4
1959	84.6	191.4	121.6	53.6	54.8	23.3	49.9	72.5	136.0	75.1	65.1	30.0	957.9
1960	115.8	111.3	44.5	61.7	37.1	65.4	15.2	222.0	29.1	25.2	95.9	24.7	847.9
1961	124.6	133.8	131.3	20.2	57.9	36.9	19.8	15.1	197.8	61.9	102.3	140.8	1,042.4
1962	123.1	155.6	65.5	43.0	24.3	24.5	22.3	17.8	21.2	149.0	6.9	240 8	894.0
1963	159.8	43.0	124.0	115.0	34.0	26.1	88.6	0.0	81.7	138.6	37.3	163.8	1,011.9
1964	64 0	58.5	65.3	46.5	42.5	20.7	36.1	63.4	60.6	35.6	126.8	50.6	670.6
1965	60.4	114.2	70.0	72.1	50.2	37.2	38.2	28.2	47.7	148.0	107.1	100.2	873.5
1966	97.6	18.9	101.2	51.2	109.1	18.0	106.2	70.7	88.8	11.4	37.3	267.8	978.2
1967	203.8	109.7	106.3	83.9	73.7	85.1	48.3	15.2	57.4	107.3	249.2	118.6	1,258.5
Total	2,540.3	2,262.0	2,401.2	1,360.7	1,157.7	1,146.7	976.5	1,019.2	2,101.2	2,250.1	2,533.3	2,481.9	22,230.8
Ave.	105.8	94.2	100.0	56.7	48.2	47 8	40.7	42.5	87.5	93.8	105 6	103.4	926.2
	Driest five years (1945, 1947, 1952, 1957, 1964)												
Total	439.3	379.1	450.0	232.9	205.1	179.0	89.8	101.7	288.4	306.2	492.2	268.4	3,432.1
Ave.	87.9	75.8	90.0	46.6	41.0	35.8	18.0	20.3	57.7	61.2	98.4	53.7	686.4

Table II 1-2

Çarşamba STATION ____ CATCHMENT AREA ____ sq km Temperature

____ RIVER, IN THE BASIN OF 35 ELEVATION ____ m UNIT ____ S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	* 6.1	* 9.6	*11.7	*15.1	*16.5	*21.4	*23.6	*21.5	*20.4	*19.5	*13.1	* 9.6	15.7
1945	* 7.6	* 5.5	* 8.2	*13.3	*20.0	*19.9	*22.8	*24.3	*20.9	*15.9	*12.2	* 6.8	14.8
1946	* 6.5	* 8.8	*10.3	*15.6	*19.0	*21 8	*23.2	*23.8	*21.9	*15.0	*14.9	*10.0	15.9
1947	* 4.7	* 9.3	*14.7	*16.2	*19.8	*23.3	*24.4	*23.1	*19.8	*15.6	*13.5	*11.3	16.3
1948	*11.3	* 8.3	* 7.1	*14.6	*19.7	*22.5	*24.1	*24.6	*19.9	*16.7	*10.1	* 5.3	15.3
1949	* 5.1	* 3.7	* 9.2	*11.9	*20.5	*22.7	*23.6	*22.9	*19.5	*16.7	*13.7	* 9.8	14.9
1950	* 3.3	* 4.7	*10.6	*19.6	*19.9	*21.5	*23.5	*22.8	*23.1	*16.0	*12.5	* 8.8	15.5
1951	* 8.4	* 9.7	*13.9	*17.3	*20.2	*22.0	*24 4	*25.1	*21.6	*13.7	*13.3	* 5.2	16.2
1952	* 7.7	* 9.0	*11.0	*15.3	*17.7	*20.5	*23.5	*25.2	*23.8	*19.4	*13 3	*11.4	16.5
1953	* 9.5	* 8.8	* 6.9	*15.0	*18.6	*22.4	*23.9	*24.2	*20.3	*17.0	* 8.9	* 2.7	14.8
1954	* 3.3	* 5.7	*11.6	*13.1	*20.3	*23.1	*25.4	*25.6	*22.0	*18.4	*14.2	*10.0	16.1
1955	* 9.0	*11.7	*11.2	*13.6	*19.1	*22.5	*24.0	*22.7	*21.1	*19.9	*12.9	* 8.5	16.4
1956	* 8.0	* 6.7	* 7.0	*16.1	*16.6	*21.2	*22.4	*24.1	*18.5	*15.8	*10.6	* 6.4	14.4
1957	* 4.2	* 9.6	*10.1	*15.7	*18.7	*22.3	*25.1	*25.4	*22.9	*17.6	*12 3	* 9.3	16.1
1958	* 8.5	*10.9	*11.7	*15.4	*20.7	*22.5	*23.4	*24.3	*19.6	*16.1	*12.0	* 8.8	16.2
1959	* 9.2	* 4.7	* 9.5	*15.0	*19.0	*20.9	*24.9	*23.8	*18.7	*13.9	*12.1	*10.1	15.1
1960	* 7.6	* 6.2	*10.1	*15.0	*19.7	*21.4	*24.0	*23.1	*20.0	*18.8	*14.1	*10.1	15.8
1961	* 5.5	* 7.3	* 9.6	*16.7	*19.6	*22.1	*23.7	*23.8	*18.7	*16.7	*13.4	*10.1	15.6
1962	* 7.4	* 8.4	*13.9	*15.1	*19.7	*22.2	*24.8	*25.2	*21.9	*17.6	*15.1	*10.1	16.8
1963	* 8.0	*10.2	* 9.5	*14.4	*18.4	*21.9	*24.6	*24.7	*21.8	*17.6	*12.2	* 8.7	16.0
1964	* 3.5	* 6.6	*11.9	*14.2	*17.8	*22.1	*23.7	*22.8	*19.7	*17.9	*11.7	* 9.6	15.1
1965	8.4	6.9	9.1	11.6	17.3	22.3	23.8	23.2	20.9	14.0	13.9	11.4	15.2
1966	10.1	11.7	11.0	14.3	16.8	20.7	24.6	24.7	19.4	19.6	16.4	11.3	16.7
1967	7.3	4.4	7.0	11.5	16.7	19.1	22.6	23 2	19.4	16.9	12.6	10.6	14.3
Total	170.2	188.4	246.8	355.6	452.3	522.3	574.0	574.1	495.8	406.3	309.0	216.0	4,510.8
Ave.	7.1	7.8	10.3	14.8	18.8	21.8	23.9	23.9	20.7	16.9	12.9	9.0	15.7
	Driest five years (1945, 1947, 1952, 1957, 1964)												
Total(5)	27.7	40.0	55.9	74.7	94.0	108.1	119.5	120.8	107.1	86.4	63.0	48.4	945.6
Ave.(5)	5.5	8.0	11.2	14.9	18.8	21.5	23.9	24.2	21.4	17.3	12.6	9.7	15.8

* indicates value estimated in correlation with MERZIFON data

Table II 1-3

ÇORUM STATION ______ CATCHMENT AREA ______ sq km Precipitation

______ RIVER, IN THE BASIN OF 798 ELEVATION ______ m UNIT ______ S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	55.1	33.8	81.1	27.5	44.9	42.4	17.3	0.7	2.0	6.3	45.5	26.2	382.8
1945	54.0	13.7	25.0	32.3	10.6	89.5	32.3	8.2	29.9	21.2	39.4	57.1	413.2
1946	10.2	43.8	71.1	65.8	51.1	39.4	64.1	8.9	0.0	54.3	17.0	58.7	484.4
1947	53.9	48 1	33.6	5.9	63.5	34.5	21.1	1.3	33.2	11.6	67.3	45.9	419.9
1948	47.4	58.9	43.2	27.2	109.9	82.1	2.2	1.0	24.8	54.7	6.9	5.3	463.6
1949	31.2	27.5	33.1	50.7	85.7	41.4	7.9	0.0	33.3	9.6	14.7	38.4	373.5
1950	48.4	40.9	54.3	35.2	106.9	51.1	16.0	1.7	0.8	22.1	11.6	17.2	406.2
1951	12.4	13.4	81.7	27.0	97.2	39.1	26.4	3.0	5.1	32.3	41.4	34.0	413.0
1952	47.7	35.4	44.6	16.6	85.9	42.4	10.3	0.2	4.7	9.3	44.5	8.4	350.0
1953	43.5	44.3	41.1	57.4	58.3	28.5	4.4	1.7	4.8	52.1	8.3	21.3	365.7
1954	74.0	40.8	23.4	37.7	18.7	33.2	6.1	23.5	5.0	4.9	19.6	48.6	335.5
1955	19.7	18.6	22.2	51.7	44.1	0.8	40.7	20.1	15.9	33.8	38.3	28.7	334.6
1956	29.8	65.4	33.5	21.4	57.5	27.8	12.4	3.3	6.9	13.7	17.5	38.8	328.0
1957	9.7	24.3	22.1	29.6	82.6	7.9	0.1	0.0	56 2	8.0	12.8	27.2	280.5
1958	44.4	12.6	87.5	50.2	65.3	91.5	10.6	7.9	21.3	19.9	5.1	48.4	464.7
1959	83.2	18.3	25.5	58.9	72.0	40.8	37.1	10.5	20.2	19.8	11.2	51.8	449.3
1960	29.6	38.3	50.0	44.4	51.8	49.6	12.1	10.3	4.2	11.3	35.7	23.7	361.0
1961	39.7	55.9	34.0	34.1	55 5	103.1	25.8	2.6	24.7	13.0	14.1	78.8	481.3
1962	48.3	49.6	35.2	39.5	34.4	13.1	6.8	0.2	16.6	38.1	11.0	127.7	420.5
1963	58.0	36.8	36.0	40.0	47.9	15.8	6.3	3.4	25.1	34.2	16.9	43.6	364.0
1964	4.3	46.4	40.8	15.5	59.5	63.7	11.5	2.2	22.3	0.4	35.6	23.0	325.2
1965	25.9	53.7	43.4	20.9	61.1	50.9	19.3	18.3	0.0	17.1	69.5	45.1	425.2
1966	88.9	6.1	37.7	64.2	45.6	19.6	8.6	8.6	12.6	0.1	15.4	58.1	365.5
1967	24.9	21.6	69.1	74.4	100.5	110.5	0.8	0.8	18.2	17,1	64.2	37.9	540.0
Total	984.2	848.2	1,069.2	928.1	1,510.5	1,118.7	400.2	138.4	387.8	504.9	663.5	993.9	9,547.6
Ave.	41.0	35.3	44.5	38.7	62.9	46.6	16.7	5.8	16.2	21.0	27.6	41.4	397.7
Driest five years (1954, 1955, 1956, 1957, 1964)													
Total	137.5	195.5	142.0	155.9	262.4	133.4	70.8	49.1	106.3	60.8	123.8	166.3	1,603.8
Ave.	27.5	39.1	28.4	31.2	52.5	26.7	14.2	9.8	21.3	12.2	24.8	33.3	321.0

Table II 1-4

ÇORUM STATION ______ CATCHMENT AREA ______ sq km Temperature

______ RIVER, IN THE BASIN OF 798 ELEVATION ______ m UNIT ______ S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	-0.9	4.0	6.4	10.6	13.4	19.1	21.3	19.1	17.0	15.0	7.3	3.6	11.3
1945	0.7	-1.3	1.9	8.7	17.1	17.0	20.4	21.9	16.2	11.6	6.6	-3.0	10.0
1946	0.0	2.5	4.6	11.1	15.6	18.9	20.8	21.0	18.3	9.4	9.2	3.1	11.2
1947	-3.0	1.9	8.8	11.3	16.3	20.4	21.9	20.2	16.0	10.2	7.8	4.6	11.4
1948	4.4	1.8	0.6	9.3	15.0	18.9	21.5	22.0	16.2	10.8	2.6	-1.8	10.1
1949	-3.4	-4.5	1.5	6.8	16.3	19.1	20.1	19.2	14.9	11.2	8.3	3.9	9.5
1950	-6.4	-5.2	4.3	14.9	15.4	17.5	20.1	19.6	20.0	10.5	6.1	2.7	10.0
1951	1.7	2.9	8.3	12.3	15.7	18.4	21.6	22.0	18.0	8.3	6.8	-2.4	11.0
1952	0.7	2.2	4.3	11.0	13.4	16.8	20.0	22.5	20.4	14.3	7.4	5.1	11.5
1953	2.9	2.2	-1.3	10.0	14.4	19.2	21.2	21.7	16.2	12.3	3.2	-4.1	9.8
1954	-4.4	-2.8	4.9	8.0	16.2	20.3	23.4	23.0	17.9	13.8	8.5	3.4	11.0
1955	2.7	6.1	6.5	9.6	15.[illegible]	20.8	22.4	20.7	17.9	14.9	7.2	2.4	12.2
1956	1.4	0.1	1.1	11.3	12.9	18.7	20.6	21.9	14.5	10.3	4.3	-0.8	9.7
1957	-3.7	3.1	4.8	11.8	14.8	19.8	23.1	23.3	20.1	12.8	6.4	2.8	11.6
1958	1.5	4.7	6.2	10.6	16.3	18.9	20.5	21.7	15.4	11.1	5.7	2.2	11.2
1959	2.7	-3.5	4.0	10.4	14.8	17.3	21.8	20.5	13.8	8.6	5.9	3.8	10.0
1960	1.8	-2.4	4.4	10.2	16.0	18.0	21.3	20.2	16.4	13.9	8.6	3.7	11.0
1961	-1.5	0.9	3.6	12.1	15.9	18.7	20.9	20.7	14.3	11.8	7.7	3.7	10.7
1962	1.1	1.9	7.8	9.9	16.3	19.0	22.3	22.5	18.1	12.8	9.6	4.1	12.1
1963	1.6	4.1	3.4	9.7	14.1	18.4	21.2	21.6	17.8	12.8	6.8	2.4	11.1
1964	-4.1	0.0	6.4	9.4	14.0	18.6	20.5	19.7	16.0	12.5	6.5	8.9	10.3
1965	1.1	-1.0	6.6	9.8	14.7	19.5	20.8	20.8	17.7	8.8	6.5	4.2	10.8
1966	2.6	5.6	6.6	12.1	14.3	18.5	22.6	27.0	16.5	14.5	10.8	3.6	12.9
1967	-1.1	-4.5	3.6	9.4	14.9	17.0	19.6	20.5	16.4	12.8	5.8	3.5	9.8
Total	-1.6	18.8	109.3	250.3	363.3	448.8	509.9	513.3	406.0	285.0	165.6	54.6	(3,123.3) 260.2
Ave.	-0.1	0.8	4.6	10.4	15.1	18.7	21.2	21.4	16.9	11.9	6.9	2.3	10.8
Driest five years (1954, 1955, 1956, 1957, 1964)													
Total	-8.1	6.5	23.7	50.1	73.4	98.2	110.0	108.6	86.4	64.3	32.9	11.7	54.8(657.7)
Ave.	-1.6	1.3	4.7	10.0	14.7	19.6	22.0	21.7	17.3	12.9	6.6	2.3	11.0

Table II 1-5

ERBAA STATION CATCHMENT AREA sq km Precipitation

RIVER, IN THE BASIN OF 230 ELEVATION m UNIT S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	67.7	33.3	65.8	51.2	48.2	33.7	21.9	3.2	14.1	26.0	55.8	7.6	428.5
1945	26.6	41.0	44.8	30.6	21.6	52.2	16.0	8.8	37.7	3.5	14.7	32.6	330.1
1946	19.2	47.4	64.3	27.2	50.8	50.7	87.1	17.8	5.0	51.5	4.1	13.1	438.2
1947	* 133.4	*16.1	*33.5	*13.7	*23.6	*7.8	*1.9	*19.8	*31.8	*36.2	*44.3	*29.1	391.2
1948	* 24.2	*106.4	*79.3	*24.9	*31.2	*80.5	*7 2	* 3.6	*25.5	*42.2	*40.9	*26.7	492.6
1949	* 58.3	* 45.6	*36.5	*59.5	*35.8	*30.2	*9.4	* 3.3	*29.2	*20.2	*16.0	*72 6	416.6
1950	* 107.3	* 56 5	*66.0	*16.5	*61.2	* 9.4	*8.3	* 6.8	* 1.9	*36.3	*21.7	*15.6	407.5
1951	* 25.5	* 39.7	*68.4	*32.4	*57.4	*56.4	*2.4	*13.0	*32.9	*49.6	*35.8	*109.8	523.3
1952	* 42.1	* 61.4	*91.5	*46.1	*61.4	*19.7	*1.9	*11.1	*11.4	*26.9	*43.8	*26.6	443.9
1953	* 36.0	* 76.9	*59.0	*40.9	*39.9	*19.7	*14.8	*10.3	*33.9	*47.1	*94.4	*27.2	500.1
1954	* 101.3	* 31.8	*48.3	*44.3	*49.5	*52.7	*19.1	*24.5	*18.7	*21.0	*23.4	*88.1	522.7
1955	* 24.0	* 28.0	*61.2	*64.5	*29.6	* 1.9	*15.8	*11.2	*13.2	*13.0	*47.1	*30.1	339.6
1956	47.2	90.3	42.7	7.2	33.4	16.4	26.2	4.8	46.4	8.1	29.6	44.6	396.9
1957	27.7	26.1	56.2	18.7	70.8	25.5	0.2	0.0	17.5	5.9	9.6	45.4	303.6
1958	104.1	34.2	109.9	64.2	45.4	39.1	30.0	8.5	7.0	9.8	10.8	49.0	512.0
1959	23.2	76.4	48.0	67 5	48.6	37.8	2.9	13.2	34.3	34.0	14.7	17.9	418.5
1960	63.2	49.5	33.2	90.6	46 9	60.9	6.6	33.9	15.8	10.9	44.1	16.1	471.7
1961	81.6	34.2	58.2	34.2	45.5	57.0	10.9	0.3	36.7	3.2	35.6	73.7	471.1
1962	65.7	62.7	40.6	27.1	46.8	23.0	0.2	0.7	9.0	39.5	6.3	74.1	395.7
1963	104.9	23.0	68.4	65.6	54.6	37.1	8.3	12.7	30.1	72.1	26.3	32.9	536.0
1964	9.3	36.5	37.7	38.7	58.1	25.2	4.4	1.9	12.5	4.5	53.6	27.8	310.2
1965	27.8	68.3	49.5	45.3	50.1	71.6	15.3	11.2	5.5	34.2	55.2	83.4	517.4
1966	58.3	8.4	51 4	56.7	48.0	43.4	68.3	35.3	2.2	3.0	37.8	101.4	514.2
1967	94.7	46.3	98.6	56.3	75.1	95.1	0.0	0.3	27.0	31.1	91.2	58.8	674.5
Total	1,373.3	1,140.0	1,413.0	1,023.9	1,133.5	947.0	379.1	256.2	499.3	629.8	856.8	1,104.2	10,756.1
Ave.	57.2	47.5	58.9	42.7	47.2	39.5	15.8	10.7	20.8	26.2	35.7	46.0	448.2
	Driest five years (1945, 1947, 1955, 1957, 1964)												
Total	221.0	147.7	233.4	166.2	203.7	112.6	38.3	41.7	112.7	63.1	169.3	165.0	1,674.7
Ave.	44.2	29.5	46.7	33.2	40.7	22.5	7.7	8.3	22.5	12.6	33.9	33.0	334.8

* indicates value estimated in correlation with NIKSAR data

Table II 1-6

ERBAA STATION CATCHMENT AREA sq km Temperature

RIVER, IN THE BASIN OF 230 ELEVATION m UNIT mm S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	* 3.8	* 7.9	*10.3	*14.1	*12.3	*21.3	*23.8	*21.4	*20.1	*19.1	*11.8	* 7.9	14.5
1945	* 5.5	* 3.1	* 6.2	*12.0	*19.7	*19.6	*22.8	*24.6	*20.6	*15.0	*10.7	* 4.7	13.7
1946	* 4.3	* 6.9	* 8.6	*14.7	*18.5	*21.7	*23.3	*24.0	*21.8	*13.9	*13.8	* 8.2	15.0
1947	* 2.3	* 7.5	*13.6	*15.3	*19.4	*23.4	*24.7	*23.2	*19.4	*14.7	*12.3	* 9.8	15.5
1948	* 9.8	* 6.3	* 5.0	*13.5	*19.3	*22.6	*24.3	*24.9	*19.6	*15.9	* 8.4	* 3.0	14.4
1949	* 2.7	* 1.1	* 7.4	*10.4	*20.2	*22.7	*23.7	*22.9	*19.1	*15.9	*12.5	* 8.0	13.9
1950	* 0.6	* 2.2	* 8.9	*19.2	*19.6	*21.4	*23.6	*22.8	*23.2	*15.1	*11.1	* 6.9	14.5
1951	* 6.4	* 7.9	*12.8	*16.6	*19.9	*21.9	*24.7	*25.4	*21.5	*12.5	*12.1	* 2.9	15.4
1952	* 5.6	* 7.1	* 9.3	*14.3	*17.1	*20.2	*23.6	*25.6	*24.0	*19.0	*12.1	* 9.9	15.6
1953	* 7.7	* 6.9	* 4.8	*14.0	*18.0	*22.4	*24.1	*24.5	*20.0	*16.2	* 7.0	* 0.0	13.8
1954	* 0.6	* 3.3	*10.1	*11.8	*20.0	*23.1	*25.8	*25.9	*22.0	*17.8	*13.0	* 8.2	15.1
1955	* 7.1	*10.2	* 9.6	*12.4	*18.6	*22.5	*24.2	*22.7	*20.9	*19.6	*11.6	* 6.7	15.5
1956	* 6.0	* 4.5	* 4.9	*15.3	*15.7	*21.0	*22.4	*24.3	*17.9	*14.9	* 8.9	* 4.2	13.3
1957	* 1.7	* 7.9	* 8.3	*14.8	*18.1	*22.3	*25.4	*25.8	*22.9	*16.9	*10.9	* 7.5	15.2
1958	* 6.5	* 9.3	*10.3	*14.4	*20.4	*22.6	*23.5	*24.6	*19.2	*15.3	*10.5	* 6.9	15.3
1959	* 7.4	* 2.2	* 7.8	*14.0	*18.5	*20.7	*25.2	*24.0	*18.1	*12.7	*10.6	* 8.4	14.1
1960	* 5.5	* 3.9	* 8.4	*13.9	*19.3	*21.3	*24.2	*23.2	*19.7	*18.3	*12.9	* 8.4	14.9
1961	* 3.1	* 5.2	* 7.9	*15.9	*19.2	*22.1	*23.9	*24.0	*18.1	*15.9	*12.2	* 8.4	14.7
1962	* 5.3	* 6.4	*12.8	*14.1	*19.3	*22.2	*25.2	*25.6	*21.8	*16.9	*14.1	* 8.4	16.0
1963	* 6.0	* 8.5	* 7.8	*13.2	*17.8	*21.8	*24.9	*25.0	*21.7	*16.9	*10.3	* 6.8	15.1
1964	* 0.8	* 4.4	*10.4	*13.0	*17.2	*22.1	*23.9	*22.8	*19.3	*17.3	*10.2	* 7.9	14.1
1965	4.6	4.0	9.7	12.4	17.9	22.2	23.4	23.2	20.0	12.0	10.8	8.3	14.0
1966	8.7	10.3	10.5	14.9	17.0	20.9	24.7	25.4	19.8	18.1	13.2	8.2	16.0
1967	3.3	1.3	6.8	12.8	17.8	19.7	22.5	23.7	19.7	15.9	9.8	7.5	13.4
Total	115.3	138.3	212.2	337.0	440.8	521.7	577.8	579.5	490.4	385.8	270.8	167.1	353.1
Ave.	4.8	5.8	8.8	14.0	18.4	21.7	24.1	24.1	20.4	16.1	11.3	7.0	14.7
	Driest five years (1945, 1947, 1955, 1957, 1964)												
Total	17.4	33.1	48.1	67.5	93.0	109.9	121.0	119.1	103.1	83.5	55.7	36.6	74.0
Ave.	3.5	6.6	9.6	13.5	18.6	22.0	24.2	23.8	20.6	16.7	11.1	7.3	14.8

* indicates value estimated in correlation with NIKSAR data

Table II 1-7

MERZUFON STATION ______ CATCHMENT AREA ______ sq km ______ Precipitation

______ RIVER, IN THE BASIN OF ______ 563 ______ ELEVATION ______ m UNIT ______ S ° ______ W ° ______

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	42.5	53.8	105.9	32.1	55.9	25.3	32.0	0.0	10.3	16.8	45.9	15.7	436.2
1945	50.1	25.3	29.6	34.9	37.2	77.4	14.1	8.9	28.5	23.9	42.3	36.4	408.6
1946	17.3	35.9	68.5	62.6	60.3	45.1	38.8	13.5	5.9	43.1	8.7	34.8	434.5
1947	74.9	35.8	30.5	7.3	31.4	20.7	6.8	2.6	16.8	23.1	65.4	39.4	354.7
1948	20.8	59.1	29.0	21.1	40.5	135.3	6.1	3.4	20.2	29.7	30.0	6.6	401.8
1949	32.2	32.4	22.9	60.2	33.3	51.3	3.3	0.0	24.3	7.3	18.6	29.6	315.4
1950	34.0	23.6	30.4	18.0	27.7	19.2	9.5	4.1	1.7	27.5	13.0	13.8	222.5
1951	23.1	32.2	45.0	28.5	41.7	29.6	3.1	1.0	10.5	30.3	48.7	26.8	320.5
1952	51.9	44.3	33.3	9.1	71.4	64.4	30.3	3.4	18.6	13.7	42.9	26.6	409.9
1953	36.9	45.0	25.4	35.3	58.5	54.4	1.8	0.8	6.7	64.4	16.3	18.3	363.8
1954	61.2	39.2	23.8	43.4	62.0	21.2	9.2	4.7	1.5	10.9	17.2	39.9	334.2
1955	22.8	23.8	36.0	41.6	15.3	4.9	30.0	20.7	25.1	29.9	24.9	13.2	288.2
1956	19.0	78.7	27.8	5.5	49.3	24.6	9.3	0.9	4.8	21.6	33.3	29.1	303.9
1957	12.6	10.7	24.2	29.7	117.3	5.4	0.7	0.0	36.9	5.9	20.0	41.6	305.0
1958	36.0	13.2	91.9	44.4	27.6	60.2	11.6	4.6	10.0	24.5	1.7	30.4	356.1
1959	95.8	7.4	30.8	45.7	86.6	50.6	3.3	22.8	19.0	36.4	14.5	34.4	447.3
1960	37.7	23.3	28.5	56.8	70.6	38.2	7.0	16.8	12.6	20.2	28.2	19.0	358.9
1961	48.8	34.6	19.2	52.2	47.2	85.3	5.8	3.7	26.4	8.7	10.8	55.4	398.1
1962	37.3	40.4	35.4	17.7	59.8	19.1	3.7	0.0	17.7	37.4	9.7	92.5	370.7
1963	53.5	30.9	25.8	34.4	41.3	18.1	0.1	0.0	18.8	26.4	25.4	24.7	299.4
1964	4.1	44.2	42.3	45.9	54.0	66.9	10.9	0.0	3.3	1.8	51.7	15.7	340.8
1965	16.5	40.2	68.4	36.2	54.9	13.9	12.3	37.5	0.0	19.3	36.5	41.5	377.2
1966	59.3	5.1	33.3	51.6	28.8	39.3	2.5	42.1	7.7	0.0	15.1	66.1	350.9
1967	24.6	16.4	51.2	65.8	58.8	42.7	0.2	9.2	13.0	10.7	39.4	29.8	361.8
Total	912.9	795.5	959.1	880.0	1,231.4	1,013.1	252.4	200.7	340.3	533.5	660.2	781.3	8,560.4
Ave.	38.0	33.1	40.0	36.7	51.3	42.2	10.5	8.4	14.2	22.2	27.5	32.6	356.7
	Driest five years (1950, 1955, 1956, 1957, 1963)												
Total	141.9	167.7	144.2	129.2	250.9	72.2	49.6	25.7	87.3	111.3	116.6	122.4	1,419.0
Ave.	28.4	33.5	28.8	25.8	50.2	14.4	9.9	5.1	17.5	22.3	23.3	24.5	283.7

Table II 1-8

MERZUFON STATION ______ CATCHMENT AREA ______ sq km ______ Temperature

______ RIVER, IN THE BASIN OF ______ 563 ______ ELEVATION ______ m UNIT ______ S ° ______ W ° ______

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	0.5	4.7	7.2	11.2	12.8	18.7	21.3	18.8	17.4	16.4	8.8	4.7	11.9
1945	2.3	-0.2	3.0	9.0	17.0	16.9	20.3	22.1	18.0	12.1	7.7	1.4	10.8
1946	1.0	3.7	5.5	11.8	15.8	19.1	20.8	21.5	19.2	11.0	10.9	5.1	12.1
1947	-1.1	4.3	10.7	12.5	16.7	20.9	22.2	20.7	16.7	11.8	9.3	6.7	12.6
1948	6.7	3.1	1.7	10.6	16.6	20.0	21.8	22.4	16.9	13.1	5.3	-0.4	11.5
1949	-0.7	-2.3	4.2	7.4	17.6	20.2	21.2	20.4	16.4	13.1	9.5	4.9	11.0
1950	-2.8	-1.2	5.8	16.5	16.9	18.8	21.1	20.3	20.7	12.2	8.1	3.7	11.7
1951	3.2	4.8	9.8	13.8	17.2	19.3	22.2	23.0	18.9	9.5	9.0	-0.5	12.5
1952	2.4	3.9	6.3	11.4	14.3	17.6	21.1	23.2	21.5	16.3	9.0	6.8	12.8
1953	4.5	3.7	1.5	11.1	15.3	19.8	21.6	22.0	17.3	13.4	3.8	-3.5	10.9
1954	-2.8	0.0	7.0	8.8	17.3	20.6	23.4	23.5	19.4	15.1	10.1	5.1	12.3
1955	3.9	7.1	6.5	9.4	15.9	19.9	21.7	20.2	18.3	16.9	8.6	3.5	12.7
1956	2.8	1.2	1.6	12.4	12.9	18.4	19.8	21.8	15.2	12.0	5.8	0.9	10.4
1957	-1.7	4.7	5.2	11.9	15.4	19.7	23.0	23.4	20.4	14.1	7.9	4.3	12.4
1958	3.3	6.2	7.2	11.5	17.8	20.0	21.0	22.1	16.5	12.4	7.5	3.7	12.4
1959	4.2	-1.2	4.6	11.1	15.8	18.1	22.8	21.5	15.4	9.7	7.6	5.3	11.2
1960	2.3	0.6	5.3	11.0	16.6	18.7	21.7	20.7	17.0	15.6	10.0	5.3	12.1
1961	-0.2	1.9	4.7	13.1	16.5	19.5	21.4	21.5	15.4	13.1	9.2	5.3	11.8
1962	2.0	3.2	9.8	11.2	16.6	19.6	22.7	23.2	19.2	14.1	11.2	5.3	13.2
1963	2.8	5.4	4.6	10.3	15.1	19.2	22.4	22.5	19.1	14.1	7.8	3.6	12.2
1964	-2.6	1.1	7.4	10.1	14.4	19.5	21.4	20.3	16.6	14.5	7.1	4.7	11.2
1965	2.4	0.4	7.2	9.8	15.1	19.5	20.6	20.4	17.9	9.4	7.7	5.0	11.3
1966	3.8	6.5	7.2	13.6	14.6	18.0	22.4	22.0	16.4	16.5	11.4	4.4	13.1
1967	-0.4	-2.2	3.7	10.0	14.9	16.7	19.3	20.4	16.4	13.9	6.8	4.0	10.3
Total	35.8	59.4	137.7	269.5	379.1	458.7	517.2	517.9	426.2	320.3	200.1	89.3	(3,411.2) 284.4
Ave.	1.5	2.5	5.7	11.2	15.8	19.1	21.5	21.6	17.8	13.3	8.3	3.7	11.9
	Driest five years (1950, 1955, 1956, 1957, 1963)												
Total	5.0	17.2	23.7	60.5	76.2	96.0	108.0	108.2	93.7	69.3	38.2	16.0	59.3(712.0)
Ave.	1.0	3.4	4.7	12.1	15.2	19.2	21.6	21.6	18.7	13.9	7.6	3.2	11.9

Table II 1-9

NIKSAR STATION CATCHMENT AREA sq km Precipitation

RIVER, IN THE BASIN OF 350 ELEVATION m UNIT S ° N °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	50.4	43.9	47.4	8.9	26.7	20.5	8.6	0.4	9.9	18.0	62.1	17.4	314.2
1945	58.7	73.4	103.3	68.5	39.9	84.2	2.1	6.6	25.1	14.7	5.9	58.6	541.0
1946	42.5	72.8	90.9	46.6	100.2	61.2	52.4	32.9	35 2	52.8	10.6	23.0	621.1
1947	145.5	15.8	35.0	13.1	24.1	6.6	0.0	19.9	33.1	38.0	47.0	30.1	408.2
1948	24.7	115.6	85.7	25.5	32.5	87.0	5.9	1.9	26.2	44.6	43.2	27.5	520.3
1949	62.4	48.4	38.3	63.8	37.5	31.4	8.4	1.6	30.3	20.3	15.6	78.3	436.3
1950	116.7	60.4	71.0	16.2	65.6	8.4	7.1	5.5	0.0	38.1	22.0	15.2	426.2
1951	26.2	41.9	73.6	33.8	61.4	60.3	0.6	12.3	34.3	52.8	37.5	119.4	554.1
1952	44.5	65.9	99.2	49.0	65.6	19.8	0.0	10.2	10.6	27.7	46.4	27.4	466.3
1953	37.8	83.0	63.2	43.2	42.1	19.7	14.3	9.4	35.4	50.0	102.4	28.0	528.5
1954	110.0	33.1	51.4	47.0	52.7	56.2	19.1	22.6	18.6	21.2	23.8	95.4	551.1
1955	24.5	28.9	65.6	69.3	30.7	0.0	15.4	10.3	12.6	12.3	50.1	31.3	351.0
1956	57.5	107.7	45.7	13.6	50.4	12.7	13.0	19.3	33.8	5.9	56.5	76.1	492.2
1957	43.0	40.3	61.8	23.6	72.7	20.9	0.0	0.0	27.4	9.5	7.0	35.8	342.0
1958	104.8	32.7	118.5	97.6	52 7	38.1	37.9	1.9	13.0	5.7	16.7	60.8	580.4
1959	55 7	134.4	47.6	59.8	65.7	49.5	0.0	47.6	23.0	51.0	38.2	22.0	594.5
1960	49.5	75.1	61.5	111.4	52.6	86.7	13.0	19.4	23.0	15.5	59.6	22.2	589.5
1961	83.7	34.3	102.2	35.6	26.6	74.8	3.4	0.0	44.9	10:5	64.1	75.7	555.8
1962	63.1	78.6	28.9	29.8	55.9	16.9	0.0	0.0	8.2	41.7	12.9	94.8	430.8
1963	98.1	26.5	83.7	72.8	65.6	24.9	37.8	0.0	42.4	28.7	21.7	34.2	536.4
1964	22.7	31.1	56.9	40.8	74.3	17.2	9.6	0.3	27.7	10.1	38.6	39.2	368.5
1965	15.4	60.2	39.1	66.6	69.5	35.8	1.3	12.5	8.7	36.6	42.9	52.5	441.1
1966	56.9	57.0	40.5	0.0	19.0	20.0	31.0	32.1	23.0	0.0	19.5	66.8	365.8
1967	63.8	37.6	38.5	33.2	0.0	8.0	0.0	1.3	28.2	56.2	103.7	68.1	438.6
Total	1,458.1	1,398.6	1,549.5	1,069.7	1,184.0	860.8	280.9	268.0	574.6	661.9	948.0	1,199.8	1,1453.9
Ave.	60.8	58.3	64.6	44.6	49.3	35.9	11.7	11.2	23.9	27.6	39.5	50.0	477.4
	Driest five years (1944, 1955, 1957, 1964, 1966)												
Total	197.5	201.2	272.2	142.6	223.4	78.6	64.6	43.1	100.1	49.9	177.3	190.5	1,741.5
Ave.	39.5	40.2	54.4	28.5	44.7	15.7	12.9	8.6	20.0	10.0	35.5	38.1	348.1

Table II 1-10

NIKSAR STATION CATCHMENT AREA sq km Temperature

RIVER, IN THE BASIN OF 350 ELEVATION m UNIT mm S ° N °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	* 8.0	*11.9	*14.3	*18.0	*16.2	*25.0	*27.4	*25.1 *	*23.8	*22.8	*15.7	*11.9	18.3
1945	* 9.6	* 7.3	*10.3	*15.9	*23.4	*23.3	*26.4	*28.2	*24.3	*18.8	*14.7	* 8.8	17.6
1946	* 8.4	*11.0	*12.6	*18.5	*22.2	*25.3	*26.9	*27.6	*25.4	*17.8	*17.7	*12.2	18.8
1947	* 6.5	*11.6	*17.5	*19.1	*23.1	*27.0	*28.3	*26.8	*23.1	*18.5	*16.2	*13.8	19.3
1948	*13.8	*10.4	* 9.1	*17.4	*23.0	*26.2	*27.9	*28.5	*23.3	*19.7	*12.4	* 7.2	18.2
1949	* 6.9	* 5.3	*11.5	*14.4	*23.9	*26.3	*27.3	*26.5	*22.8	*19.7	*16.4	*12.0	17.7
1950	* 4.9	* 6.4	*12.9	*22.9	*23.3	*25.1	*27.2	*26.4	*26.8	*18.9	*15.1	*11.0	18.4
1951	*10.5	*11.9	*16.7	*20.4	*23.6	*25.5	*28.3	*28.9	*25.2	*16.4	*16.0	* 7.1	19.2
1952	* 9.7	*11.2	*13.3	*18.2	*20.9	*23.9	*27.2	*29.1	*27.6	*22.7	*16.0	*13.9	19.5
1953	*11.8	*11.0	* 8.9	*17.9	*21.8	*26.0	*27.7	*28.1	*23.7	*20.0	*11.1	* 4.3	17.7
1954	* 4.9	* 7.5	*14.1	*15.7	*23.7	*26.7	*29.3	*29.4	*25.6	*21.6	*16.9	*12.2	19.0
1955	*11.2	*14.2	*13.6	*16.3	*22.3	*26.1	*27.8	*26.3	*24.6	*23.3	*15.5	*10.8	19.3
1956	*10.1	* 8.6	* 9.0	*19.1	*19.5	*24.7	*26.0	*27.9	*21.7	*18.7	*12.9	* 8.4	17.2
1957	* 5.9	*11.9	*12.3	*18.6	*21.8	*25.9	*28.9	*29.3	*26.5	*20.7	*14.9	*11.6	19.0
1958	*10.6	*13.3	*14.3	*18.3	*24.1	*26.2	*27.1	*28.2	*22.9	*19.1	*14.5	*11.0	19.1
1959	*11.5	* 6.4	*21.6	*17.9	*22.2	*24.4	*28.7	*27.6	*21.8	*16.6	*14.6	*12.4	18.8
1960	* 9.6	* 8.1	*12.4	*17.8	*23.0	*25.0	*27.8	*26.8	*23.4	*22.0	*16.8	*12.4	18.8
1961	* 7.3	* 9.3	*11.9	*19.7	*22.9	*25.7	*27.5	*27.6	*21.8	*19.7	*16.1	*12.4	18.5
1962	* 9.4	*10.5	*16.7	*18.0*	*23.0	*25.8	*28.7	*29.1	*25.4	*20.7	*18.0	*12.4	19.8
1963	*10.1	*12.5	*21.6	*17.1	*21.6	*25.4	*28.5	*28.5	*25.3	*20.7	*14.3	*10.9	19.7
1964	* 5.1	* 8.5	*14.4	*16.9	*21.0	*25.7	*27.5	*26.4	*23.0	*21.1	*14.2	*11.9	18.0
1965	4.6	8.2	9.7	16.3	16.4	19.8	22.9	25.1	23.7	13.4	11.7	8.8	15.0
1966	12.7	14.3	11.0	15.7	16.6	20.4	24.4	28.9	23.5	17.4	13.9	12.2	17.6
1967	2.8	1.7	10.9	16.7	21.6	23.4	26.1	23.6	19.5	16.4	9.7	7.7	15.0
Total	205.9	233.0	307.7	426.8	521.1	598.8	655.8	659.9	574.7	466.7	355.3	257.3	439.7
Ave.	8.6	9.7	12.8	17.8	21.7	24.9	27.3	27.5	23.9	19.4	14.8	10.7	18.3
	Driest five years (1944, 1955, 1957, 1964, 1966)												
Total	42.9	60.8	65.6	85.5	97.9	123.1	136.0	136.0	121.4	105.3	74.2	58.4	92.3
Ave.	8.6	12.2	13.1	17.1	19.6	24.6	27.2	27.2	24.3	21.1	14.8	11.7	18.5

* indicates value estimated in correlation with HERZIFON data

Table II 1-11

TOKAT STATION ______ CATCHMENT AREA ______ sq km Precipitation

RIVER, IN THE BASIN OF 623 ELEVATION ______ m UNIT ______ S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	76.9	46.4	59.1	36.1	50.1	46.8	12.0	2.8	14.7	32.1	58.1	16.1	451.2
1945	53.0	47.7	74.0	70.2	38.0	49.6	3.5	4.0	25.7	26.1	6.9	41.8	440.5
1946	28.2	44.8	78.5	42.8	75.6	78.2	6.4	14.3	33.5	60.9	15.2	19.2	497.6
1947	74.5	18.0	47.2	6.9	47.5	13.9	5.3	0.0	35.1	25.4	85.0	33.2	392.0
1948	26.4	76.7	56.1	27.0	78.2	62.9	1.2	3.8	12.9	35.2	38.6	24.0	443.0
1949	57.1	41.4	126.4	118.8	54.9	67.3	19.4	1.8	29.4	27.4	19.8	53.8	617.5
1950	123.6	38.7	73.2	22.0	80.8	55.3	2.0	1.7	0.0	30.3	11.5	13.8	452.9
1951	34.2	24.5	42.1	48.7	96.7	38.7	5.5	67.2	31.6	63.1	29.9	55.0	537.2
1952	65.9	66.3	87.0	43.6	80.0	20.8	4.9	1.7	16.2	13.7	43.4	17.4	460.9
1953	44.9	68.7	43.5	38.1	62.3	47.1	6.3	6.3	27.2	26.5	58.9	26.6	456.4
1954	79.6	31.8	39.0	41.7	51.8	17.4	0.0	7.6	8.6	10.2	18.2	66.8	372.7
1955	25.3	46.4	38.7	79.8	30.8	0.3	18.8	5.3	12.2	-24.4	38.1	37.1	357.2
1956	32.3	53.9	33.7	8.4	61.5	21.9	3.9	0.8	25.4	5.0	46.4	51.6	344.8
1957	15.0	39.2	42.4	19.3	84.3	10.0	0.9	0.0	18.7	5.4	25.2	28.3	288.7
1958	92.2	28.3	80.6	50.0	62.4	95.7	32.4	11.0	2.0	4.0	16.0	70.7	545.3
1959	46.2	71.0	27.2	50.0	87.0	48.5	3.9	41.5	11.5	21.5	28.5	26.5	463.3
1960	49.6	47.0	36 8	116 0	38.5	39.3	4.1	26.5	22.5	12.9	53.8	21.3	468.3
1961	58.6	6.0	36.3	13.1	20.0	75.3	8.1	0 0	19.8	4.9	35.4	90.6	368.1
1962	44.3	67.1	19.2	40.6	41.2	8.7	1.1	0.0	14.5	40.8	10.0	92.1	379.6
1963	100.9	41.2	50.7	53.4	50.3	46.0	7.5	1.0	33.7	51.6	23.3	57.2	516.8
1964	12.5	36.0	50.6	46.2	77.1	37.5	2.5	0.3	10.0	7.4	42.9	57.0	380.0
1965	9.8	23.1	27.9	42.1	48.6	19.4	5.6	3.6	10.7	25.8	-59.9	77.9	354.4
1966	72.3	14.1	40.4	58.1	35.5	26.8	33.5	4.4	19.4	0.0	39.5	103.0	447.0
1967	56.2	22.9	48.3	32.7	63.5	38.4	0.0	0.1	40.1	36.7	80.2	44.2	463.3
Total	1,279.5	1,001.2	1,258.9	1,105.6	1,416.6	965.8	188.8	205.7	475.4	591.3	884.7	1,125.2	10,498.7
Ave.	53.3	41.7	52.5	46.1	59.0	40.2	7.9	8.6	19.8	24.6	36.9	46.9	437.5
	Driest five years (1955, 1956, 1957, 1961, 1965)												
Total	141.0	168.6	179.0	162.7	245.2	126.9	37.3	9.7	86.8	65.5	205.0	285.5	1,713.2
Ave.	28.2	33.7	35.8	32.5	49.0	25.4	7.5	1.9	17.4	13.1	41.0	57.1	342.6

Table II 1-12

TOKAT STATION ______ CATCHMENT AREA ______ sq km Temperature

RIVER IN THE BASIN OF 623 ELEVATION ______ m UNIT ______ S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	* 1.8	* 5.9	* 8.3	*12.2	*13.8	*19.5	*22.1	*19.6	*18.3	*17.3	* 9.9	* 5.9	12.9 154.6
1945	* 3.5	* 1.1	* 4.2	*10.1	*17.9	*17.8	*21.1	*22.8	*18.9	*13.1	* 8.8	* 2.7	11.8 142.0
1946	* 2.3	* 4.9	* 6.7	*12.8	*16.7	*19.9	*21.6	*22.3	*20.0	*12.0	*11.9	* 6.3	13.1 157.4
1947	* 0.2	* 5.5	*11.7	*13.5	*17.6	*21.7	*22.9	*21.5	*17.6	*12.8	*10.4	* 7.8	13.6 163.2
1948	* 7.8	* 4.3	* 3.0	*11.6	*17.5	*20.8	*22.6	*23.1	*17.8	*14.1	* 6.5	* 1.0	12.5 150.1
1949	* 0.6	*-0.9	* 5.4	* 8.5	*18.5	*21.0	*22.0	*21.2	*17.3	*14.1	*10.6	* 6.1	12.0 144.4
1950	4.5	4.9	7.4	17.4	17.2	18.7	20.7	20.1	20.9	12 1	8.8	4.3	13.1 157.0
1951	4.9	5.8	11.0	13.4	16.4	19.4	22.5	23.2	18.3	10.2	9.5	-1.1	12.8 153.5
1952	2.5	4.2	6.1	11.7	15.7	18.5	21.6	22.7	21.1	16.0	9.0	8.0	13.1 157.1
1953	6.2	4.7	2.0	11.9	15 8	20.7	21.7	22.5	16.7	13.5	3.8	-3.5	11.3 136.0
1954	-1.0	2.2	8.4	10.2	16.9	21.8	25.0	24.9	20.1	15.1	9.0	4.9	13.1 157.5
1955	4.7	7.2	8.1	8.8	12.2	22.3	22.8	21.3	19.3	15.1	9.0	7.0	13.1 157.8
1956	4.3	1.9	4.4	14.1	14.1	20.4	20.6	22.6	16.1	13.0	7.0	2.2	11.7 140.7
1957	*-0.4	* 5.9	* 6.4	*12.9	*16.3	*20.5	*23.7	*24.1	*21.2	*15.0	* 9.0	* 5.5	13.3 160.1
1958	* 4.5	* 7.3	* 8.3	*12.5	*18.7	*20.8	*21.8	*22.8	*17.4	*13.4	* 8.6	* 4.9	13.4 161.0
1959	* 5.4	* 0.1	* 5.8	*12.1	*16.7	*18.9	*23.5	*22.3	*16.3	*10.8	* 8.7	* 6.5	12.3 147.1
1960	* 3.5	* 1.9	* 6.5	*12.0	*17.5	*19.5	*22.5	*21.5	*17.9	*16.5	*11.0	* 6.5	13.1 156.8
1961	0.1	3.2	5.2	13.9	18.1	20.3	21.2	21.5	15.2	13.1	8.1	6.1	22.2 146.0
1962	2.6	3.9	11.1	11.7	17.0	20.4	23.0	22.3	19.1	14.1	10.6	6.5	13.5 162.8
1963	-3.0	5.9	5.3	11.2	15.5	19.2	16.0	21.6	18.3	14.1	7.6	4.0	11.3 135.7
1964	-4.1	0.9	7.7	10.9	15.1	19.7	21.2	20.7	17.2	13.4	8.0	5.6	11.4 136.8
1965	3.2	2.1	8.5	11.4	15.8	20.3	21.3	22.1	18.5	10.2	8.6	5.6	12.3 147.6
1966	6.5	7.9	8.9	14.0	15.8	19.6	22.6	23.4	17.8	16.1	11.8	6.1	14.2 170.6
1967	0.2	-1.4	4.6	11.2	16.2	17.9	19.9	20.9	17.6	14.4	7.3	5.8	11.2 134.6
Total	60.8	89.4	165.0	290.0	393.0	479.6	523.9	531.0	438.9	329.5	213.5	114.7	3,629.3
Ave.	2.5	3.7	6.9	12.1	16.4	20.0	21.8	22.1	18.3	13.7	8.9	4.8	12.6
	Driest five years (1955, 1956, 1957, 1961, 1965)												
Total	11.9	20.3	32.6	61.1	76.5	103.8	109.6	111.6	90.3	66.4	41.7	26.4	62.7(752.2)
Ave.	2.4	4.1	6.5	12.2	15.3	20.8	21.9	22.3	18.1	13.3	8.3	5.3	12.5

* indicates value estimated in correlation with MERZIFON data

Table II 1-13

AMASYA STATION CATCHMENT AREA sq km Precipitation

RIVER, IN THE BASIN OF 400 ELEVATION m UNIT S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1944	63.4	42.5	86.1	41.1	32.3	13.3	0.0	0.0	3.7	29.3	38.1	11.0	360.8
1945	59.4	25.5	38.8	22.9	29.2	30.0	16.2	12.3	38.1	12.8	12.7	51.7	349.6
1946	31.0	70.5	49.6	30.4	56.0	23.9	60.7	9.3	2.0	48.5	10.6	21.5	414.0
1947	99.3	30.1	36.9	2.1	36.1	15.5	0.0	1.5	19.0	27.2	92.3	22.8	382.8
1948	25.8	66.3	53.0	30.5	60.4	127.8	1.5	2.3	17.4	36.6	18.8	1.9	442.3
1949	35.0	27.3	25.2	36.8	36.5	34.8	3.7	0.0	25.1	6.5	32.7	44.8	308.4
1950	76.0	51.4	53.9	15.1	43.5	12.0	8.3	10.6	0.0	23.9	18.9	8.1	321.7
1951	30.6	34.3	63.2	26 6	86.0	22.5	4.3	1.9	25.7	41.2	64.2	46.4	446.9
1952	70.5	64.8	64.8	32.4	65.2	40.4	8.1	0.0	15.5	9.5	71.5	29.3	472.0
1953	44.5	52.7	51.9	40.6	69.5	26.6	3.5	5.4	21.2	62.9	37.7	17.0	433.5
1954	121.6	41.3	27.8	57.6	51.4	16.0	0.0	7.8	2.1	11.4	12.5	68.7	418.2
1955	33.4	31.3	40.0	38.5	20.1	3.2	8.1	13.0	12.1	7.2	43.6	16.3	266.8
1956	38.2	100.3	53.7	7.9	27.7	26.3	10.7	0.1	13.4	6.0	25.6	39.9	349.8
1957	14.1	39.0	43.3	24.2	109.8	8.7	0.0	0.2	30.4	8.0	12.2	50.1	340.0
1958	84.6	25.7	140.4	46.8	30.7	67.2	4.8	1.6	9.4	16.6	2.2	47.7	477.7
1959	97.6	32.5	40.1	42.8	43.3	54.9	10.8	28.2	18.1	44.3	17.7	43.1	473.4
1960	48.4	51.3	33.0	78.3	49.6	31.5	4.2	4.5	16.3	10.4	36.6	26.9	391.0
1961	68.7	41.4	50.1	12.8	31.8	48.8	15.9	8.5	23.9	8.1	11.1	71.0	392.1
1962	52.5	59.4	54.2	29.6	28.1	16.7	2.0	0.0	24.3	33.8	11.0	78.4	390.0
1963	93.8	38.6	67.0	65.7	50.8	20.3	0.0	0.0	28.4	54.2	32.2	48.1	499.1
1964	9.5	58.6	38.4	49.7	76.9	33.0	16.5	0.0	7.5	2.7	58.5	29.9	381.2
1965	25.9	73.7	55.1	39.0	53.8	11.2	9.0	25.3	3.8	31.7	61.3	92.7	482.5
1966	114.0	11.9	64.6	80.2	43.2	10.6	15.9	25.6	1.7	1.2	19.5	107.7	496.1
1967	60.2	31.6	103.6	92.4	55.2	68.5	0.0	7.5	25.7	16.5	82.3	56.6	600.1
Total	1,398.0	1,102.0	1,334.7	944.0	1,187.1	763.7	204.2	165.6	384.8	550.5	823.8	1,031.6	9,890.0
Ave.	58.2	45.9	55.6	39.3	49.5	31.8	8.5	6.9	16.0	22.9	34.3	43.0	411.9
	Driest five years (1945, 1949, 1950, 1955, 1957)												
Total	217.9	174.5	201.2	137.5	239.1	88.7	36.3	36.1	105.7	58.4	120.1	171.0	1,586.5
Ave	43.6	34.9	40.2	27.5	47.8	17.7	7.3	7.2	21.1	11.7	24.0	34.2	317.2

Table II 1-14

EVAPORATION LOSSES STATION CATCHMENT AREA sq km

RIVER, IN THE BASIN OF ELEVATION m UNIT mm S ° W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
Merzifon Station													
Max. Evapo. 1961-1965	30.2	44.8	119.8	165.9	232.7	223.5	356.2	319.9	193.8	132.9	75.3	41.0	1,936.0
70%	21.1	31.4	83.9	116.1	162.9	156.5	249.2	223.9	136.7	93.0	52.7	28.7	1,356.2
Evapotranspiration	37.8	37.5	48.0	50.0	59.5	35.0	8.9	3.3	16.9	21.0	30.5	38.2	386.6
Evaporation Losses	-	-	35.9	66.1	103.4	121.5	240.4	220.6	119.8	62.0	22.2	-	991.9
Samsun Station													
Max. Evapo. 1961-1965	65.4	63.0	80.6	73.7	64.2	89.4	117.8	107.6	89.4	106.9	99.6	90.2	1,047.8
70%	45.8	44.1	56.4	51.6	44.9	62.6	82.5	75.3	62.6	74.8	69.7	63.1	733.4
Evapotranspiration	44.9	44.5	54.0	40.0	44.0	37.5	15.5	10.5	20.5	26.0	35.5	43.0	415.9
Evaporation Losses	-	-	-	-	-	35.1	67.0	64.8	52.1	48.8	34.2	20.1	322.1

Table II 1-15

SAMSUN STATION | CATCHMENT AREA sq km | Evaporation

RIVER, IN THE BASIN OF | ELEVATION m | UNIT mm | S ° | W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1950	52.3	83.3	48.3	68.2	46.2	91.5	122.0	70.7	87.3	86.4	81.7	131.8	969.9
1951	85.6	43.5	56.1	44.4	56.8	74.5	87.5	77.4	70.8	34.9	53.3	73.0	757.8
1952	82.6	76.4	87.7	48.7	38.9	68.8	71.7	89.8	78.2	71.6	85.3	75.8	875.5
1953	66.8	63.3	50.7	35.6	37.0	58.2	98.0	91.6	76.4	41.0	27.3	51.3	697.2
1954	26.2	19.6	44.6	30.2	51.3	55.6	91.7	90.8	71.5	60.8	60.9	55.5	658.7
1955	67.2	77.0	35.0	40.9	48.1	66.8	87.2	75.0	69.3	58.8	67.3	68.6	761.2
1956	72.8	40.6	46.1	73.7	53.5	61.5	100.0	98.2	89.0	65.9	70.1	63.4	834.8
1957	51.0	50.1	38.6	57.2	36.2	70.6	110.7	105.0	71.1	51.4	39.9	67.3	749.1
1958	60.1	69.6	36.4	41.6	52.6	84.5	104.0	98.5	69.0	60.1	41.9	75.1	793.4
1959	76.1	28.3	36.6	65.9	35.8	57.0	96.7	102.7	70.0	45.4	45.8	66.2	726.5
1960	79.8	60.6	32.3	19.5	46.1	61.8	92.5	95.7	61.6	106.9	60.0	81.4	798.2
1961	60.0	34.5	55.0	48.2	51.2	52.7	71.7	78.9	53.2	38.8	64.8	51.6	660.6
1962	51.5	40.9	80.6	39.9	64.2	70.8	84.6	95.1	75.5	49.3	57.3	58.8	768.5
1963	43.9	63.0	53.1	19.6	31.1	76.6	108.2	107.6	75.4	46.2	77.3	82.3	784.3
1964	43.5	58.2	34.7	64.4	38.9	91.4	117.8	104.7	89.4	81.6	56.3	66.9	847.8
1965	65.4	44.5	34.6	47.8	47.7	89.4	102.6	101.2	86.1	62.7	99.6	90.2	871.8
Total	984.8	853.6	770.4	745.8	735.6	1,131.7	1,546.9	1,482.9	1,193.8	961.8	988.8	1,159.2	12,555.3
Average	61.6	53.4	48.2	46.6	46.0	70.7	96.7	92.7	94.6	60.1	61.8	72.5	784.7

Table II 1-16

MERZUFON STATION | CATCHMENT AREA sq km | Evaporation

RIVER, IN THE BASIN OF | ELEVATION m | UNIT mm | S ° | W °

YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	ANNUAL
1950	-	-	46.3	176.8	181.7	204.9	232.9	223.2	228.1	124.4	74.4	20.7	1,513.4
1951	14.6	34.2	95.1	143.9	185.4	211.0	246.3	256.1	206.1	91.5	85.4	-	1,569.6
1952	4.9	23.2	52.4	114.6	150.0	190.2	232.9	258.5	237.8	174.4	85.4	58.5	1,582.8
1953	30.5	20.7	-	111.0	162.2	217.1	239.0	243.9	186.6	139.0	22.0	-	1,372.0
1954	-	-	61.0	82.9	186.6	226.8	261.0	262.2	212.2	159.8	98.8	37.8	1,589.1
1955	23.2	62.2	54.9	90.2	169.5	218.3	240.2	222.0	198.8	181.7	80.5	18.3	1,559.8
1956	9.8	-	-	126.8	132.9	200.0	217.1	241.5	161.0	122.0	46.3	-	1,257.4
1957	-	32.9	39.0	120.7	163.4	215.9	256.1	261.0	224.4	147.6	72.0	28.1	1,561.1
1958	15.9	51.2	63.4	115.9	192.7	219.5	231.7	245.1	176.8	126.8	67.1	20.7	1,526.8
1959	26.8	-	31.7	111.0	168.3	196.3	253.7	237.8	163.4	93.9	68.3	40.2	1,391.4
1960	3.7	-	40.2	109.8	178.1	203.7	240.2	228.1	182.9	165.9	97.6	40.2	1,410.4
1961	16.5	27.9	85.5	165.9	232.7	196.8	356.2	319.9	184.6	114.5	75.3	28.9	1,804.7
1962	26.6	41.5	119.8	151.0	163.9	223.5	327.9	311.2	193.8	100.4	43.7	31.1	1,734.4
1963	28.6	44.8	71.4	90.3	99.3	170.9	238.9	284.4	153.0	87.1	39.0	41.0	1,348.7
1964	27.2	25.7	67.3	110.5	106.7	142.1	239.7	231.0	138.9	132.9	46.0	34.4	1,302.4
1965	30.2	28.2	51.4	96.9	103.3	153.6	178.1	191.7	138.3	64.5	50.2	28.2	1,114.6
Total	258.5	392.5	879.4	1,918.2	2,576.7	3,190.6	3,991.9	4,017.6	2,986.7	2,026.4	1,052.0	428.1	23,718.6
Average	16.2	24.5	55.0	119.9	161.0	199.4	249.5	251.1	186.7	126.7	65.8	26.8	1,482.6

Table II 1-17

Runoff STATION ____ CATCHMENT AREA 8,202.4 sq km KILICKAYA, TURKEY

Kelkit RIVER, IN THE BASIN OF Kilickaya ELEVATION ____ m UNIT 10^6 cu.m. S ____ W ____

YEAR	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	ANNUAL
1939	373.69	357.70	105.32	51.77	46.14	43.60	47.07	51.26	68.76	61.12	105.34	154.91	1,466.68
1940	781.88	498.08	243.32	97.38	40.82	34.39	68.84	81.46	98.14	72.40	145.25	364.38	2,526.34
1941	776.72	563.45	127.34	63.97	40.02	32.93	55.29	108.11	62.90	60.89	81.06	194.04	2,166.72
1942	673.09	562.86	125.28	40.91	29.41	28.31	55.05	130.39	107.90	69.78	58.00	98.24	1,979.22
1943	519.92	513.95	160.84	46.11	27.60	26.61	29.28	38.53	52.85	50.12	63.48	284.36	1,813.65
1944	401.45	565.82	237.17	63.23	33.49	32.34	38.27	69.80	53.28	43.49	39.47	71.95	1,649.76
1945	47.81	558.16	152.29	42.67	26.71	23.87	39.64	32.50	37.12	34.75	34.67	127.66	1,157.85
1946	514.12	561.36	226.04	56.57	35.97	27.93	82.13	44.23	35.95	46.22	68.05	308.44	2,007.01
1947	269.10	121.16	66.95	27.55	18.69	23.74	25.38	80.84	44.39	46.83	52.18	62.02	838.83
1948	558.62	541.58	219.42	37.01	25.14	24.65	28.16	27.93	29.81	26.68	27.18	85.71	1,631.89
1949	342.62	653.52	125.50	31.99	22.68	25.99	27.07	26.77	28.52	106.61	91.86	159.07	1,642.20
1950	699.36	501.00	115.35	42.19	27.53	25.08	54.17	47.66	42.31	45.49	39.09	215.73	1,854.96
1951	279.47	383.86	185.48	51.72	29.11	34.10	66.78	103.29	71.27	62.03	108.21	191.87	1,567.19
1952	672.91	413.54	153.81	49.26	30.15	27.34	28.70	32.94	37.98	33.90	52,03	74.78	1,607.34
1953	539.51	515.48	177.35	58.13	29.36	33.70	35.97	38.88	53.87	57.70	67.59	303.57	1,911.11
1954	654.40	670.07	278.28	93.36	34.50	30.84	30.31	31.89	36.95	42.20	53.63	102.73	2,059.16
1955	236.98	214.91	52.61	21.30	19.05	18.68	21.40	24.70	35.85	35.65	70.82	90.30	842.25
1956	533.81	393.79	186.33	46.73	25.08	32.68	29.85	36.08	70.22	39.68	59.49	250.50	1,704.24
1957	388.92	435.39	208.67	49.40	26.04	25.60	28.85	31.57	37.63	36.72	45.82	160.19	1,474.80
1958	483.44	339.90	190.21	43.73	26.13	25.03	29.50	29.11	34.66	36.41	30.66	130.72	1,399.50
1959	400.32	366.86	202.25	50.03	23.04	21.76	*41.39	*47.80	*41.52	*45.18	*94.93	*205.26	1,540.34
1960	*804.05	*556.94	*167.86	*67.67	*39.58	*36.12	*34.59	*35.45	*37.51	*36.64	*39.15	*89.17	1,944.73
1961	*355.71	*200.83	*91.64	*22.06	*14.51	*19.99	21.82	39.00	71.84	50.20	64.31	355.68	1,307.59
1962	401.02	394.65	121.45	31.10	14.07	11.56	19.00	28.10	71.46	79.31	100.45	182.95	1,455.12
1963	532.77	545.93	448.13	101.51	35.24	34.07	30.36	43.71	37.65	33.67	44.69	156.83	2,044.56
1964	477.30	476.24	257.21	52.36	24.73	27.28	28.47	35.43	47.06	41.21	36.06	214.51	1,717.86
1965	509.75	415.07	130.06	58.64	16.27	16.04	47.31	57.85	75.51	169.29	135.34	249.13	1,880.26
1966	509.17	465.53	198.95	65.65	21.74	24.37	28.31	34.29	54.44	45.71	43.40	104.98	1,596.54
Total	13,737.91	12,787.63	4,955.11	1,464.00	782.80	768.60	1,072.96	1,389.57	1,477.35	1,509.88	1,852.21	4,989.68	46,787.70
Average	490.64	456.70	176.97	52.29	27.96	27.45	38.32	49.63	52.76	53.92	66.15	178.20	1,670.99 (139.25)

* Value adjusted in correlation with Fatli data

Table II 1-18

Runoff STATION ____ CATCHMENT AREA 35,891.5 sq km AYVACIK, TURKEY

Yesilirmak RIVER, IN THE BASIN OF Ayvacik ELEVATION ____ m UNIT 10^6 cu.m. S ____ W ____

YEAR	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	ANNUAL
1939	904.99	713.36	278.38	152.07	132.28	143.51	192.52	208.03	302.06	534.60	629.08	803.96	4,994.84
1940	2,187.90	1,305.58	687.38	304.13	134.64	117.82	174.37	222.74	311.68	411.45	718.85	1,522.54	8,099.08
1941	1,914.90	1,032.10	265.55	166.10	101.03	96.32	138.92	219.60	182.88	192.08	312.22	741.72	5,363.42
1942	1,572.50	1,130.29	301.85	119.98	86.75	96.71	146.22	280.02	326.30	263.91	250.68	430.86	5,006.07
1943	1,544.96	1,191.40	508.82	155.32	95.44	91.72	103.51	127.47	164.67	191.27	286.49	876.89	5,337.96
1944	1,020.30	1,085.13	476.34	170.53	96.69	91.91	103.99	160.55	143.36	131.01	120.16	240.04	3,840.01
1945	1,107.28	1,194.39	352.25	125.04	83.83	80.26	108.76	101.25	129.97	131.90	158.55	391.85	-,965.33
1946	1,145.01	1,074.01	451.58	178.57	129.63	101.67	184.67	142.49	129.55	189.07	425.78	911.70	5,063.73
1947	632.06	285.63	158.41	89.76	74.10	78.30	83.39	188.00	167.73	178.44	265.36	381.53	2,582.71
1948	1,545.61	1,246.64	648.19	132.72	87.78	89.23	107.81	103.67	121.51	115.58	128.56	477.38	4,804.68
1949	1,405.07	1,595.16	334.16	108.77	80.75	94.69	97.12	104.52	119.40	126.75	169.71	859.09	5,095.19
1950	1,487.51	1,092.25	258.24	120.16	81.40	77.67	116.08	112.19	112.44	121.50	107.61	382.30	4,069.35
1951	437.16	693.82	324.88	113.73	79.61	86.60	136.48	174.40	169.93	291.45	542.02	832.28	3,882.36
1952	1,994.65	1,005.58	415.08	164.29	98.74	84.29	91.22	106.05	127.61	124.90	207.56	367.73	4,787.70
1953	1,469.79	837.03	406.38	151.35	108.42	108.42	147.74	178.59	217.81	240.18	414.02	1,361.55	5,641.28
1954	1,902.36	1,579.44	622.41	214.63	108.74	93.79	91.35	102.59	133.75	186.43	205.83	325.82	5,567.14
1955	570.68	523.83	136.40	64.96	60.40	70.15	145.09	173.87	313.17	355.74	587.75	729.49	3,731.53
1956	1,164.07	810.69	486.00	138.02	76.91	101.76	96.22	112.45	162.63	112.61	249.83	803.41	4,314.60
1957	783.68	931.13	540.16	134.97	64.16	69.70	76.89	90.22	109.62	196.81	262.74	727.83	3,987.91
1958	1,167.75	830.42	605.00	150.32	68.59	62.95	69.53	72.88	100.11	130.84	134.98	666.26	4,059.63
1959	1,032.96	835.94	552.30	105.17	71.24	59.88	80.08	90.65	87.60	98.81	270.64	567.64	3,852.91
1960	1,446.56	979.23	414.37	116.57	71.78	65.14	74.14	91.79	122.38	208.01	225.41	410.96	4,226.34
1961	797.26	416.47	288.33	105.25	50.67	71.18	86.69	115.63	245.90	289.36	377.34	959.28	3,803.36
1962	792.86	580.86	211.98	68.14	52.03	56.90	84.07	97.52	213.44	374.96	678.48	749.18	3,960.42
1963	1,461.97	1,267.79	907.81	308.46	115.09	133.55	176.52	229.69	269.48	152.19	244.08	709.69	5,976.32
1964	913.42	789.22	490.54	106.50	43.44	59.91	74.91	107.18	157.38	169.73	216.00	733.23	3,861.46
1965	1,099.61	900.07	348.54	108.30	43.68	45.49	103.85	153.36	338.82	*936.86	*591.73	*742.72	5,413.03
1966	*1,181.83	*835.29	*367.00	*194.23	*104.84	*100.27	*117.63	*84.31	*209.06	*272.89	*240.63	*890.33	4,598.31
Total	34,684.70	26,762.75	11,838.33	4,068.04	2,402.66	2,429.79	3,209.77	3,951.71	5,190.24	6,729.33	9,022.09	19,597.26	129,886.67
Average	1,238.74	955.81	422.80	145.29	85.81	86.79	114.63	141.13	185.37	240.33	322.22	699.90	4,638.81 (386.57)

* Value adjusted taking into consideration of assumed Almus natural flow

Table II 1-19

Runoff STATION CATCHMENT AREA 2,352.8 sq km ALMUS, TURKEY

Yesilirmak RIVER IN THE BASIN OF Almus ELEVATION m UNIT 10^6 cu.m. S • W •

YEAR	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	ANNUAL
1939	154,0	149.0	47.0	32.4	29.5	28.2	30.0	32.0	43.0	37.0	47.3	76.8	706.2
1940	267.0	191.0	109.5	53.6	26.9	23.2	40.8	46.5	53.9	42.2	73.2	149.5	1,077 3
1941	266.0	210.0	65.9	32.2	26.1	22.5	34.0	57.6	37.7	37.0	46.5	88.0	923.5
1942	242.0	210.0	65.4	26.8	20.6	20.0	34.0	67.2	58.0	41.0	35.2	53.8	874.0
1943	200.0	196.0	79.8	29.4	19.5	19.0	20.4	25.8	33.0	31.6	38.2	124.0	816.7
1944	160.0	211.0	107.5	38.0	23.0	22.1	25.4	41.0	33.2	28.2	26.0	42.0	757.4
1945	180.5	209.5	76.0	27.7	19.1	17.3	26.1	22.4	24.6	23.6	23.5	66.8	717.1
1946	196.0	210.0	104.0	34.5	24.1	19.8	28.6	18.5	17.2	31.5	62.1	168.0	914.3
1947	116.0	71.5	29.3	17.3	12.7	14.0	13.9	34.6	30.1	36.5	46.6	67.8	490.3
1948	270.0	212.0	116.0	45.4	27.2	22.5	23.7	19.6	22.9	21.3	23.1	87.3	891.0
1949	215.0	264.0	65.2	33.3	22.4	21.7	24.5	22.1	21.4	23.9	26.3	136.0	875.8
1950	267.0	163.0	59.0	33.0	25.4	20.9	24.3	21.9	23.6	23.3	20.8	73.1	755.3
1951	84.1	59.7	41.1	15.7	9.5	11.5	21.4	12.0	14.8	37.3	75.0	121.0	503.1
1952	239.0	179.0	75.1	30.5	18.9	14.3	20.0	22.6	25.4	23.0	32.5	43.2	723.5
1953	205.0	196.0	85.2	35.6	20.5	23.0	24.2	25.7	33.5	35.3	40.0	129.9	853.9
1954	237.0	240.0	121.5	51.4	23.4	21.4	23.8	23.6	29.7	46.1	54.0	85.0	956.9
1955	113.5	105.7	32.3	18.0	13.8	13.5	11.5	13.8	20.5	22.7	56.3	81.8	503.4
1956	207.7	128.9	69.9	34.3	26.2	23.3	21.1	25.7	29.0	22.6	35.7	132.6	757.0
1957	131.4	138.3	62.6	24.0	13.4	12.6	13.0	13.0	13.9	20.4	39.0	108.0	589.6
1958	231.1	139.2	89.8	45.3	28.9	24.5	24.8	23.9	26.1	21.4	27.5	117.2	799.7
1959	229.9	143.0	101.4	28.8	22.6	18.1	19.0	21.5	19.1	21.5	45.6	104.6	775.1
1960	288.1	136.9	68.6	38.2	27.0	25.1	24.1	24.6	25.9	25.4	26.8	51.6	762.3
1961	155.0	98.0	52.8	16.8	11.8	15.6	17.8	24.6	39.2	33.5	38.8	155.0	658.9
1962	172.0	149.0	57.0	18.9	13.0	12.0	15.2	17.9	35.5	59.2	67.0	83.0	699.7
1963	226.0	225.0	180.5	69.4	31.4	29.8	*31.7	*38.1	*37.5	*22.9	*28.9	*87.2	1,008.4
1964	*174.2	*157.5	*99.3	*28.0	*16.5	*17.4	*18.9	*23.1	*29.6	*27.1	*25.1	*95.7	712.4
1965	*197.7	*180.3	*89.4	*33.9	*13.9	*13.6	*29.6	*34.3	*46.1	*80.2	*67.2	*105.9	892.1
1966	*175.1	*149.1	*77.0	*35.3	*16.7	*18.1	*20.0	*22.3	*30.5	*31.0	*26.3	*55.9	657.3
Total	5,600.3	4,722.6	2,228.1	927.7	584.0	545.0	661.8	775.9	854.9	906.7	1,154.5	2,690.7	21,652.2
Average	200.01	168.66	79.58	33.13	20.86	19.46	23.64	27.71	30.53	32.38	41.23	96.10	773.29 (64.44)

* Value estimated in correlation with Fatli data assuming without Almus reservoir

Table II 1-20

Approximately regulated discharge from the reservoir STATION CATCHMENT AREA 2,352.8 sq km ALMUS, TURKEY

Yesilirmak RIVER IN THE BASIN OF Almus ELEVATION m UNIT 10^6 cu.m. S • W •

YEAR	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	ANNUAL
1939	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	51.24	54.77	669.49
1940	104.28	190.26	107.36	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	908.83
1941	258.65	209.26	63.76	67 01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	1,038.60
1942	106.45	209.26	63.26	67.01	65.35	53.01	54 77	53.01	54.77	54.77	49.47	54.77	885.90
1943	53.01	181.70	77.66	67.01	65.35	53.01	54.77	53.01	54.77	54.77	51.24	54.77	821.07
1944	53.01	139.23	105.36	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	804.53
1945	53.01	98.00	73.86	67.01	65.35	53.01	54.77	53.01	54 77	54.77	49.47	54.77	731.80
1946	53.01	86.20	101.86	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	748.00
1947	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	51.24	54.77	669.49
1948	53.01	123.11	113 86	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	796.91
1949	53.01	201.10	63.06	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	824.10
1950	81.45	162.26	56.86	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	807.50
1951	53.01	54.77	53 01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	51.24	54.77	669.49
1952	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53 01	54.77	54.77	49.47	54.77	667.72
1953	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	667.72
1954	53.01	208.67	119.36	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	887.92
1955	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	51.24	54.77	669.49
1956	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	667.72
1957	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	667.72
1958	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	667.72
1959	53.01	85.05	99.26	67.01	65.35	53.01	54.77	53.01	54.77	54.77	51.24	54.77	746.02
1960	53.01	134.56	66.46	67.01	53.01	53.01	54.77	53.01	54.77	54.77	49.47	54.77	748.62
1961	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	667.72
1962	53.01	54.77	53.01	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	667.72
1963	53.01	145.76	178.36	67.01	65.35	53.01	54.77	53.01	54.77	54.77	51.24	54.77	885.83
1964	53.01	135.93	97.16	67.01	65.35	53.01	54.77	53.01	54.77	54 77	49.47	54.77	793.03
1965	53.01	88.50	87.26	67.01	65.35	53.01	54.77	53.01	54.77	54.77	49.47	54.77	735.70
1966	82.65	148.36	74.86	67.01	65.35	53.01	54.77	53 01	54.77	54.77	49.47	54.77	812.80
Total	1,852.71	3,149.68	2,132.73	1,876.28	1,817.46	1,484.28	1,533.56	1,484.28	1,533.56	1,533.56	1,397.55	1,533.56	21,329.21
Average	66.17	112.49	76.17	67.01	64.91	53.01	54.77	53.01	54.77	54.77	49.91	54.77	761.76 (63.48)

Table II 1-21 Design Flood in Turkey

	Name	Type		D. A. (Km^2)	Annual Runoff (10^6m^3)	Average Precipitation (mm)	Design Flood (cms)
1.	Demirkopru	F	77	6,590	708	630	9,300
2.	Hirfanli	F	82	26,200	2,993	400	8,000
3.	Seyhan	F	77	19,194	4,200	600	7,000
4.	Keban	F	204	64,090	20,400	650	20,000
5.	Susurluk	F		6,028			6,200
6.	Manyas	F		1,981			3,560
7.	Kemer	CG	114	3,100	950	750	5,000
8.	Almus	F		2,353	759	900	2,200
9.	Cubuk			190			500
10.	Seyitler			295			450
11.	Selevir			722			675
12.	Altinapa			589			1,640
13.	May			1,411			535
14.	Medik	F	46	7,000	645	365	1,800
15.	Sariyar	CG	110	42,196	2,500	300	8,000
16.	Sille			33			250
17.	Ayranci			1,335			500
18.	Damca			80			150
19.	Ayvacik			36,000	4,700	530	11,000
20.	Kilickaya			8,202	1,700	450	4,000

Table II 1-22 Deriving Probable Maximum Flood at Kilickaya
(Based on mean and standard deviation of precipitation)

No.	Year	Precipitation in March, P(mm)	X =log. P	No.	Year	Precipitation in March, P(mm)	X = log. P
1	1940	59.6	1.77525	15	1954	47.1	1.67302
2	1941	88.5	1.94694	16	1955	30.4	1.48287
3	1942	41.2	1.61490	17	1956	20.3	1.30750
4	1943	28.1	1.44871	18	1957	33.1	1.51983
5	1944	59.1	1.77159	19	1958	52.4	1.71933
6	1945	74.0	1.86923	20	1959	26.1	1.41664
7	1946	78.5	1.89487	21	1960	33.2	1.52114
8	1947	47.2	1.67394	22	1961	30.9	1.48996
9	1948	56.1	1.74896	23	1962	49.8	1.69723
10	1949	126.4	2.10174	24	1963	63.3	1.80140
11	1950	40.1	1.60314	25	1964	89.4	1.95134
12	1951	32.1	1.50651	26	1965	53.5	1.72835
13	1952	87.0	1.93952	27	1966	53.9	1.73159
14	1953	15.0	1.17609	28	1967	58.7	1.76864

X = XN + K. SN
Xt = Precipitation for return period T, in years, when a paticular extreme-value distribution in used.
N, SN = Mean and standard deviation for a series of N annual maximum
K = Standardized variance

$\Sigma x = 46.88023$
$= 1.67429$

$\Sigma x^2 = 79.69583$

$SN = \sqrt{\frac{\Sigma x^2}{N} - \bar{x}^2} = 0.04303$

t = X + SN. K
= 1.67429 + 0.20800 K

K	Frequency	X'	P (mm)
2.33	100 yrs	2.15893	144
3.08	1,000 yrs	2.31493	207
3.62	10,000 yrs	2.42725	267
4.00		2.50629	321
5.50	(90% included)	2.81829	658
6.00		2.92229	836
10.00		3.75429	5,680
15.00		4.79429	6,230

K = 5.5 P = 658 mm

$Q_{peak} = (0.80 \times 658 \times \frac{8,202}{86.40} \times 0.18 + 520^{*}) \times 1.05$
$= (9,000 + 520) \times 1.05$
$= 5,800$ cms

Volume = 0.8 x 0.658 x 8,202 + 1,000* = 5,400 mcm

K = 4.0 P = 321 mm

$Q_{peak} = (0.80 \times 321 \times \frac{8,202}{86.40} \times 0.18 + 520^{*}) \times 1.05$
$= (4,380 + 520) \times 1.05$
$= 5,100$ cms

Volume = 0.80 x 0.321 x 8,202 + 1,000* = 3,200 mcm

K = 3.62 (10,000 yr Frequency) P = 267 mm

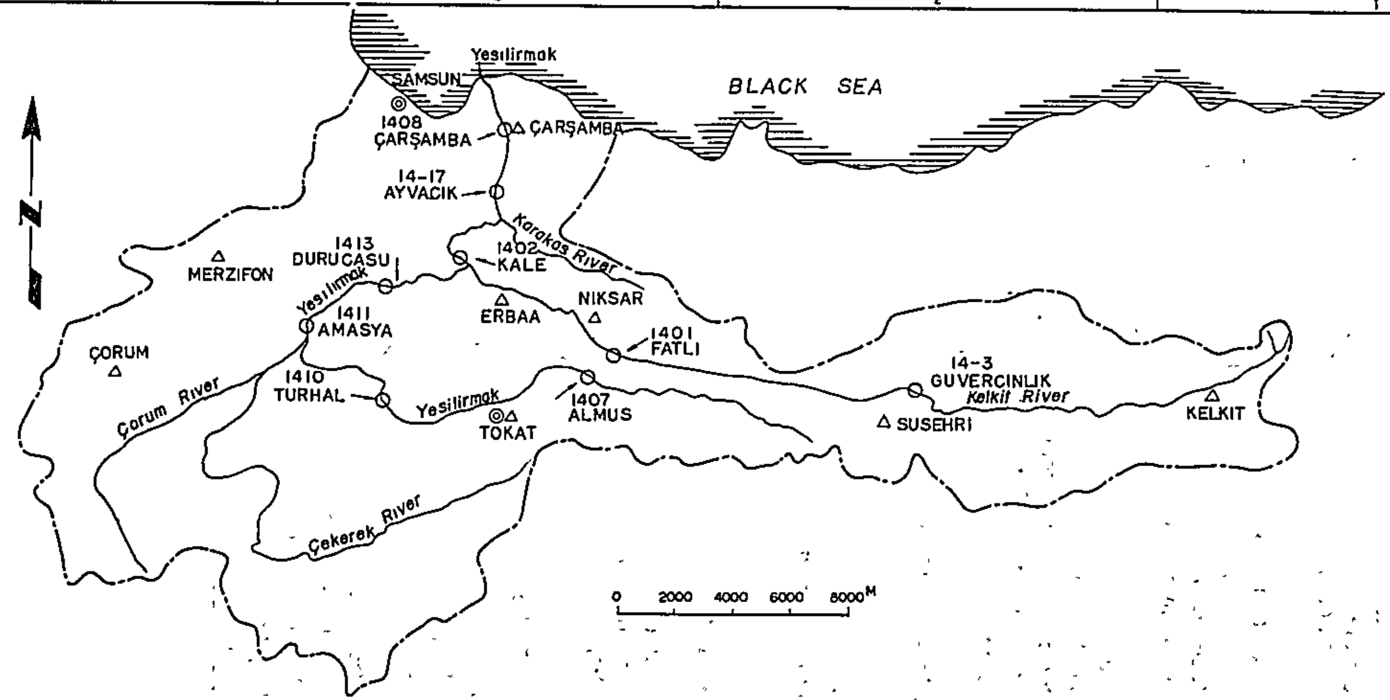
$Q_{peak} = (0.80 \times 267 \times \frac{8,202}{86.40} \times 0.18 + 520^{*}) \times 1.05$
$= (3,700 + 520) \times 1.05$
$= 4,400$ cms

Volume = 0.80 x 0.267 x 8,202 + 1,000* = 2,800 mcm

* Adopted the Probable Maximu Base flow of the storm-2 in Table 3

Table II 1-23 Deriving Probable Maximum Flood at Kilickaya
(Based on two floods in 1952 and 1967)

Item	Storm - 1 (March,1952)	Storm - 2 (April, 1967)
(1) Monthly Average 1,000 mb Temperature (°C)	7.5	15.0
(2) Precipitable Water from 1,900 m to 12,000 m (Based on (1)), (mm)	270	700
(3) Maximum Average Upper Wind Speed at Ankara (m/s)	37.5	34.0
(4) Moisture Inflow Index, (3) x (2), (1,000 mm, m/s)	10.2	23.8
(5) Maximum Moisture Inflow Index (See Fig. 11), (1,000 mm, m/s)	32.0	60.0
(6) Maximizing Factor (5)/(4)	3.1	2.5
(7) Precipitation in Storm (mm)	87.0	33.2
(8) Probable Maximum Precipitation in Storm (6) x (7) (mm)	270	83
(9) Probable Maximum Runoff for a Storm, (8) x 0.80 (mm)	216	67
(10) Probable Maximum Runoff for a Storm, (9) x 8,202km² ($10^6 m^3$)	1,780	550
(÷ 86,400), (m^3/s-day)	20,600	6,400
(11) Probable Maximum Surface Daily Peak, (10) x 18.0% (m^3/s)	3,700	1,200
(12) Maximum Temperature in the Storm at Tokat, (El. 650 m) (°C)	24.2	18.2
(13) Maximum Temperature in the Storm at Center of Snowline, 1,900 m (°C)	17.2	11.2
(14) Snowmelt in the Storm $(13) \times 4\ mm/°C \times \frac{8{,}000\ km^2}{8{,}202\ km^2}$ (mm/day)	66	44
(15) Past Maximum Temperature at Tokat (°C)	30.1	30.1
(16) Past Maximum Temperature at Center of Snowline, 1,900 m (°C)	23.1	23.1
(17) Past Maximum Snowmelt $(16) \times 5\ mm/°C \times \frac{8{,}000\ km^2}{8{,}202\ km^2}$ (mm/day)	113	113
(18) Maximizing Factor for Base Flow (17) / (14)	1.7	2.6
(19) Base Flow at Kilickaya: Total (m^3/s - day)	3,700	4,400
Peak (m^3/s)	105	200
(20) Probable Maximum Base Flow: (18) x (19) Total (m^3/s - day)	6,300	11,500
Peak (m^3/s)	180	520
(21) Probable Maximum Daily Peak (11) + (20), (m^3/s)	3,880	1,720
(22) Probable Maximum Peak Flow (21) x 1.05 (m^3/s)	4,000	1,800
(23) Probable Maximum Flood Volume (10) + (20) (m^3/s - day)	24,300	17,900
($10^6 m^3$)	2,100	1,550



LEGEND

○ Gaging Station

△ Precipitation Station

RUNOFF RECORD

Station		C.A (sq km)	'32	'34	'36	'38	'40	'42	'44	'46	'48	'50	'52	'54	'56	'58	'60	'62	'64	'66	'68	'70
1408	ÇARŞAMBA	36,136.4																				
14-17	AYVACIK	36,000.0																				
1402	KALE	33,904.0																				
1413	DURUCASU	21,464.0																				
1411	AMASYA	18,788.4																				
1410	TURHAL	4,816.4																				
1407	ALMUS	2,352.8																				
1401	FATLI	10,048.8				Apr																
14-13	GUVERCINLIK	7,860.0																				

PRECIPITATION RECORD

Station	'32	'34	'36	'38	'40	'42	'44	'46	'48	'50	'52	'54	'56	'58	'60	'62	'64	'66	'68	'70
ÇARŞAMBA																				
MERZIFON																				
ÇORUM																				
ERBAA																				
NIKSAR																				
TOKAT																				
SUSEHRI																				
KELKIT																				

LOCATION	DATE	DESCRIPTION	BY
REVISION			

OVERSEAS TECHNICAL COOPERATION AGENCY, JAPAN
DEVLET SU İŞLERİ, TURKEY
KELKİT-KARATAŞ PROJECT

LOCATION MAP OF PRECIPITATION AND RUNOFF GAGING STATION

ELECTRIC POWER DEVELOPMENT CO., LTD. (E.P.D.Consultants) TOKYO JAPAN

Fig. II 1-1

SHEET NO. OF

Fig. II 1-2 Yesılırmak Basın Gagıng Statıon

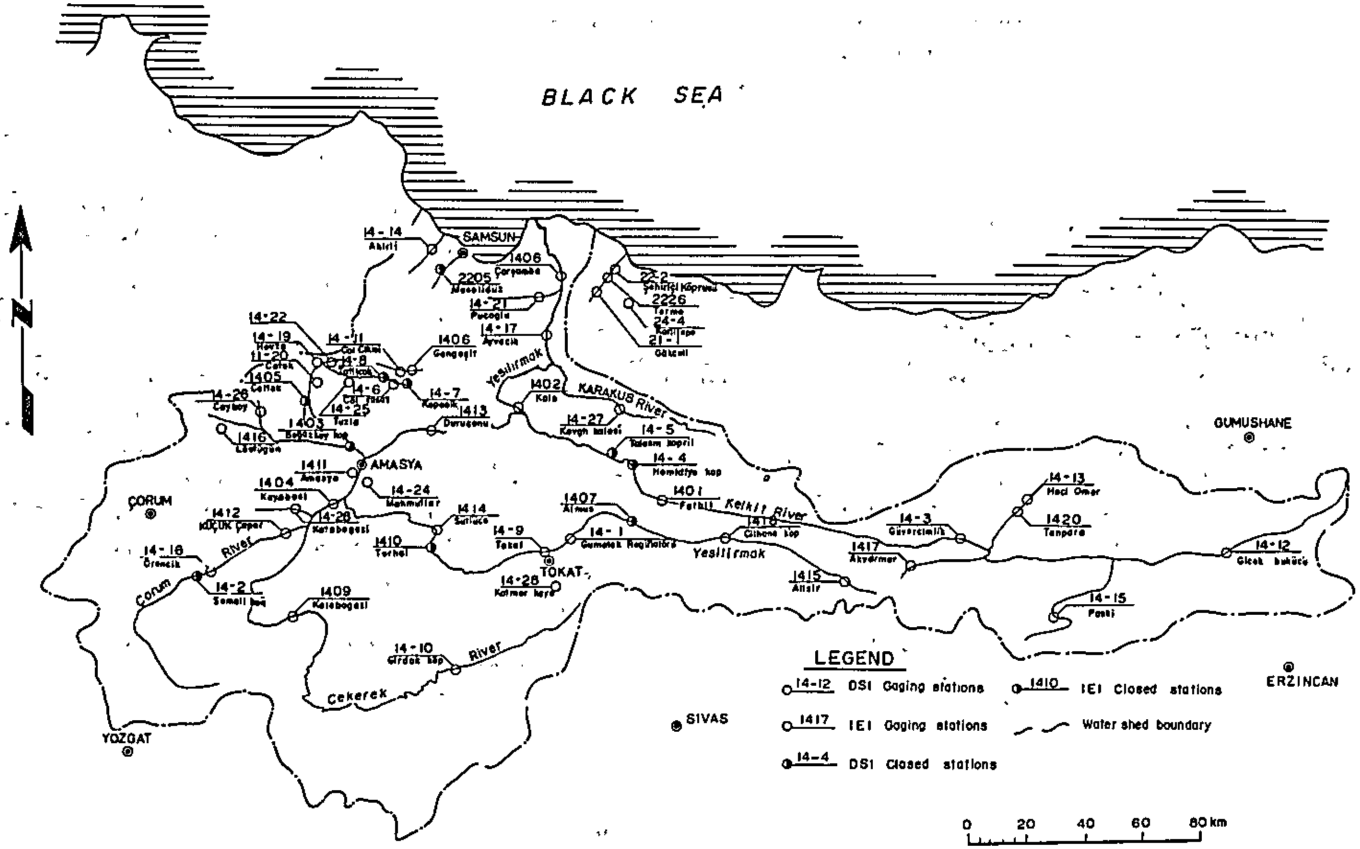
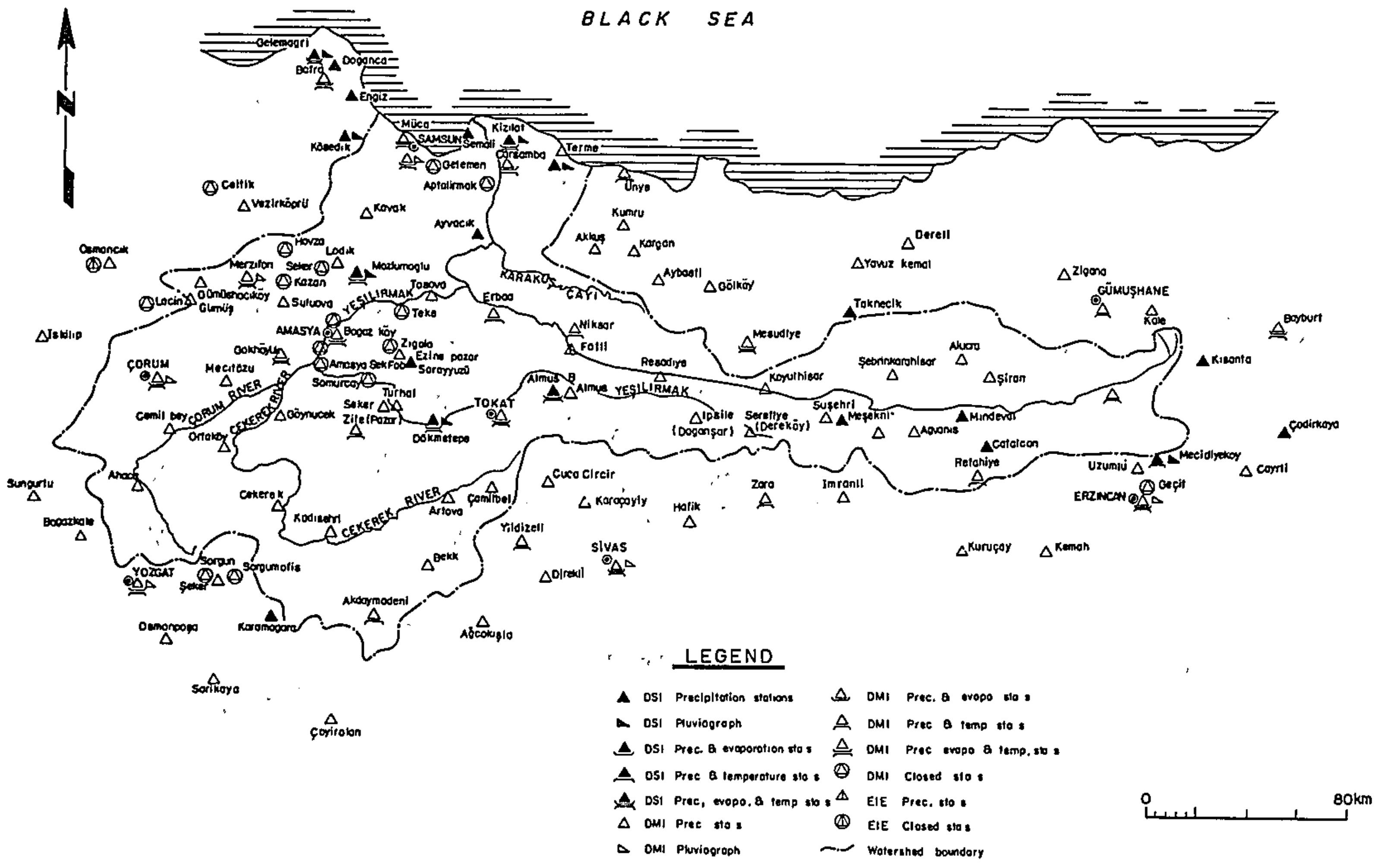


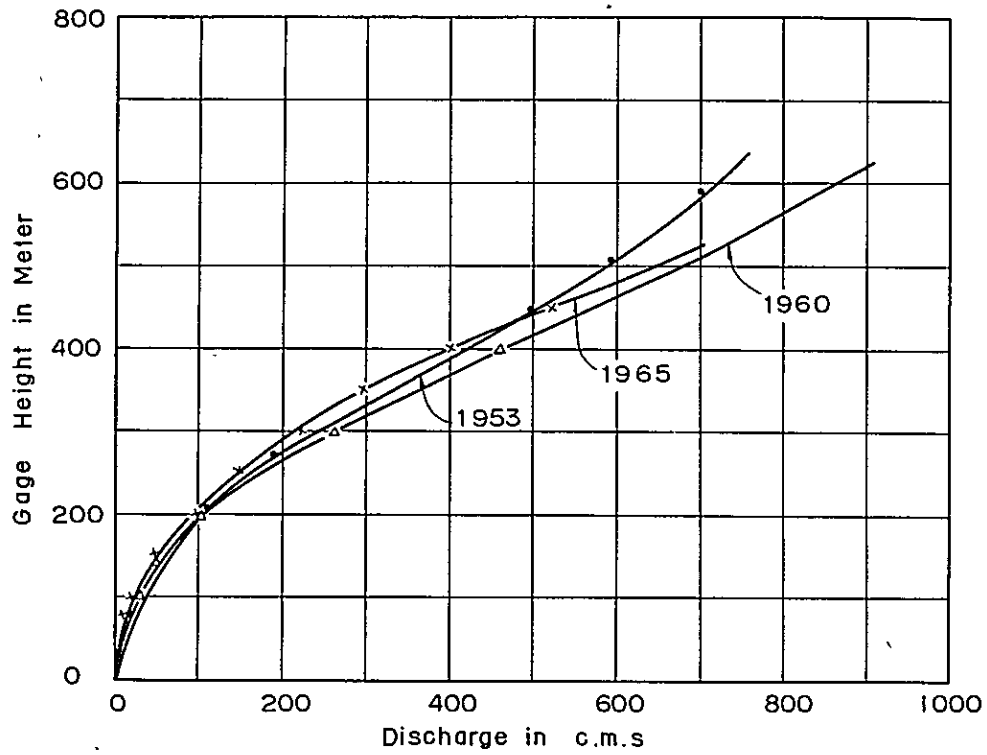
Fig. II 1-3 Yesılırmak Basin Meteorological Station



Source : Leedshill-Bechtel Report

Fig. II 1-4 Rating Curves

FATLI Gaging Station



KALE Gaging Station

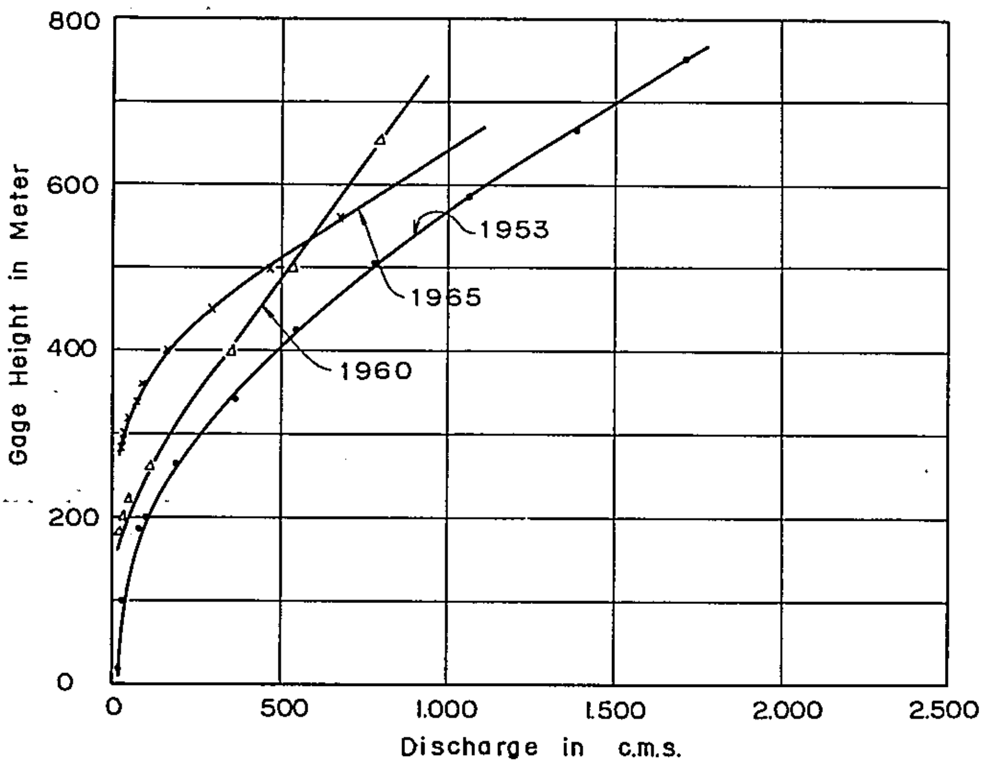
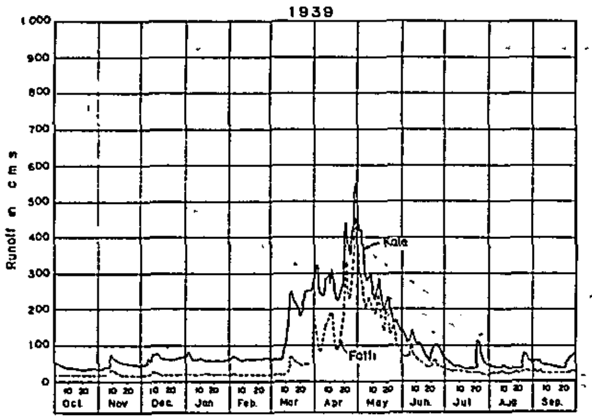


Fig. II 1-5 Hydrograph of Kale and Fath



II 1-8

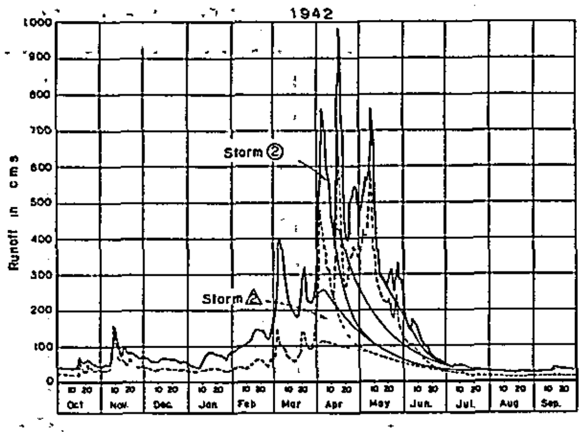
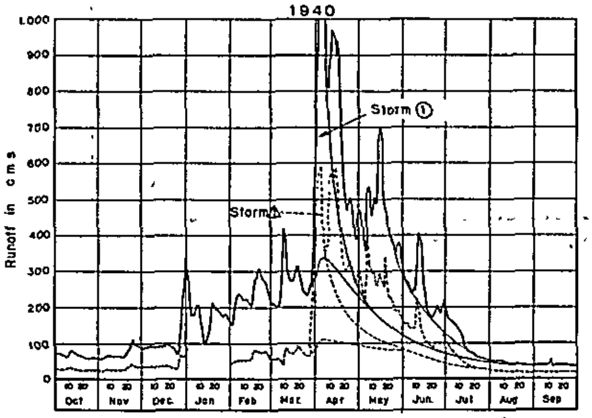
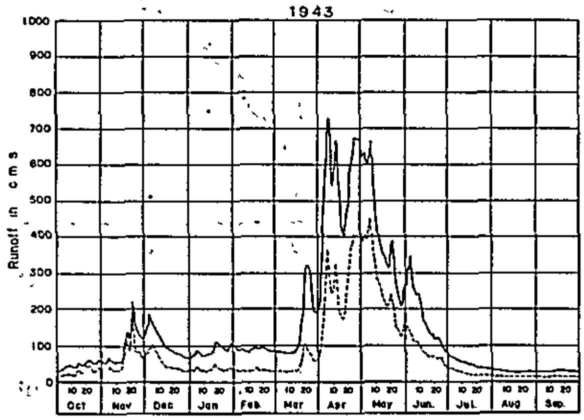


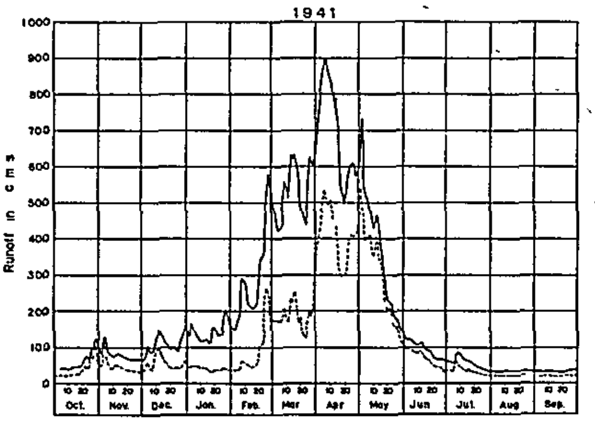
Fig. II 1-6



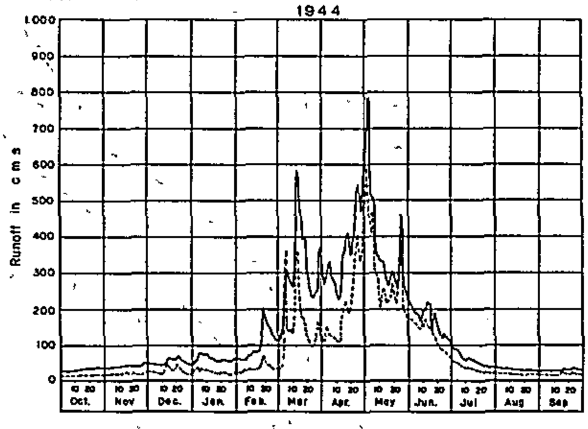
II 1-9



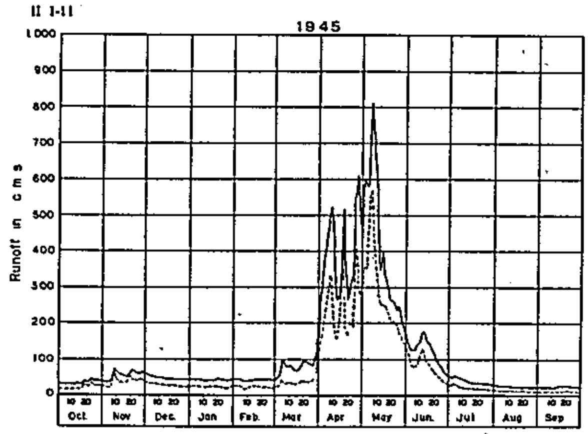
II 1-7



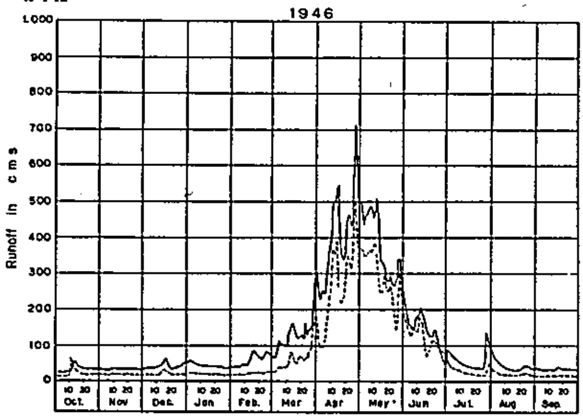
II 1-10



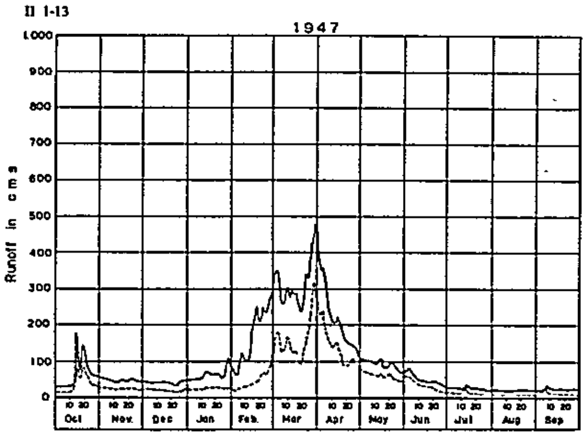
II 1-11



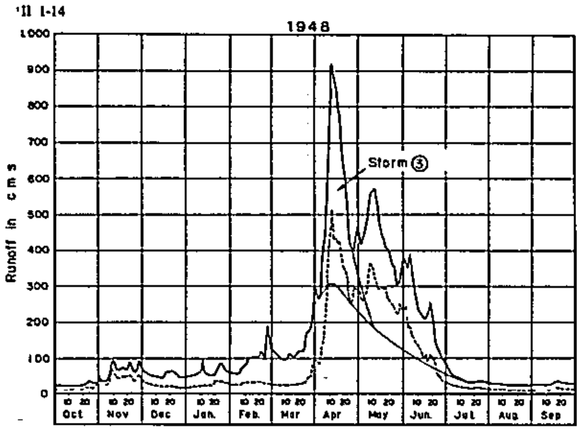
II 1-12



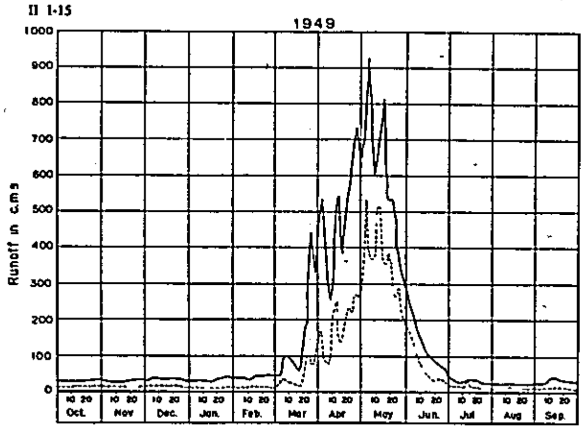
II 1-13



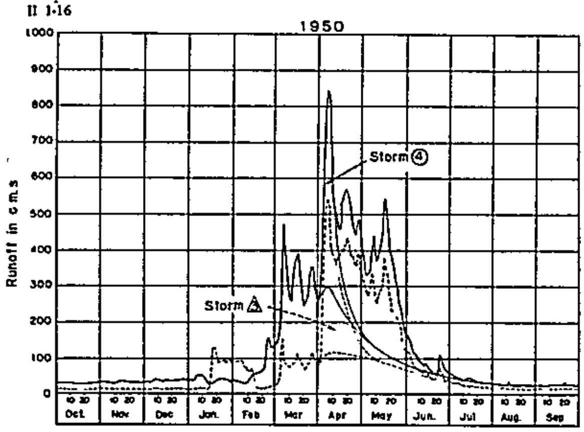
II 1-14



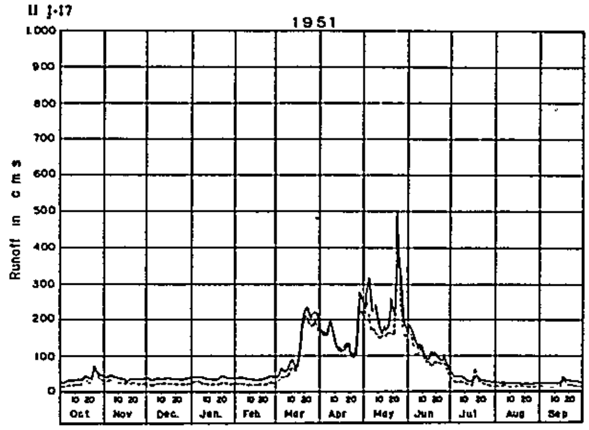
II 1-15



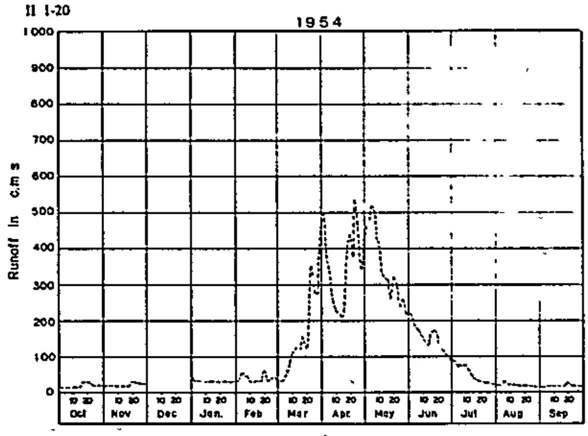
II 1-16



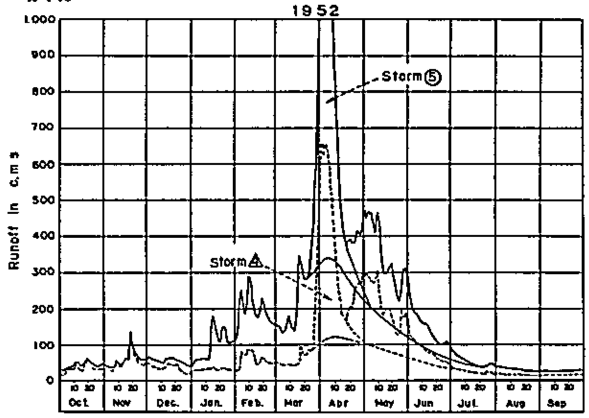
II 1-17



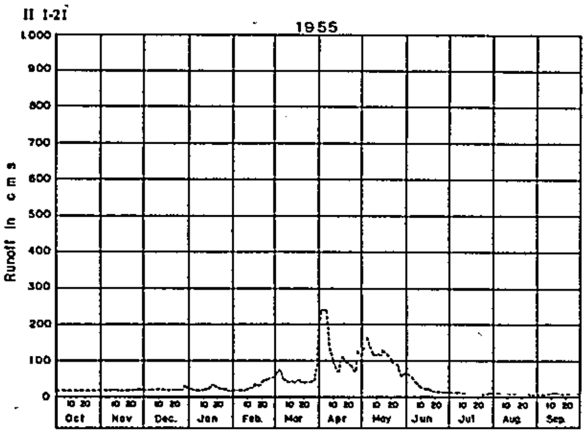
II 1-20



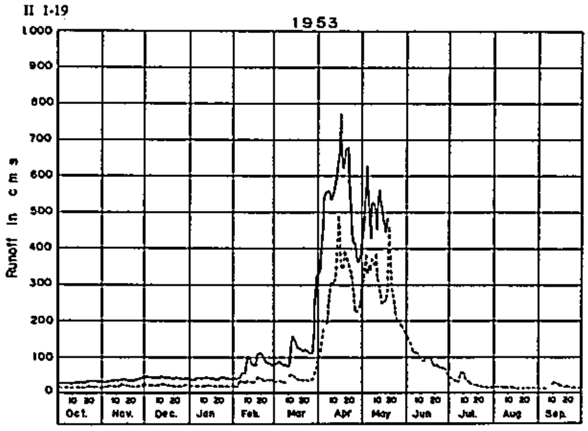
II 1-18



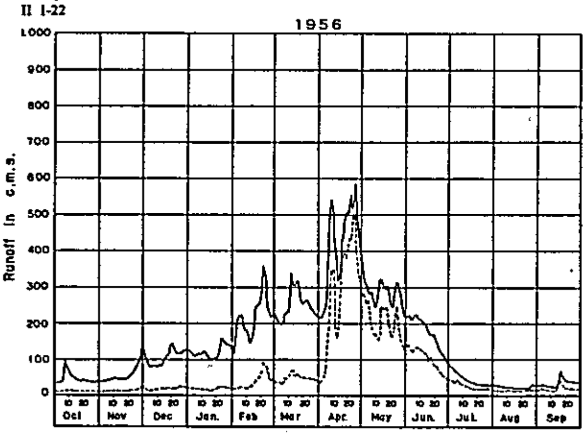
II 1-21



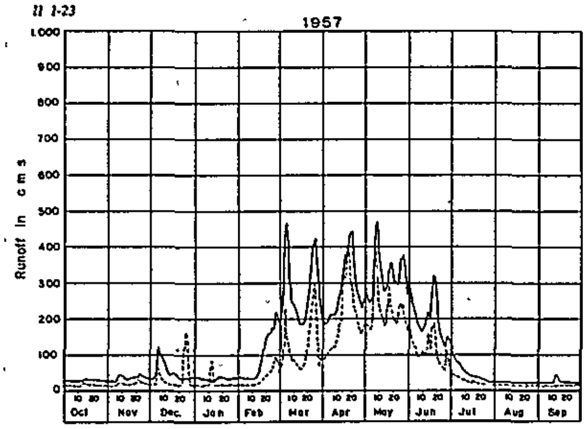
II 1-19



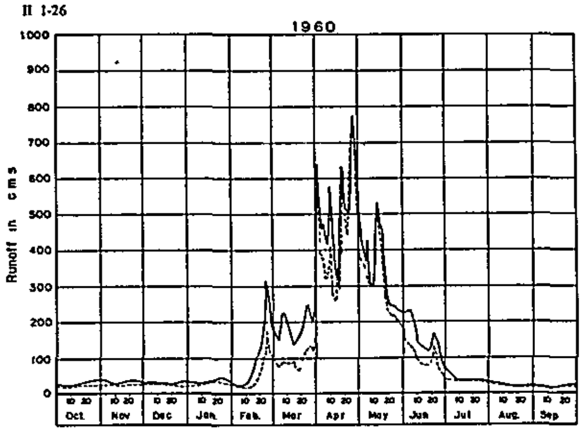
II 1-22



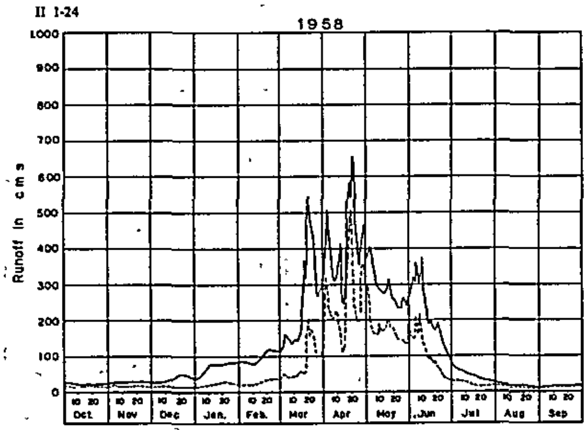
II 1-23



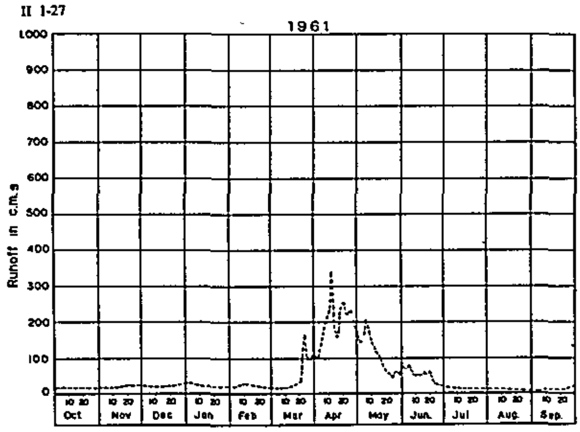
II 1-26



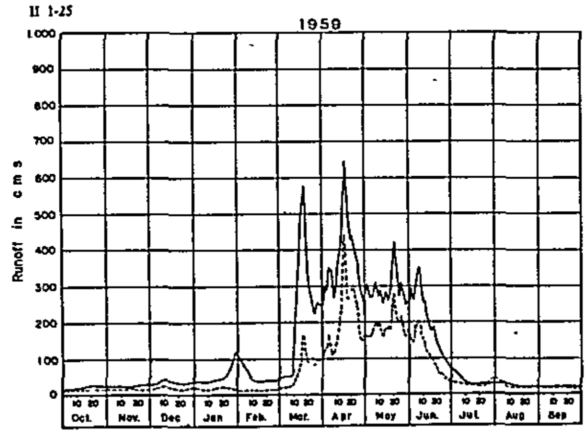
II 1-24



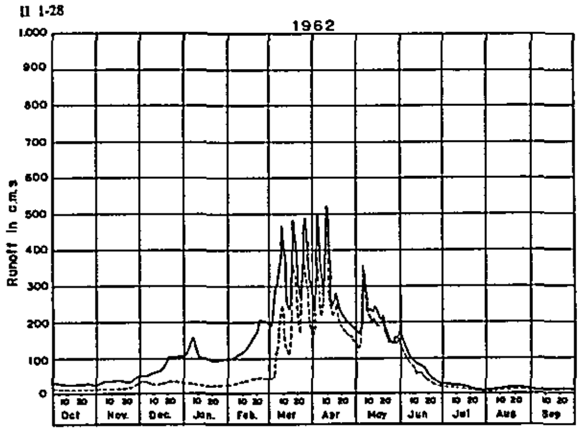
II 1-27



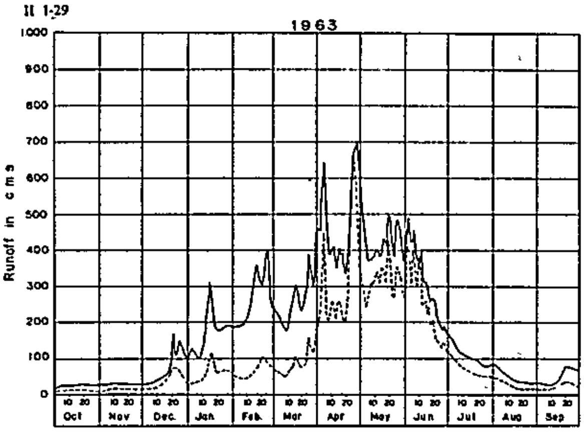
II 1-25



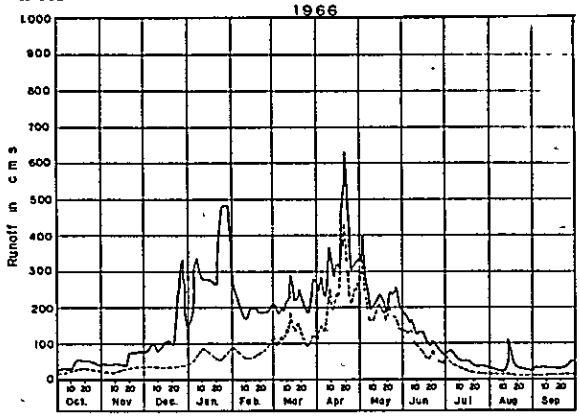
II 1-28



II 1-29



II 1-32



II 1-30

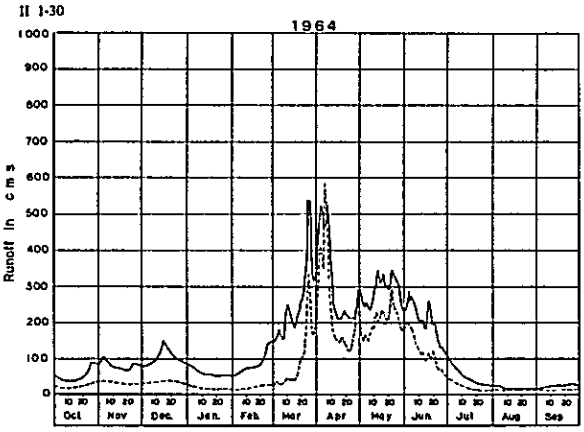
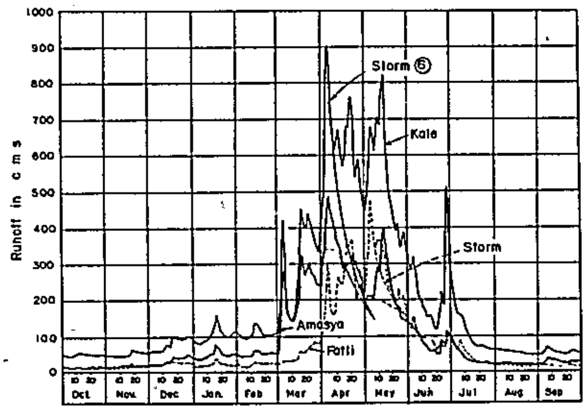


Fig. II 1-33 Hydrograph of Kale, Fatle and Amasya



II 1-31

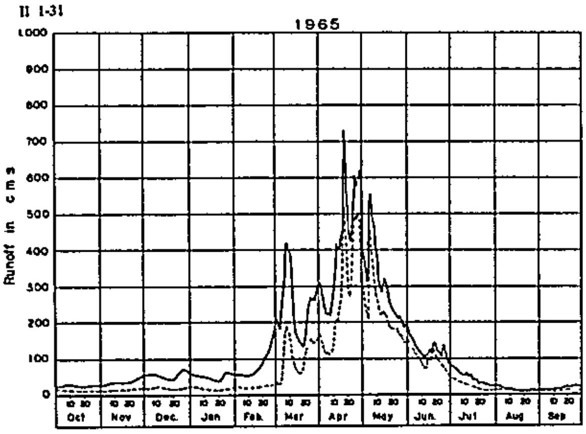


Fig. II 1-34 Enveloped Curve of Maximum Flood in Turkey

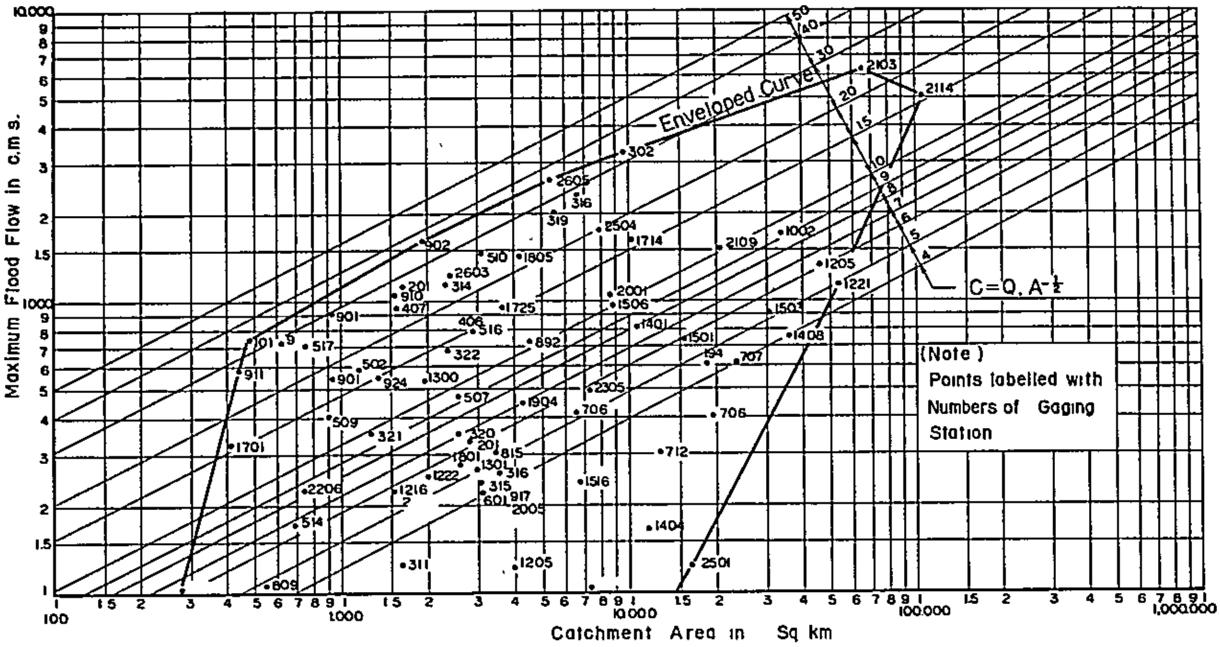
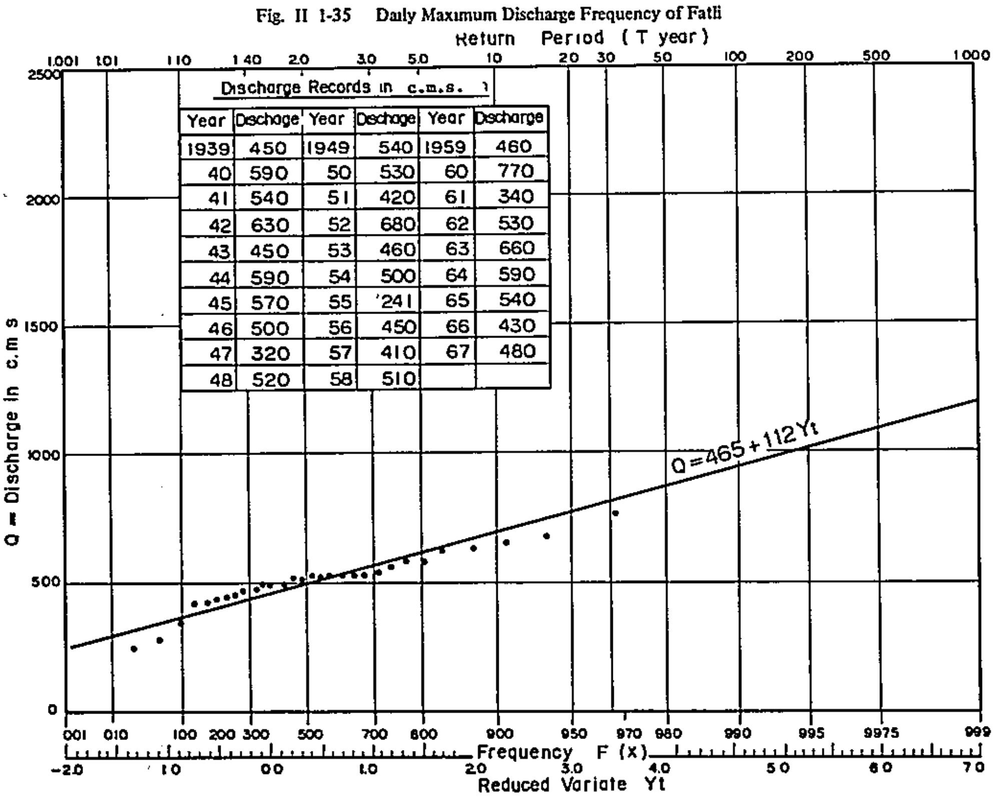


Fig. II 1-35 Daily Maximum Discharge Frequency of Fatli



Discharge Records in c.m.s.

Year	Dschage	Year	Dschage	Year	Discharge
1939	450	1949	540	1959	460
40	590	50	530	60	770
41	540	51	420	61	340
42	630	52	680	62	530
43	450	53	460	63	660
44	590	54	500	64	590
45	570	55	'241	65	540
46	500	56	450	66	430
47	320	57	410	67	480
48	520	58	510		

Fig. II 1-36 Correlation Between Peak Discharge and Daily Maximum Discharge at Fatlı

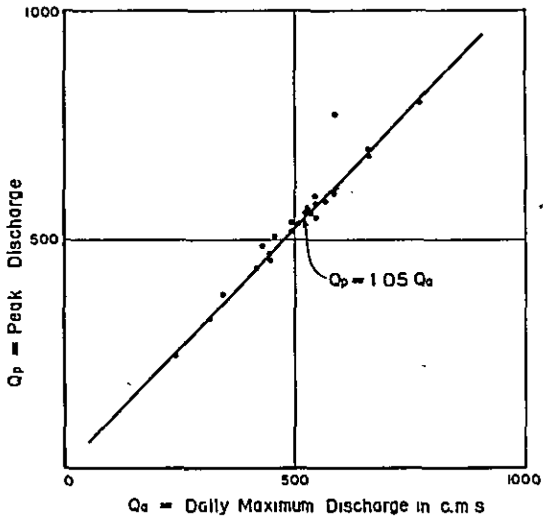


Fig. II 1-37 Correlation Between Design Flood and Catchment Area in Turkey

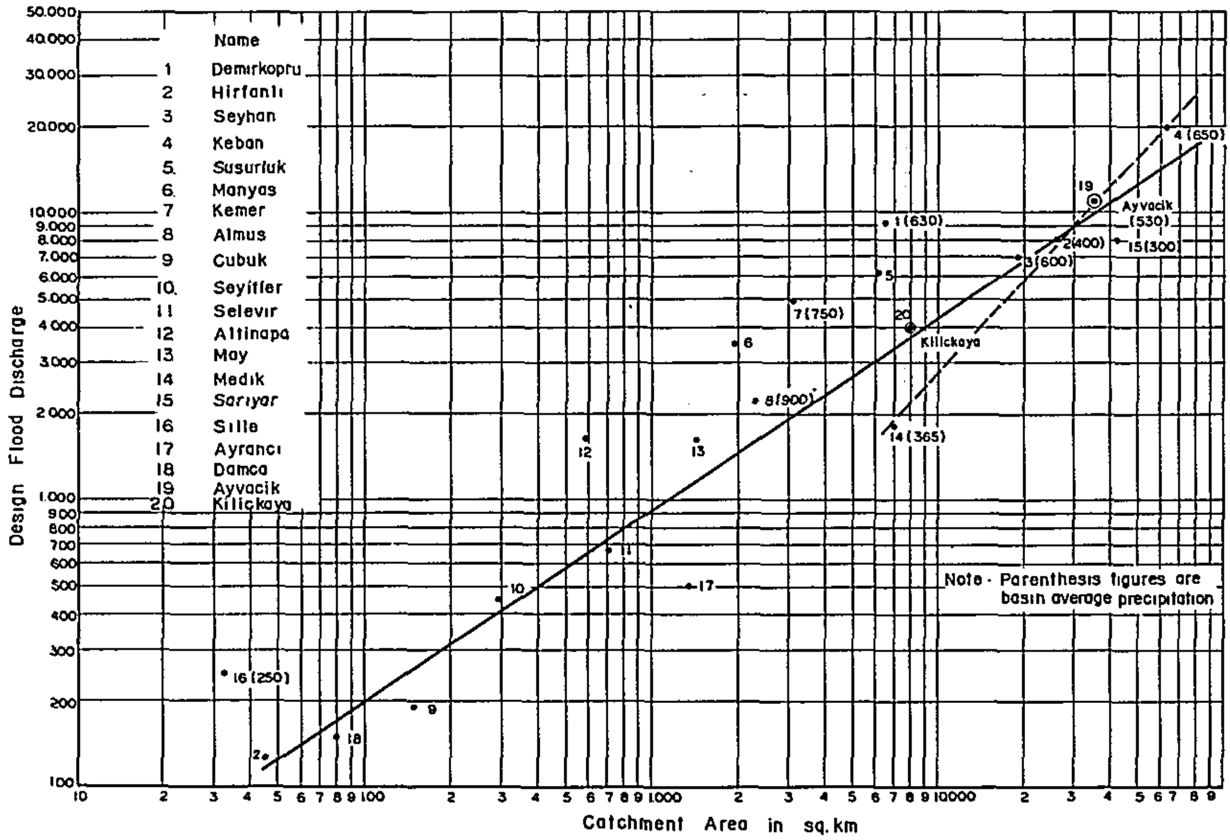
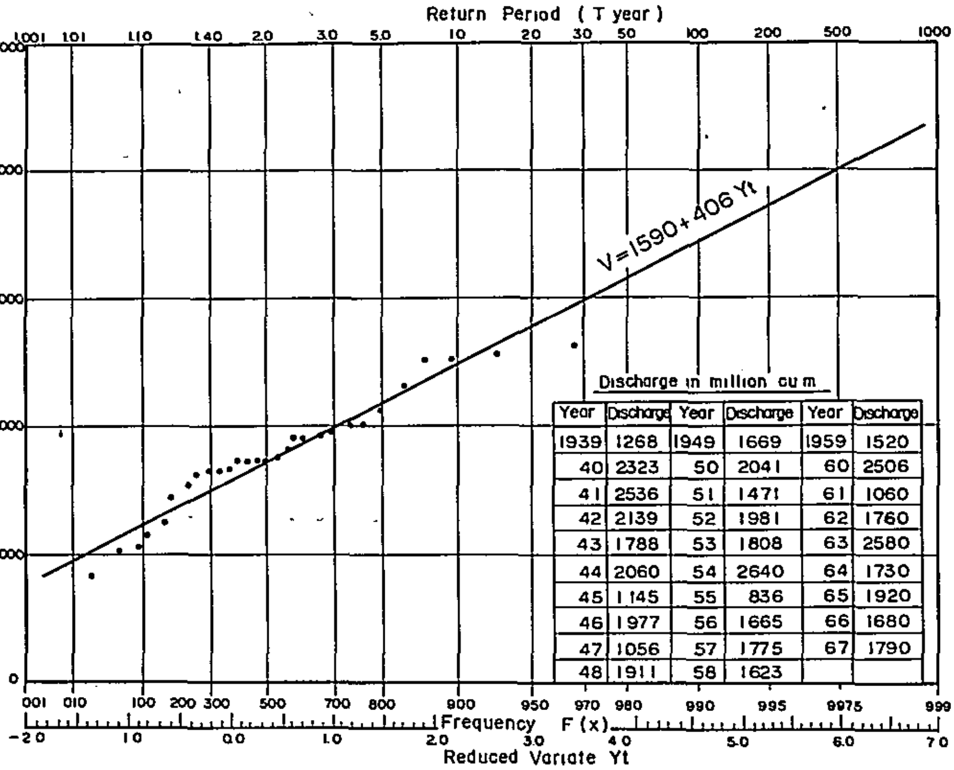


Fig. II 1-38 Total Discharge Frequency in Storm Season of Fatli



Year	Discharge	Year	Discharge	Year	Discharge
1939	1268	1949	1669	1959	1520
40	2323	50	2041	60	2506
41	2536	51	1471	61	1060
42	2139	52	1981	62	1760
43	1788	53	1808	63	2580
44	2060	54	2640	64	1730
45	1145	55	836	65	1920
46	1977	56	1665	66	1680
47	1056	57	1775	67	1790
48	1911	58	1623		

Fig. II 1-39 Correlation Between Peak Discharge and Total Discharge in Storm Season

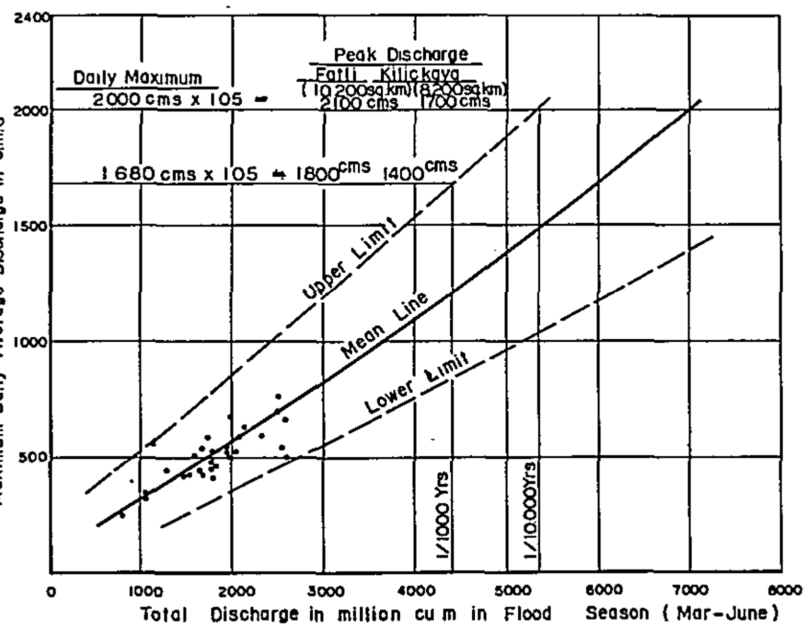


Fig. II 1-40 Distribution of Standardized Variate (K)

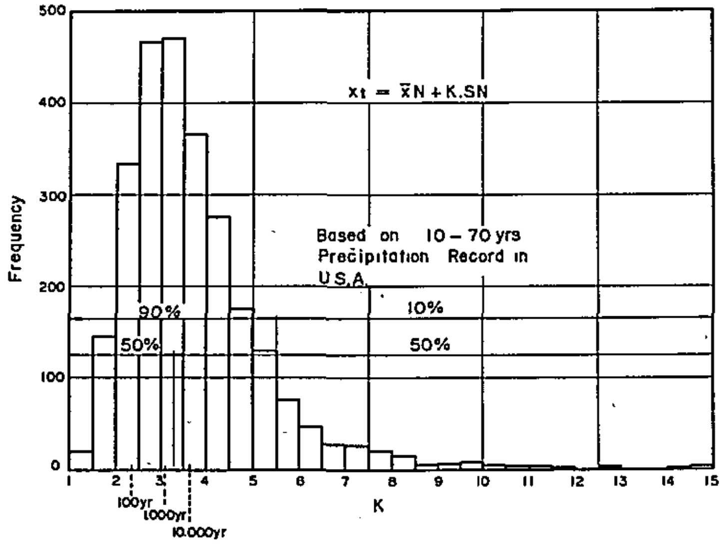


Fig. II 1-41 Unit Hydrograph of Kılıçkaya

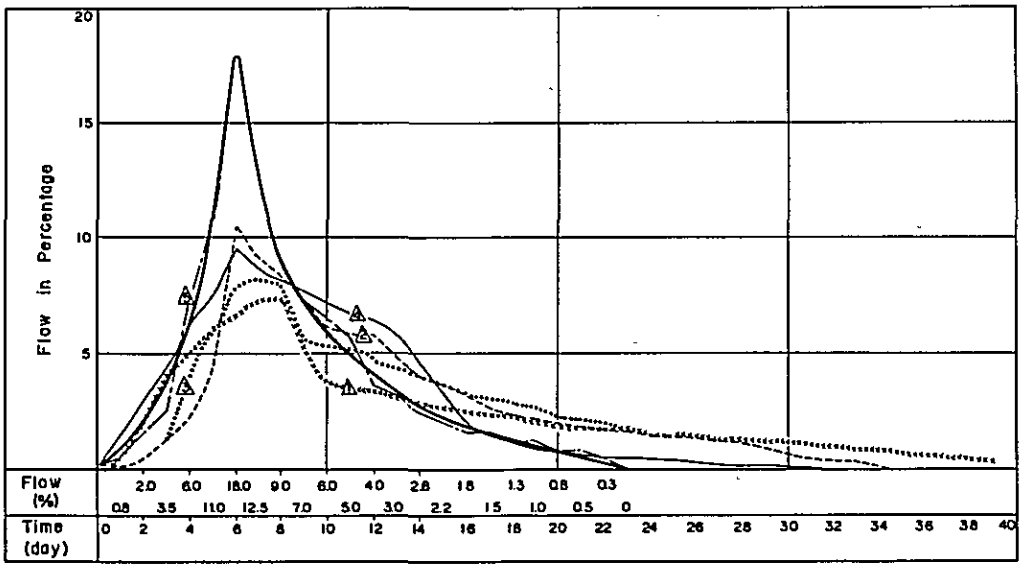


Fig. II 1-42 Correlation Between Annual Runoff of Fatli and Average Annual Precipitation

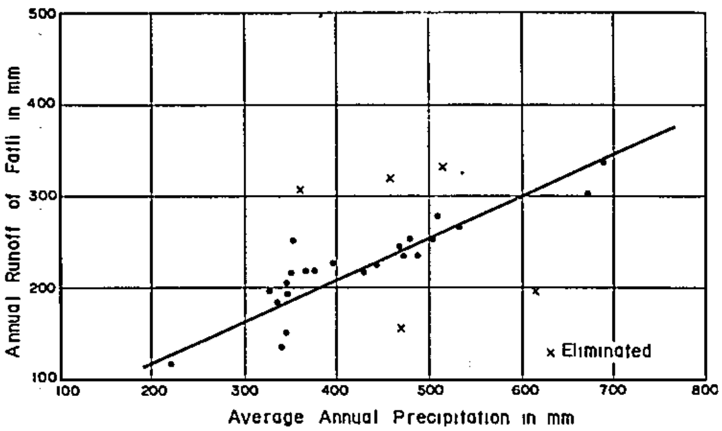


Fig. II 1-43 Correlation Between Total Runoff at Fatli and Precipitation in Stormy Season

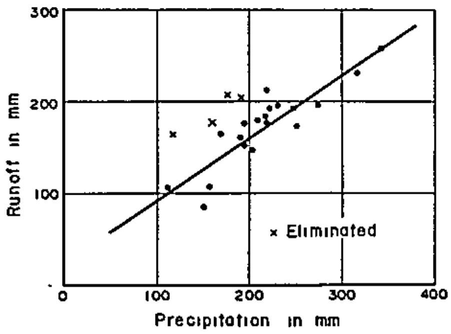


Fig. II 1-44 Correlation Between Loss Water and Precipitation in Storm Season

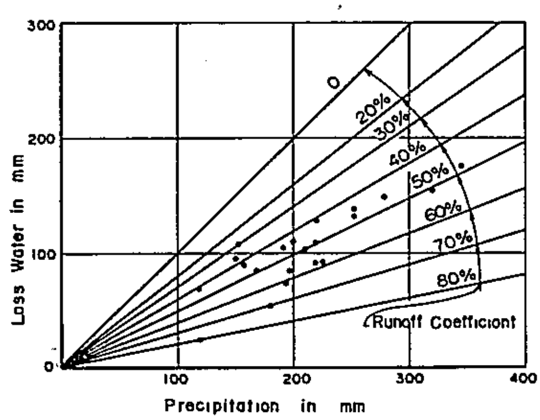


Fig. II 1-45 Seasonal Variation of Several Facters of Probable Maximum Precipitation

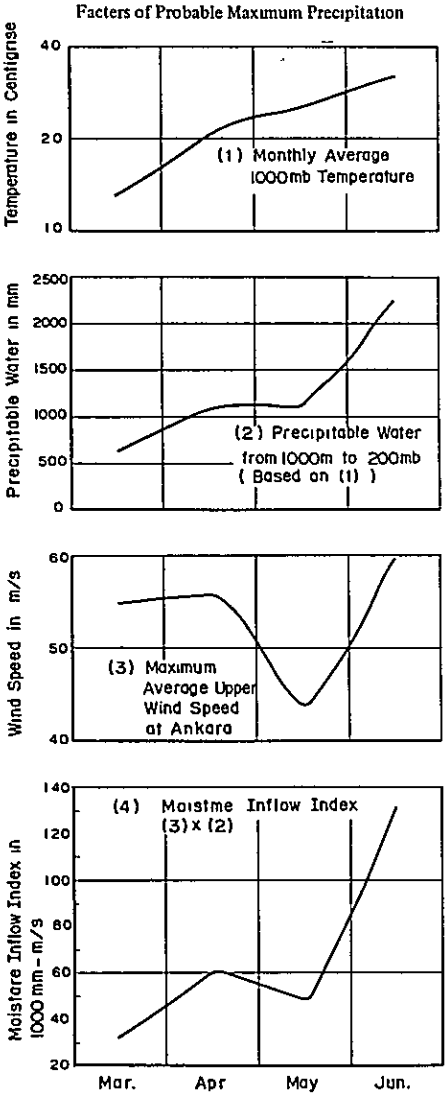


Fig II 1-46 Recession Curve of Hydrograph at Fath

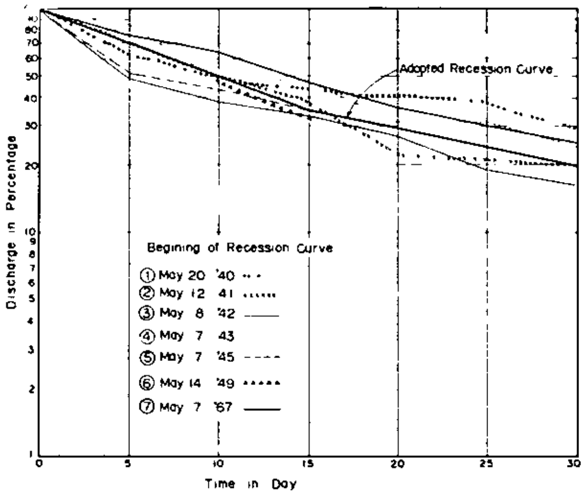


Fig II 1-47 Flood Flow Hydrograph and Precipitation in Storm (March 1st to June 30th 1952)

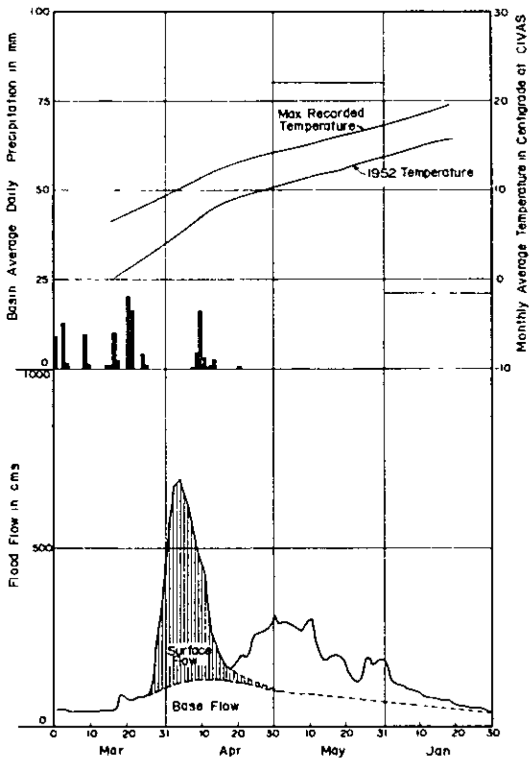


Fig II 1-48 Flood Flow Hydrograph and Precipitation in Storm (March 1st to June 30th 1967)

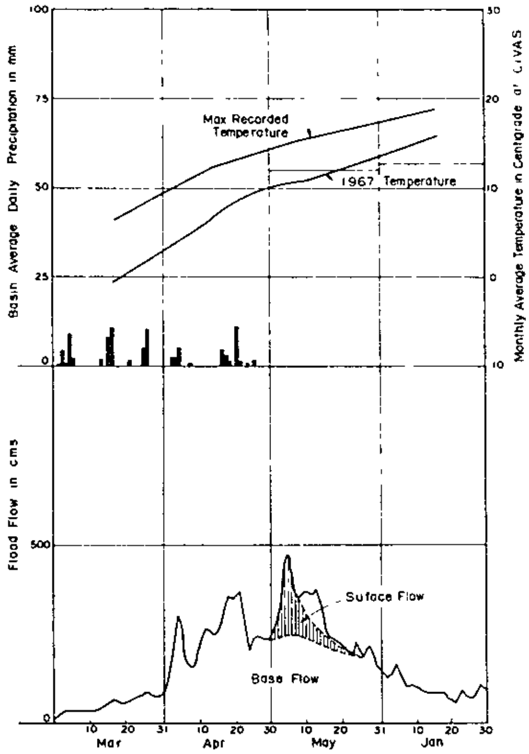
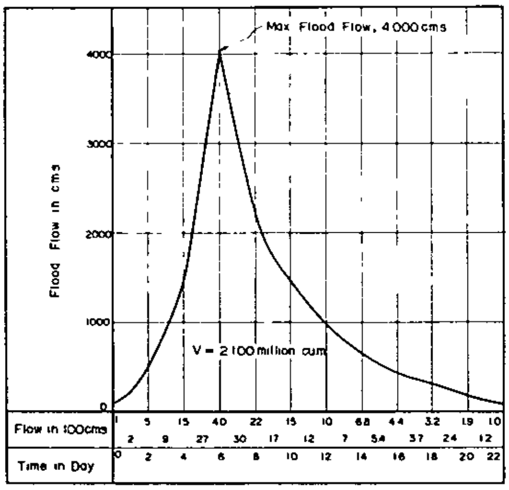


Fig II 1-49 Design Flood Hydrograph at Kilickaya



II 2 Geology

Contents

Table

Figures

II 2 GEOLOGY

2.1 INTRODUCTION

2.1.1 Geology Studies Performed by the DSI

The geological studies concerning Kilickaya Dam were performed in 1967 by the DSI as follows:

A. Reservoir Area

Geologic mapping ..... based on photogrammetrical topographic maps on the scale of 1/5,000 and 1/25,000.

B. Dam Site

a. Geologic mapping ..... based on surveyed map on the scale of 1/1,000.
b. Drilling ..... 1,031m in total length in 16 holes
c. Permeability test ..... performed on drill holes (1.5 m long each) in the river deposits.
d. Water pressure test ..... performed drill holes (2m long each) in the rocks.
e. Measurement of underground water table..... performed on all drill hole for the period up to December 16, 1967,

Drilling works were peroformed by engineers and operators of the DSI by using mainly NX size. High core recovery performed shows that their technical skill is excellent The drill cores are arranged in core boxes and kept in a storage in the suburbs of Samsun. Permeability test and water pressure test were proved successful, as mentioned below, to show the permeabilities of the river deposit and rock.

Geologic survey and core observation were performed by Mr. Gungor Syin, a geologist of the DSI. The results of these studies are contained in the report titled "Engineering Geology Planning Report of KILICKAYA DAM of Kelkit--Karatas Project", together with the geologic map and the log of drill hole. The report is an excellent and laborious work concerning the engineering geology of the dam site and the reservoir area.

2.1.2 Geologic Studies Performed by the Japanese Government Survey Team and Summary of the Results of the Studies.

The Japanese Survey Team made geologic studies of the dam site and the reservoir area, and observation of all drill cores. It also performed a close study on the geologic data prepared by the DSI. It tried to make geologic interpretation by aerial photographs of the project area, but, unfortunately no such photographs were made available to the team.

The general topographic and geologic features of the project area are described in Volume I, 3–4, and engineering geologic explanations on the project structures and reservoir are given in Volume I, 7–3. Therefore, in this chapter, geologic features of the dam site and the reservoir area are given, and geologic log of drill holes and the photomicrographs covering thin section of rocks are attached.

The engineering judgment on the geology of the project is summarized as follows:

Dam Site:

A. In the riverbed a deposit of gravel exists which is 31.5m in thickness. This deposit must be excavated and taken away from the place where the impervious core is to be founded. No excavation is necessary at the place where rockfill part is to rest.

B. Almost all the rock foundations are altered trachy andesite. The rocks which are heavily altered have tendency to be easily decomposed by water saturation. However, such altered portions are limited, and generally speaking, including heavily altered portions, it has enough stability as the foundation of the dam.

C. Weathering of foundation rocks is considerably heavy in the area from the riverside to the skirts of a hill on the right bank. In other area, the rock which has enough stability as dam foundation can be reached by excavation of about 2m in depth.

D. At the elevation of about 830m on the right bank of the river, there is a fault with a strike parallel to the river and having a dip of 65°to the mountain side. The fault has 5cm-wide openings produces of spring water. Therefore grouting is necessary in the fault part.

E. The foundation rock around the site has generally high water tightness. Accordingly, numbers of grouting holes and amount of injection necessiated will be less than in ordinary cases.

Appurtenant Structures:

A. Drilling is necessary to find thickness of talus deposits distributed at the areas where the power station and the switch-yard are proposed.

B. Concrete placing is necessary for the spillway and penstock line.

C. There will be no substantial problems in the excavation of diversion tunnel. Support works will be required only for limited portions. Sections where concrete lining is needed will be very few in consideration of geologic conditions.

Reservoir Site:

A. There is no topographical or geologic factors which suggests possible leakage from the reservoir.

B. As for the landslides which generally occur in the Tertiary group, further studies and observation are necessary. However, there is almost no fear of large and rapid landslides which may endanger the dam.

2.2 DAM SITE

2.2.1 Topography

The Kelkit river flows in the general direction from east to west, but, as it bends sharply at upstream and downstream of the dam axis, in the dam site area it flows in the direction from SSE to NNW. Each bank of the river facing the bending projects in the form of a peninsula.The elevation of the riverbed at the dam axis is 752m and the elevations of the ridges of the hills in both abutments are about 990m. On the left bank of the river at about 130m upstream of the dam axis, and on the right bank, at about 200m downstream, there are marshes of considerable coverage, respectively. The slope of the mountain has a number of creases. The slope is generally steep, and except for the talus deposits at the foot of the mountain the average gradient of the slope at the dam axis is 350 on the left bank and 40^{o} on the right bank respectively. On the left bank above the elevation of 1,000m the slope is gentle. The width of the river is about 50m in the river-course and the valley is about 400m wide at the elevation of 850m. The section of the valley is very similar to that of a vessal's bottom in shape.

The density of plants near the dam site is, very poor due to extensive outcrop of rocks and dry climate. On a part of the riverside a small number of poplartrees are growing. On the mountain slope a few grasses and shrubs grow scattered.

2.2.2 Stratigraphy

The rocks around the dam site are mainly trachyandesites, and augite porphyrites intrudes at some parts. Above the elevations of 1,020m on the left bank of the river, the oligo–miocen strata are extensively distributed. Between these strata and trachyandsite, agglomerate and tuffs of 20–40M in thickness are distributed almost horizontally. But they will have no direct influence to the dam as the high water level of the reservoir is designed to be 850m in elevation and does not reach the elevations. The top soil of the mountain slope is thin. On the foot of the mountain there are rather thick talus deposits. The river channel is covered with gravel of 31.5m in thickness.

A. Top Soil and Talus Deposits

On the mountain side slope above elevation 770m on the left bank and 765m on the right bank of the dam axis rocks are exposed, and talus deposited below the elevations on the river side slope. The thickness of talus deposits at the drill spots are, on the left bank SK 2 (EL. 762.09m, vertical hole) 12.6m and on the right bank SK–M10 (EL 764.35m, 70° as to mountain side) 10.0m. At the marshes located at 130m upstream from the dam axis on the left bank and at 200m downstream on the right bank, there are large volume of talus deposits.

Talus deposits are generally composed of large and small blocks, though those at the upstream on the left bank are composed of more of soil ingredent and less blocks.

B. River Deposit

Drilling was performed at 7 spots in total at the river bed including 5 spots (SK–3, 4, 5, 6, 7) crossing the river at about 50m upstream of the dam axis, 1 spot (SK–8) at 80m downstream and 1 spot (SK–9) at 120 upstream. The depth of gravel deposit at each spot is, in numerical order from SK–3 to SK–9, as follows:

28,75m, 28.75m, 31.50m, 29,00m, 25.60m, 29.50m, 29;40m.

These gravel are almost all composed of volcanics, rarely including limestones. All the pebbles are hard.

As it is difficult to lift sand and pebbles by drilling from river deposits, exact composition of grain size can not be known. The core recovery of the river deposit at this site is less than 40%. Core observation shows that diameters of pebbles are mostly 5–10cm and rarely 20–50cm. The majority of big boulders are limestones. Judging from the feeling of drillers at drilling work, it is believed that the ratio of sand and silt is small and that they are not distributed in layers. The standard penetration test was performed. But no exact value was obtained as there existed too much gravel.

C. Trachyandesite

The dam foundation is generally composed of trachyandesite, augite trachyandesite distributed at a part of upstream area on the right bank.

The trachyands has entirely been subjected to hydrothermal alteration. The degree of alteration varies according to locations. Colors of rocks are also multy-dark greenish gray, purplish red, light green, yellowish grey, etc. mixed finely together. Agglomeratic or flow structures are seen in part.

They are generally massive and have cracks. They can be broken with heavy strikes by a hammer. The heavily altered part has smaller specific gravity and its texture is porous. Among the drill cores which are recovered in the form of a stick, there are some which easily get disintegrated in water. The length of drill core is generally about 20cm, but on some occasion it is as long as 50cm. At deeper part cut plane of core is fresh and not stained by limestone. Some thin cracks are filled with secondary calcite.

The results of microscopic observation on this rock are given in Fig. II–2–56 and 57. Judging from the rock component minerals and texture it is rather akin to porphyrite. However, naming of the rock in this report follows in the previous reports.

D. Augite Porphyrite

Augite porphyrites are distributed extensively around the ridge of the hill which projects in the form of a peninsula on the right bank of the river at about 300m upstream from the dam axis. On the left bank, they are distributed over the from 150m to 200m upstream of the dam axis and at the elevations ranging from 860m to 930m. The dyke rocks of 2m in width existing near the intake site of the spillway on the left bank and the rock at the dam axis on the right bank is found to be augite porphyrites as the result of microscopic observation.

The rock has a porphyritic texture with dark gray color, its groundmass being a little glassy. A part of the mafic phenocrysts composed of augite, hornblend, biotite, etc. is replaced by calcite and chlorite. The rock is so hard that it is difficult to break it with heavy strike of hammer. When broken, it forms sharp edges. Columnar joints are seen on the rocks in the aforementioned rock mass of the right bank of the river.

The results of microscopic observation are given in Fig. II–2–58 and 59. Among trachy andesites, mentioned in the preceding paragraph, those slightly altered ones are, as the result of microscopic observation, found to have strong resemblance to this augite porphyrite.

2.2.3 Geologic Structure

At the dam site, there are one or two small faults or open cracks, but no such one is found which might become obstacle to the project.

A. Fault

In the vicinity of the dam site, a fault exists on the bank, of the river. The fault on the left bank is a small having a crashed zone of 20cm in width filled with secondary lime. Since this fault is located at an elevation of 880m and at about 200m upstream of the dam site, it has no direct influence over the project.

The fault on the right bank is at an elevation of about 830m. The fault continues upward for 80m from about 50m upstream of the dam axis. This fault has a strike parallel with the river (N 10° W) and a dip of 65° to the hillside. In some places, openings of about 5cm in width can be seen on outcrops. It seems like a fissure rather than a fault. KS 16 crosses this fault at 49m under the ground. Water still flows out of the drill hole.

B. Crack and Joint

Flow structure is seen on a part of trachyandesite and columnar joint on a part of augite porphyrite. Both of them have many cracks and joints., Judging from drill core observation, made, these cracks are mostly closed or dilled with calcite veins in the under ground though they have some openings at the surface of the earth.

At 100m downstream of the axis on the left bank and about 40m upstream of outlet site of the diversion tunnel, there are continuous open crocks running along the creases of the mountain. The width of opening of the former is 3cm and the latter 10cm.

2.3 RESERVOIR AREA

2.3.1 Topography

The Kelkit Reservoir lies along the main course of the Kelkit river and its tributaries including the Cat, Darubul, Karahisar, Degirmen and Susehri rivers. The Suschri River flows at 7.5Km south of the dam site from west to east. The Kelkit river in the section of 8km long at the upstream of proposed dam flows east to west. The reservoir will be formed in the shape of the letter U and has an opening to west, connecting both rivers. Between the two rivers, the Eyme Mountains (Elevation 1,500–1,600m) composed of limestones and ophiolitic series lie expanding east to west with a width of about 7.5km.

On both banks of the Kelkit river between the dam site and about 7.5km upstream, volcanic rocks crop out and the slopes are steep. However, higher than an elevation of 1,000m on the left bank, strata of oligo-miocene series are distributed and the slope is gentle. The Cat river flows from north to south through volcanic rocks and joins the Kelkit river in its right bank at about 700m upstream of the dam site. The valley of the Cat forms the shape of in cross, section. The Darabul and Karahisar rivers flow from NEE to SWW and join the Kelkit from the right bank at about 10km and 15km upstream of the dam site, respectively. Around each junction, an extensive alluvial plain is formed. These two tributaries and upper course of the Kelkit, flow through the oligo-miocene strata. They have wide valleys and gentle sloped mountains surrounding them. In the east of the junction of the Darabul and Kelkit, Dumatasi Mountain (elevation=2,740m) composed fo volcanic rock of 1.5km in diameter rises in the shape of a dome.

The Degirmen and Susehri rivers flow through the flat land. The proposed reservoir will be along these rivers in a width of about 3km.

In the vicinity of the reservoir, there is no saddle-like topography which may cause leakage from the reservoir.

2.3.2 Stratigraphy

The strata distributed in the reservoir area are, in chronological order, as follows:

Recent	Top soil and Talus deposit
	River deposit
Quaternary	River tarrace deposit
Tertiary (oligo –Mio–Pliocene)	Sedimentary rocks
Upper Cretaceous	Volcanic facies (A part may possibly be Eocene)
	Flysch facies
	Limestone facies
	Ophiolitic facies

A. Top Soil and Talus Deposit

The topography of the area where limestone, flysch facies and volcanics are distributed is steep. On the slope, rocks are exposed. While on the foot of the mountain, a thick talus is deposited. The topography of the area, which occupies a major part of the reservoir area and distributed by Tertiary system, is gentle and the surface of the earth is covered with a thick layer of residual soil.

In the DWG RESERVOIR AREA, GEOLOGIC PLAN, no particular descriptions are made concerning the surface soil. Regarding the talus deposit, only those places including the foot of the Eyme Mountains and the vicinity of the Damatasi mountain where the deposit is thick and extensive, are shown.

B. River Deposit and River Tarrace Deposit

The river terrace deposits are seen on the left bank of the Susehri river and the right bank of the Karabisar river. They are composed of silt, sand and gravel.

The river deposit occupies major parts of the Suschri Plain and also covers the riverbeds of the Kelkit and its tributaries. There are no rock bed exposed on these riverbeds. At the up and down parts of the dam site, there are widely spreading flood plane deposits which are exposed above the water level, except in case of flood. At the junction of the Kelkit and the Darabul at 6.5km upstream of the dam site, the width of the river reaches 750m. According to the drillings performed on the central spot of the river at the dam site, the depth of river deposit is about 30m. Sand and gravel on the river channel of these areas will be used as materials for concrete aggregate and filter of rock fill dam.

According to the grain size analysis, the composition of the deposits is less than 10% of silt or clay, 30–40% of sand and 60–70% of gravel. The largest diameter of gravel is about 30cm. The percentage of gravel larger than 12.5cm in diameter is less than 10%. These pebbles mainly consist of volcanic rocks and, in rate cases, of limestones. They are very hard.

C. Oligo–Mio–Pleiocene Sedimentary Rocks

The rocks which occupies a larger part of the reservoir area is that of tertiary sedimentary rocks. The covering area of the proposed reservoir is generally tertiary system. However, the area extending for about 6km upstream from the dam site are mainly compose of volconics and in the eastern end of the Eyme mountains are distributed ophiolitic facies and limestones.

Though the exact epoch of the Tertiary system is not known, judging from the fact that it partially contains gypsum and lignite and from its rock facies, we can correlate with other area in Turkey. It is believed that the major part of it belongs to Oligo–Miocene.

In the conglomerate distributed on the left bank of the Kelkit river near the back water of the reservoir, fossils representing the Pliocene are often found. But, as there is only few outcrops, the area of distribution is not determined.

Oligo–Miocene strata is composed of alternation of conglomerates, sandstone and shales. Pebbles in conglomerates are mostly those of round shaped volcanic rocks of less than 10cm in diameter.

The matrix of conglomerates and sandstone contain a large quantity of fragments of quartz and lesser quantity of heldspar, hornblende, mica and chlorite. As the cement material, a large volume of limy material is contained. Infiltration of limonite is seen. On the right bank of the river and at 6–7km upstream of the dam site, some hard sandstones of reddish color are distributed. Sand stones distributed in other area are generally easily broken by heavy strokes of hammer. The strata have been folded. The dips of the strata are, though some spot shown degree of 50° , generally less than 20°.

The topography of the area where Tertiary system is distributed is generally gentle and the ground is covered with thick layer of residual soil made by weathering. Wheat cultivation is extensively practiced in the area. Exposed strata can be seen only at along some marshes which lie on the riverside or slopes. There are some places where cliffs of about 10m in height are formed due to erosion of river water. Those cliffs make the slopes unstabilized and causes landslides in various places. The thick layer of residual soil and the loosened strata are another cause of landslides.

D. Volcanic Rocks

Volcanic rocks are distributed at the following 4 places in the project area.

a. On both banks of the Kelkit river between about 5km upstream and 4km downstream of the dam site.

b. Dome shaped huge mass of rocks of 1.5km in diameter rising on the right bank of the Kelkit river at 8km east of the dam site.

c. A mass of rocks extending for 6km east to west and 1km south to north distributed on the southwest slope of the Eyme mountain.

d. The mountain at the southern part of the Susehri plain.

These places are mostly located higher than the high water level of reservoir, and therefore, they have no direct influence over the project. In "a" area, outcrop expands continuously to north on the right bank of the river, but on the left bank above the elevation of 1,000m, volcanics are covered by Oligo–Miocene strata. It is said that volcanics in this region were made by volcanic activities in the Upper Cretaceous and the eocene epochs. "a" and "c" areas are considered to belong to the Upper Cretaceous and "b" and "d" belong mainly to the eocene, though not proved.

In "a" area, trachy andesite, augite porphyrite, basalt, agglomerate and dyke rocks are distributed intricately. Augite porphyrite and dyke rocks seem to have intruded in the eocene epoch. As for Trachyandesites and augite porphyrites which are distributed at the dam site, descriptions were made before. The characteristics of them are that the former has strong hydrothermal alteration and the latter is nearly fresh and head. In this area trachy andesites are distributed rather extensively. At the upper parts of the Cat river and the Kelkit river, agglomerates and tuffs are distributed.

On the left bank of the river, at 3km downstream of the dam site, olivine basalt are distributed. On the left bank of the dam site, at an elevation of 1,000m, tuffs and agglomerate are distributed in 20m thickness covering trachy andesites.

These volcanic rocks are generally hard, but heavily altered portions, though very limited, are easily disintegrated when saturated with water. Generally speaking the area volcanic rock is distributed has steep slopes and rocks are exposed all over the slopes. Talus deposits are seen on the skirt of the slope.

E. Flysch Facies

Flysch facies are distributed at two places separately; on both banks of the river at about 6km upstream of the dam site and in the north slope of the Eyme mountain. In the former case distribution is mainly below the proposed high water level and is rather limited. Distribution of flysch facies in the slope of the mountan is very extensive above an elevation of 1,000m. Flysch facies are the stratified rocks composed of marl, limestone, sandstone and conglomerate alternation. Judging from the fossils of Hippuretes contained in flysch facies, it is considered that sedimentation was made on the shallow sea of the latter geosyncline of upper

Cretaceous. The strata are hard, but have many cracks and are easily broken.

F. Limestone

Concerning the limestones in this area, there are small masses in the ophiolitic facies and the strata which is distributed extensively to from the main body of the Eyme mountains. At the north slopes of the Eyme mountains, basal limestone is covered by Oligo–Miocene strata and crops out sporadically. This limestone can be found at the proposed reservoir area near the eastern end of the mountains. It is covered by a thick talus deposits.

The limestone is crystallized in some parts, and is solid and hard. The beddings of 5–25 cm spaces are developed, with many foldings and cracks. In a village to southeast of the dam site, water comes flowing from the limestone layer. No limestone cave is found.

G. Ophiolitic Facies

Ophiolitic facies is a name of serpentiniferous mesozoic complex. In this area, it constitutes the main body of the east half of the Eyme mountains. It further extends to east and reaches at the right bank of the Kelkit river near its junction with the Susehri river. As the south and north foots of the Eyme mountain are covered with the latter formation, the direct relation between the ophiolitic facies with the reservoir is seen only at the section where the Kelkit flows from south to north at the east end of the Eyme mountain. It includes the section between the junction with the Susehri river and about 2.5km downstream from it on the left side and the section of about 2km upstream and downstream from the junction on the right bank.

Ophiolitic facies distributed in this area belong to the upper Cretaceous. It was formed when basic or ultra basic rock effused or intruded in the geosynclinal sea-bed and caught the crystalline limestones and radiolarian cherts. As the intrusive rocks, there are serpentine, gabbro, diabase and spilite. Some of the radiolarian cherts have a trend of NW–SE. Generally speaking, the strata are disturbed and the rocks have many cracks and are highly weathered.

2.3.3 Geologic Structure

Project area locates in Alps-Himalayar Orogenic Zone, and those sedimentary rocks and volcanic rocks which belong to different epochs are distributed complicatedly. Affected by repeated orogenic movements, the strata are strongly folded and heavily faulted.

Ophiolitic facies, limestone and flysch facies which belong to upper Cretaceous are hardly disturbed. Details of the structure of Oligo–Miocene group can not be known since there are little outcrops found. Strikes and dips of strata differ area to area, showing a complex geologic structure. It seems that the whole area is controled by folding axis of east to west direction.

The Kelkit fault, which run in the direction of NWW–SEE at 7–8km south of the dam site, extends downstream along the river for about 15km downstream of the dam site. It is a large scale tectonic line. In the Eyme mountains, at the area where limestone and flysch facies are distributed, there are some topography which seem to be fault-scarps in paralle with the Kelkit fault. In the volcanic rock area, there is no remarkable fault.

2.4 PERMEABILITY TEST AND WATER PRESSURE TEST

A. Permeability Test

Permeability test was performed on all drill holes in the river deposits, in an space interval of 1.5m. A 1.5m-long drive pipe which have 420 holes of 6mm diameter was used in the test. Leakage under some water head was measured 3 times at 5 minutes' interval, that is, 15 minutes in total.

The result of the test shows that the river deposit in this site has a permeability coefficient ranging from 10^{-2} cm/sec to 10^{-3}/sec.

B. Water Pressure Test

The water pressure test was performed on all drill holes at an space interval of 2m to ascertain the water tightness of the foundation rocks. In the test, water was pressured-in between packer and bottom of holls (2m each in length) and measurement was conducted by water meter. Pumping-in pressure applied was 2, 4, 6, 8 and 10 atm., and leakage was measured for 10 minutes under each pressure.

The results of the tests were described in the geological log of drill holes. The Lugeon values which were calculated on the result of the test are given in figures in the geologic log of drill holes and also graphed in the DWG, "'........: KILICKAYA DAM, GIOLOGIC SECTION. The Lugeon value shows leakage through of foundation rocks in terms of litres per minute per one meter length of drill hole under a poring pressure of 10 kg/cm^2. 1 Lugeon corresponds to approximately 1×10^{-5} cm/sec.

The watertightness of foundation rocks in this site was mentioned in Volume I, Chapter 7–3–1–E. They have high watertightness in general. There were no leakage at all throughout the test performed. Even in the cases leakage occured it was mostly less than 10 Lugeon (= 1 x 10^{-4} cm/sec.).

2.5 EXPLANATION OF THE GEOLOGIC LOG OF DRILL HOLE

2.5.1 Core Recovery

The core recovery is presented in percentage with histogram. Recovered ratio is shown in the histogram by oblique lines.

2.5.2 Size of Core and Kind of Bit

Size of core and kind of bit are shown in the same column, NX and BX mean the size of core, 74.8mm and 59.18mm in diameter, respectively. "D", and "M" are used as the abbreviations of diamond core bit and metal (cemented carbide) bit respectively.

2.5.3 Classification of characteristics of rock shown in log sheet of core boring

In the sheet, some of the rock characters as observed in the core is classified with numerals from 1 to 5 in accordance with the degree of weathering, hardness and cracking as follows:

A. Degree of Weathering

Numerals

1 The rock is very fresh, and the rock forming minerals and grains are neither weathered nor deteriorated.

2 The rock is soild. Some of cracks and joints are slightly stained, but lack in veneer of clay or clayey materials. The rock forming minerals and grains are partially sustained with slight weathering and deterioration.

3 The rock forming minerals and grains excluding quartz are slightly softened due to weathering. Most of cracks and joints, sometimes rock itself, is tained by limonite, etc., and some of cracks and joints are filled with veneer of clay or clayey materials.

4 The rock forming minerals and grains, excluding quartz, are fairly softened by weathering with slight strokes it easely gets broken off along cracks or joints into

pieces of fragments. Among the joints and cracks, veneer of clay and clayey materials exist.

5. Owing to weathering, the rock forming minerals and grains are deteriorated and discolored, and the rock is remarkably softened and loosened.

   Some types of rock have been extensively solved to include voids or cavities and their texture vary from impervious to porous.

   In the extreme case, rock has been completely decomposed and its character has been altered to that of soil or earthy materials. In some cases roots of plant have penetrated not only into the cracks and joints but also into the rock itself.

B. Degree of Hardness

The hardness mentioned herein after does not refer to the mineralogical hardness according to MORS scale and SHORE scleroscope, etc., but is concerned with analysis according to engineering geology which includes abrasive resistance, toughness, compression strength, and tensile strength, etc. that are determined by geologists in accordance with engineering judgement of the foundation for structures.

The criteria of harness are as follows:

Criteria

Numerals

1. The rock is very hard like granite and greywacke, etc. and fresh. It breaks by strong hammer blow into sharp edged pieces of fragments with sharp fractures.

2. The rock is fairly hard, like high quality concrete. It breaks, by strong hammer blow, into pieces of fragments accompanied by some amount of rock power.

3. The rock is generally hard, like common concrete, or abrasives. It breaks by hammer blow into pieces or fragments with some amount of rock dust and powder. In this criteria are included rocks whose feature shown hard in most parts and somewhat soft in other parts. The rock is generally soft or weak in cementation, like chalk, tuff, etc. and easily breaks by hammer blow, or sometimes shaped off by hand or can be whittled with a knife.

4. The rock is very soft, like lignite, and it is easily broken with finger squeeze and can be scratched by finger nail or copper coin. Sometimes the rock is a loose material, like aluvial and glacial soils, owing to the lost of solidity.

C Degree of Cracking

Numerals	Criteria
1.	Cracks and joints are spaced more than 50 cm apart.
2.	Cracks and joints are spaced 50 to 20 cm apart.
3.	Cracks and joints are spaced 20 to 50 cm apart.
4.	Cracks and joints are spaced less than 5 cm apart.
5.	Cracks and joints are hardly sustained, the cores are broken into chips and grains.

Table II 2-1 List of Drill Hole

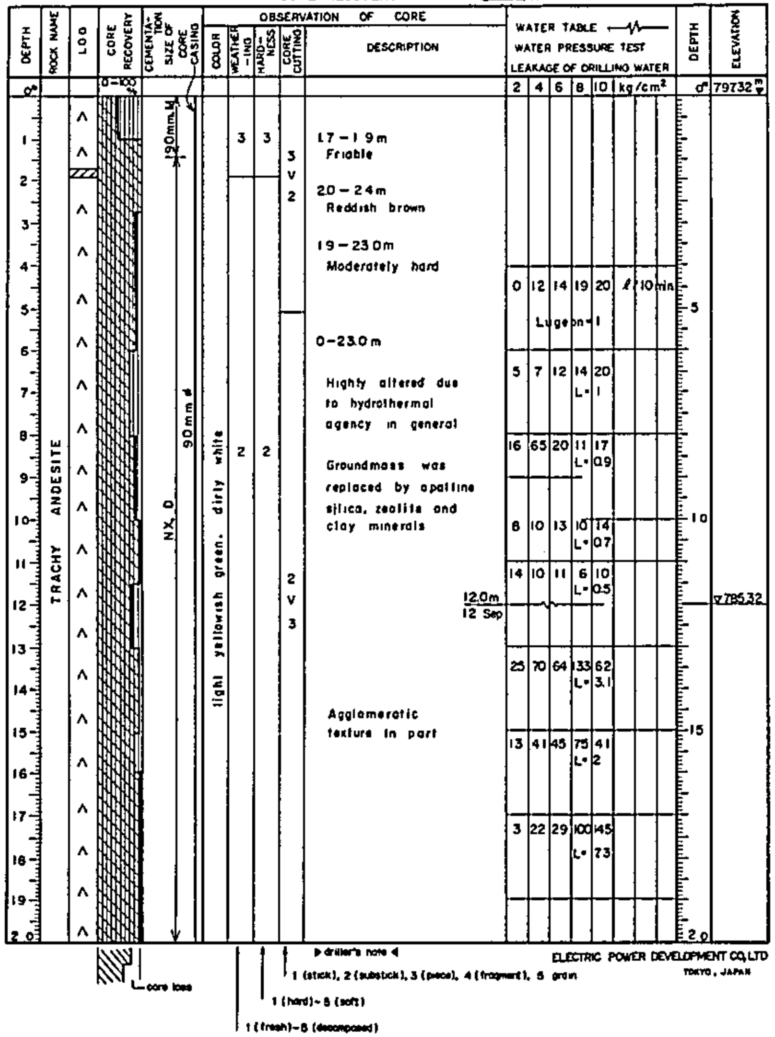
Hole Name	Location	Elevation (m)	Direction of Hole	Depth of Hole	Depth of Over-burden (m)	Length of Rock Drilling (m)	Core Length in Rock Drilling (m)	Core Recovery in Rock Drilling(%)	Fig. No.
SK-M1	Left bank	797.32	S59°W, 60°	80.00		80.00	71.63	89.5	1- 4
2	"	762.09	Vertical	60.00	12.60	47.40	40.94	86.3	5- 7
3	River bed	753.57	"	50.00	28.75	21.25	21.09	99.2	8-10
4	"	751.63	"	50.00	28.75	21.25	18.25	85.1	11-13
5	"	751.66	"	80.00	31.50	48.50	43.32	88.4	14-17
6	"	751.54	"	50.00	29.00	21.00	18.55	88.5	18-20
7	"	752.38	"	50.00	25.00	24.40	19.70	80.8	21-23
8	"	752.56	"	60.00	29.50	30.50	29.42	96.0	24-26
9	"	755.00	"	60.00	29.40	30.60	30.41	99.5	27-29
M10	Right bank	764.35	S75°E, 75°	60.00	10.00	50.00	42.74	85.5	30-32
11	"	824.82	Vertical	90.00	-	90.00	84.54	94.0	33-37
13	Left bank	881.14	"	40.00	-	40.00	36.93	86.7	38-39
15	"	838.55	"	76.00	-	76.00	70.80	81.0	40-43
M16	Right bank	820.34	S75°E, 45°	90.00	-	90.00	85.82	95.4	44-48
17	Left bank	1,056.00	Vertical	60.00	10.00	50.00	39.37	77.7	49-51
18	"	1,050.00	"	75.00	24.60	50.40	38.05	75.7	52-55
	16 holes			1,031.00		771.30	691.56	89.6	

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-1

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-MI (SHEET 1 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	80.00 m	COMMENCED	17-Aug-'67
ELEVATION	797.32 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	11-Sep-'67
COORDINATE		LENGTH OF ROCK DRILLING	80.00 m	DRILLED BY	RIZA KIBAR (DSI)
ANGLE FROM HORIZONTAL	60°	TOTAL LENGTH OF CORE	71.63 m	LOGGED BY	T FUJITA (J ST)
BEARING OF ANGLE HOLE	S59°W	CORE RECOVERY	89.5 %		

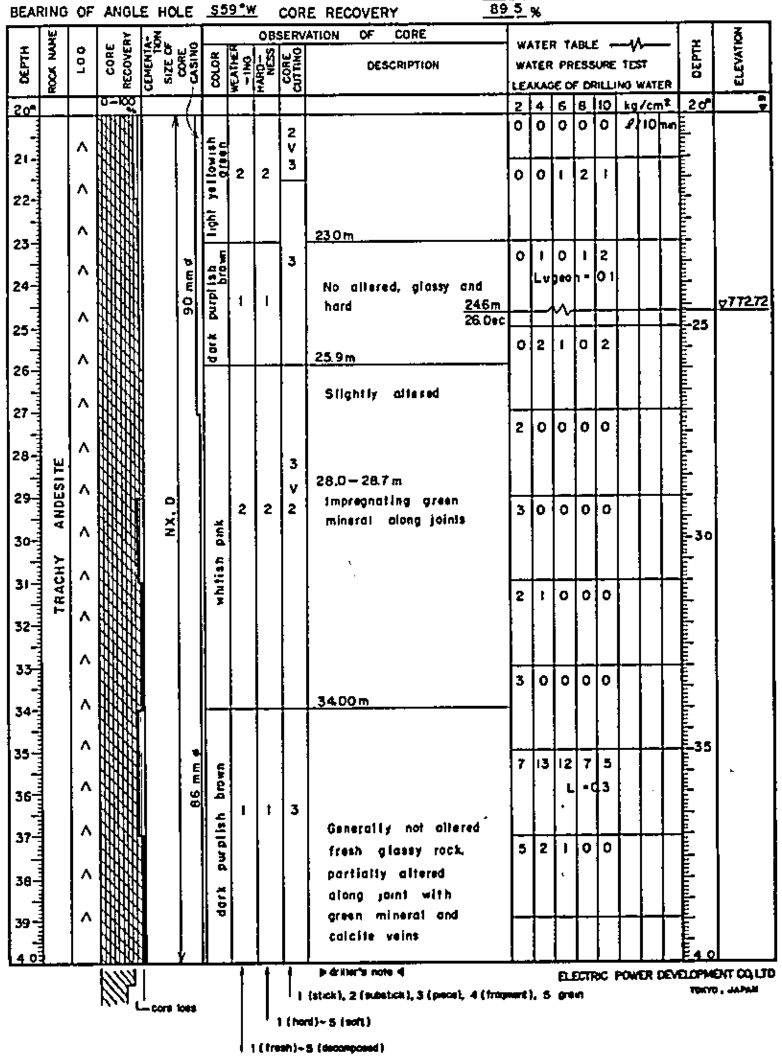


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-2

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-MI (SHEET 2 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	80.00 m	COMMENCED	17-Aug-'67
ELEVATION	797.32 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	11-Sep-'67
COORDINATE		LENGTH OF ROCK DRILLING	80.00 m	DRILLED BY	RIZA KIBAR (DSI)
ANGLE FROM HORIZONTAL	60°	TOTAL LENGTH OF CORE	71.63 m	LOGGED BY	T FUJITA (J ST)
BEARING OF ANGLE HOLE	S59°W	CORE RECOVERY	89.5 %		



GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-3

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-MI (SHEET 3 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	80.00 m	COMMENCED	17-Aug-'67
ELEVATION	797.32 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	11-Sep-'67
COORDINATE		LENGTH OF ROCK DRILLING	80.00 m	DRILLED BY	RIZA KIBAR (DSI)
ANGLE FROM HORIZONTAL	60°	TOTAL LENGTH OF CORE	71.63 m	LOGGED BY	T FUJITA (JST)
BEARING OF ANGLE HOLE	S59°W	CORE RECOVERY	89.5 %		

Rock name: TRACHY ANDESITE (40–60 m). Size of core / casing: 66 mm φ, 4.1 m; NX, D.

Depth (m)	Color	Weathering	Hardness	Core cutting	Description
40.0–45.0	dark purplish brown	1	1	3	Slightly altered along joints; 43.7 – 44.2 m Sustaining vertical joints; 45.0 m
45.0–55.2	Yellowish white	2	2	3 V 2; 2; 1 V 2	Highly altered, ground-mass was replaced by zeolite and montmorillonitic clay mineral; Relatively hard; 55.2 m
55.2–58.2	dark purplish brown			2	Generally fresh, altered in part; 58.2 m
58.2–60.0					Alternation of highly and low altered part

Water pressure test / leakage of drilling water (ℓ/10min):

Depth (m)	2 kg/cm²	4	6	8	10	Lugeon
40–41	5	0	0	0	0	
41–43	5	10	13	6	8	Lugeon = 0.4
43–44.5	0	0	2	1	3	
44.5–47	7	6	0	11	18	L = 0.9
47–49	17	25	36	47	35	L = 1.8
49–51	35	42	55	81	123	L = 6.2
51–53	80	60	40	33	40	L = 2
53–55	85	90	100	135	142	L = 7
55–57	60	55	69	90	145	L = 7.3
57–58.5	170	156	200			
58.5–60	0	0	0	0	0	

▶ driller's note ◀ — Core: 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain; Hardness: 1 (hard) – 5 (soft); Weathering: 1 (fresh) – 5 (decomposed); core loss

ELECTRIC POWER DEVELOPMENT CO., LTD TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-4

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-MI (SHEET 4 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	80.00 m	COMMENCED	17-Aug-'67
ELEVATION	797.32 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	11-Sep-'67
COORDINATE		LENGTH OF ROCK DRILLING	80.00 m	DRILLED BY	RIZA KIBAR (DSI)
ANGLE FROM HORIZONTAL	60°	TOTAL LENGTH OF CORE	— m	LOGGED BY	T FUJITA (JST)
BEARING OF ANGLE HOLE	S59°W	CORE RECOVERY	— %		

Rock name: TRACHY ANDESITE (60–80 m). Size of core / casing: Nx, D (to 66.25 m); Bx, D.

Depth (m)	Color	Weathering	Hardness	Core cutting	Description
60.0–68.5	dark brown & light green	2	2	2 V 3	66.25 m
68.5–80.0	motted with green, brownish grey & reddish brown			3 ~ 1 ~ 4	Somewhat altered alternately, relatively hard in general; Almost cores were cut by about 5cm in length; 80.00 m

Water pressure test / leakage of drilling water (ℓ/10min):

Depth (m)	2 kg/cm²	4	6	8	10	Lugeon
60–62.5	10	0	0	0	0	
62.5–64.5	30	62	72	112	163	Lugeon = 8.2
64.5–66.5	54	64	82	85	106	L = 5.4
66.5–68.5	0	3	5	8	9	
68.5–70.5	24	32	30	17	32	L = 1.6
70.5–72.5	0	2	5	7	9	L = 0.5
72.5–74.5	0	4	9	7	6	L = 0.3
74.5–76.5	8	10	3	10	8	L = 0.4
76.5–78.5	0	3	3	1	4	L = 0.2
78.5–80	0	0	1	1	0	

▶ driller's note ◀ — Core: 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain; Hardness: 1 (hard) – 5 (soft); Weathering: 1 (fresh) – 5 (decomposed); core loss

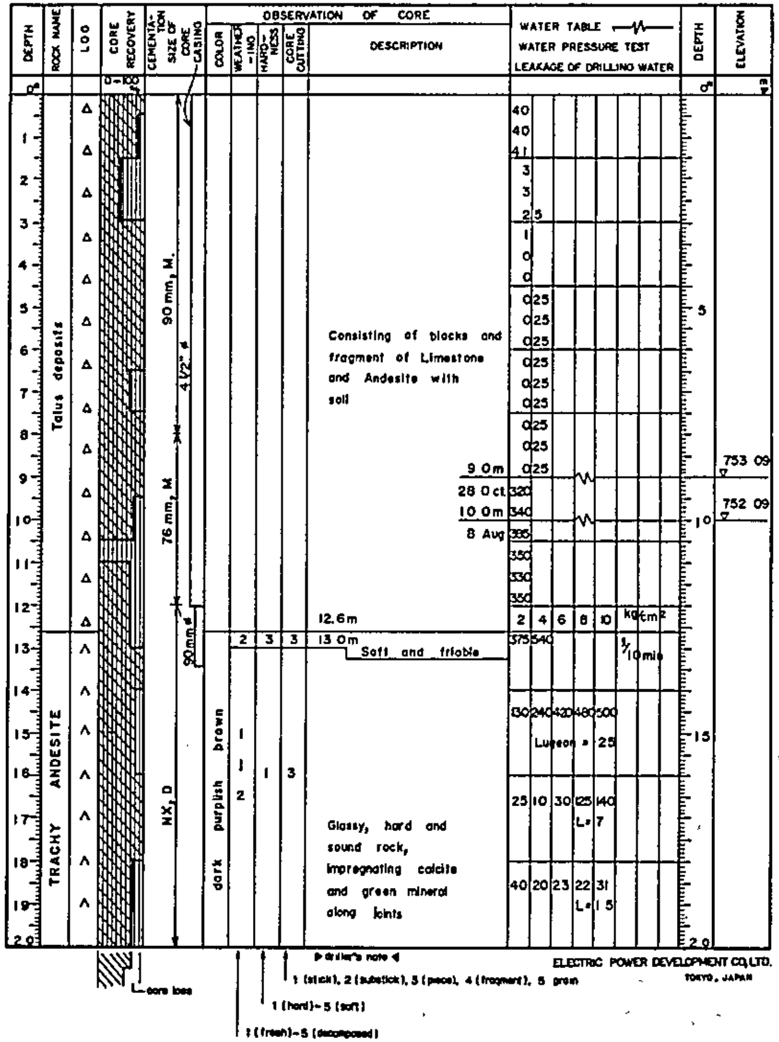
ELECTRIC POWER DEVELOPMENT CO., LTD TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-5

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-2 (SHEET 1 OF 3)

LOCATION	Left bank	DEPTH OF HOLE	60.00 m	COMMENCED	22-Jul-'67
ELEVATION	762.09 m	DEPTH OF OVERBURDEN	12.60 m	COMPLETED	7-Aug-'67
COORDINATE		LENGTH OF ROCK DRILLING	47.40 m	DRILLED BY	RIZA KİBAR(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	40.94 m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	86.3 %		

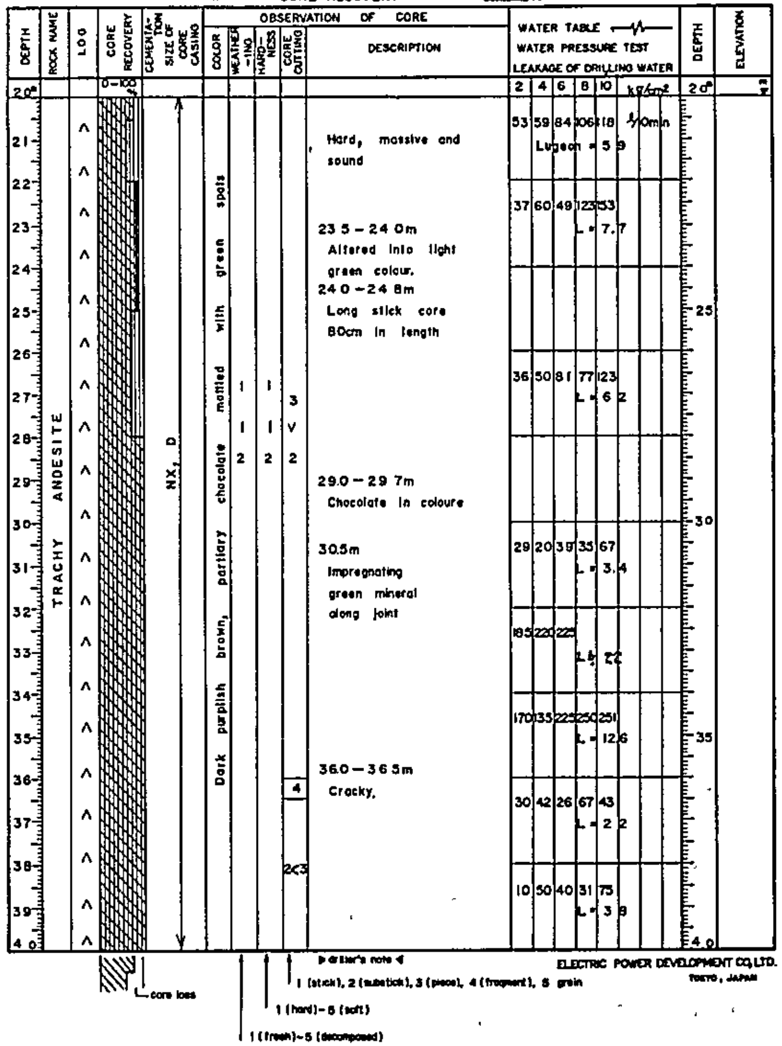


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-6

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-2 (SHEET 2 OF 3)

LOCATION	Left bank	DEPTH OF HOLE	60.00 m	COMMENCED	22-Jul-'67
ELEVATION	762.09 m	DEPTH OF OVERBURDEN	12.60 m	COMPLETED	7-Aug-'67
COORDINATE		LENGTH OF ROCK DRILLING	47.40 m	DRILLED BY	RIZA KİBAR(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	40.94 m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	86.3 %		

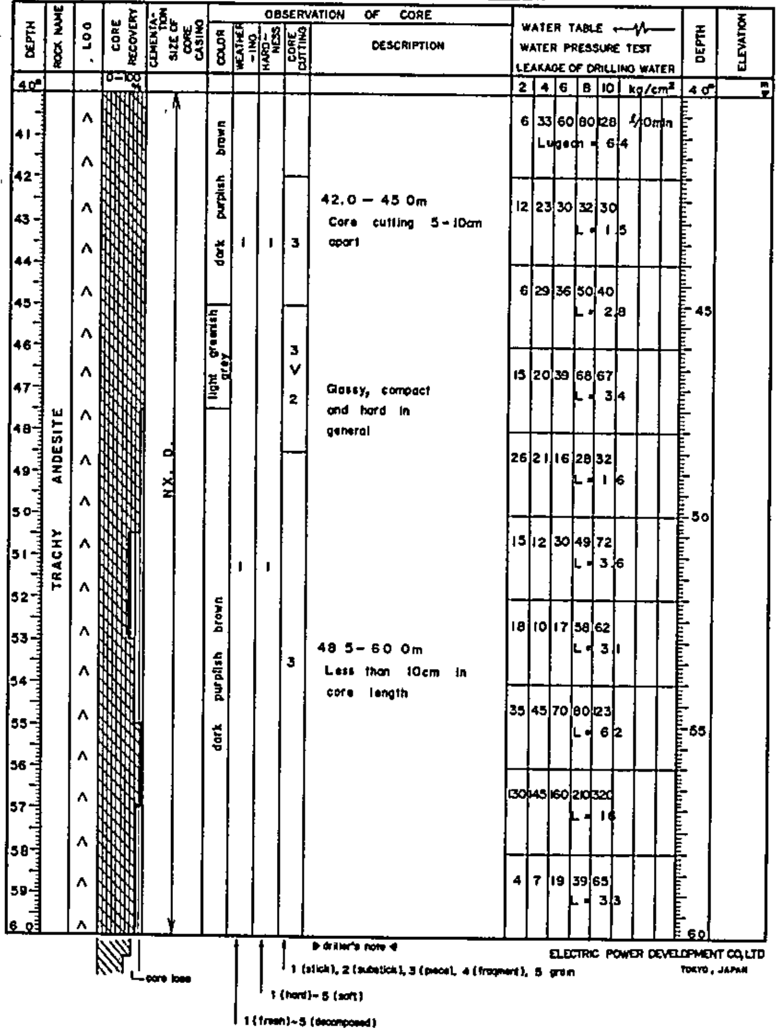


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-7

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No.SK-2 (SHEET 3 OF 3)

LOCATION	Left bank	DEPTH OF HOLE	60.00 m	COMMENCED	22-Jul-'67
ELEVATION	762.09 m	DEPTH OF OVERBURDEN	12.60 m	COMPLETED	7-Aug-'67
COORDINATE		LENGTH OF ROCK DRILLING	47.40 m	DRILLED BY	RIZA KİBAR(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	40.94 m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	86.3 %		



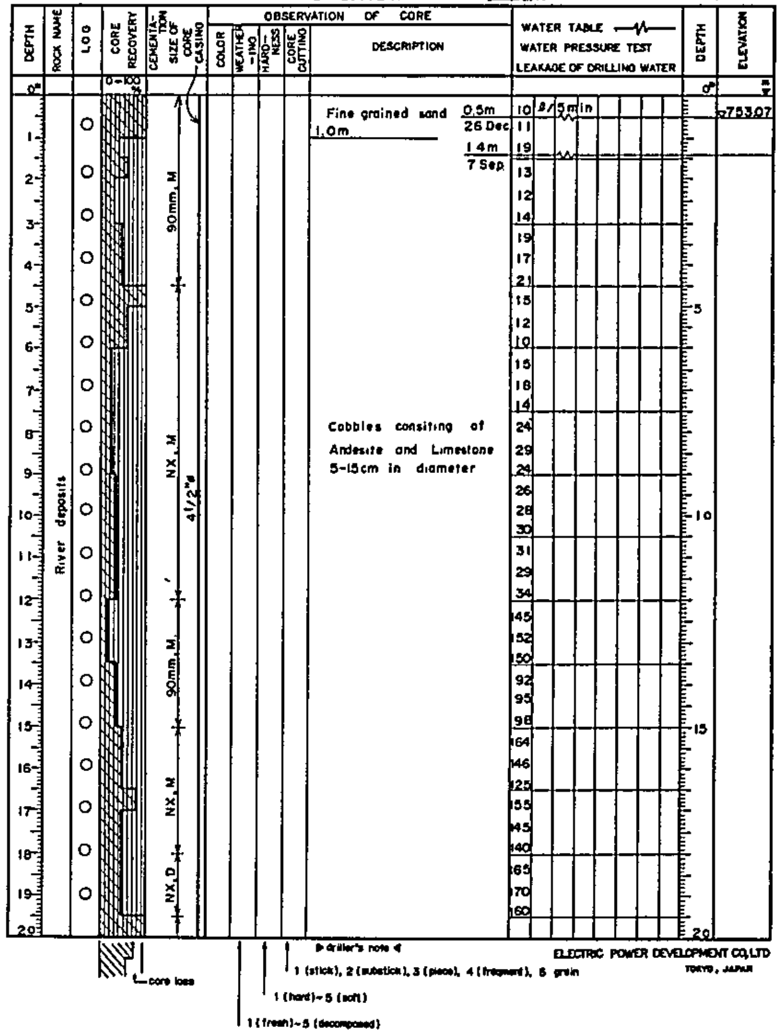
ELECTRIC POWER DEVELOPMENT CO.,LTD
TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-8

KELKİT-KARATAŞ PROJECT. KILIÇKAYA DAM HOLE No.SK-3 (SHEET 1 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00 m	COMMENCED	3-Aug-'67
ELEVATION	753.57 m	DEPTH OF OVERBURDEN	28.75 m	COMPLETED	6-Sep-'67
COORDINATE		LENGTH OF ROCK DRILLING	21.25 m	DRILLED BY	ALİ BİLGİN(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	21.09 m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	99.2 %		



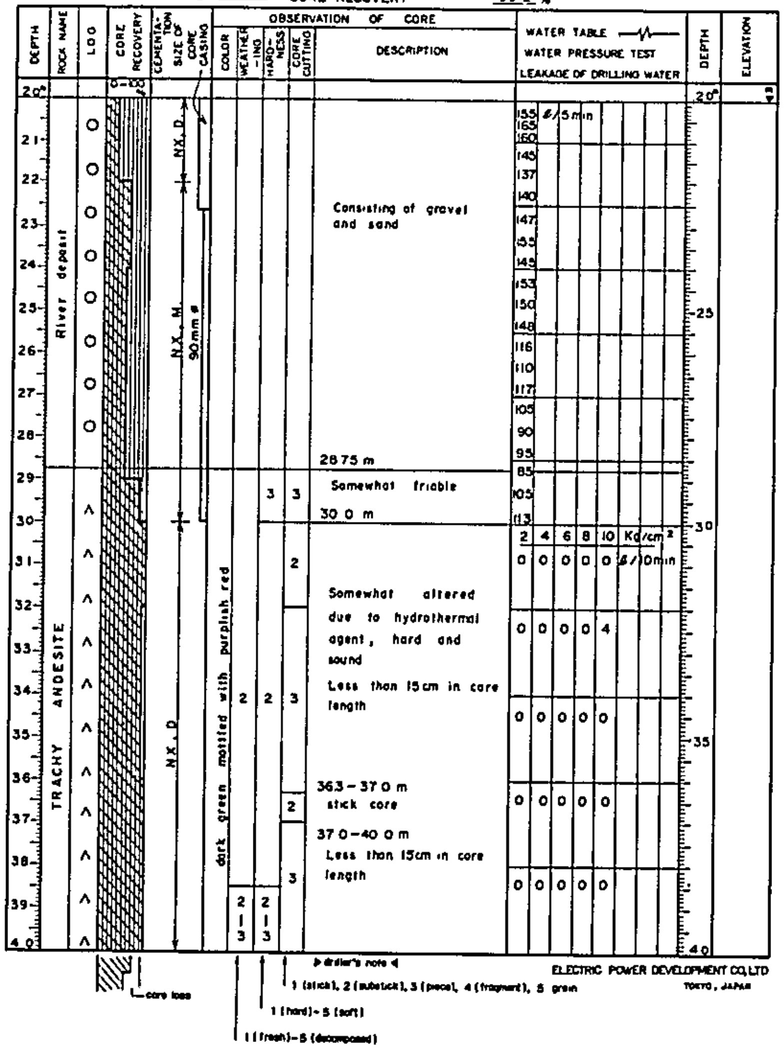
ELECTRIC POWER DEVELOPMENT CO.,LTD
TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-9

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-3 (SHEET 2 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00 m	COMMENCED	3 - Aug - '67
ELEVATION	753.57 m	DEPTH OF OVERBURDEN	28.75 m	COMPLETED	6 - Sep - '67
COORDINATE		LENGTH OF ROCK DRILLING	21.25 m	DRILLED BY	ALİ BILGIN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	21.09 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	99.2 %		

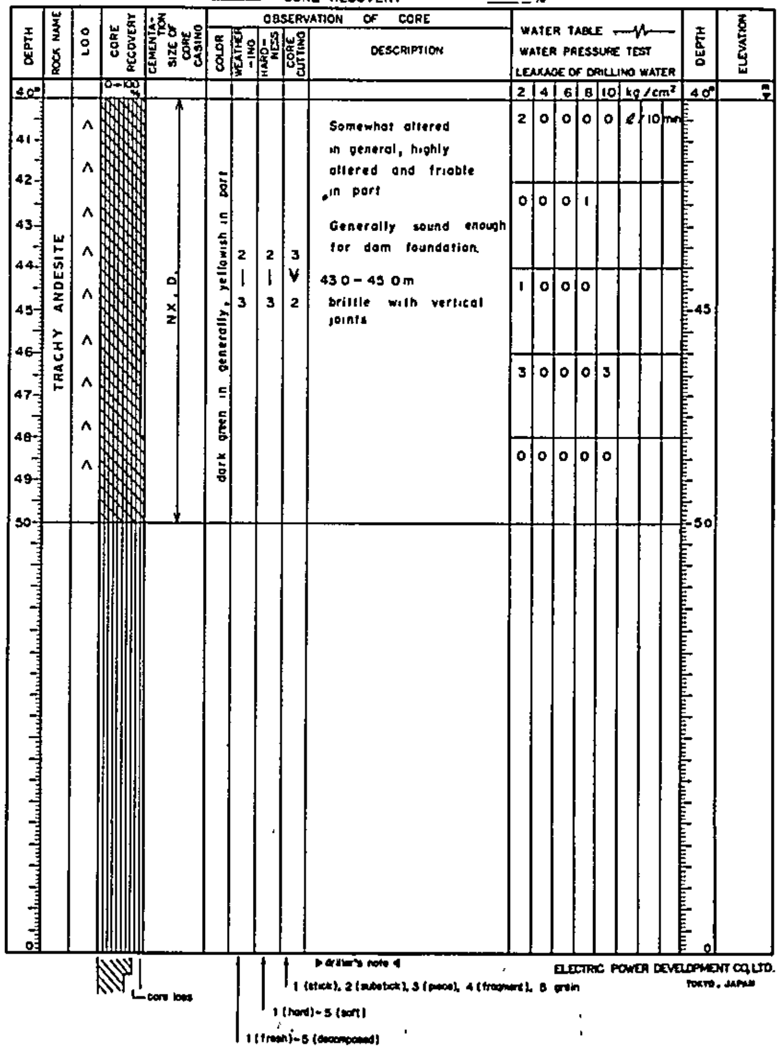


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-10

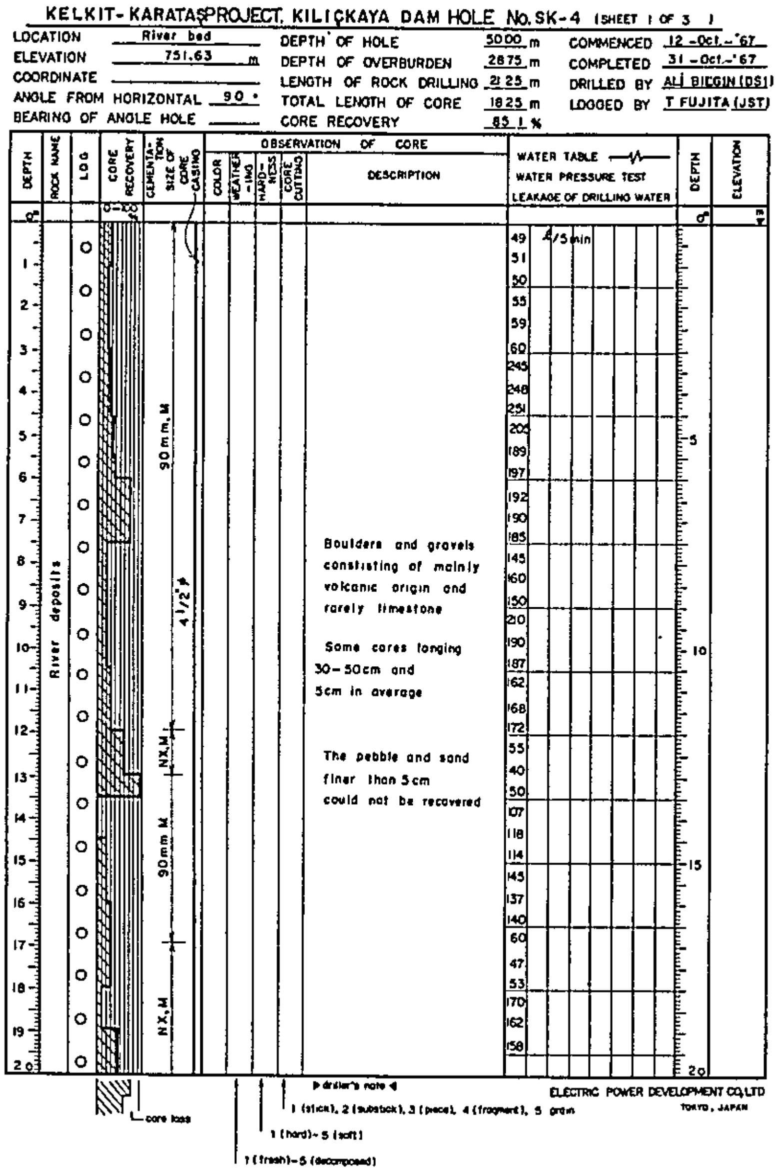
KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-3 (SHEET 3 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00 m	COMMENCED	3 - Aug - '67
ELEVATION	753.57 m	DEPTH OF OVERBURDEN	28.75 m	COMPLETED	6 - Sep - '67
COORDINATE		LENGTH OF ROCK DRILLING	21.25 m	DRILLED BY	ALİ BILGIN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	21.09 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	99.2 %		



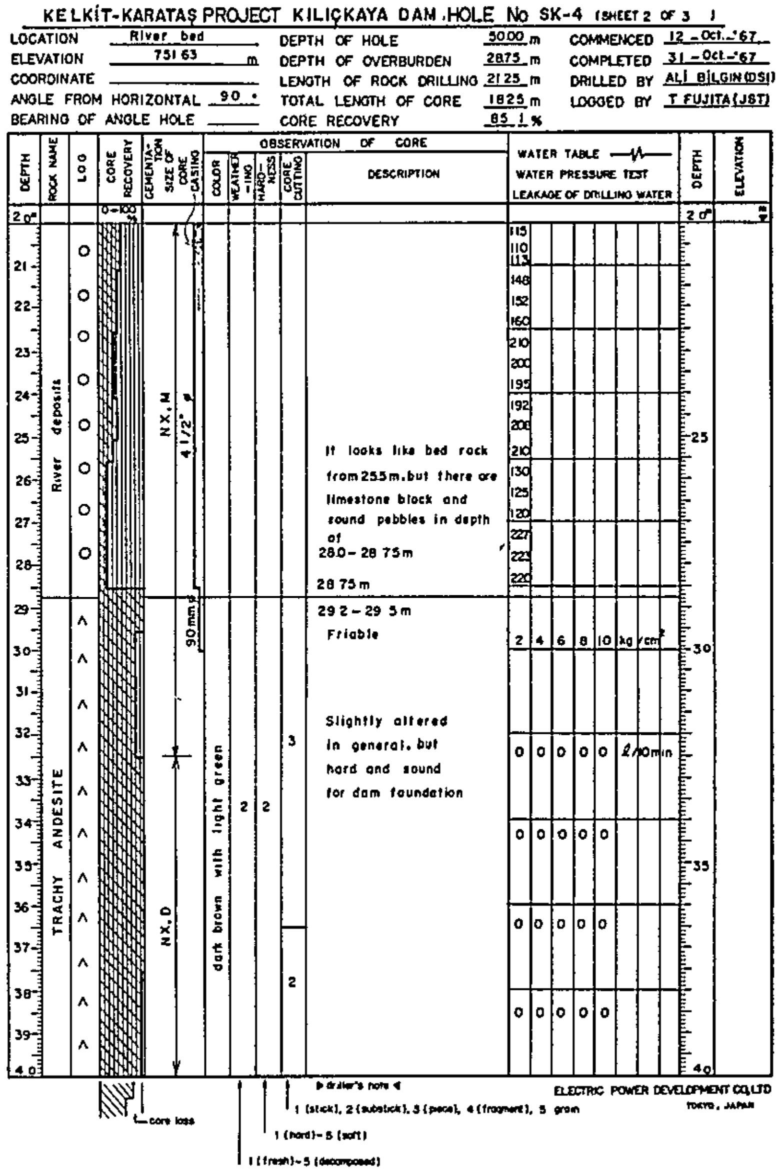
GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-11



GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-12

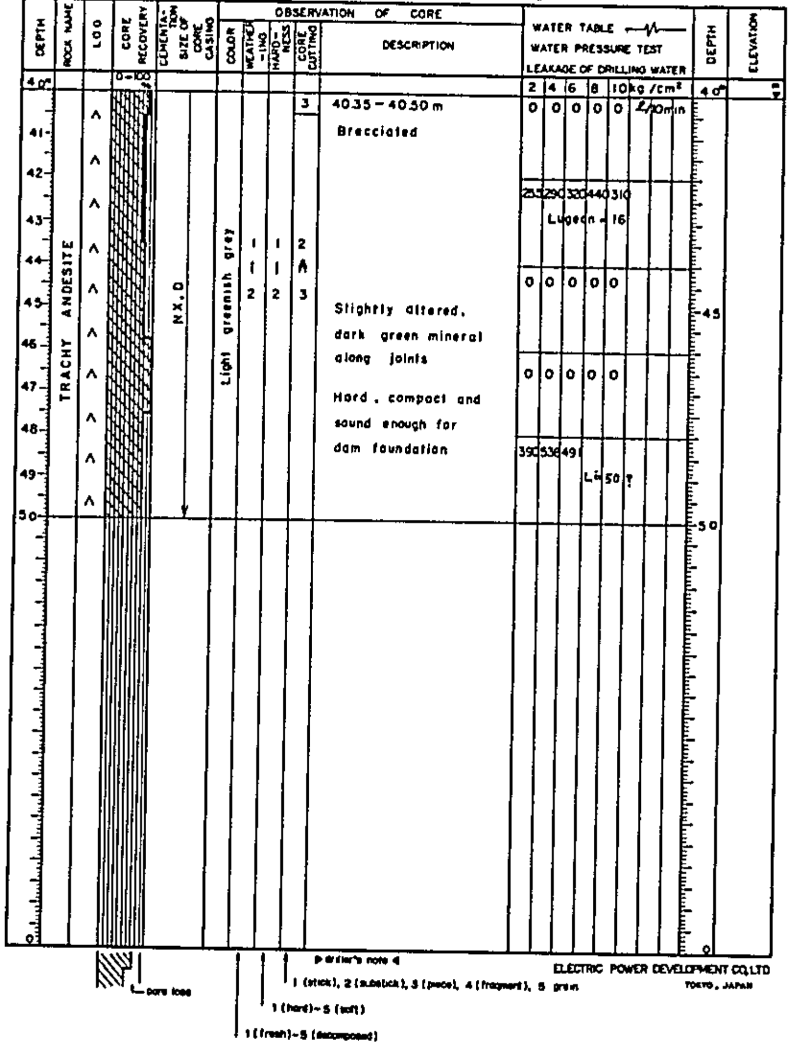


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-13

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-4 (SHEET 3 OF 3)

LOCATION	River bed	DEPTH OF HOLE	500 m	COMMENCED	12 - Oct - '67
ELEVATION	751.63 m	DEPTH OF OVERBURDEN	28.75 m	COMPLETED	31 - Oct - '67
COORDINATE		LENGTH OF ROCK DRILLING	21.25 m	DRILLED BY	ALİ BİLGİN (DSİ)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	18.25 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	85.1 %		

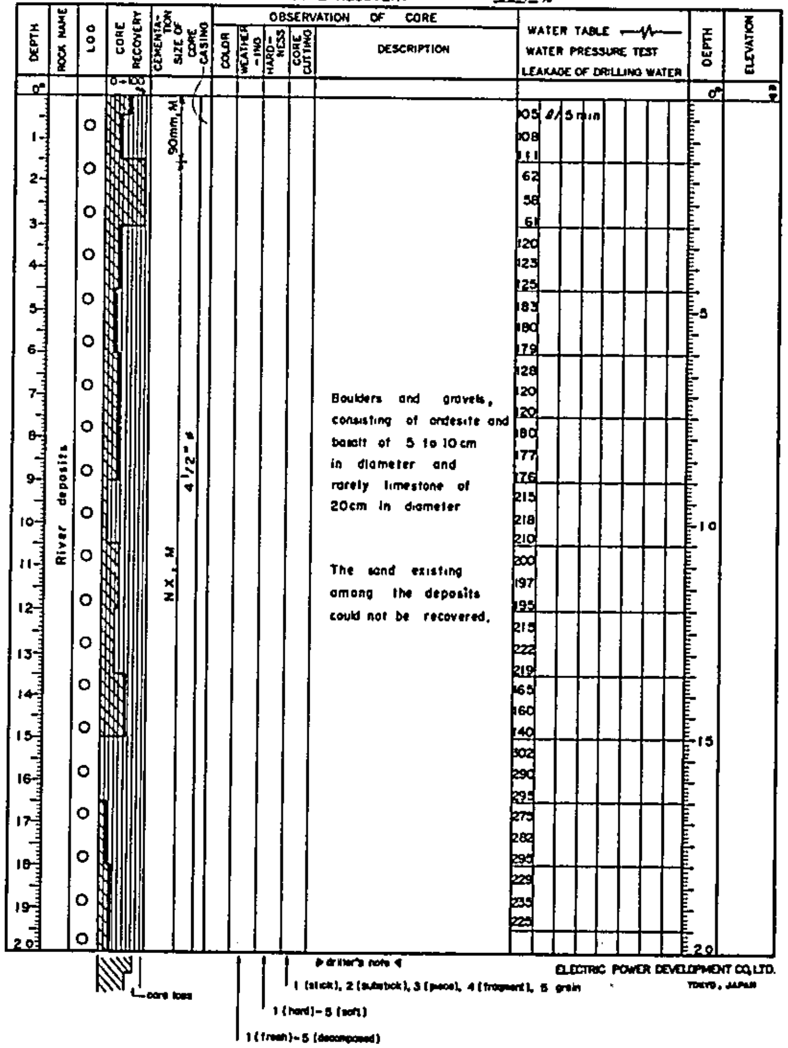


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-14

KELKİT-KARATAŞ PROJECT KILIÇKAYA-DAM HOLE No SK-5 (SHEET 1 OF 4)

LOCATION	River bed	DEPTH OF HOLE	80.00 m	COMMENCED	11 - Sep - '67
ELEVATION	751.66 m	DEPTH OF OVERBURDEN	31.50 m	COMPLETED	9 - Oct - '67
COORDINATE		LENGTH OF ROCK DRILLING	48.50 m	DRILLED BY	ALİ BİLGİN (DSİ)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	43.32 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	88.4 %		

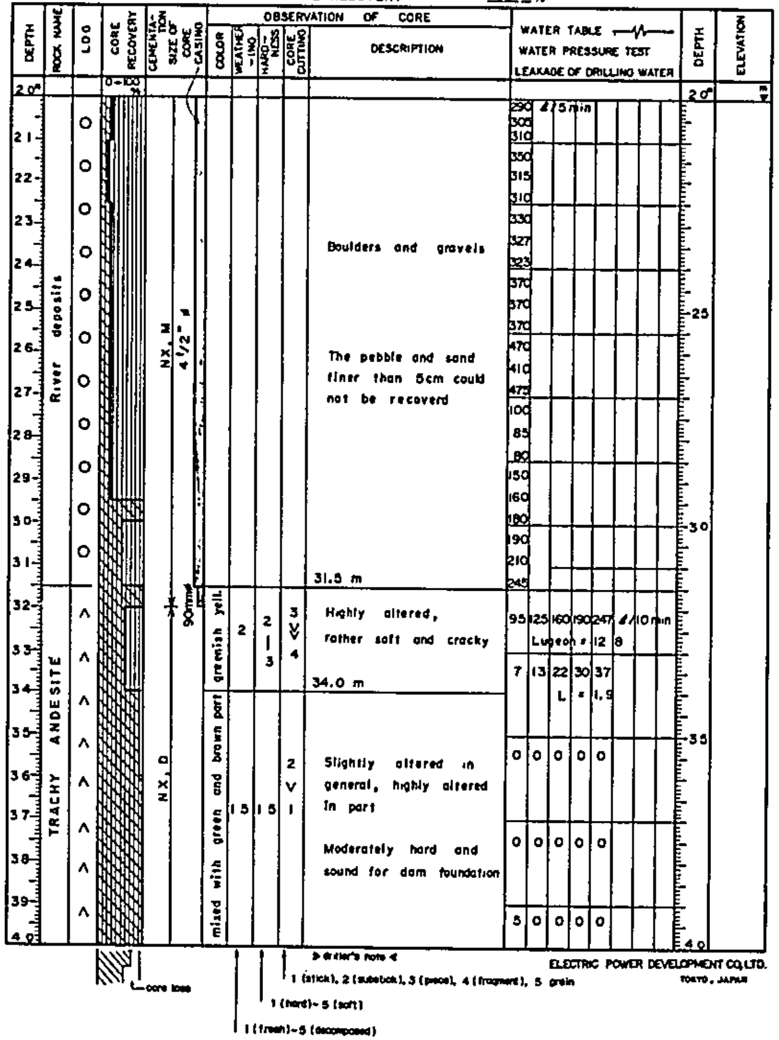


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-15

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-5 (SHEET 2 OF 4)

LOCATION	River bed	DEPTH OF HOLE	80.00 m	COMMENCED	11-Sep.-'67
ELEVATION	751.66 m	DEPTH OF OVERBURDEN	31.50 m	COMPLETED	9-Oct.-'67
COORDINATE		LENGTH OF ROCK DRILLING	48.50 m	DRILLED BY	ALİ BİLGİN(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	43.32 m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	88.4 %		

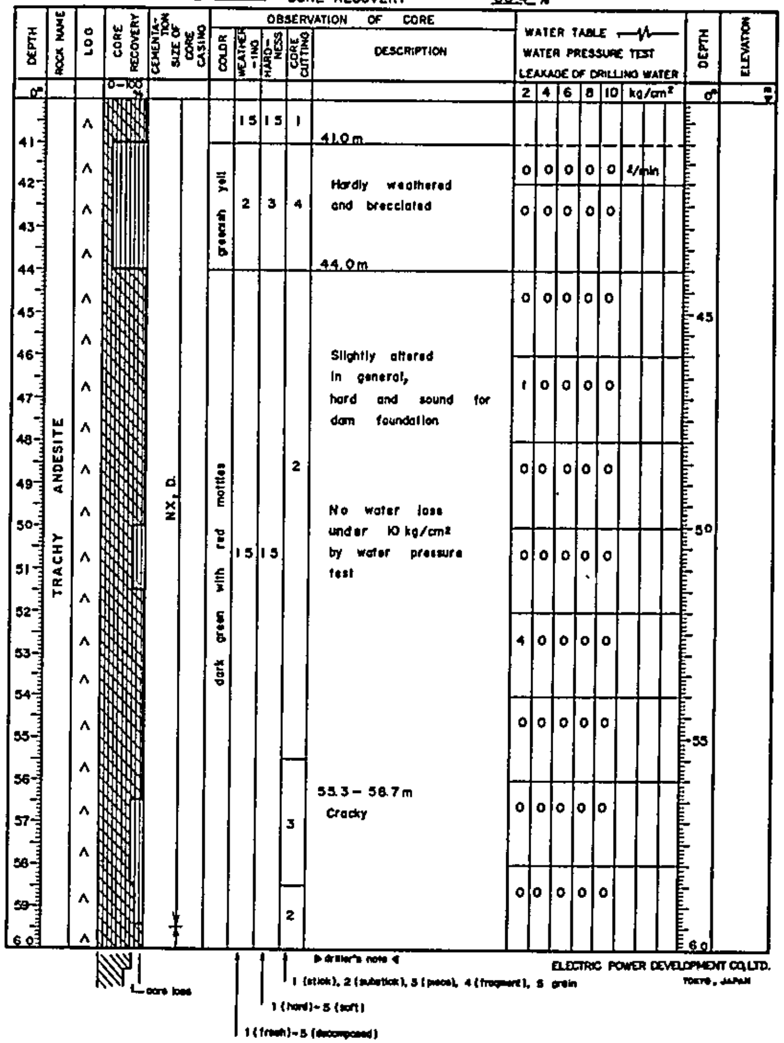


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-16

KELKİT-KARATAŞ PROJECT. KILIÇKAYA DAM HOLE No. SK-5 (SHEET 3 OF 4)

LOCATION	River bed	DEPTH OF HOLE	80.00 m	COMMENCED	11-sep.-'67
ELEVATION	751.66 m	DEPTH OF OVERBURDEN	31.50 m	COMPLETED	9-Oct.-'67
COORDINATE		LENGTH OF ROCK DRILLING	48.50 m	DRILLED BY	ALİ BİLGİN(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	43.32 m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	88.4 %		

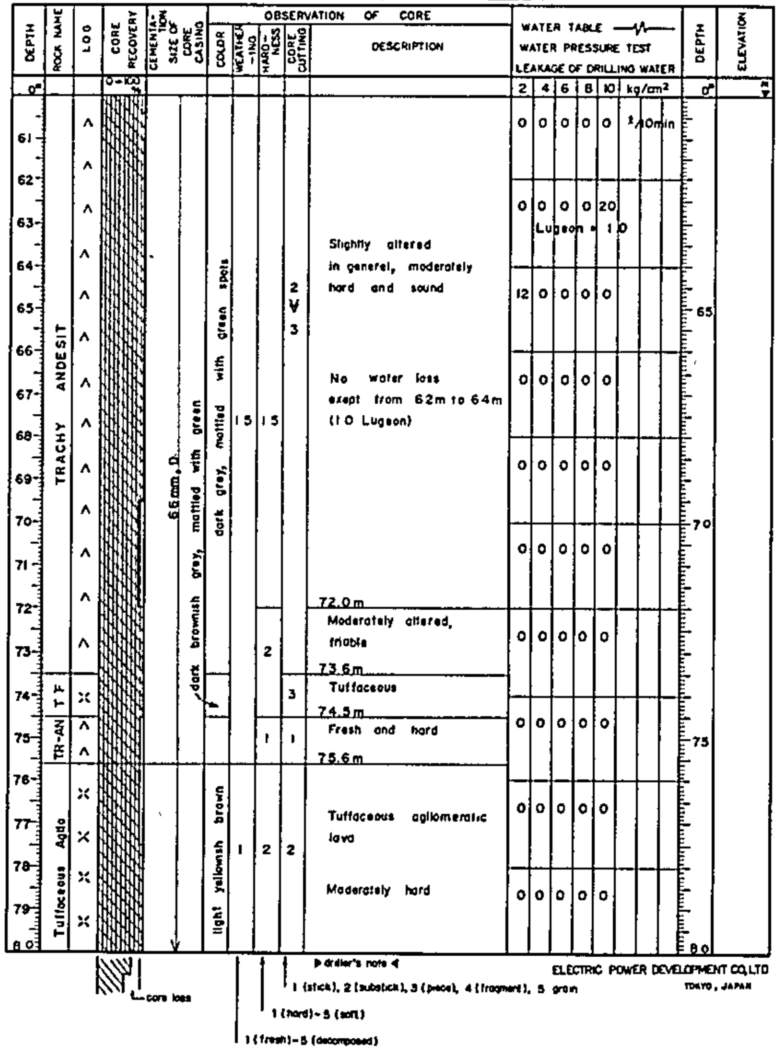


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-17

KELKIT-KARTAŞ PROJECT KILIÇKAYA DAM HOLE No SK-5 (SHEET 4 OF 4)

LOCATION	River bed	DEPTH OF HOLE	80.00m	COMMENCED	11-Sep-'67
ELEVATION	751.66 m	DEPTH OF OVERBURDEN	31.50m	COMPLETED	9-Oct-'67
COORDINATE		LENGTH OF ROCK DRILLING	48.50m	DRILLED BY	ALİ BİLGİN(DSİ)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	43.32m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	88.4 %		

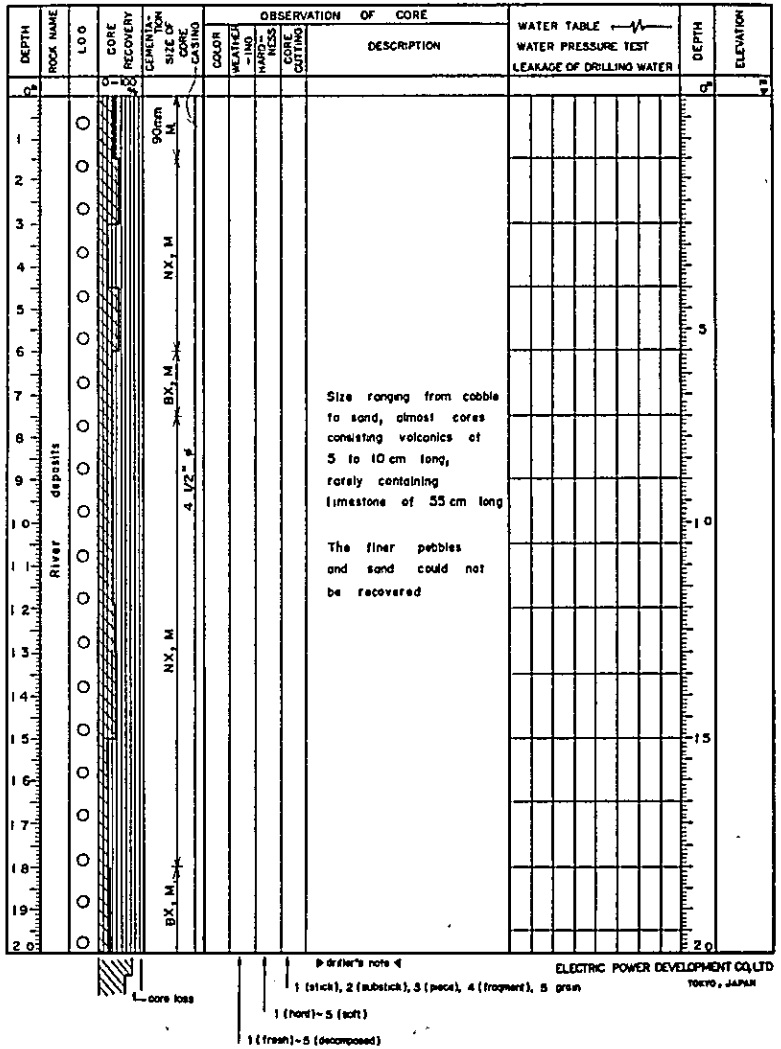


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-18

KELKIT-KARTAŞ PROJECT KILIÇKAYA DAM HOLE No SK-6 (SHEET 1 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00m	COMMENCED	12-Oct-'67
ELEVATION	751.54 m	DEPTH OF OVERBURDEN	29.00m	COMPLETED	12-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	21.00m	DRILLED BY	SADİ ÇALIŞIR(DSİ)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	18.55m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	88.5 %		

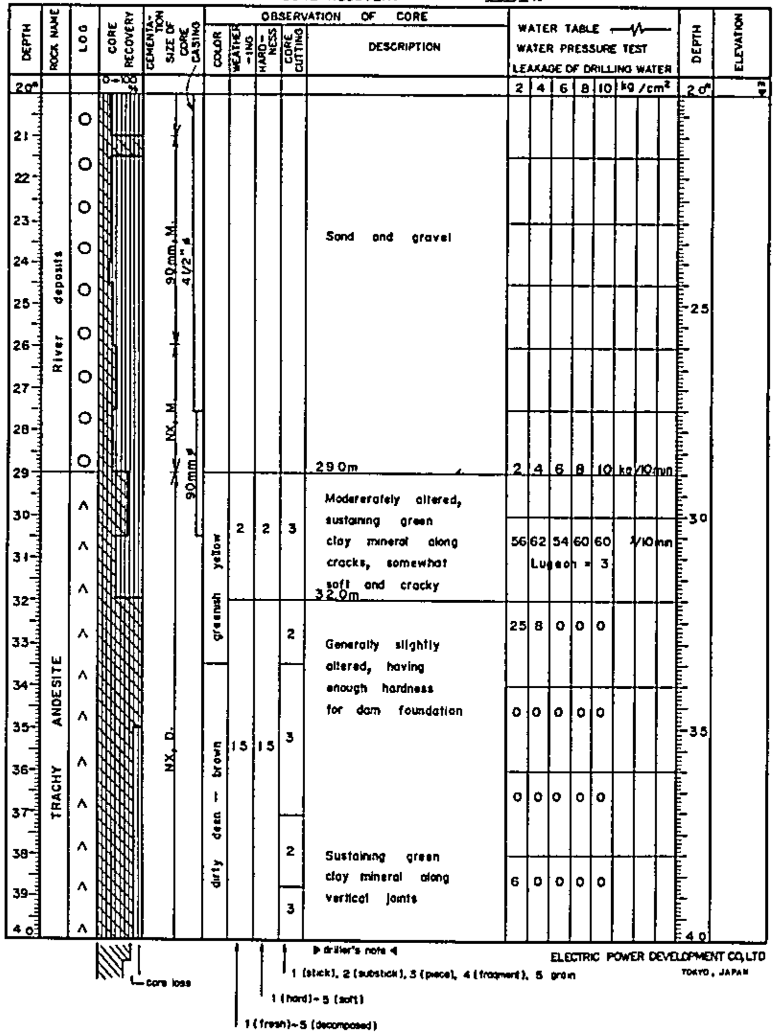


GEOLOGIC LOG OF DRILL HOLE

Fig II 2-19

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-6 (SHEET 2 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00m	COMMENCED	12-Oct-'67
ELEVATION	751.54 m	DEPTH OF OVERBURDEN	29.00m	COMPLETED	12-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	21.00m	DRILLED BY	SADI ÇALIŞIR(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	18.55m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	88.5 %		

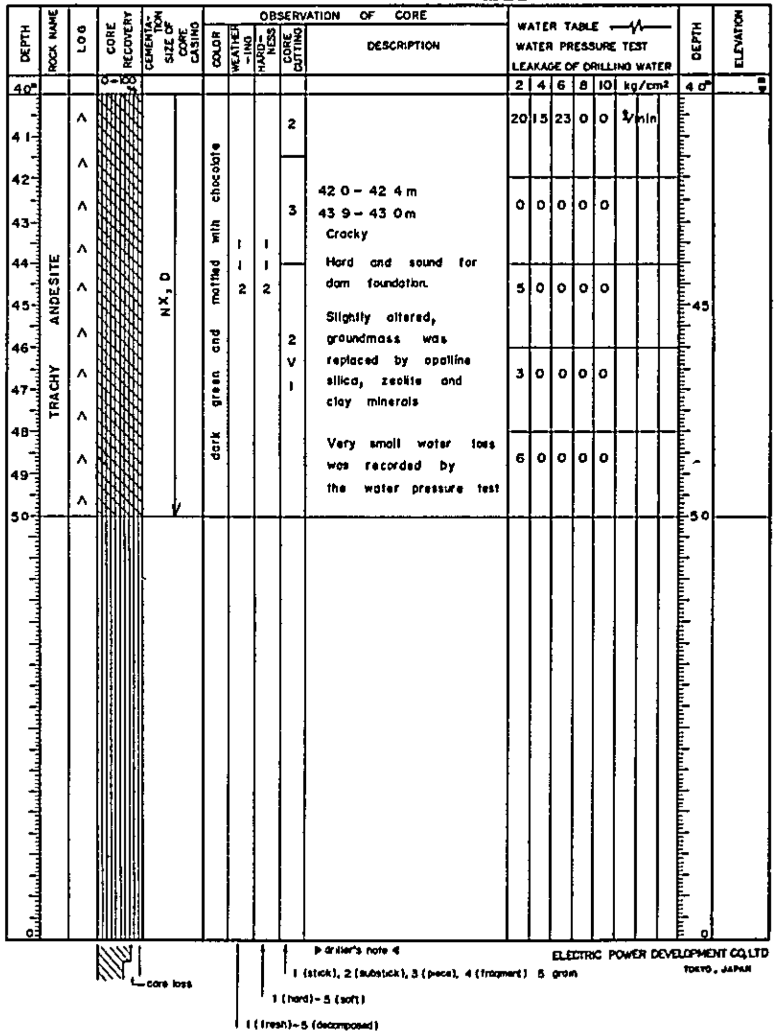


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-20

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-6 (SHEET 3 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00m	COMMENCED	12-Oct-'67
ELEVATION	751.54 m	DEPTH OF OVERBURDEN	29.00m	COMPLETED	12-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	21.00m	DRILLED BY	SADI ÇALIŞIR(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	18.55m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	88.5 %		

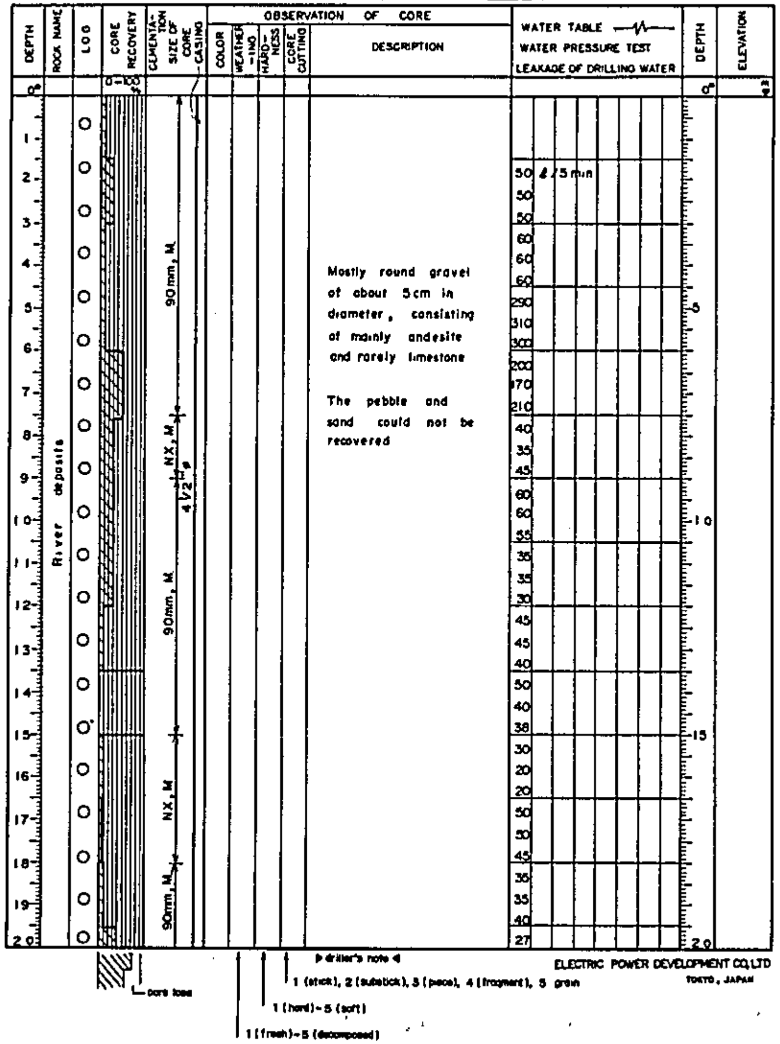


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-21

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAMHOLE No SK-7 (SHEET 1 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00 m	COMMENCED	28-Sep-'67
ELEVATION	752.38 m	DEPTH OF OVERBURDEN	25.60 m	COMPLETED	7-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	24.40 m	DRILLED BY	ÇETİN DURMAZ (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	19.70 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	80.8 %		

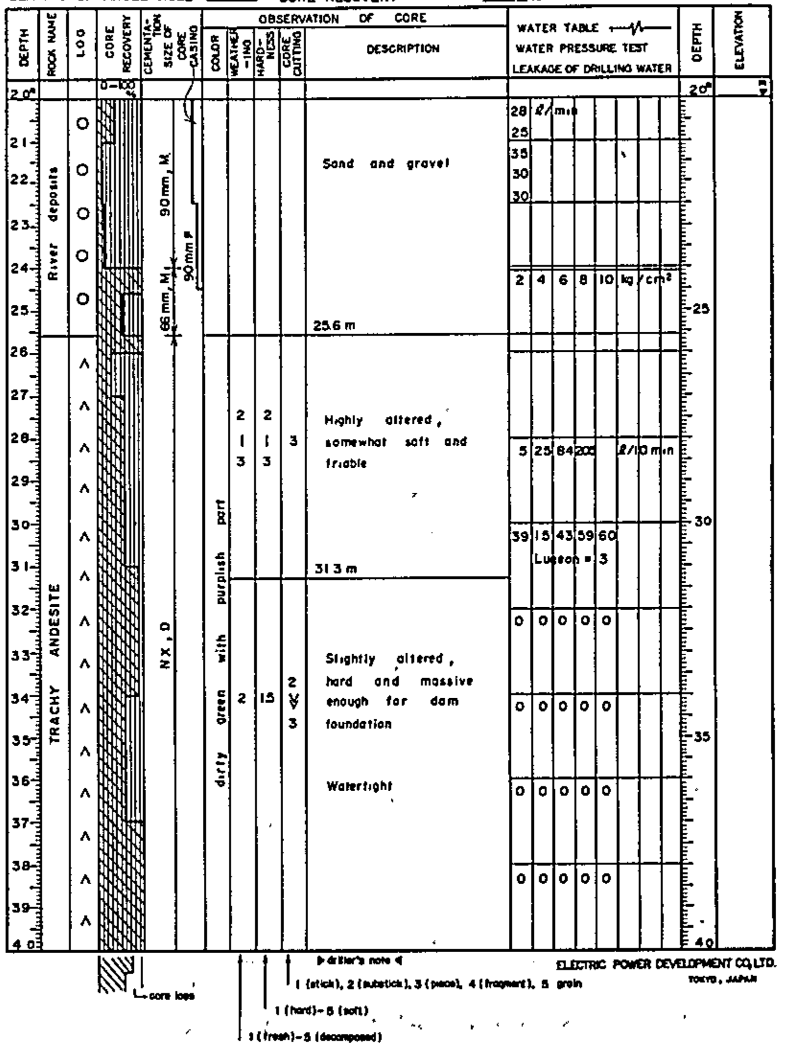


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-22

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No.SK-7 (SHEET 2 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00 m	COMMENCED	28-Sep-'67
ELEVATION	752.38 m	DEPTH OF OVERBURDEN	25.60 m	COMPLETED	7-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	24.40 m	DRILLED BY	ÇETİN DURMAZ (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	19.70 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	80.8 %		

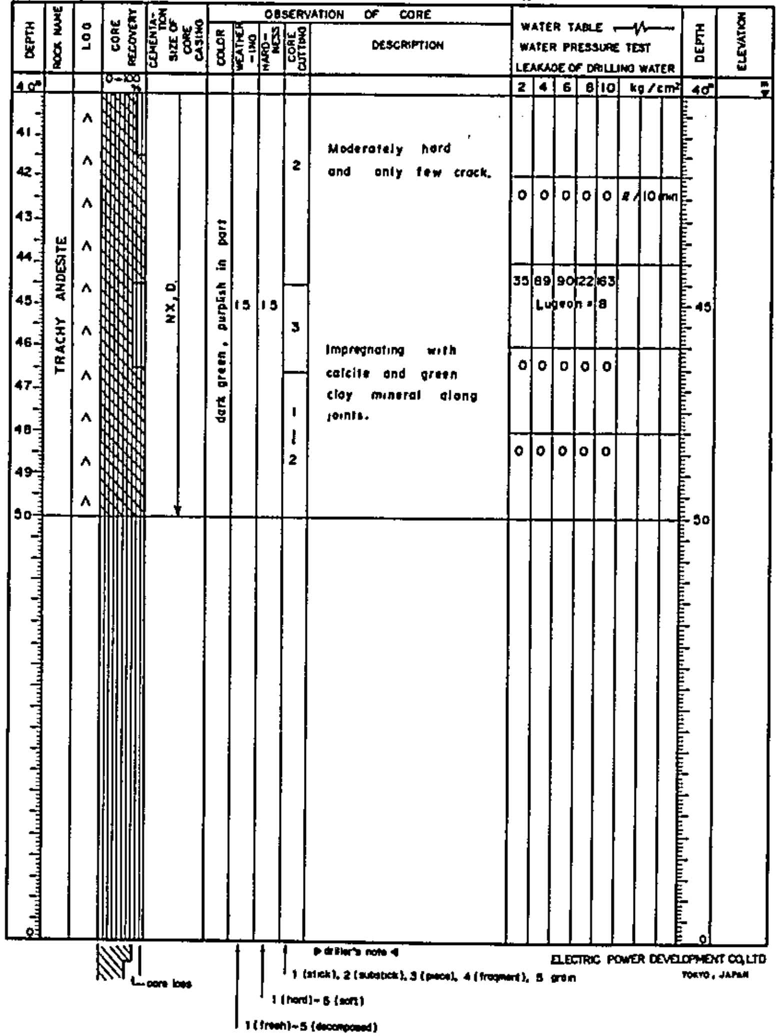


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-23

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-7 (SHEET 3 OF 3)

LOCATION	River bed	DEPTH OF HOLE	50.00 m	COMMENCED	28-Sep-'67
ELEVATION	752.38 m	DEPTH OF OVERBURDEN	25.60 m	COMPLETED	7-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	24.40 m	DRILLED BY	ÇETİN DURMAZ(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	19.70 m	LOGGED BY	T.FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	80.8 %		

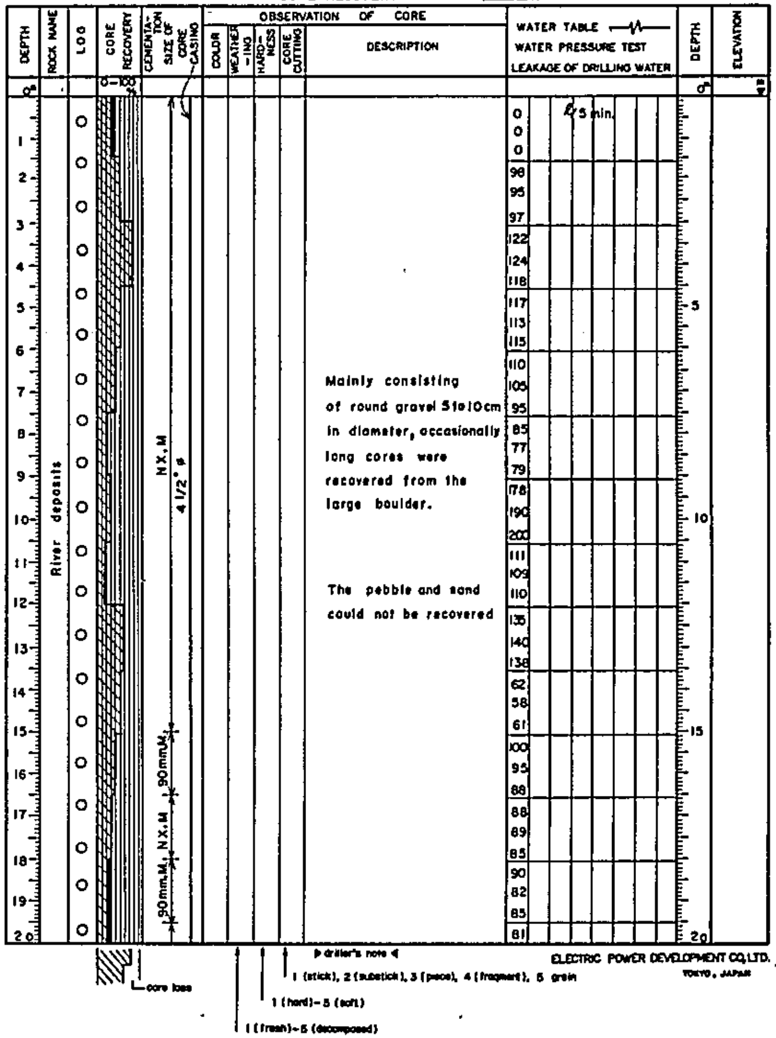


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-24

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-8 (SHEET 1 OF 3)

LOCATION	River bed	DEPTH OF HOLE	60.00 m	COMMENCED	2-Nov-'67
ELEVATION	752.56 m	DEPTH OF OVERBURDEN	29.50 m	COMPLETED	4-Dec-'67
COORDINATE		LENGTH OF ROCK DRILLING	30.50 m	DRILLED BY	AHMET AVCI(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	29.42 m	LOGGED BY	T.FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	96.0 %		

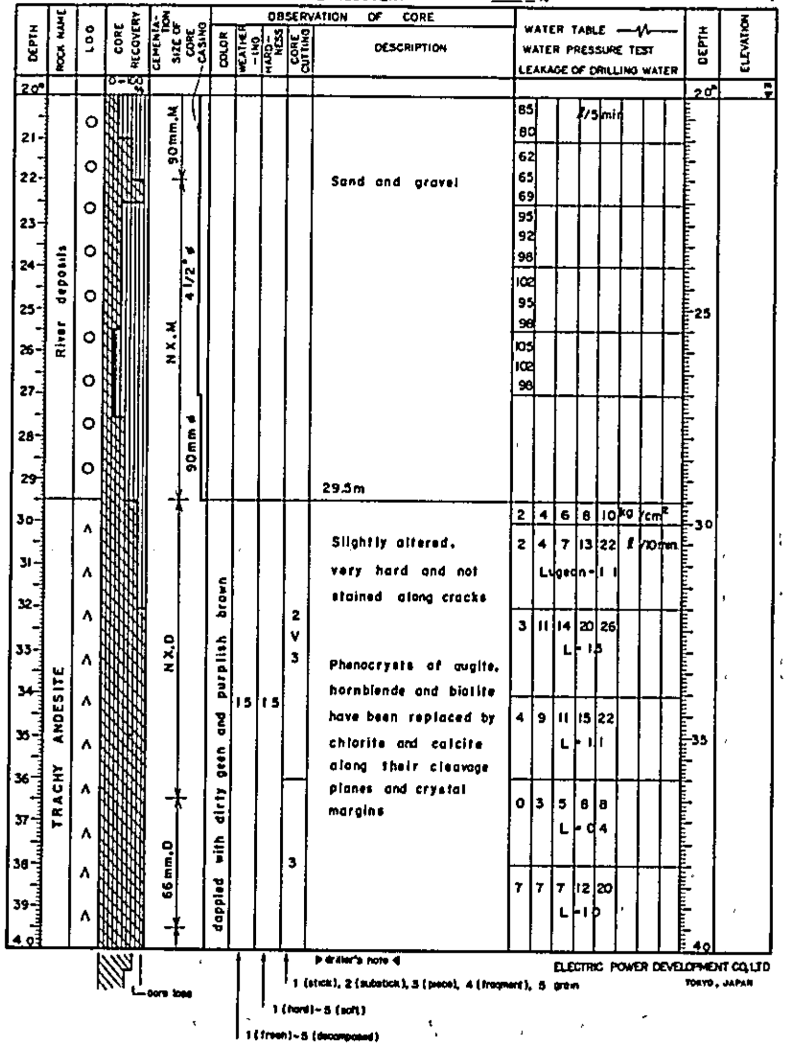


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-25

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-8 (SHEET 2 OF 3)

LOCATION	River bed	DEPTH OF HOLE	60.00 m	COMMENCED	2 - Nov.-'67
ELEVATION	752.56 m	DEPTH OF OVERBURDEN	29.50 m	COMPLETED	4 - Dec.-'67
COORDINATE		LENGTH OF ROCK DRILLING	30.50 m	DRILLED BY	AHMET AVCI (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	29.42 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	96.0 %		

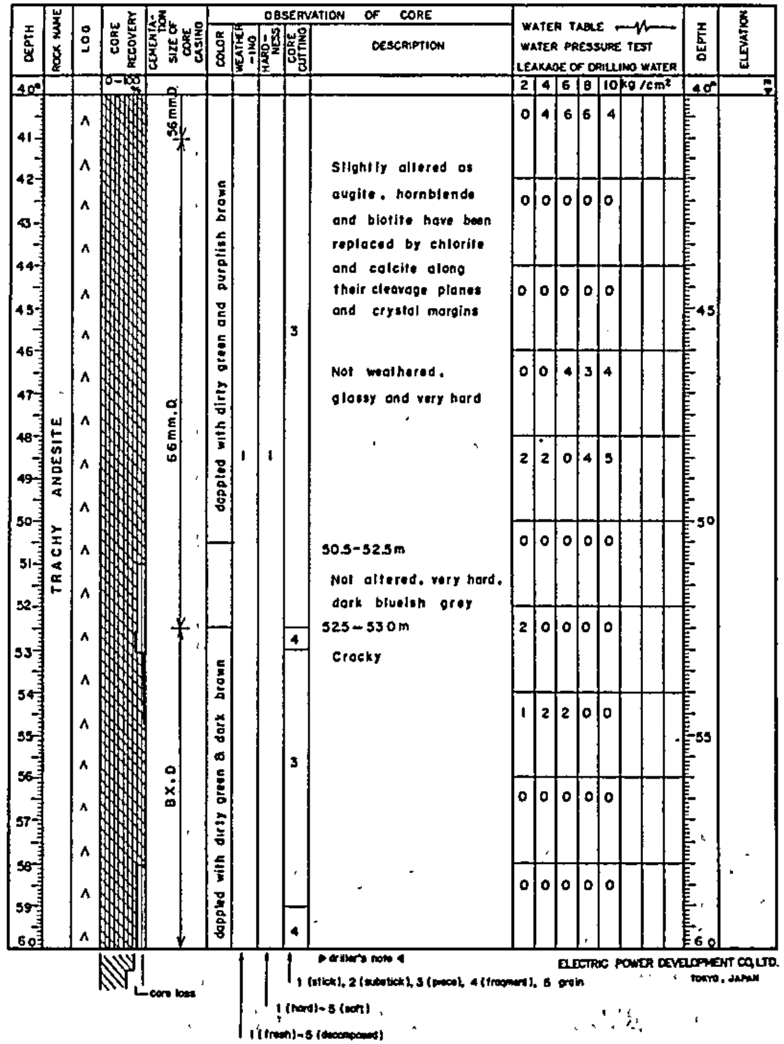


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-26

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-8 (SHEET 3 OF 3)

LOCATION	River bed	DEPTH OF HOLE	60.00 m	COMMENCED	2 - Nov.-'67
ELEVATION	752.56 m	DEPTH OF OVERBURDEN	29.50 m	COMPLETED	4 - Dec.-'67
COORDINATE		LENGTH OF ROCK DRILLING	30.50 m	DRILLED BY	AHMET AVCI (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	29.42 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	96.0 %		

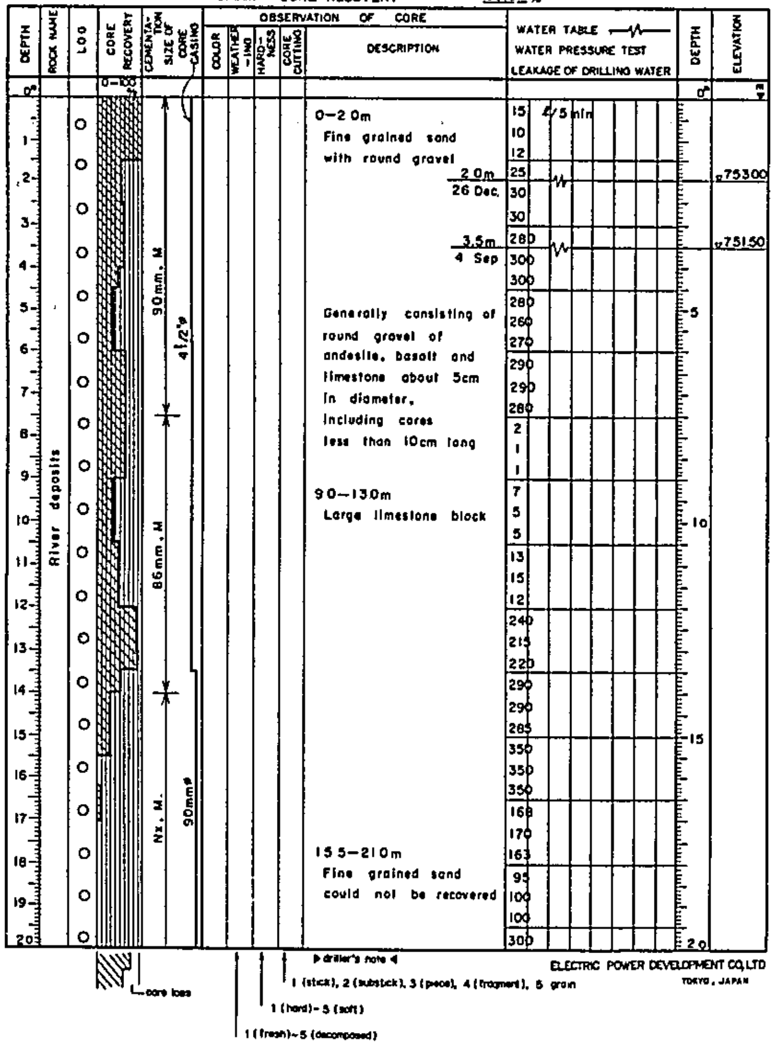


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-27

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-9 (SHEET 1 OF 3)

LOCATION	River bed	DEPTH OF HOLE	60.00 m	COMMENCED	5 -Aug.-'67
ELEVATION	755.00 m	DEPTH OF OVERBURDEN	29.40 m	COMPLETED	3 -Sep.-'67
COORDINATE		LENGTH OF ROCK DRILLING	30.60 m	DRILLED BY	CETIN DUZMAZ(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	30.41 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	99.5 %		

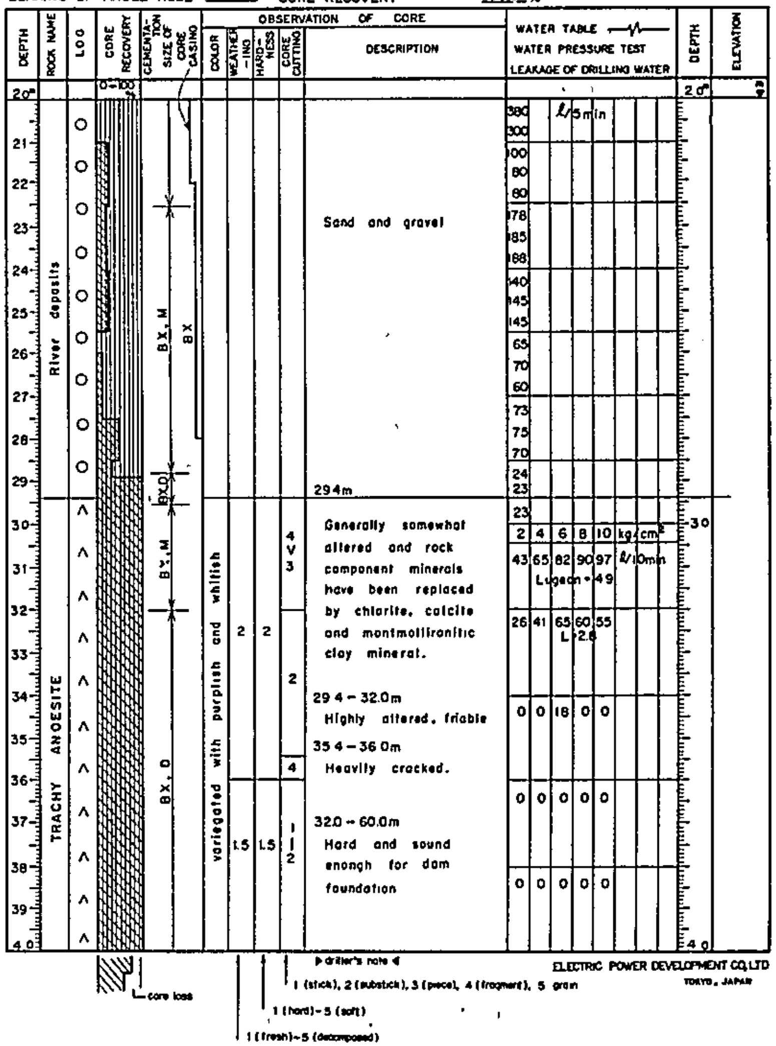


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-28

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-9 (SHEET 2 OF 3)

LOCATION	River bed	DEPTH OF HOLE	60.00 m	COMMENCED	5 -Aug.-'67
ELEVATION	755.00 m	DEPTH OF OVERBURDEN	29.40 m	COMPLETED	3 -Sep.-'67
COORDINATE		LENGTH OF ROCK DRILLING	30.60 m	DRILLED BY	CETIN DUZMAZ(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	30.41 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	99.5 %		

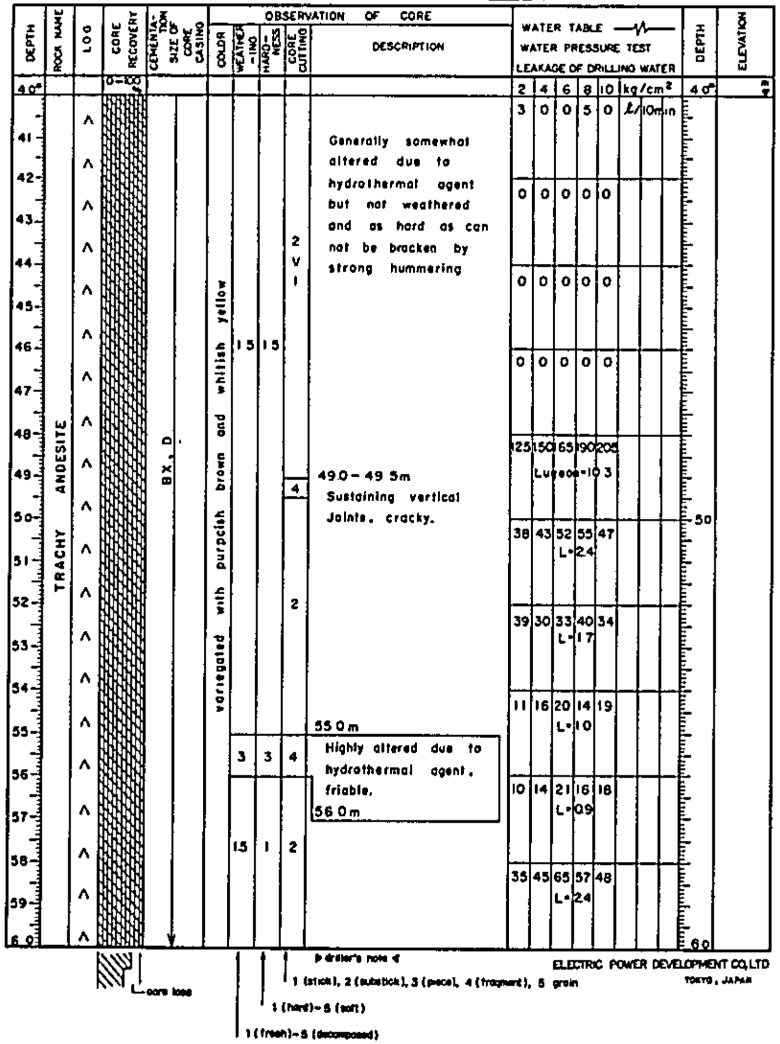


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-29

KELKİT-KARATAŞ PROJECT KILIÇKAY DAM HOLE No. SK-9 (SHEET 3 OF 3)

LOCATION	River bed	DEPTH OF HOLE	60.00 m	COMMENCED	5 - Aug.-'67
ELEVATION	755.00 m	DEPTH OF OVERBURDEN	29.40 m	COMPLETED	3 - Sep.-'67
COORDINATE		LENGTH OF ROCK DRILLING	30.60 m	DRILLED BY	ÇETIN DUZMAZ (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	30.41 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	99.5 %		

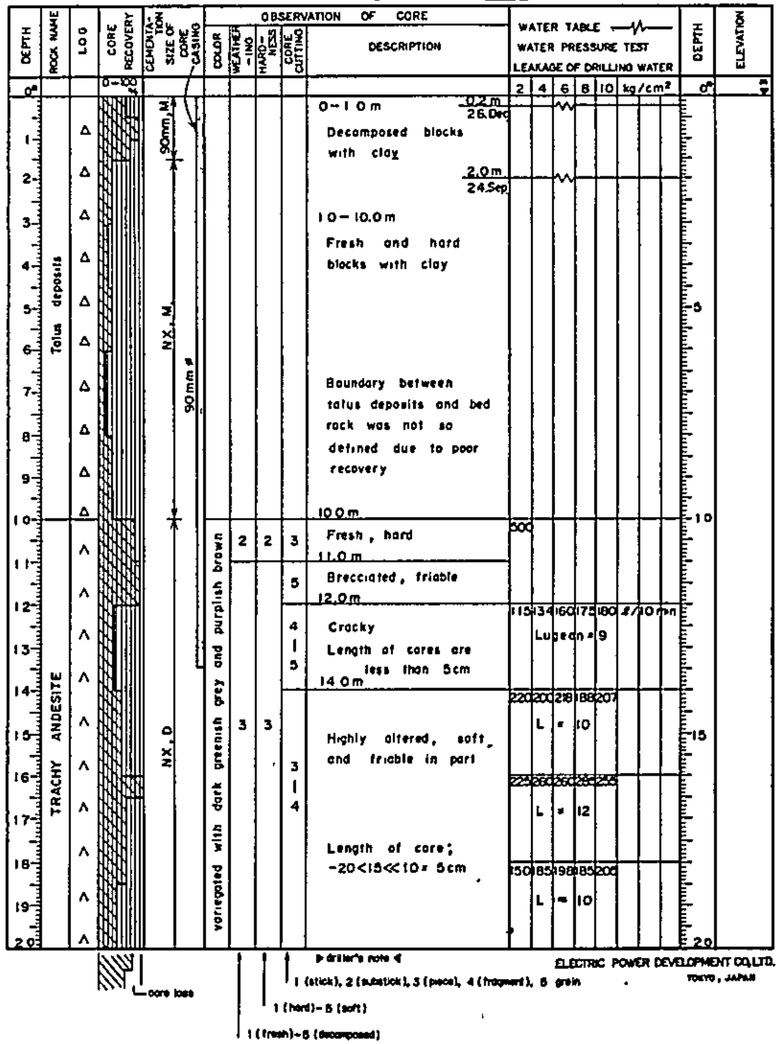


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-30

KELKİT-KARTAŞ PROJECT KILIÇKAYA DAMHOLE No SK-M10 (SHEET 1 OF 3)

LOCATION	Right bank	DEPTH OF HOLE	60.00 m	COMMENCED	9 - Sep.-'67
ELEVATION	764.35 m	DEPTH OF OVERBURDEN	10.00 m	COMPLETED	23 - Sep.-'67
COORDINATE		LENGTH OF ROCK DRILLING	50.00 m	DRILLED BY	ÇETIN DURMAZ (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	42.74 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	85.5 %		

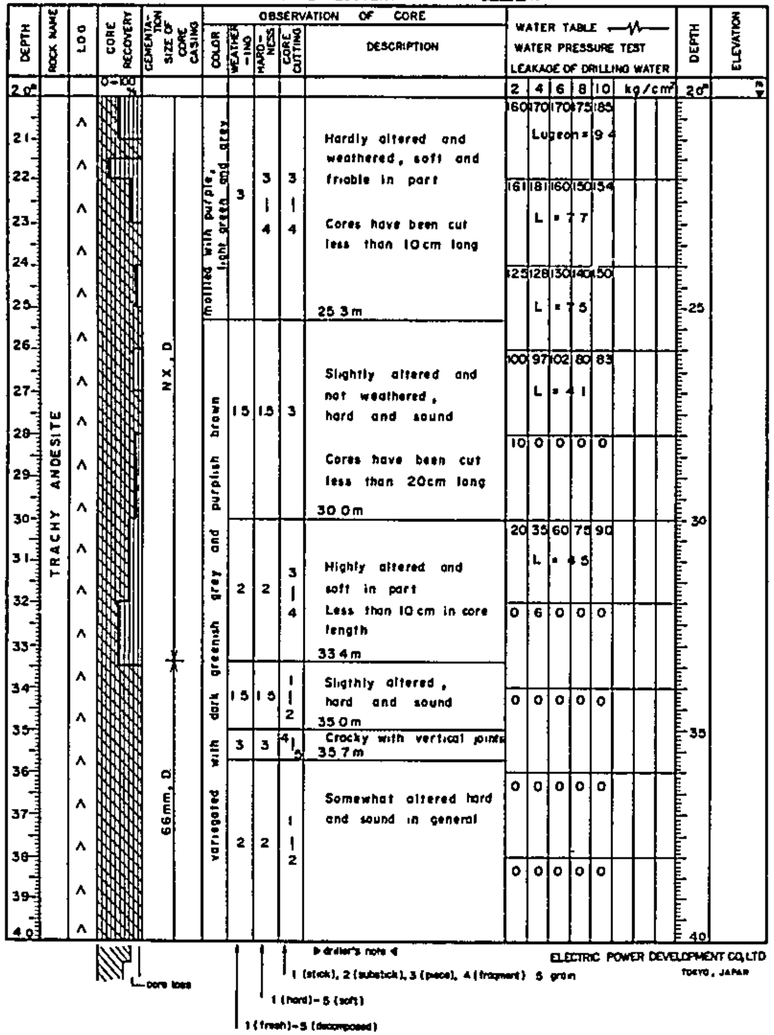


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-31

KELKİT-KARATAŞ PROJECT. KILIÇKAYA DAM HOLE No SK-10 (SHEET 2 OF 3)

LOCATION	Right bank	DEPTH OF HOLE	60.00 m	COMMENCED	9-Sep-'67
ELEVATION	764.35m	DEPTH OF OVERBURDEN	10.00 m	COMPLETED	23-Sep-'67
COORDINATE		LENGTH OF ROCK DRILLING	50.00 m	DRILLED BY	ÇETİN DURMAZ (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	42.74 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	85.5 %		

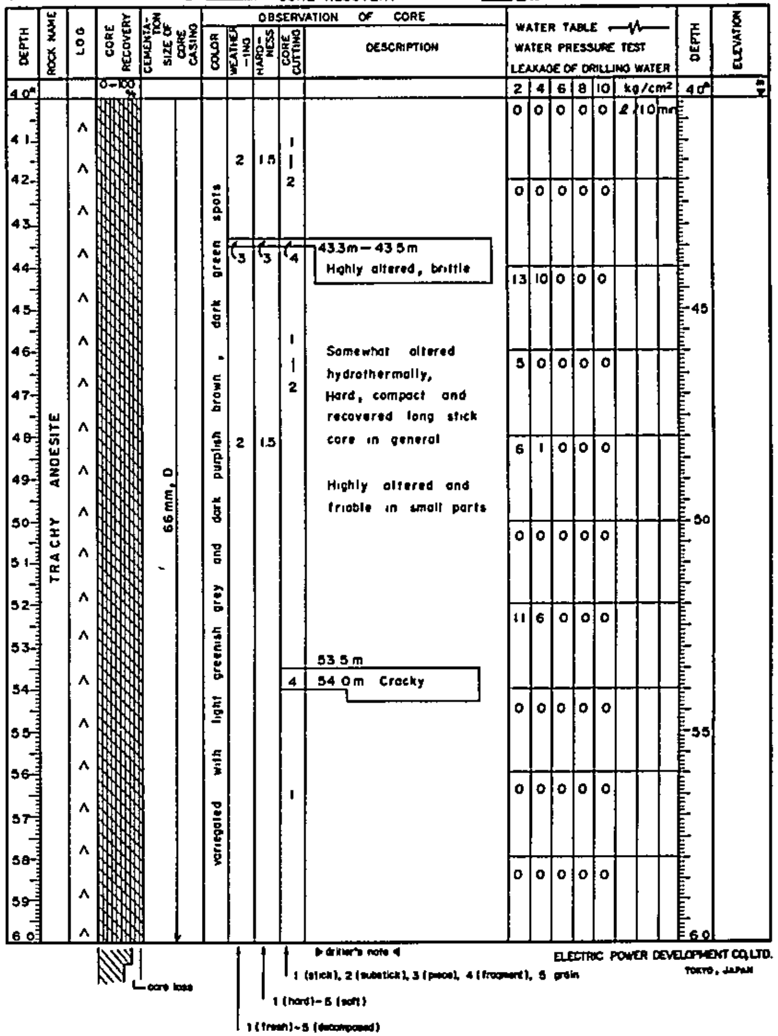


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-32

KELKİT-KARATAŞ PROJECT KILIÇKYA DAM HOLE No. SK-10 (SHEET 3 OF 3)

LOCATION	Right bank	DEPTH OF HOLE	60.00 m	COMMENCED	9-Sep-'67
ELEVATION	764.35m	DEPTH OF OVERBURDEN	10.00 m	COMPLETED	23-Sep-'67
COORDINATE		LENGTH OF ROCK DRILLING	50.00 m	DRILLED BY	ÇETİN DURMAZ (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	42.74 m	LOGGED BY	T FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	85.5 %		

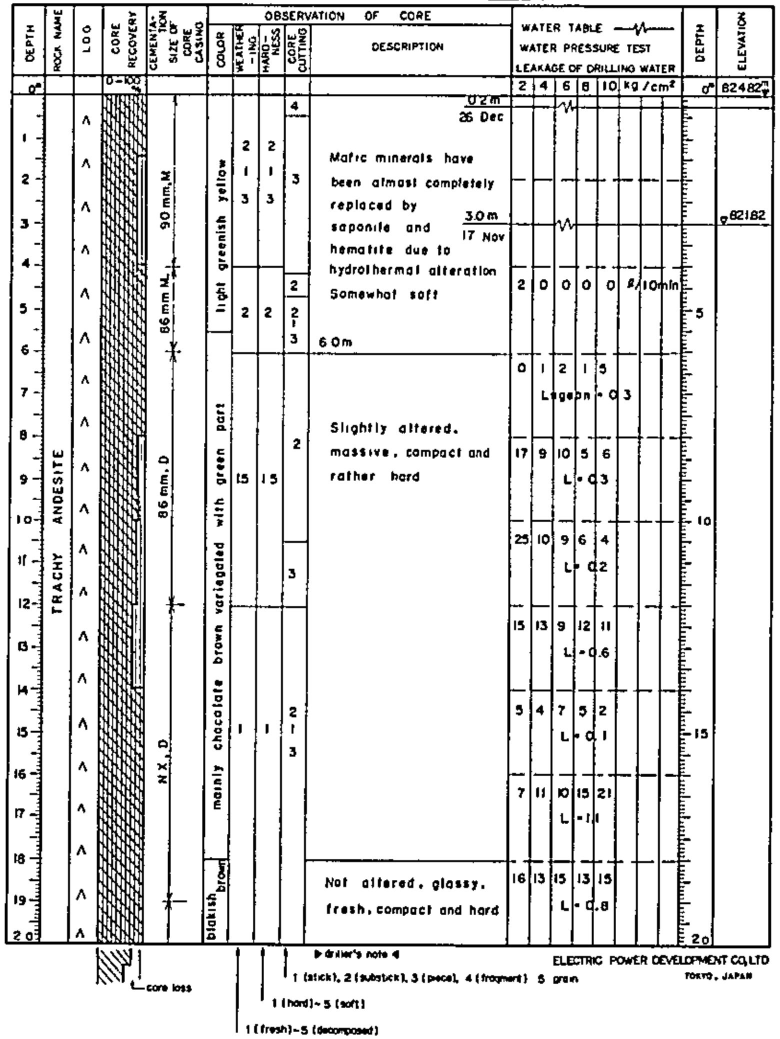


GEOLOGIC LOG OF DRILL HOLE

Fig II 2-33

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-11 (SHEET 1 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	29-Sep-'67
ELEVATION	824.82 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	16-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZER (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	84.54 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	94.0 %		

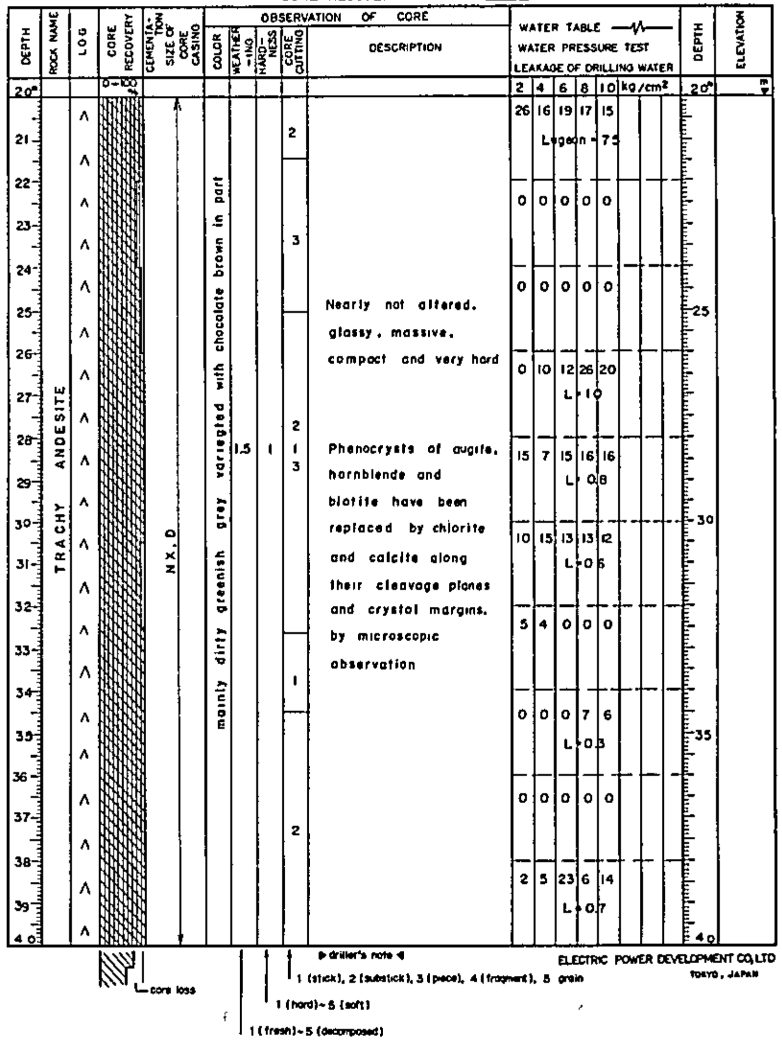


GEOLOGIC LOG OF DRILL HOLE

Fig II 2-34

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-11 (SHEET 2 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	29-Sep-'67
ELEVATION	824.82 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	16-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZER (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	84.54 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	94.0 %		

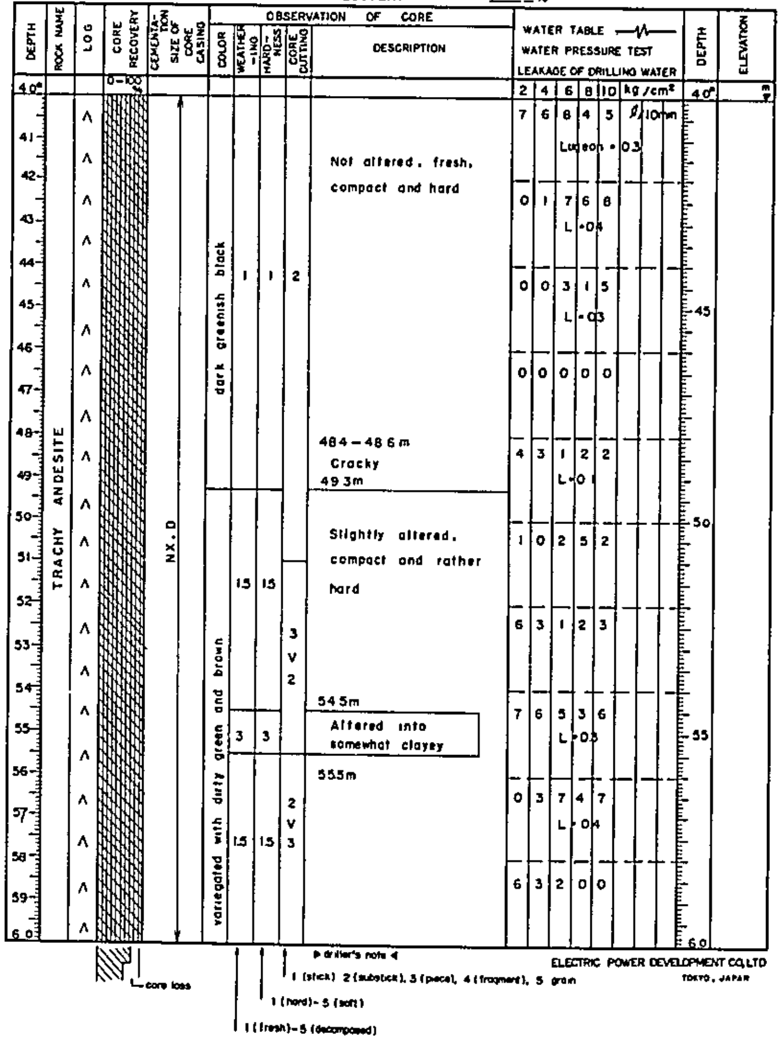


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-35

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-11 (SHEET 3 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	29-Sep.-'67
ELEVATION	824.82 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	16-Nov.-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZER (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	84.54 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	94.0 %		

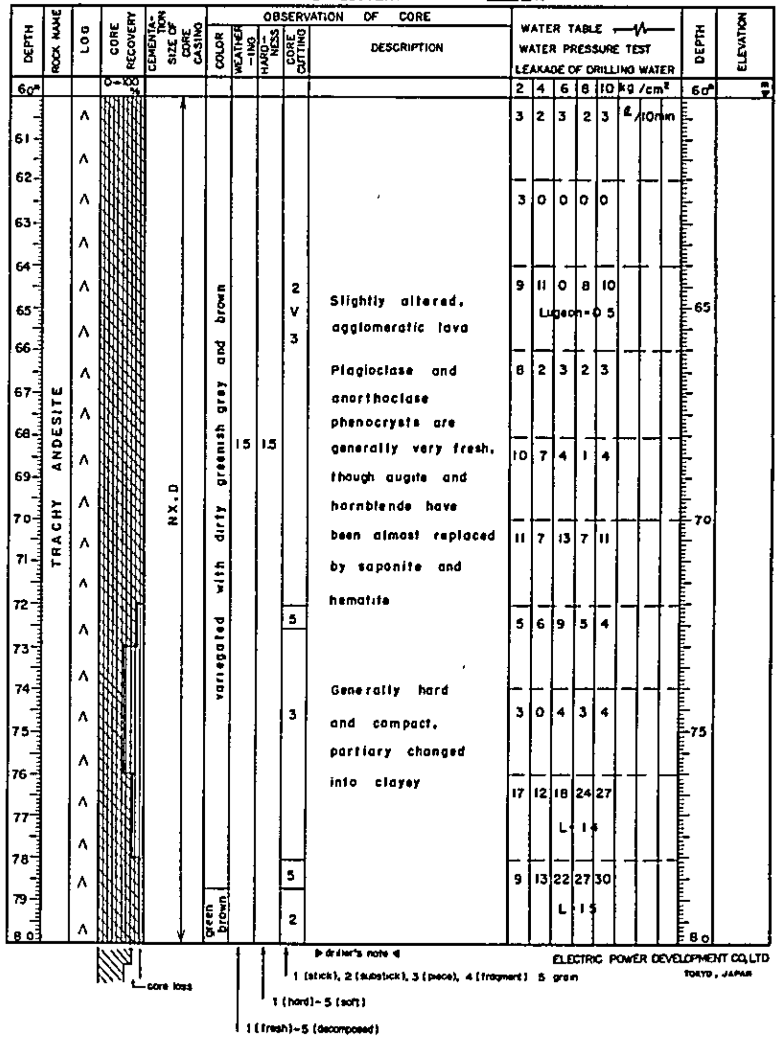


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-36

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-11 (SHEET 4 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	29-Sep.-'67
ELEVATION	824.82 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	16-Nov.-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZER (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	84.54 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	94.0 %		

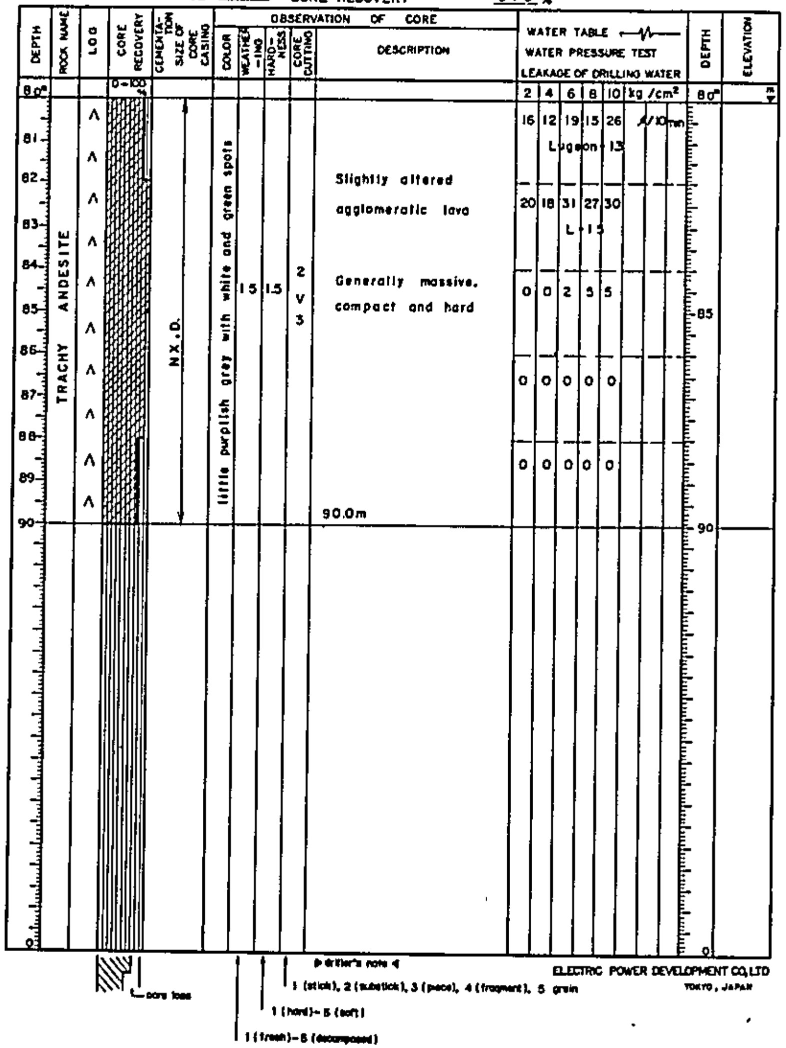


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-37

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-11 (SHEET 5 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	29-Sep.-'67
ELEVATION	824.82 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	16-Nov.-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZER (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	84.54 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	94.0 %		

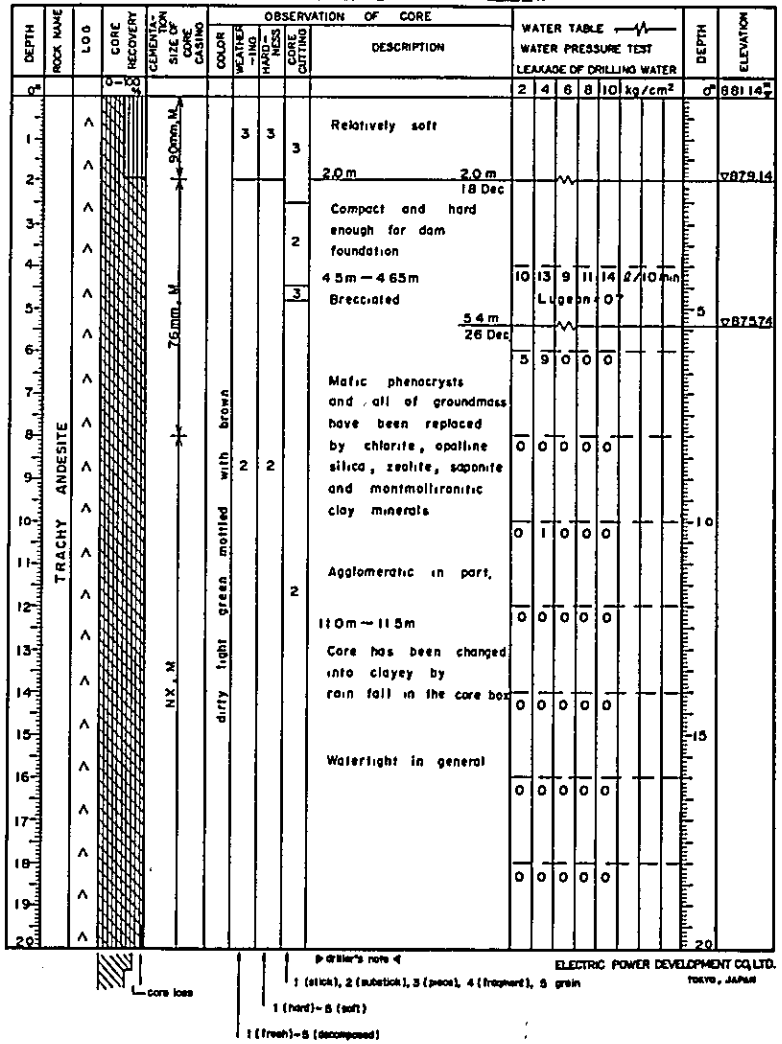


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-38

KELKİT-KARATAŞ PROJECT. KILIÇKAYA DAM HOLE No. SK-13 (SHEET 1 OF 2)

LOCATION	Spillway	DEPTH OF HOLE	40.00 m	COMMENCED	5-Dec.-'67
ELEVATION	881.14 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	18-Dec.-'67
COORDINATE		LENGTH OF ROCK DRILLING	40.00 m	DRILLED BY	HÜSEYİN GÜRSES (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	36.93 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	86.7 %		



GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-39

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-13 (SHEET 2 OF 2)

LOCATION	Spillway	DEPTH OF HOLE	40.00 m	COMMENCED	5-Dec-'67
ELEVATION	881.14 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	18-Dec-'67
COORDINATE		LENGTH OF ROCK DRILLING	40.00 m	DRILLED BY	HÜSEYİN GÜRSES (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	36.93 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	86.7 %		

Rock name: TRACHY ANDESITE (20–40 m)

Size of core / casing: NX.M, NX.D, NX.M, NX.D, NX.M, BX.M

Color: variegated with dirty light green and brown

Weathering: 2 Hardness: 2 Core cutting: 2, 3, 2, 3

Description:

Mafic phenocrysts and all groundmass have been replaced by chlorite, opalline silica, zeolite, saponite and montmollironitic clay minerals due to hydrothermal alteration

Somewhat softened but compact and hard enough for dam foundation.

27.5–28.3 m Changed into clayey in water

Agglomeratic in part

Watertight in general

Water pressure test (leakage of drilling water, l/10 min, at 2 / 4 / 6 / 8 / 10 kg/cm²):

2	4	6	8	10	Remarks
0	0	0	0	0	
0	0	0	0	0	
0	0	0	0	0	
23	20	25	19	16	Lugeon = 0.8
20	18	18	13	10	L = 0.5
19	17	19	20	15	L = 0.8
22	15	16	18	11	L = 0.6
20	24	20	16	15	L = 0.8
1	0	0	0	0	
3	0	0	0	0	

Legend: core loss; ▶ driller's note ◀; core cutting 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain; hardness 1 (hard) – 5 (soft); weathering 1 (fresh) – 5 (decomposed)

ELECTRIC POWER DEVELOPMENT CO., LTD TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-40

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-15 (SHEET 1 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	76.00 m	COMMENCED	3-Nov-'67
ELEVATION	838.55 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	30-Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	76.00 m	DRILLED BY	RAİK YALÇIN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	70.80 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	81.0 %		

Rock name: TRACHY ANDESITE (0–20 m)

Size of core / casing: 90mm M, 86mm M, 90mm ф casing, 76mm M, 76mm D

Color: light greenish white variegated with purplish brown

Weathering: 3, 2 Hardness: 3, 2 Core cutting: 4 > 3, 1 – 2

Description:

Highly altered, somewhat soft and friable. 2.0 m

Generally highly altered; plagioclase and anorthoclase are fresh, though augite and hornblende in the phenocrysts have been almost completely replaced by chlorite, saponite and hamatite, the groundmass which must had been composed of plagioclase, magnetite and mafic minerals such as augite and hornblende were replaced by opalline silica, zeolite and clay minerals

Massive and relatively hard. Cores have been cut more than 50cm long in many section

Watertight in general

Water table: 9.0 m, 1. Dec; ▽829.55

Water pressure test (leakage of drilling water, l/10 min, at 2 / 4 / 6 / 8 / 10 kg/cm²):

2	4	6	8	10	Remarks
5	7	6	6	8	Lugeon = 0.4
4	7	5	4	6	L = 0.3
0	3	1	0	2	L = 0.1
21	0	0	0	0	
9	0	0	0	0	
1	0	0	0	0	
3	2	4	5	3	
0	0	0	0	0	
0	0	0	0	0	

Legend: core loss; ▶ driller's note ◀; core cutting 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain; hardness 1 (hard) – 5 (soft); weathering 1 (fresh) – 5 (decomposed)

ELECTRIC POWER DEVELOPMENT CO., LTD TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig II 2-41

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-15 (SHEET 2 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	76.00 m	COMMENCED	3 -Nov.-'67
ELEVATION	838.55 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	30 -Nov.-'67
COORDINATE		LENGTH OF ROCK DRILLING	76.00 m	DRILLED BY	RAK YALÇIN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	70.80 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	81.0 %		

DEPTH 20 – 40 m. ROCK NAME: TRACHY ANDESITE. CORE RECOVERY 0–100 %. SIZE OF CORE CASING: 76mm, D (20–26 m); 76mm, M (26–31 m); 76mm, D (31–40 m).

OBSERVATION OF CORE — COLOR: light greenish white variegated with purplish brown in part. WEATHERING: 2. HARDNESS: 2. CORE CUTTING: 1 – 2.

DESCRIPTION:

Generally highly altered; plagioclase and anorthoclase are generally fresh, though augite and hornblende have been almost completely replaced by saponite and hematite, the groundmass was also wholly replaced by opaline silica and clay minerals.

Massive and relatively hard

Cores have been cut more than 50cm long in many sections, partiary have been cut 5 – 10cm in length.

No leakage by water pressure test

WATER TABLE: 37.0 m, 26 Dec; ELEVATION ▽801.55

WATER PRESSURE TEST — LEAKAGE OF DRILLING WATER

Depth (m)	2	4	6	8	10 kg/cm²
20 – 22	3	1	0	0	0
22 – 24	0	0	0	0	0
24 – 26	0	0	0	0	0
26 – 28	1	0	0	0	0
28 – 30	2	0	0	0	0
30 – 32	0	0	0	0	0
32 – 34	0	0	0	0	0
34 – 36	3	0	0	0	0
36 – 38	5	1	0	0	0
38 – 40	3	4	2	1	0

core loss

▶ driller's note ◀
1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain
1 (hard) – 5 (soft)
1 (fresh) – 5 (decomposed)

ELECTRIC POWER DEVELOPMENT CO., LTD
TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig II 2-42

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-15 (SHEET 3 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	76.00 m	COMMENCED	3 -Nov.-'67
ELEVATION	838.55 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	30 -Nov.-'67
COORDINATE		LENGTH OF ROCK DRILLING	76.00 m	DRILLED BY	RAK YALÇIN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	70.80 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	81.0 %		

DEPTH 40 – 60 m. ROCK NAME: TRACHY ANDESITE. CORE RECOVERY 0–100 %. SIZE OF CORE CASING: 76mm, D.

OBSERVATION OF CORE — COLOR: light greenish white variegated with purplish brown. WEATHERING: 2. HARDNESS: 2. CORE CUTTING: 1 – 2 – 1 – 3.

DESCRIPTION:

Mafic phenocryst and all groundmass have been replaced by chlorite, saponite, hematite, opaline silica and clay minerals due to hydrothermal alteration.

These altered rock have somewhat higher porosity and lower density than fresh rock and become very fragile when they are saturated with water

Massive and relatively hard

WATER PRESSURE TEST — LEAKAGE OF DRILLING WATER

Depth (m)	2	4	6	8	10 kg/cm²	
40 – 42	4	3	2	0	2	
42 – 44	0	0	0	0	0	
44 – 46	0	0	0	0	0	
46 – 48	0	0	0	0	0	
48 – 50	0	0	0	0	0	
50 – 52	65	70	65	61	74	Lugeon = 37
52 – 54	57	55	56	73	76	L = 38
54 – 56	5	2	0	0	0	
56 – 58	53	62	70	81	121	L = 60
58 – 60	25	43	66	82	103	L = 50

core loss

▶ driller's note ◀
1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain
1 (hard) – 5 (soft)
1 (fresh) – 5 (decomposed)

ELECTRIC POWER DEVELOPMENT CO., LTD.
TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-43

KELKİT KARATAŞ PROJECT. KILIÇKAYA DAM HOLE No. SK-15 (SHEET 4 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	76.00 m	COMMENCED	3 -Nov-'67
ELEVATION	838.55 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	30 -Nov-'67
COORDINATE		LENGTH OF ROCK DRILLING	76.00 m	DRILLED BY	RAIK YALÇIN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	70.80 m	LOGGED BY	T.FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	81.0 %		

Rock name: TRACHY ANDESITE. Size of core casing: BX, D. Depth 60.0 m – 76.0 m.

Depth (m)	Color	Weathering	Hardness	Core cutting	Description
60.0–62.0	brown	1.5	1.5		somewhat altered, generally hard, partialy soft and clayey 62.0 m
62.0–67.0	blackish	1	1	4	Nearly fresh, mafic phenocrysts have been altered along their cleavage planes and crystal margins Glassy, compact and hard Cores have been cut by less than 5cm long 67.0 m
67.0–75.0	variogated with brown and yellow	2–3	2–3	4	Highly altered; mafic phenocrysts and groundmass have been wholly replaced by chlorite, hematite, opalline silica, zeolite and montmollianitic clay minerals Relatively soft in general, partiary clayey 75.0 m
75.0–76.0	light brown	1	1	2	Glassy, compact and very hard 76.0 m

Water pressure test (leakage of drilling water, ℓ/10 min, at 2, 4, 6, 8, 10 kg/cm²)

2	4	6	8	10	Lugeon
135	100	108	95	111	Lugeon = 5.6
30	33	33	24	28	L = 1.4
69	61	67	50	55	L = 2.8
81	83	77	70	72	L = 3.6
75	105	125	145	175	L = 8.8
53	65	76	87	101	L = 5.0
83	99	117	135	138	L = 6.9
11	9	7	10	13	L = 0.7

ELECTRIC POWER DEVELOPMENT CO.,LTD TOKYO, JAPAN

Core loss. ▶ driller's note ◀ 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain. 1 (hard) – 5 (soft). 1 (fresh) – 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-44

KELKİT–KARATAŞ PROJECT. KILIÇKAYA DAM HOLE No. SK-M16 (SHEET 1 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	21 -Nov-'67
ELEVATION	820.34 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	15 -Dec-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZAR (DSI)
ANGLE FROM HORIZONTAL	45°	TOTAL LENGTH OF CORE	85.82 m	LOGGED BY	T.FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	95.4 %		

Rock name: TRACHY ANDESITE. Size of core casing: 90mm, M (0–3 m); 86mm, M (3–12 m); 76mm, M (12–20 m).

Depth (m)	Color	Weathering	Hardness	Core cutting	Description
0–15	(dirty) light yellowish green	2	2	2 > 3	5.0 – 5.2 m Brecciated. All section of this hole has been highly altered hydrothermally; mafic phenocrysts and all groundmass have been completely replaced by hematite, opalline silica, zeolite and clay minerals. Somewhat soft but massive and hard enough for dam foundation.
15–20	brown mottled with light green			2	Low permeability.

Water pressure test (leakage of drilling water, ℓ/10 min, at 2, 4, 6, 8, 10 kg/cm²)

2	4	6	8	10	Lugeon
30	20				
50	20				
20	31	34	40	33	Lugeon = 1.7
15	23	24	33	37	L = 1.9
20	20	19	25	29	L = 1.5
19	28	20	25	33	L = 1.7
23	21	20	18	17	L = 0.9
9	7	3	4	10	L = 0.5
14	14	18	20	20	L = 1.0

ELECTRIC POWER DEVELOPMENT CO.,LTD TOKYO, JAPAN

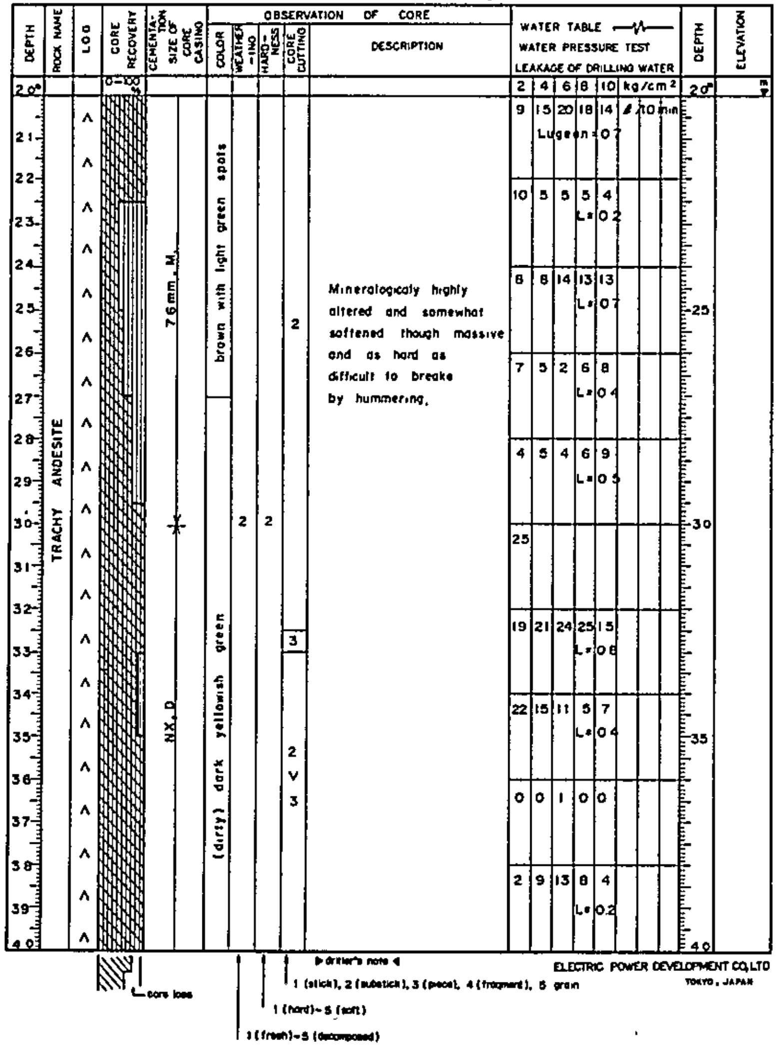
Core loss. ▶ driller's note ◀ 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain. 1 (hard) – 5 (soft). 1 (fresh) – 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-45

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-MI6 (SHEET 2 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	21 -Nov.-'67
ELEVATION	820.34 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	15 -Dec.-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZAR (DSI)
ANGLE FROM HORIZONTAL	45°	TOTAL LENGTH OF CORE	85.82 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	95.4 %		

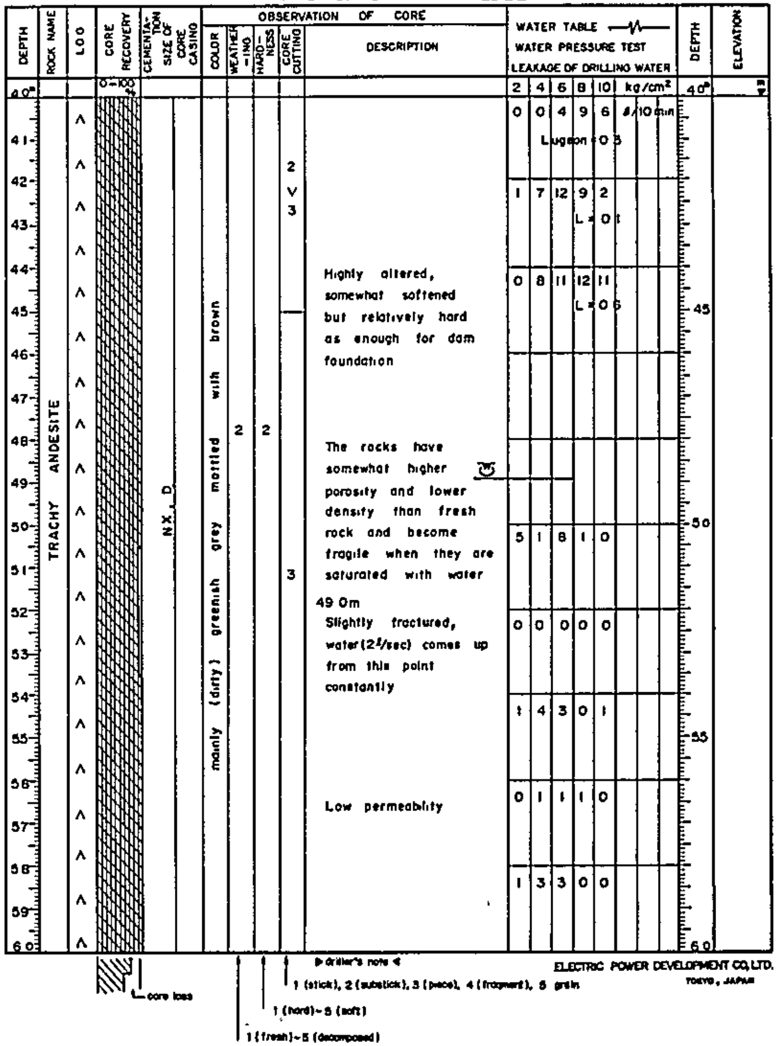


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-46

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-MI6 (SHEET 3 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	21 -Nov.-'67
ELEVATION	820.34 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	15 -Dec.-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZAR (DSI)
ANGLE FROM HORIZONTAL	45°	TOTAL LENGTH OF CORE	85.82 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	95.4 %		

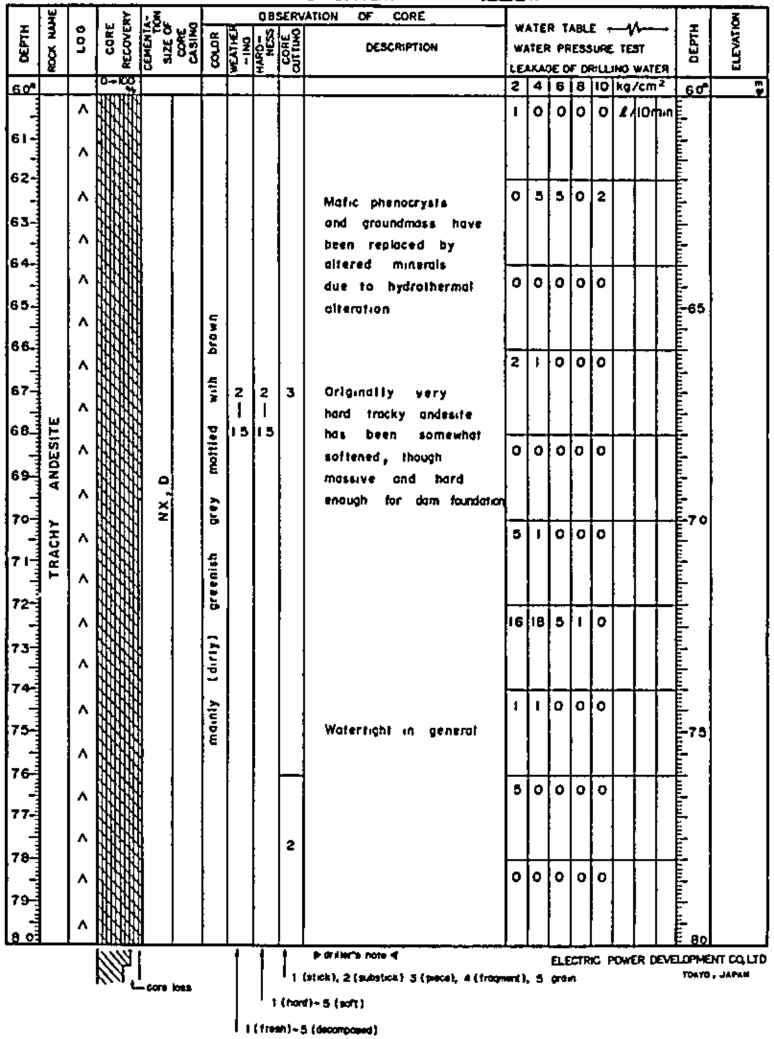


GEOLOGIC LOG OF DRILL HOLE

Fig II 2-47

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No.SK-M16 (SHEET 4 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	21 -Nov.-'67
ELEVATION	820.34 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	15 -Dec.-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZAR (DSI)
ANGLE FROM HORIZONTAL	45°	TOTAL LENGTH OF CORE	85.82 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	95.4 %		

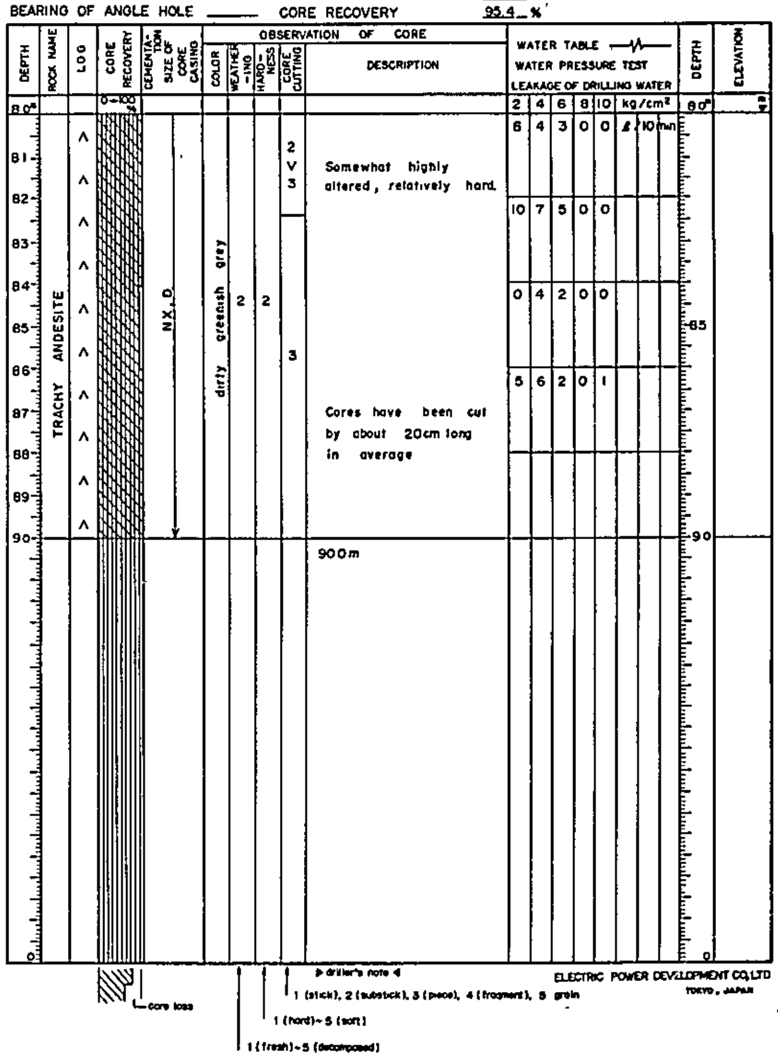


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-48

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No.SK-M16 (SHEET 5 OF 5)

LOCATION	Right bank	DEPTH OF HOLE	90.00 m	COMMENCED	21 -Nov.-'67
ELEVATION	820.34 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	15 -Dec.-'67
COORDINATE		LENGTH OF ROCK DRILLING	90.00 m	DRILLED BY	RAMAZAN ÖZAR (DSI)
ANGLE FROM HORIZONTAL	45°	TOTAL LENGTH OF CORE	85.82 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	95.4 %		

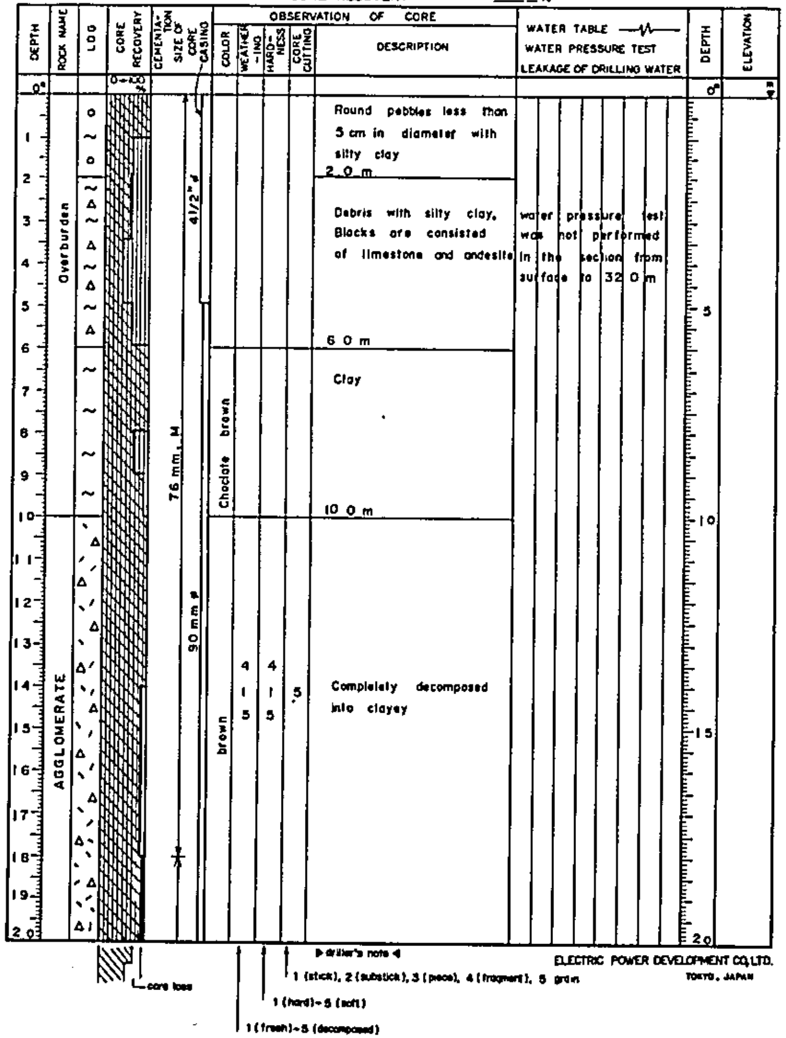


GEOLOGIC LOG OF DRILL HOLE

Fig II 2-49

KELKIT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-17 (SHEET 1 OF 3)

LOCATION	Left bank	DEPTH OF HOLE	60.00m	COMMENCED	1 - Jul - '67
ELEVATION	1050.00 m	DEPTH OF OVERBURDEN	10.00m	COMPLETED	15 - Jul - '67
COORDINATE		LENGTH OF ROCK DRILLING	50.00m	DRILLED BY	RIZA KİBAR(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	39.37m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	77.7 %		

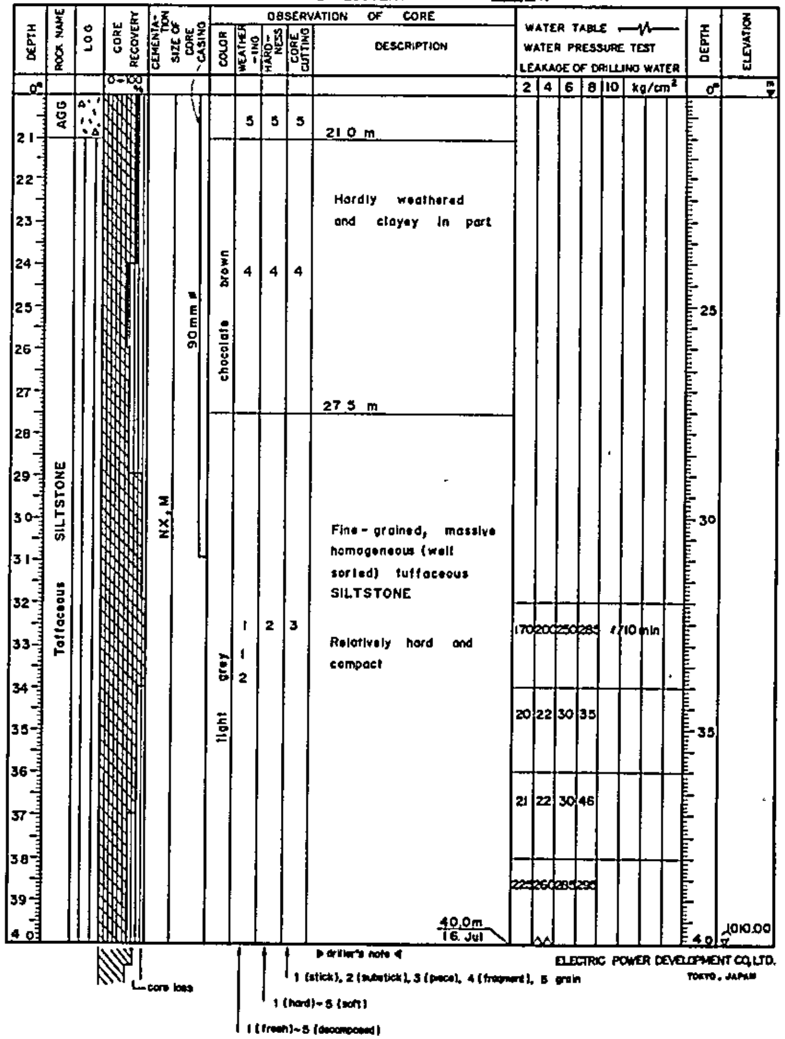


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-50

KELKIT KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-17 (SHEET 2 OF 3)

LOCATION	Left bank	DEPTH OF HOLE	60.00m	COMMENCED	1 - Jul - '67
ELEVATION	1050.00 m	DEPTH OF OVERBURDEN	10.00m	COMPLETED	15 - Jul - '67
COORDINATE		LENGTH OF ROCK DRILLING	50.00m	DRILLED BY	RIZA KİBAR(DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	39.37m	LOGGED BY	T. FUJITA(JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	77.7 %		

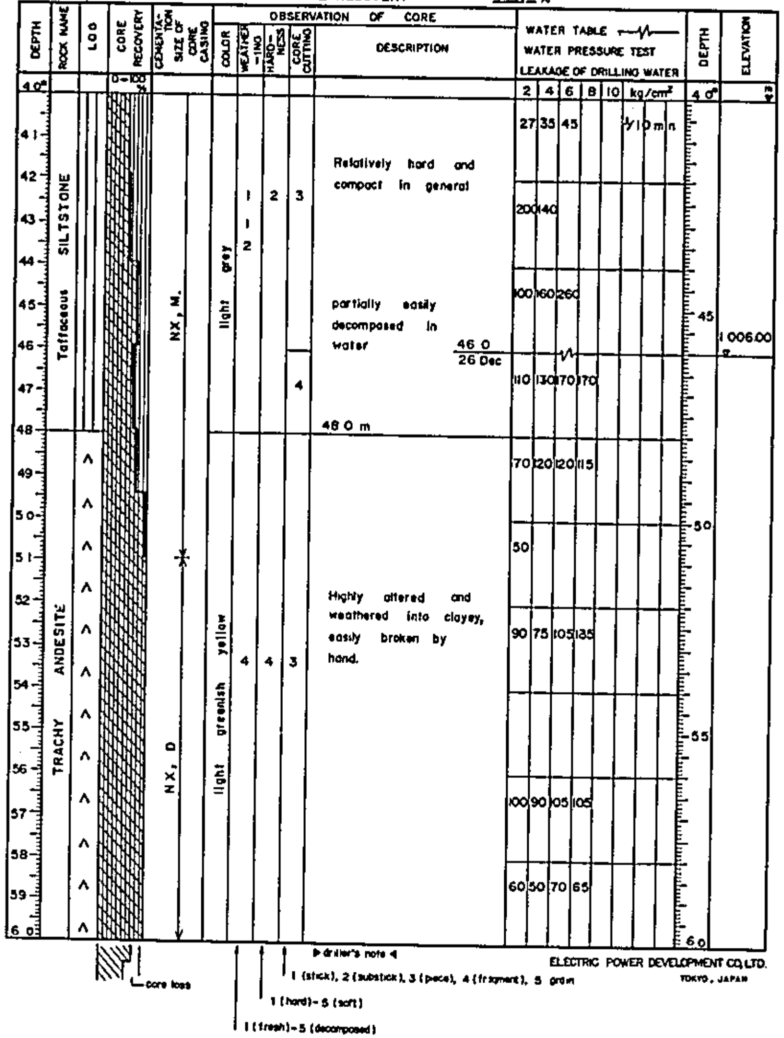


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-51

KELKİT-KARATAŞ PROJECT, KILIÇKAYA DAM HOLE No. SK-17 (SHEET 3 OF 3)

LOCATION	Left bank	DEPTH OF HOLE	60.00 m	COMMENCED	1 - Jul - '67
ELEVATION	1050.00 m	DEPTH OF OVERBURDEN	10.00 m	COMPLETED	1 - Jul - '67
COORDINATE		LENGTH OF ROCK DRILLING	50.00 m	DRILLED BY	RIZA KIBAR (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	39.37 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	77.7 %		

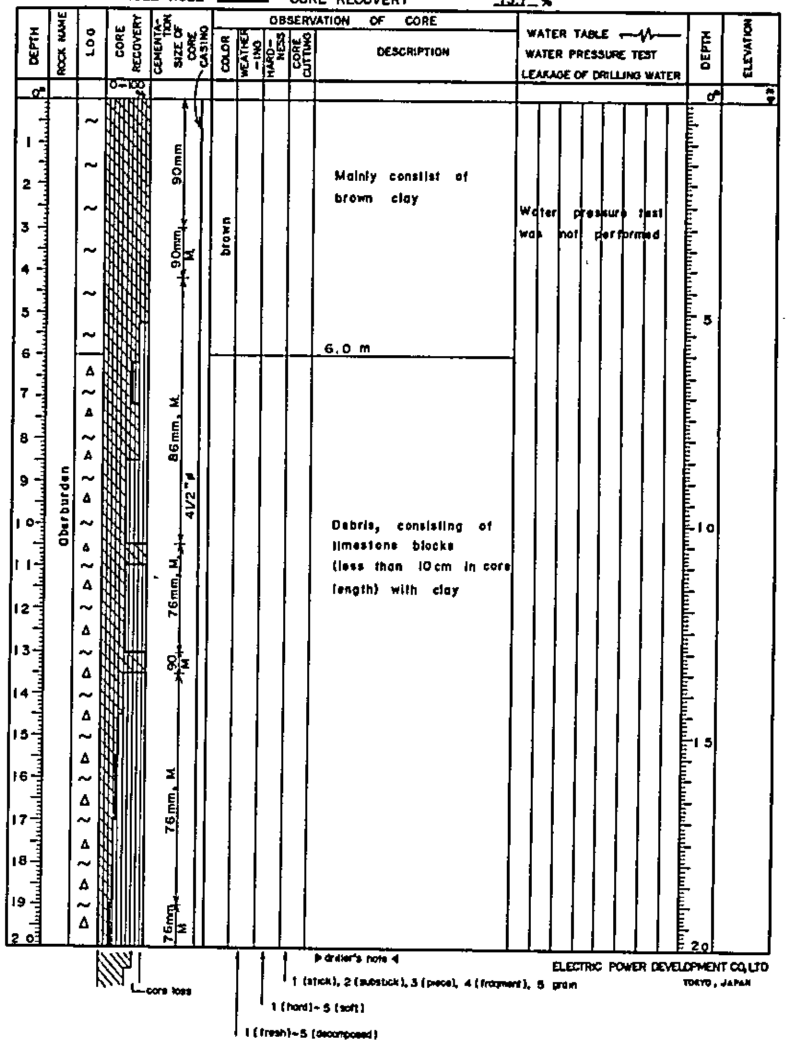


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-52

KELKİT-KARATAŞ PROJECT, KILIÇKAYA DAM HOLE No. SK-18 (SHEET 1 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	75.00 m	COMMENCED	30 - Jun - '67
ELEVATION	1050.00 m	DEPTH OF OVERBURDEN	24.60 m	COMPLETED	28 - Aug - '67
COORDINATE		LENGTH OF ROCK DRILLING	50.40 m	DRILLED BY	ALİ BİLBİR (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	38.05 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	75.7 %		

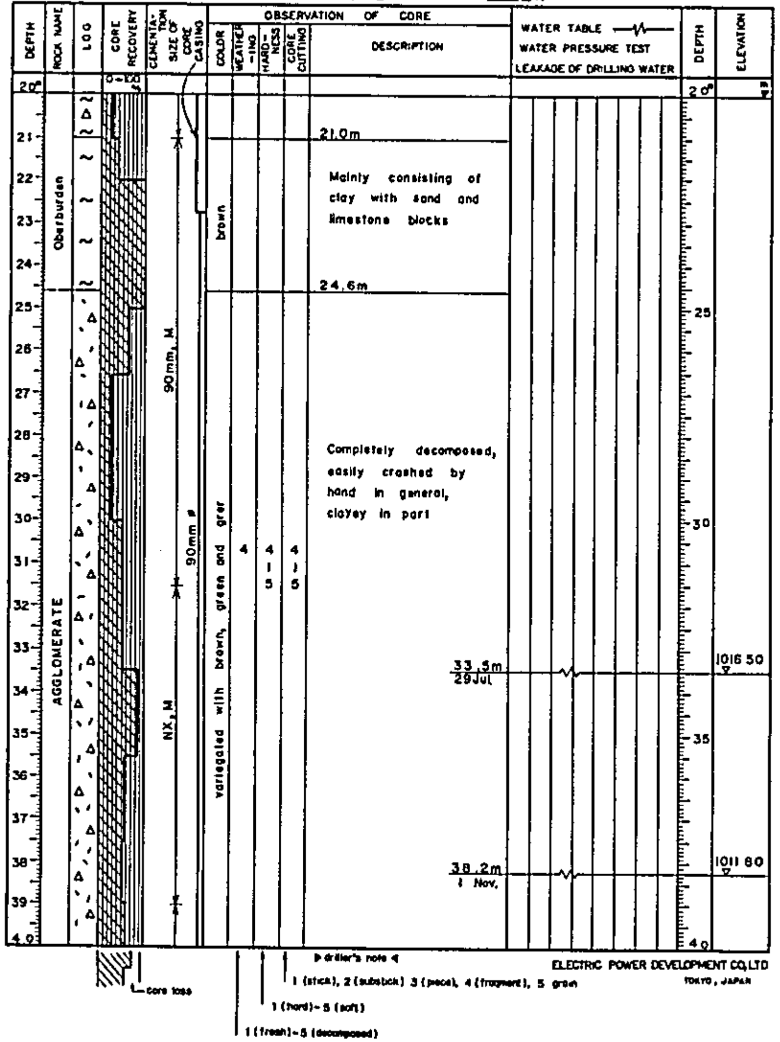


GEOLOGIC LOG OF DRILL HOLE

Fig II 2-53

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No SK-18 (SHEET 2 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	75.00 m	COMMENCED	30-Jun-'67
ELEVATION	1050.00 m	DEPTH OF OVERBURDEN	24.60 m	COMPLETED	28-Aug-'67
COORDINATE		LENGTH OF ROCK DRILLING	50.40 m	DRILLED BY	ALİ BİLBİN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	38.05 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	75.7 %		

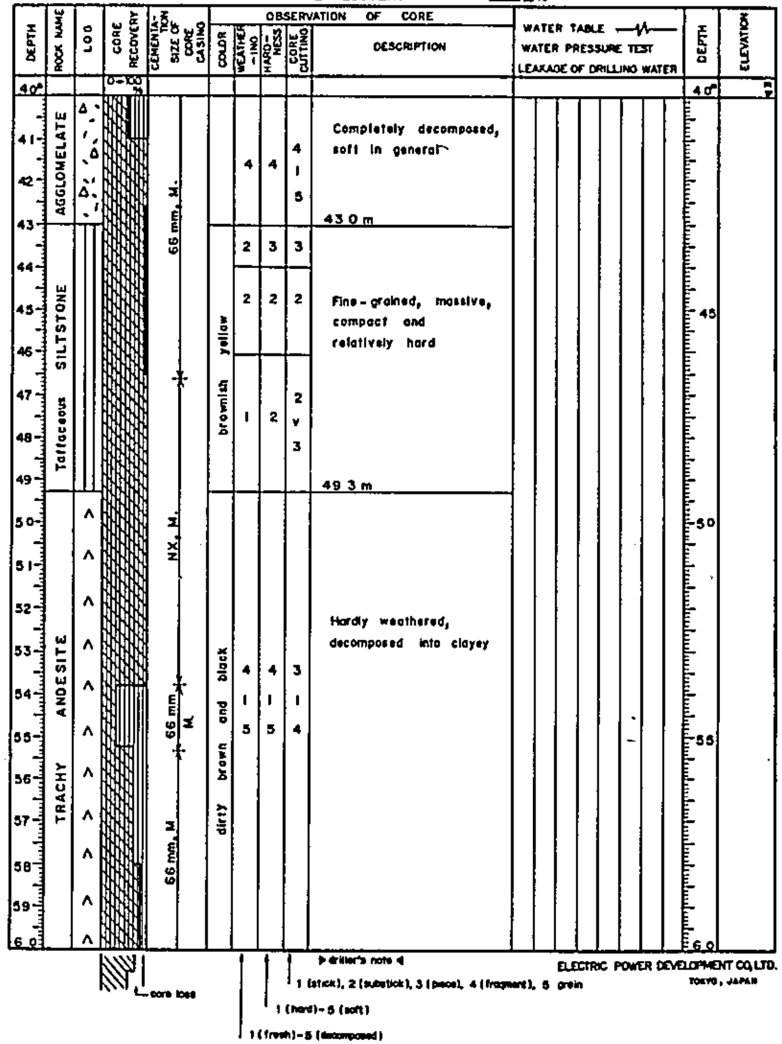


GEOLOGIC LOG OF DRILL HOLE

Fig. II 2-54

KELKİT-KARATAŞ PROJECT KILIÇKAYA DAM HOLE No. SK-18 (SHEET 3 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	75.00 m	COMMENCED	30-Jun-'67
ELEVATION	1050.00 m	DEPTH OF OVERBURDEN	24.60 m	COMPLETED	28-Aug-'67
COORDINATE		LENGTH OF ROCK DRILLING	50.40 m	DRILLED BY	ALİ BİLBİN (DSI)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	38.05 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	75.7 %		



GEOLOGIC LOG OF DRILL HOLE

Fig II 2-55

KELKIT-KARATAŞPROJECT KILIÇKAYA DAM HOLE No. SK-18 (SHEET 4 OF 4)

LOCATION	Left bank	DEPTH OF HOLE	75.00 m	COMMENCED	30-Jun-'67
ELEVATION	1050.00 m	DEPTH OF OVERBURDEN	24.00 m	COMPLETED	28-Aug-'67
COORDINATE		LENGTH OF ROCK DRILLING	50.40 m	DRILLED BY	ALİ BİLBİN (DSİ)
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	38.05 m	LOGGED BY	T. FUJITA (JST)
BEARING OF ANGLE HOLE		CORE RECOVERY	75.7 %		

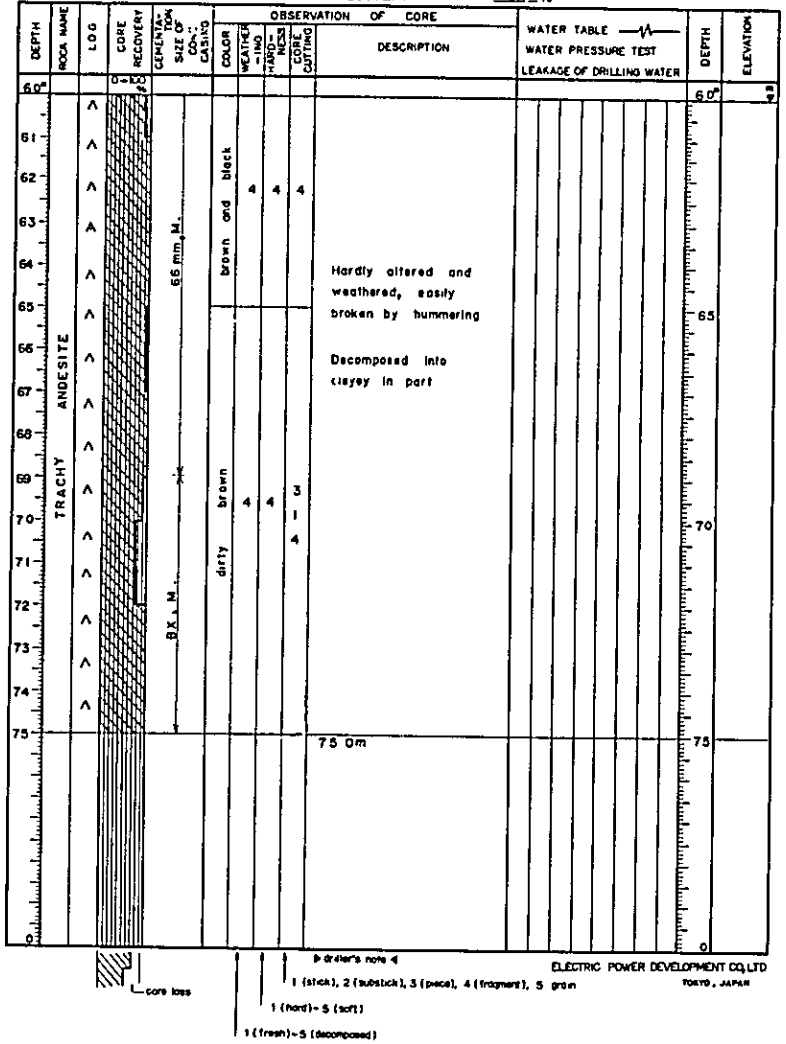
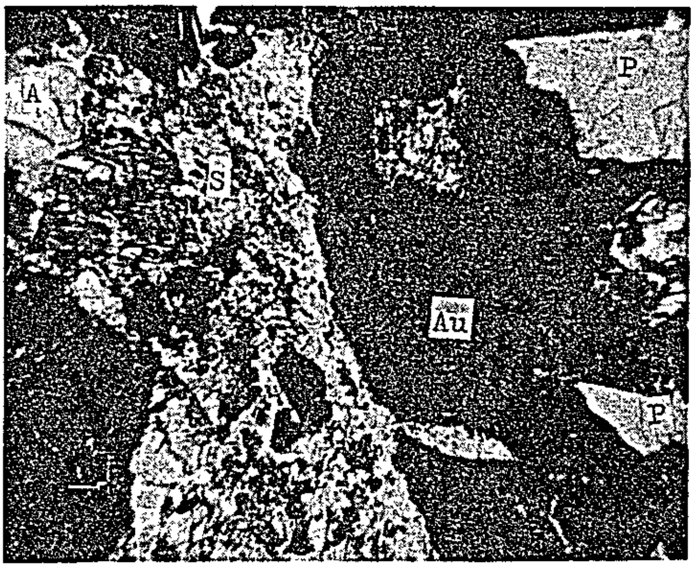


Fig. II 2-56 Photomicrograph of Thin Section (1-4)



open nicols, x 50

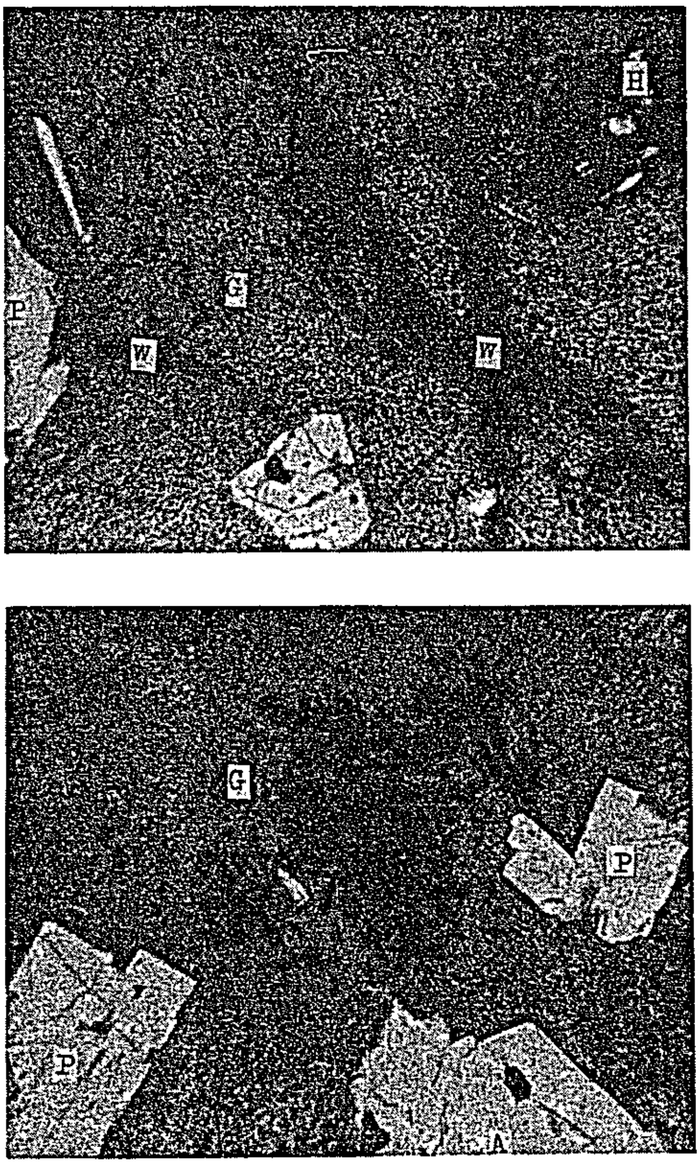
P Plagioclase phenocrysts
A Anorthclase
Au Augite replaced by saponite and hematite
S Silicified and zelitized matrix part

Locality: Drilling Core, SK-11 85m
Rock Name: Altered TRACHY ANDESITE
Phenocrysts: Plagioclase, Anorthoclase, Augite.

Plagioclase and anorthoclase phenocrysts are generally very fresh, through augite and hornblende have been almost completely replaced by saponite and hemetite.

Groundmass: The groundmass which must had been composed of plagioclase, magnetite and mafic minerals such as augite and hornblende was wholly replaced by opalline silica, zeolite and clay minerals.

Fig. II 2-57 Photomicrograph of Thin Section (2-4)

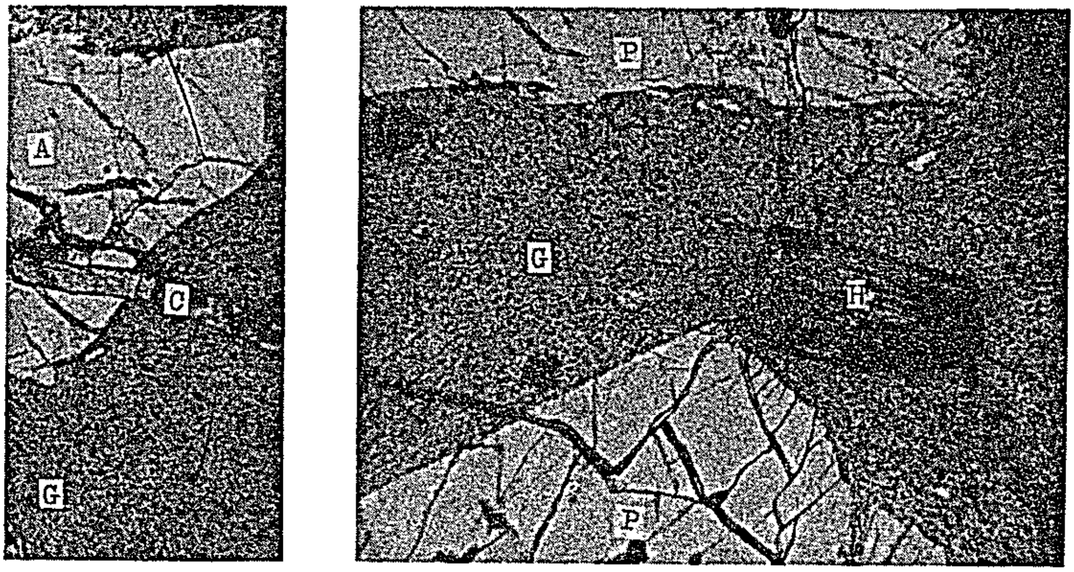


open nicols, x 50

Locality: Drilling Cora SK-15, 65m
Rock Name: Altered TRACHY ANDESITE

See the weathering developed along the closed cracks. The weathered part (W) is mostly characterized by the development of hematite and chlorite. Hornbleded is mostly replaced by chlorite and calcite.

Fig. II 2-58 Photomicrograph of Thin Section (3-4)

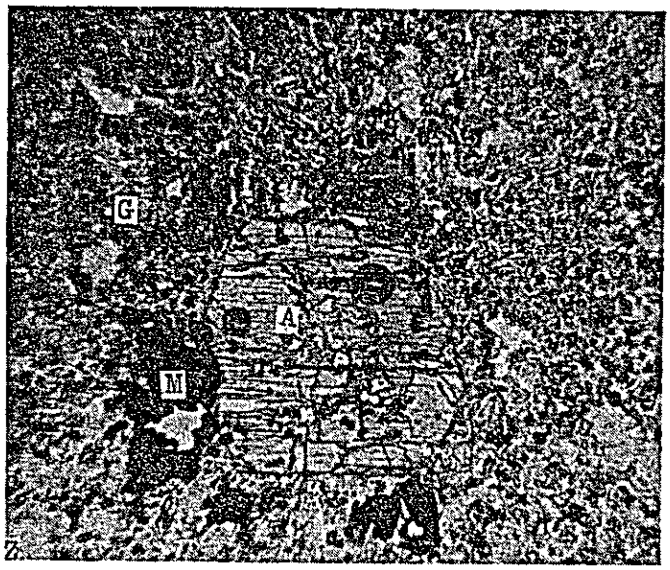


open nicols, x 50

P Plagioclase
A Anorthoclase
H Hornblende partly replaced by chlorite
G Groundmass
C Calcite vein

Locality: EL. 800m on the Dam Axis of Right Bank
Rock Name: Augite PORPHYRITE
Phenocrysts: Augite, bytownite, anorthoclase, hornblende and biotite.
Augite, hornblende and biotite have been replaced by chlorite and calcite along their cleavage planes and crystal margins.
Bytownite plagioclase show strong zonal struture and Carlsbad twin.
Groundmass: Mainly consists of micrccrysts of sodic plagioclase, glass and hematite.

Fig. II 2-59 Photomicrograph of Thin Section (4-4)



open nicols, x 50

A Augite
M Magnetite
G Groundmass composed of plagioclase, magnetite and augite
Z Zeolite

Locality: Dyke rock, at Intake of Spillway

Rock Name: Augite PORPHYRITE

Phenocrysts: Augite and bytownite

Most of augite phenocrysts were strongly replaced by calcite and chlorite. Plagioclase phenocrysts show usually Carlsbad twinning and strong zonal structure.

Groundmass: Chiefly composed of microcrysts of augite, plagioclase and magnetite with small amounts of zeolite. Zeolites are mostly filling small scale amygdales.

II 3 Construction Materials

Tables

Figures

Table II 3-1 Result of Soil Tests

Survey Area	Test Pit No.	Unified Soil Classification	Specific Gravity	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Gradation -4.8mm (%)	Gradation -0.075mm (%)	Compaction Optimum Water Contents (%)	Compaction Maximum Dry Density (t/m^3)
A Area	101	CL	2.80	39 0	20.6	18.4	100	84	13.4	1 67
	102	CL	2.62	38 4	20.5	17.9	100	88	16 5	1 73
	103	CL	2.78	40.0	20.7	19.3	99	80	17.5	1 72
	104	CH	2.67	62.6	28.2	34 4	100	82	18 0	1.56
	105	CL	2.78	33.3	19.3	14 0	96	68	11 2	1.91
	106	CH	2.58	59.3	28.8	30.5	98	76	22.0	1.53
	107	MH	2 75	52.1	28.9	23.2	100	89	17.5	1.68
	108	CH	2 55	60.0	40.1	20.9	99	94	22.2	1.49
	109	CL	2.65	31.8	21 6	10.3	100	66	15.0	1.82
	110	CL	2.75	43.3	16 4	26.9	100	86	16 5	1 43
	113	CL-ML	-	34.7	23.0	11.7	99	66	14 0	1.79
	114	CL	2 75	39.3	17.7	21.6	100	80	17.8	1 70
	115	CL	2.66	46.5	19.3	27.4	82	62	18 5	1.70
	116	CL	2.70	41.2	16.1	25.1	98	68	17 0	1.69
	117	CH	2.66	54 4	14.4	40 0	99	92	15.0	1.66
	118	CH	2.56	55 6	26 4	29 2	99	86	22 0	1 55
	119-a	CH	2 65	54.2	21.9	32.3	100	93	22 2	1 57
	119-b	CL-ML	2.69	42.2	24.5	17.7	100	92	15 2	1 71
	120	CH	2 68	50.4	21 4	29 0	99	84	16 5	1 70
	121	CL-ML	2.74	43.5	24.7	18.8	100	80	15.5	1.74
B Area	201	CL	2.68	32.0	16 2	15 8	95	72	16 5	1.79
	203	CL	2.69	40.4	18.2	22.2	97	70	17 0	1.72
	205	SC	2.60	43 3	12.9	30.4	-	48	15 0	1.82
	207	CL	2.74	45.6	15.7	29 9	98	77	16.0	1 79
	208	CH	2.59	53 4	20.1	33.3	88	77	16 0	1 74
	209	CL	2.49	46 6	15.0	31 6	99	92	17.5	1.73
	211	CL	2 68	47.5	17.3	30.2	80	63	18.0	1 71
	213	GC	2.66	36.7	14 0	22.7	29	20	14 0	1.81
	216	SC	2.70	34.5	16.2	18.2	100	46	15.0	1.88
	217	CL	2 71	40.0	13.8	26 2	88	76	16 4	1.79
	218	CL	2.72	44.8	13.4	31.2	96	89	15.5	1 83
	219	SC	2.72	30.4	16.5	13 9	55	25	11.0	2.02
	220	SC-CL	2.67	45.9	19.2	26.7	67	50	15.8	1 77
	221	GC	2.65	32 0	14.5	17.5	47	30	13 0	1 93
	222	SC	2 64	50.7	19.0	31.7	59	48	19.0	1.69
	223	CL	2.70	47.0	14.3	32.7	71	54	17.5	1 78
	224	SC	2.66	40.6	17 6	23.0	63	18	15.0	1.75
	225	CL	2 60	46 2	12 9	33.3	98	76	23.0	1.57

Table II 3-2 Result of Soil Tests

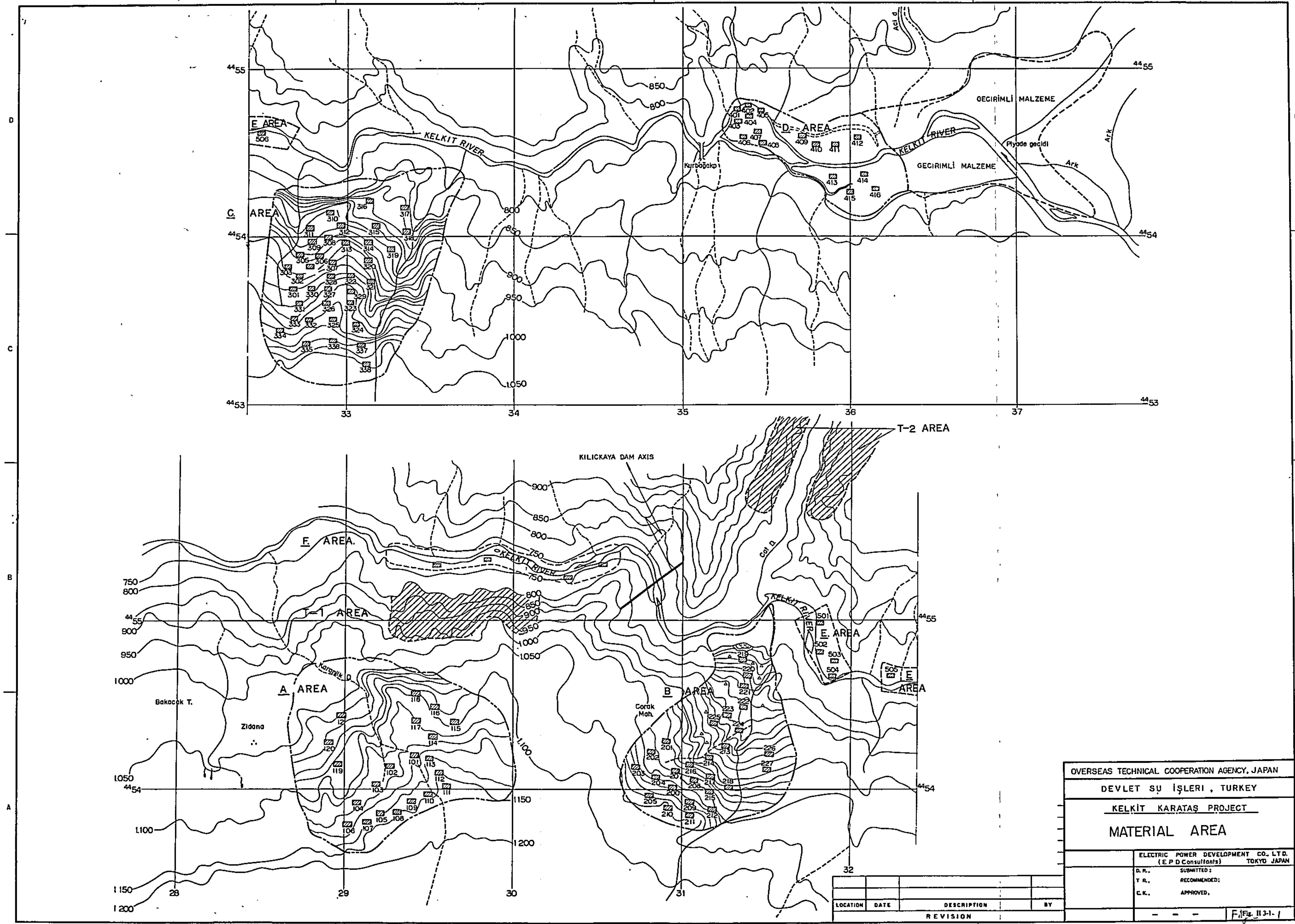
Survey Area	Test Pit No.	Unified Soil Classification	Specific Gravity	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Gradation -4.8mm (%)	Gradation -0.075mm (%)	Compaction Optimum Water Contents (%)	Compaction Maximum Dry Density (t/m^3)
C Area	302-a	CH	2.56	51.0	19.0	32.0	81	62	17.0	1 71
	302-b	SC	2.56	39.8	18.0	21.8	80	36	17 0	1 64
	303-a	CL	2 63	38.4	18.3	20.1	92	70	16.0	1.76
	303-b	CL	2.61	43 2	17.7	25 5	98	80	18 0	1 76
	304	CL-ML	2.69	34.7	21.8	12.9	97	80	15 5	1 79
	305	CL	2.66	38.8	13.9	24.9	82	53	13.0	1 81
	306	CL	2 72	35.8	13.7	22.1	97	70	15.3	1.68
	309-a	CH	2 71	52 1	17 0	35 0	97	84	19 0	1 67
	309-b	SC	2.66	35.2	14.9	20 3	58	42	14 5	1.84
	310	CL	2.71	50.1	15.4	34.8	98	80	19.0	1 70
	311	CL	2 65	49.8	15.6	34.2	99	74	15.5	1.71
	312	CL	2.70	42.3	19.0	23.3	100	87	18 0	1.69
	313	CL	2.68	41.0	17.2	23.8	97	83	17.0	1 71
	314-a	SC	2.59	48.4	18.1	30 3	60	46	14 0	1 74
	314-b	CL	2.62	47.2	16.6	30.6	100	90	14 0	1.81
	315	CL	2 58	39 2	12 8	26.4	99	98	12.0	1.85
	316-a	CL	2 71	39.1	22.9	16 2	100	80	16.5	1 74
	316-b	CL	2.75	47.2	23.1	24.1	99	62	24 0	1.53
	317-a	CH	2 54	52.2	15.4	36.8	99	92	18.0	1.69
	317-b	CL-SC	2 59	36 0	19.8	16.2	97	50	15.0	1 76
	318	CL	2 55	48.7	20 9	27.8	100	94	18.5	1.63
	319	CL	2 70	38 2	15.9	22.3	97	75	15.1	1 78
	320	CH	2.59	52.8	14.0	38 8	99	88	18.5	1.69
	321	CL	2 66	39.2	15.6	23 6	99	80	15.0	1.81
	322	CL	2 61	47.8	19.2	28.6	80	66	21 0	1 62
	323	CL	2 71	35.4	14 4	21.0	99	66	15.0	1 87
	324	CL	2.66	41.4	13 4	28.0	89	75	14.5	1.82
	325	CL	2 63	46.5	13.4	33.1	94	82	15.5	1.80
	326	CH	2.54	56 2	22.5	33.7	99	92	20 0	1 58
	327	CL	2.62	43.0	17.7	25 3	98	83	17 5	1.73
	328	SC	2 66	40.6	17.6	23.0	68	50	15 0	1.75
	330	CL	2 69	43.6	18.4	25.2	80	66	18 5	1 68
	331-a	CH	2.70	52.5	25 1	27.4	99	88	20 0	1 56
	331-b	CL	2 69	42.5	17 6	24.9	99	88	18.0	1 69
	332	CH	2.43	57 4	23.2	34.2	91	60	20 0	1 60
	333-a	CH	2.76	61 4	22.2	39.2	98	77	21.0	1 60
	334-a	CL	2 68	30.0	15.7	14.3	91	74	12.2	1 93
	334-b	ML	2 68	49.0	31.4	17.6	99	60	21.0	1 54
	336	CL	2.67	42 6	17 9	24.3	99	86	15.8	1.68
	337	CL	2 58	41.8	16 3	25.5	99	84	18.0	1.64
	338	CL	2.64	42.6	15.0	27.6	89	70	15.5	1 78

Table II 3-3 Result of River Sand and Gravel

Survey Area	Test Pit No.	Unified Soil Classification	Gradation			Sand				Gravel				
			-38.1mm (%)	-4.8mm (%)	-0.074mm (%)	Specific Gravity	Absorption (%)	Bulk Density (kg/m^3)	Durability Na_2SO_4(%)	Specific Gravity	Absorption (%)	Durability Na_2SO_4(%)	Abrasion Los Angeles 100 turns(%)	Abrasion Los Angeles 500 turns(%)
D Area	401	GW	61	31	1	2.60	1.9	1,733	10.0	2.63	0.4	14.1	3.2	18.3
	402	GP	79	46	1	2.61	2.3	1,761	9.1	2.76	0.5	10.9	1.4	17.0
	403	GP	71	38	1	2.66	1.1	1,690	10.0	2.66	0.3	20.8	3.5	20 6
	404	SW	95	53	2	2.66	0.1	1,720	7.5	2.45	2.2	13.1	6 8	34.9
	405	SP	99	85	0	2.77	2.6	1,632	-	2.53	1.6	-	-	-
	406	GP	69	33	0	2.56	1.6	1,683	7.5	2 69	0.4	9.8	2.7	20.2
	407	GP	62	31	1	2.67	0.6	1,730	15.5	2.52	0.8	14.0	3.4	15.8
	408	GP	77	35	0	2.66	1.2	1,810	10.7	2 63	0.8	11.4	3.3	19.8
	409	GP	81	40	5	2.66	1.0	1,750	9.5	2.65	1.1	11.0	3.8	19.1
	409	GP	71	33	1	2.66	1.3	1,700	19.0	2.66	0.4	16.3	3.2	15.6
	410	GP	72	36	1	2.65	1.5	1,690	12.0	2.56	0.9	6.5	5.7	22 4
	411	GW	52	25	1	2.65	0.8	1,700	8.5	2.67	0.5	10.8	2.5	16.0
	412	GP	78	37	2	2 65	0.2	1,800	12.5	2.61	0.1	9.5	3.2	17.2
	414	GP	81	40	1	2.66	1.8	1,720	6.7	2.58	1.3	10.3	3.1	30.0
	415	GW	61	29	1	2 66	0.8	1,760	8.5	2.63	0.7	10.0	0.9	18.0
	416	GP	68	35	1	2.65	0.1	1,710	12.2	2.56	0.4	14 0	3.6	16.6
E Area	501	SP	95	60	1	2 58	0.2	1,670	20.0	2.63	0.9	25.0	5.5	25.0
	502	GP	-	-	-	2.58	3.1	-	-	-	-	35.0	2.8	13.7
	505	GW	57	25	1	2.63	0.2	1,661	20.0	2.64	0.4	25.0	3.5	18.3
F Area	601	GP	37	16	2	2.59	0.9	1,630	6 2	2.73	2.0	6.8	6.3	16 6
	602	GP	49	21	2	2.66	1.3	1,690	10.9	2.56	1.9	11.8	3.0	27 3
	603	GP	48	19	2	2.59	0.9	1,720	4.0	2.54	1.2	11.0	8.5	19.1

Table II 3-4 Result of Rock Tests

Sample	Specific Gravity	Absorption (%)	Durability Na_2SO_4 (%)	Abrasion Los Angeles 100 turns (%)	Abrasion Los Angeles 500 turns (%)
T - 1	2.59	0.03	3.9	3.7	14.2
T - 2	2.58	0.05	5.2	4.8	16.8
Dam Site Boring No. 13 Depth 13 m	2.38	3.40	62.7	4 3	17.3



C. AREA
D AREA
E AREA
F. AREA
T-1 AREA
T-2 AREA
A AREA
B AREA
KELKIT RIVER
GECIRIMLI MALZEME
Piyade gecidi
Kurbağakp.
KILICKAYA DAM AXIS
Karanlık D.
Bakacak T.
Zidana
Corak Mah.
Cal D.
Acl d
Ark
OVERSEAS TECHNICAL COOPERATION AGENCY, JAPAN
DEVLET SU İŞLERI , TURKEY
KELKIT KARATAŞ PROJECT
MATERIAL AREA
ELECTRIC POWER DEVELOPMENT CO., LTD.
(E P D Consultants) TOKYO JAPAN
D.R., SUBMITTED:
T.R., RECOMMENDED:
C.K., APPROVED.
LOCATION DATE DESCRIPTION BY
REVISION
Fig. II 3-1-1
SHEET NO. OF

Fig. II 3-2 Logs of Test Pit at A Area

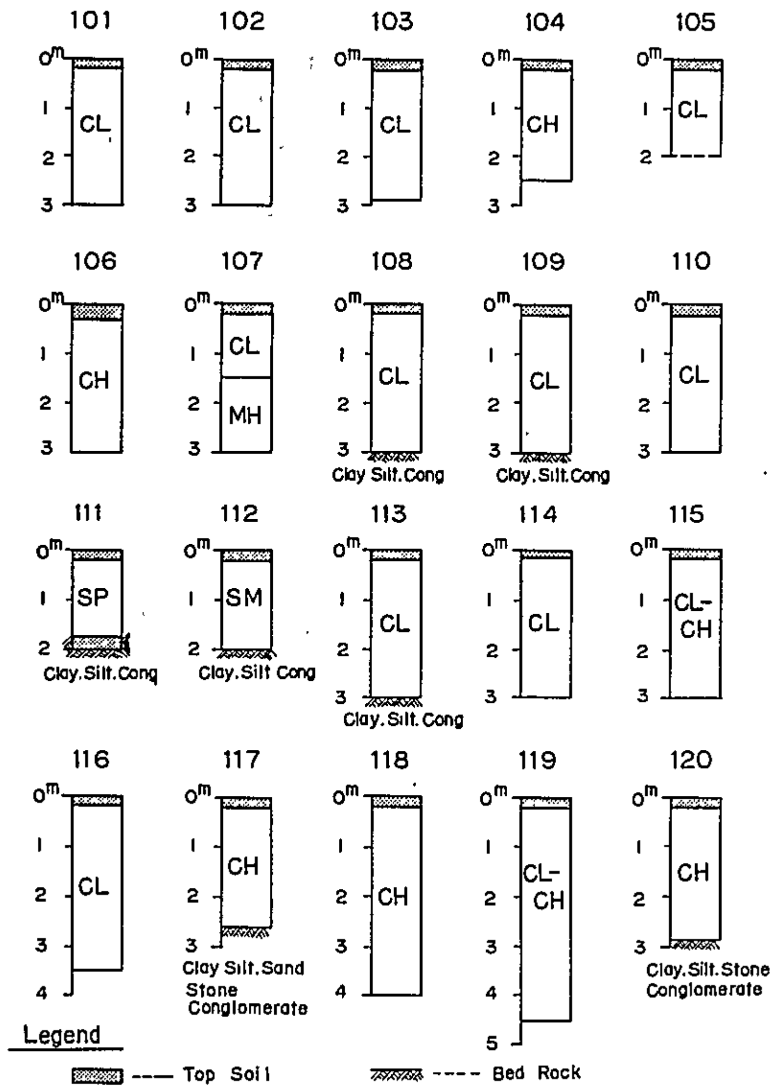


Fig. II 3-3 Logs of Test Pit at A & B Area

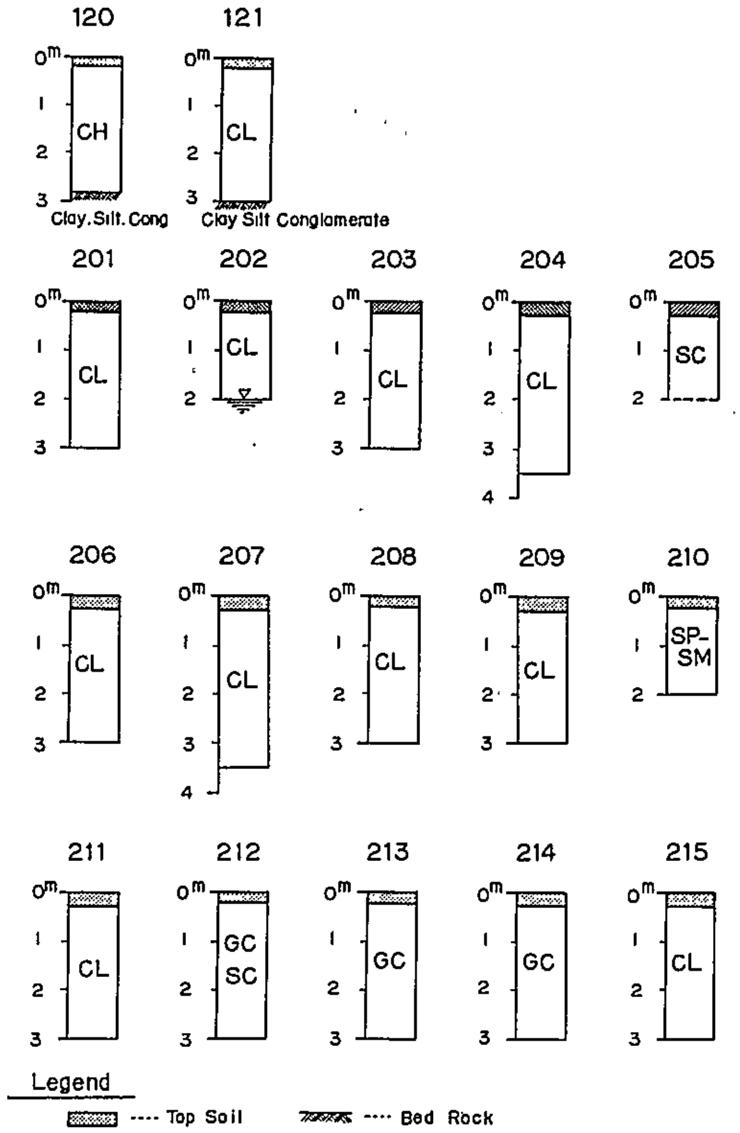


Fig. II 3-4 Logs of Test Pit at B & C Area

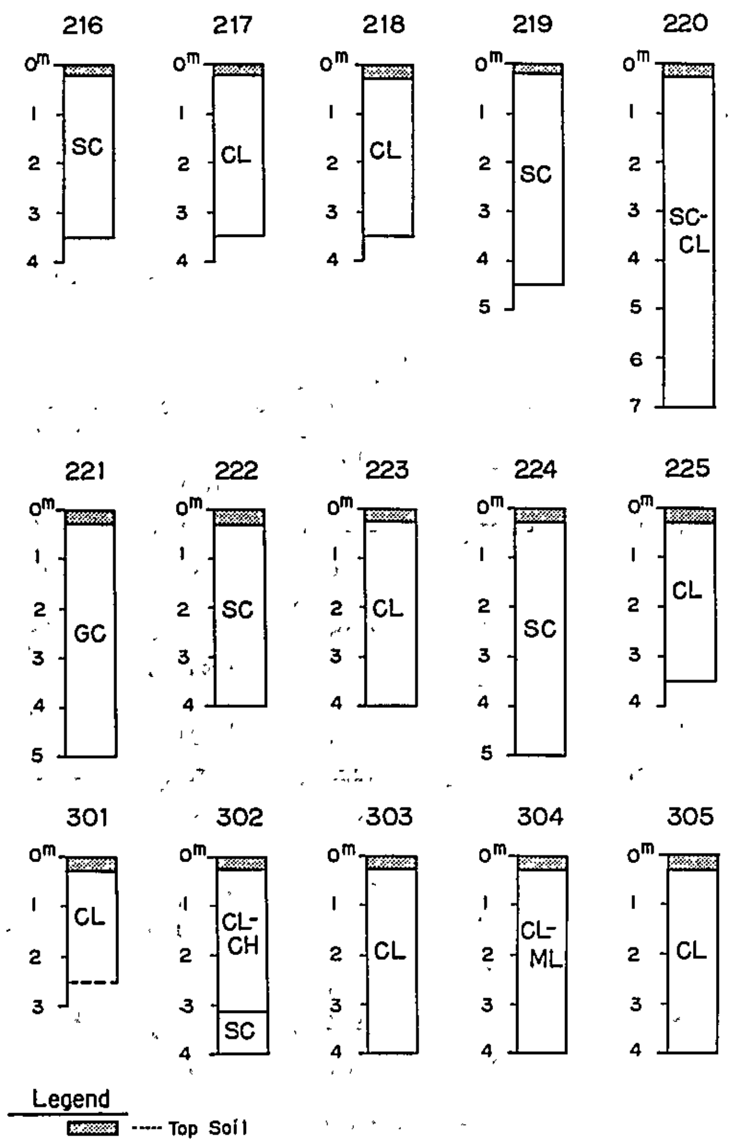


Fig. II 3-5 Logs of Test Pit at C Area

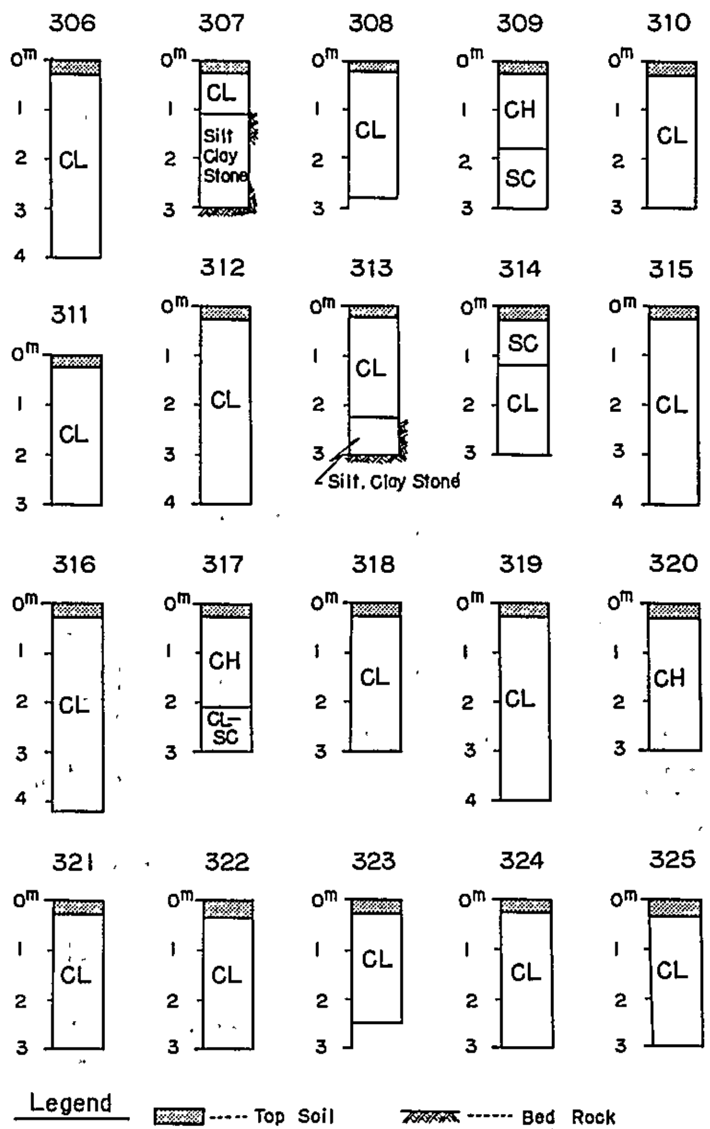


Fig. II 3-6 Logs of Test Pit at C Area

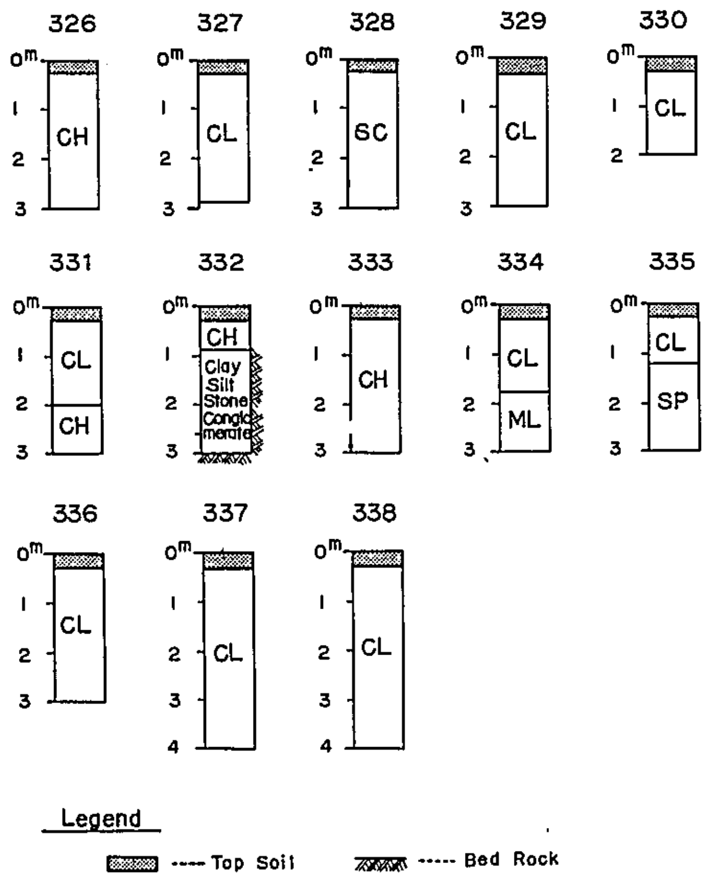


Fig. II 3-7 Logs of Test Pit at D area

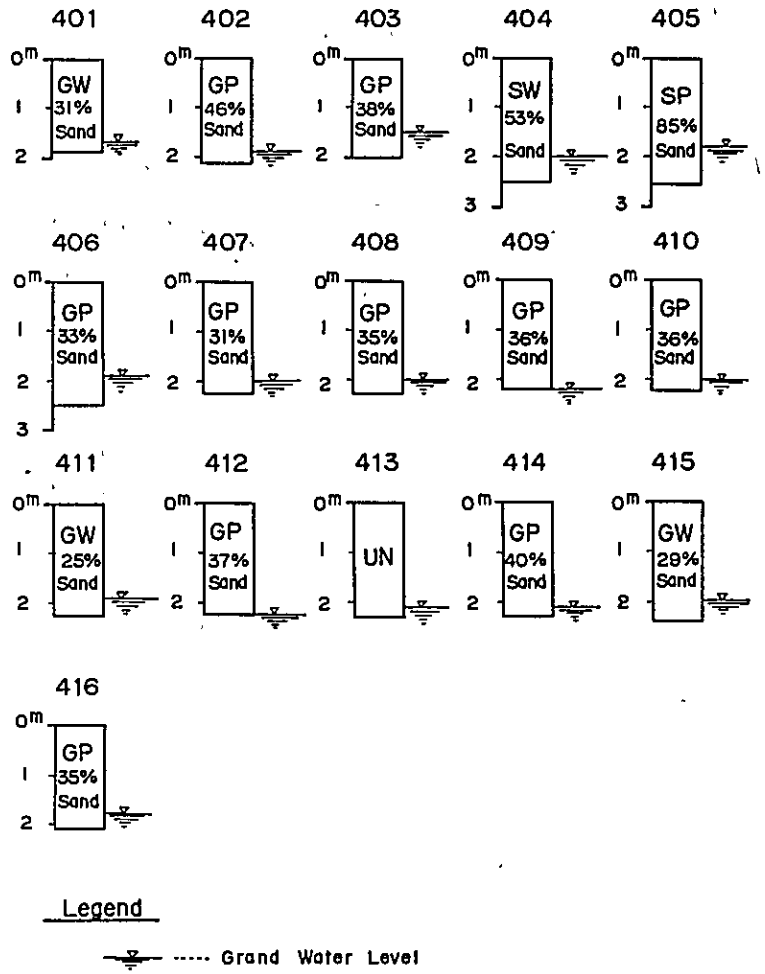


Fig. II 3-8 Logs of Test Pit at E & F Area

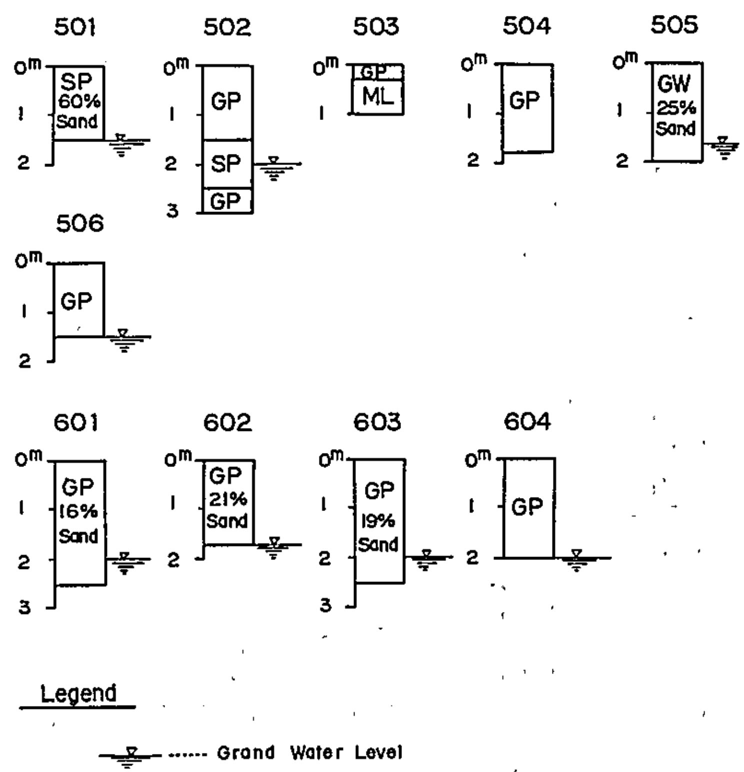
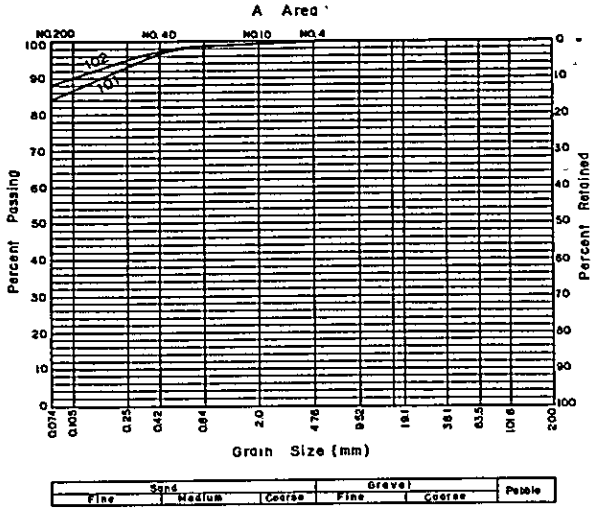
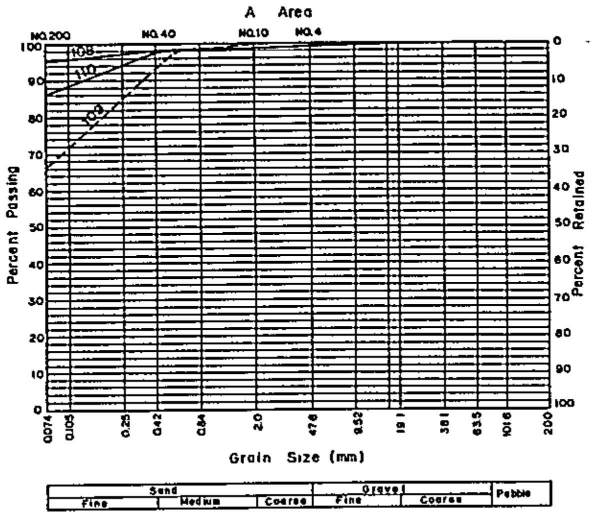
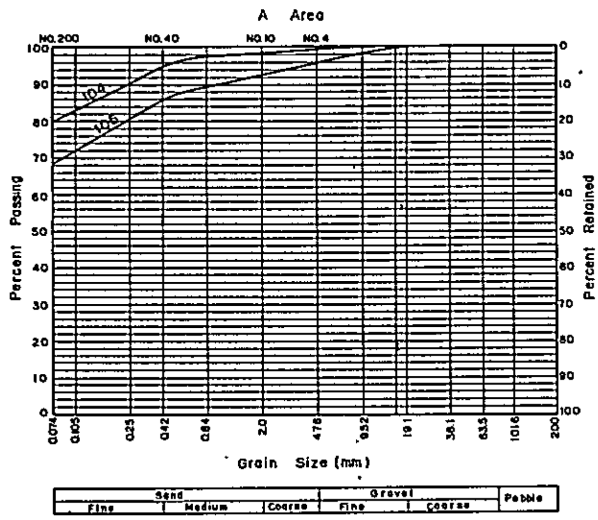
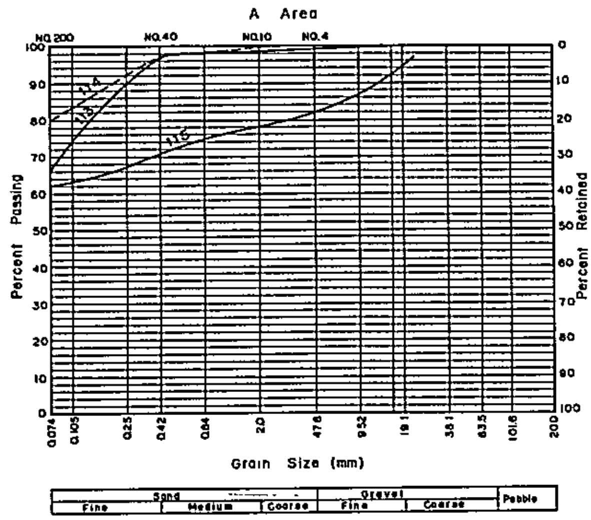


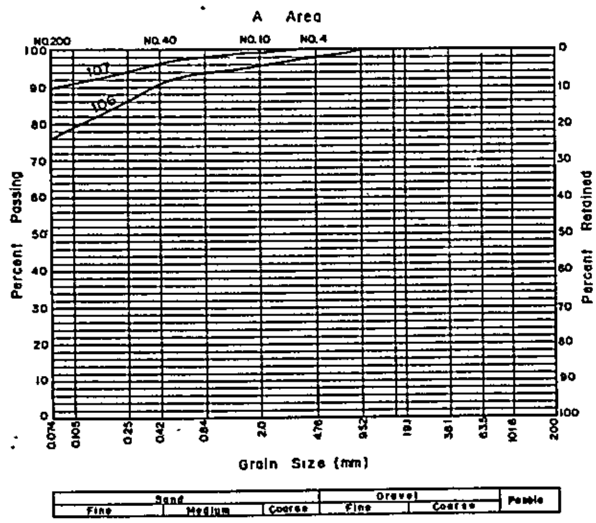
Fig. II 3-9 Grain Size Distribution Curves for Test Samples











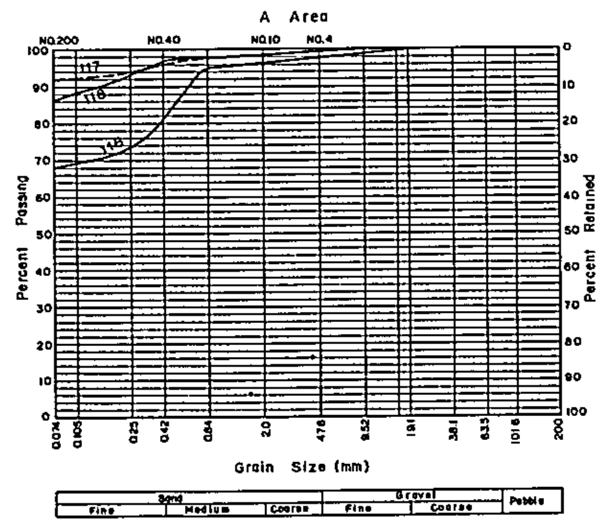


Fig. II 3-10 Grain Size Distribution Curves for Test Samples

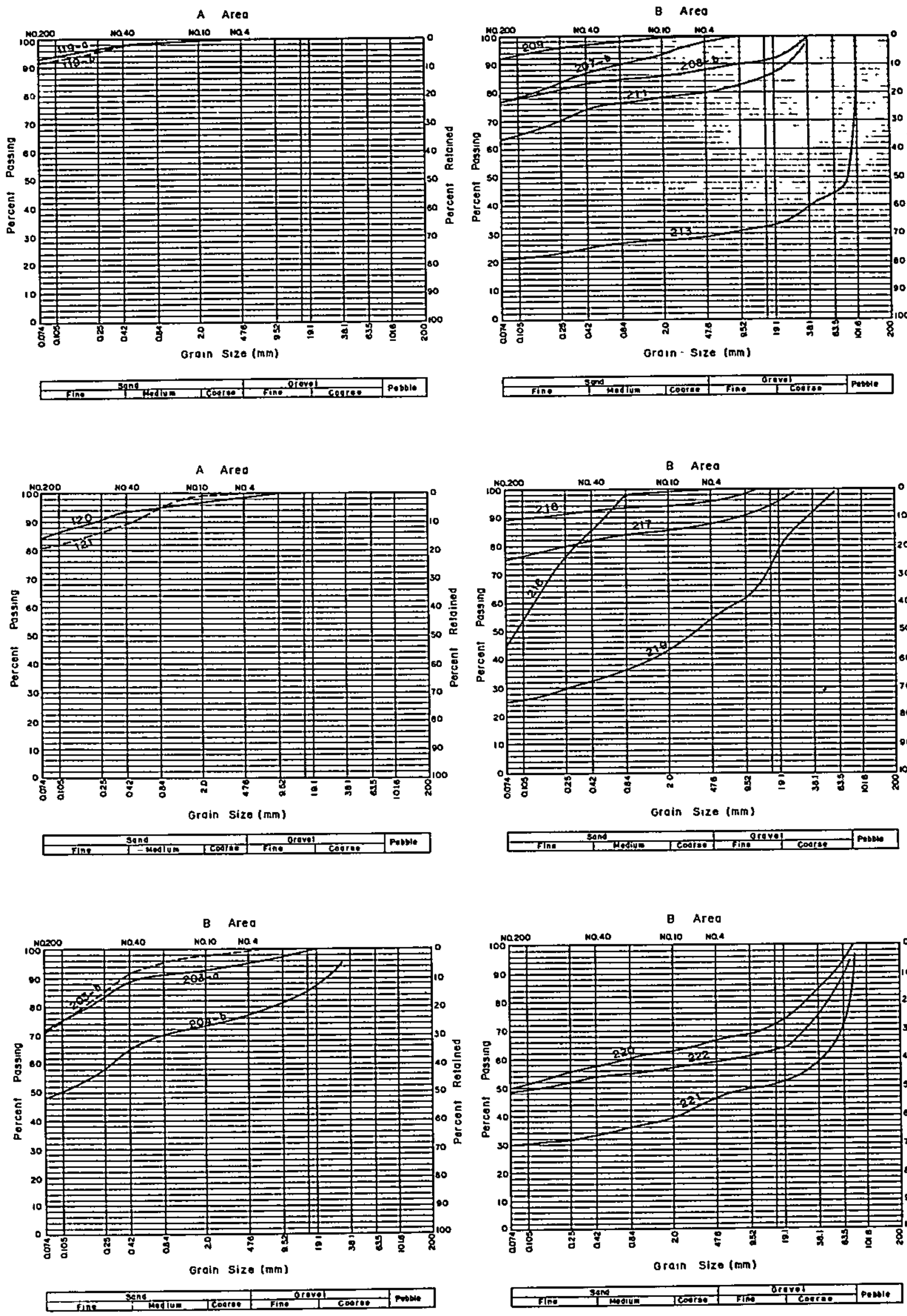


Fig. II 3-11 Grain Size Distribution Curves for Test Samples

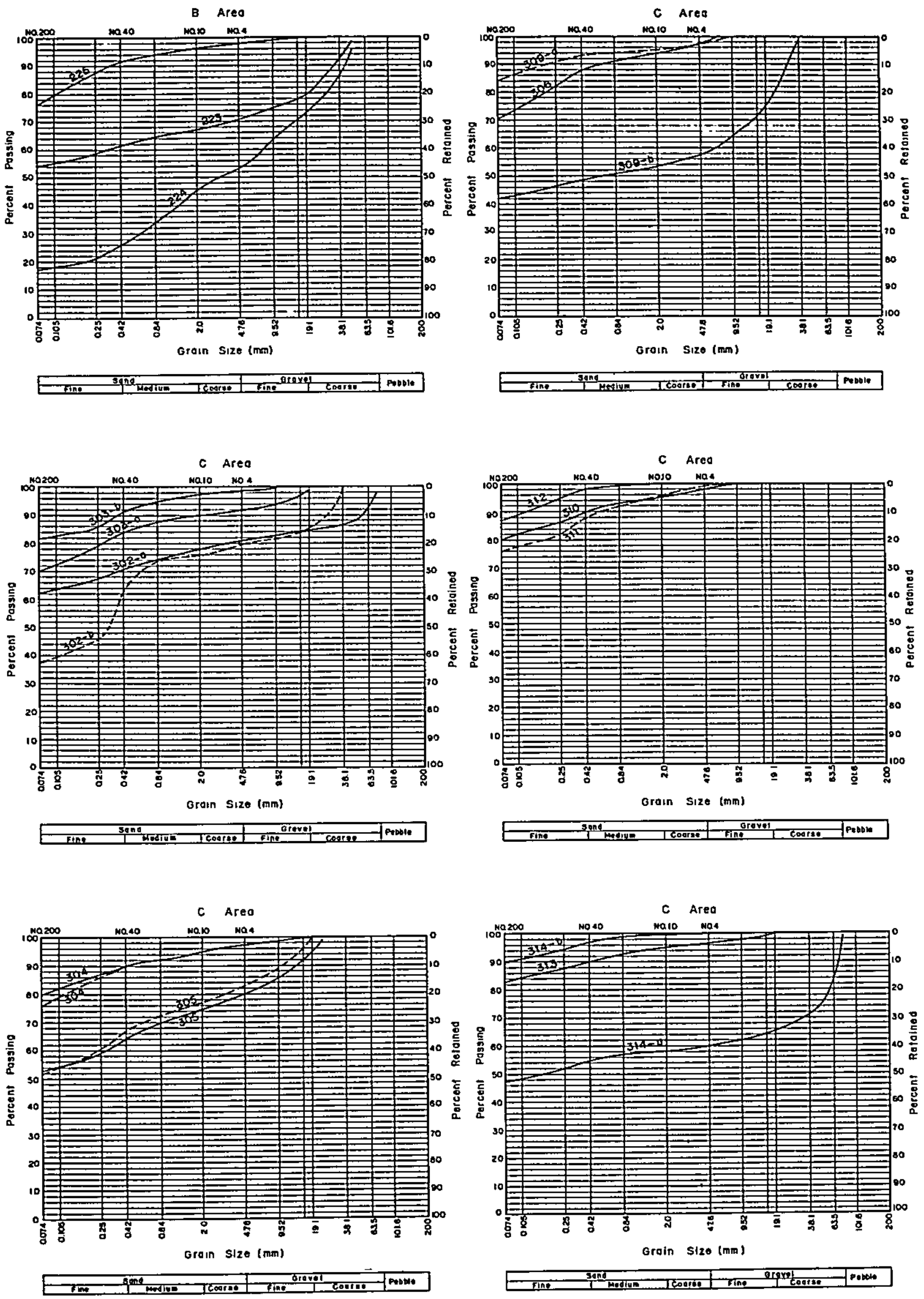


Fig. II 3-12 Grain Size Distribution Curves for Test Samples

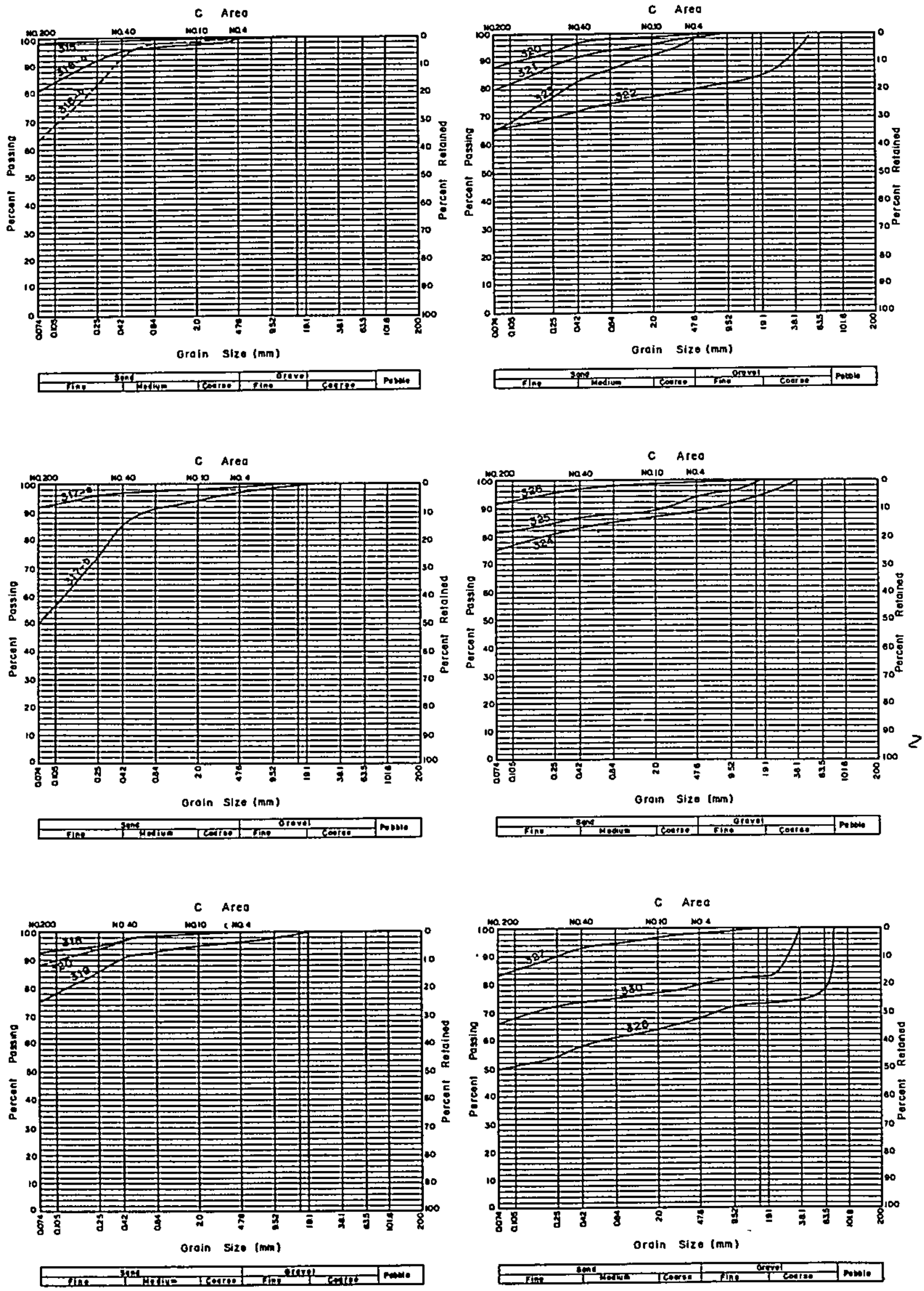
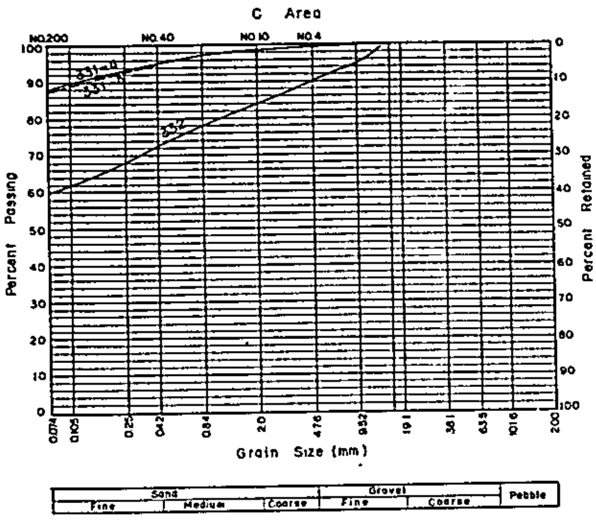
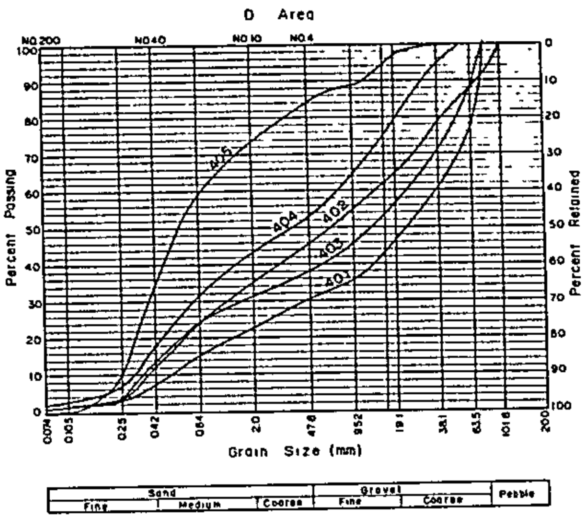
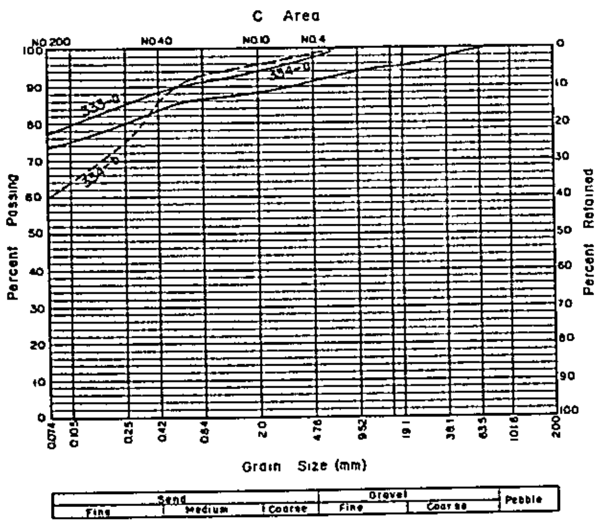
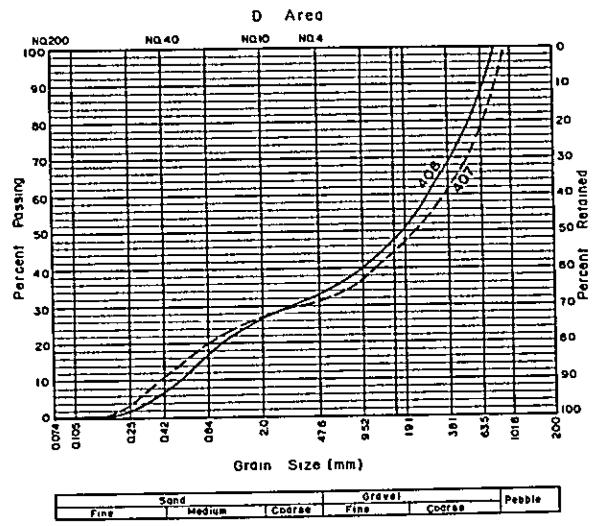


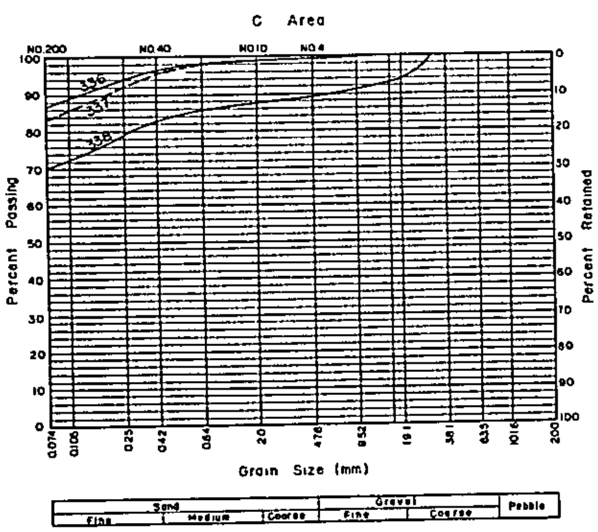
Fig. II 3-13 Grain Size Distribution Curves for Test Samples











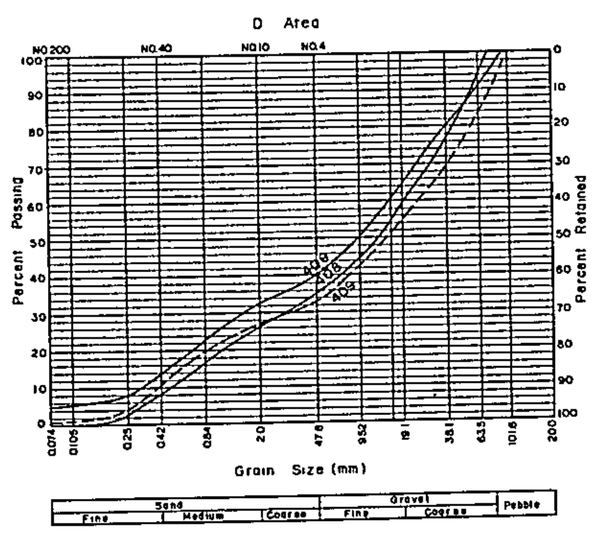
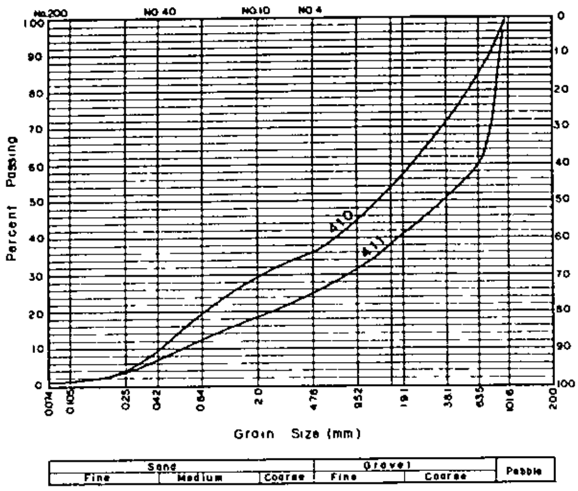
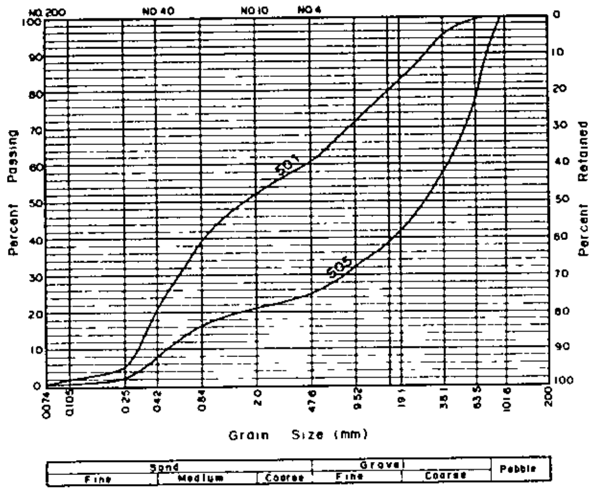


Fig II 3-14 Grain Size Distribution Curves for Test Samples

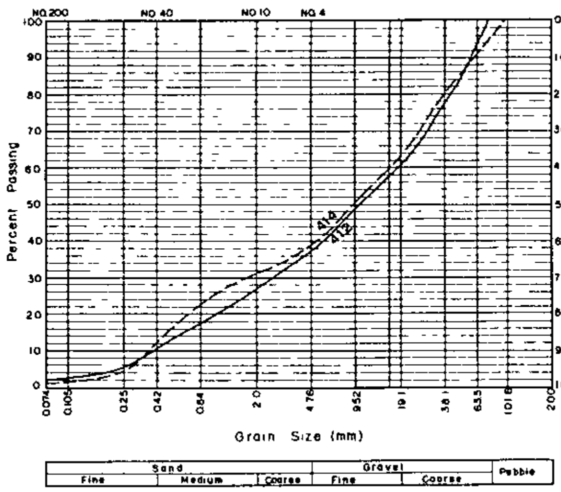
D Area



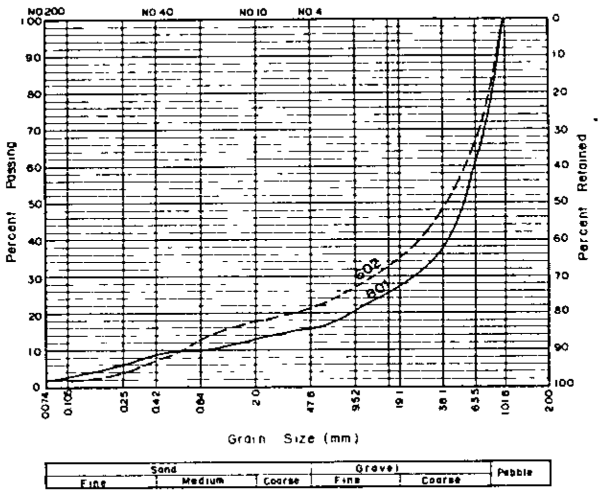
E Area



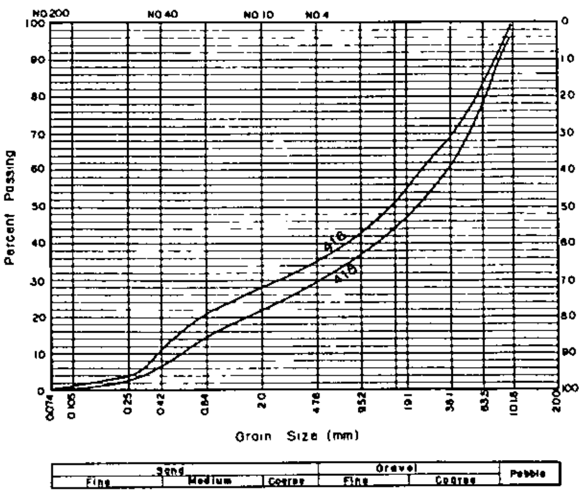
D Area



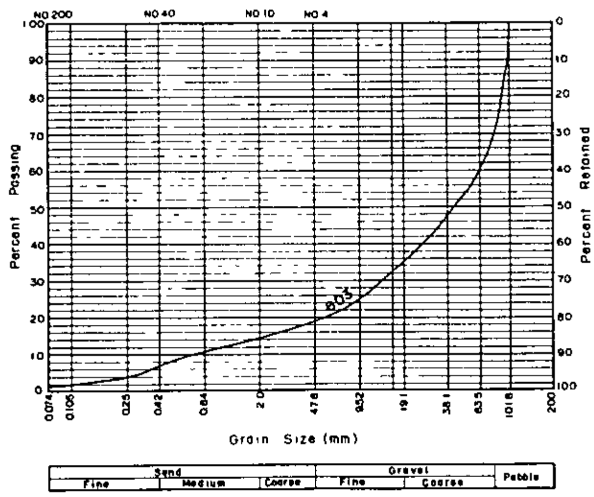
F Area



D Area



F Area



II 4 Size and Operation of Reservoir and Calculation of Sedimentation

Contents

Tables

Figure

II-4 SIZE AND OPERATION OF RESERVOIR AND CALCULATION OF SEDIMENTATION

II-4.1 Operation Study

Reservoir operation studies were carried out with the aid of an electronic computor. This appendix includes the example of an program, summaries of inflow, discharge for power generation, summaries of inflow, discharge for power generation, energy production and etc. In this study, it is considered to release from Kilıckaya discharge over 32.32 c.m.s. in July and 21.92 c.m.s. in August than normal firm discharge, 35.68 c.m.s. for irrigation purpose in Carsamba plain.

Summaries of power production which were used for selecting optimum size of reservoir are also included.

Q_I	;	Inflow
Q_{EV}	,	Evaporation from reservoir surface
Q_{SP}	,	Spilled discharge
Q_F	,	Firm discharge
Q_S	;	Secondary discharge
Q_E	;	Discharge for generation
H	,	Water surface elevation (end of month)
V_K	;	Effective volume of reservoir (end of month)
P_F	;	Firm energy production
P_S	;	Secondary energy production
P	;	Energy production

II-4.2 Calculation of Sedimentation

Monthly discharge-sedimentation concentration curves arranged by DSI are used to obtain the sedimentation amout in Kilickaya reservoir. Monthly average discharge duration values are obtained by the data recored at Fatli with the following correlation formula:

$$Q_K = 0.69\,Q_F + 1\ 28$$

Q_K	;	value at Kilıckaya
Q_F	;	value at Fatli

The data used come from 28 years period; 1939 – 1967. For the downstream effect, sedimentation at Tapekisla are directly calculated by using monthly discharge durations and discharge-concentration curves for 3 cases:

(1) natural discharge
(2) discharge regulated by Kilickaya
(3) discharge regulated by Kilickaya and the regulating-pond of it.

To estimate the sedimentation amount flowing into Ayvacik reservoir, the portion coming from Yesilirmak and Cekerek river is regarded as the same as studied by DSI. Therefore, the effects of the existing Almus dam and the proposed Alsancak dam are not considered.

Monthly Duration Calculation of the Kelkit River

1. Data

(1) Daily discharge at Fatli site gaging station Q_{FA}

(2) Released and spilled discharge from Kilickaya P.S. Q_{KD}

2. Formula for calculation

2.1 $$\overline{DAY}(Q > Q_I) = \frac{\Sigma DAY(Q > Q_I)}{T} \quad (1)$$

2.2 Natural inflow at Kilickaya site

$$Q_K = C_K \cdot Q_{FA} + 1.28 \quad (2)$$

2.3 Natural inflow at Tepekisla site

$$Q_T = C_T \cdot Q_{FA} \quad (3)$$

2.4 Regulated discharge at Tepekisla (with after bay)

$$Q_{TR} = Q_T - Q_K + Q_{KD}$$
$$= (C_T - C_K) Q_{FA} + Q_{KD} - 1.28 \quad (4)$$

Provided $[\, Q_{KD} = Q_E + Q_{SP}]$

2.5 Regulated discharge at Tepekisla (without after bay)

$$Q_{TS} = \begin{cases} Q_{FA}(C_T - C_K) - 1.28 + 3.6\, Q_F + Q_{SP} & (5.1) \\ Q_{FA}(C_T - C_K) - 1.28 + Q_{SP} & (5.2) \end{cases}$$

and number of days corresponds to (5.1) is calculated by

$$DAY\ Q_{TS1} = \frac{Q_E}{3.60 Q_F}$$

number of days corresponds to (5.2) is by

$$DAY\ Q_{TS2} = 1 - \frac{Q_E}{3.60 Q_F} \text{ respectively}$$

2.6 The difference between max. and min. value chosen from the period is divided into 16 logarithmically equal intervals.
Used in the calculation divide 16 equially

$$\frac{\mathrm{LOG}\ Q_{MAX} - \mathrm{LOG}\ Q_{MIN}}{N} = R$$

$$\mathrm{LOG}\ Q_{MAX} = \mathrm{LOG}\ Q_1$$
$$\mathrm{LOG}\ Q_{MAX} - R = \mathrm{LOG}\ Q_2$$
$$\mathrm{LOG}\ Q_{MAX} - 2R = \mathrm{LOG}\ Q_3$$
$$\vdots \qquad \vdots$$
$$\mathrm{LOG}\ Q_{MAX} - NR = \mathrm{LOG}\ Q_N = \mathrm{LOG}\ Q_{MIN}$$

3. Symbols

Q_K : Discharge at Kilickaya (c.m.s.)
Q_T : Discharge at Tepekisla (c.m.s.)
Q_{FA} : Discharge at Fatli (Data of gaging) (c.m.s.)
C_K : Coefficient of discharge ratio (Kilickaya / Fatli)
C_T : Coefficient of discharge ratio (Tepekisla / Fatli)
Q_{TR} : Regulated discharge at Tepekisla (With after bay) (c.m.s.)
Q_{TS} : Regulated discharge at Tepekisla (Without after bay) (c.m.s.)
Q_{KD} : Released discharge from Kilickaya (c.m.s.)
DAY($Q>Q_I$) Numbers of days having discharge more than Q_I in the month respected
T : Observated period (shown by year)
Q_I : Struta of discharge
Q_E : Discharge for total energy production
Q_F : Discharge for firm energy production
Q_{SP} : Overflow discharge from Kilickaya Dam

```
FORTRAN IV G LEVEL 1, MOD 0            MAIN            DATE = 69052          00/52/33            PAGE 0001
      C              KILICKAYA POWER PRODUCTION (DIFFERENT W-LEVL IN EACH)
      C              *** THIS PROGRAM HANDLE FOLLOWING CASE ***
      C              *** CASE 10, 14, 12, 13, 15. ***
      C              PLAN DRAFTED BY HIRATSUKA.
      C               JANUARY/11/69  K.AOSHIMA
      C *** (HYDROELECTRIC WATER UTILIZATION POWER STUDY ; ENTRY ) ***
            IMPLICIT REAL*8 (A-H,O-Z)
            INTEGER  YY,DD
            REAL*4   DATA(32,56),OUT(56)/56*0.0/
            DIMENSION SUM(56),IDT(32),DAILY(11),BVK(5),BH(5),CEV1(12),
           X                                                     CEV2(12),
           X         QKO(28,12),PSDAA(5,14,20),PSDA1(14,20),
           X         WSFAX1(2,7),WSFAX2(2,7),WSFAX3(2,7),WSFAX4(2,7),
           X         WSFA1(2,7),WSFA2(2,7),WSFA3(2,7),WSFA4(2,7),
           X         WSFAX5(2,7),WSFA5(2,7)
            EQUIVALENCE (DAILY(1),QI),
           X            (DAILY(2),QEV),
           X            (DAILY(3),QSP),
           X            (DAILY(4),QF),
           X            (DAILY(5),QS),
           X            (DAILY(6),QE),
           X            (DAILY(7),H),
           X            (DAILY(8),VK),
           X            (DAILY(9),PF),
           X            (DAILY(10),PS),
           X            (DAILY(11),P)
            DO 100 I=1,11
        100 DAILY(I)=0.0D0
            DO 101 J=1,5
            DO 101 K=1,14
            DO 101 L=1,20
            PSDA1(K,L)=0.0D0
        101 PSDAA(J,K,L)=0.0D0
            READ  (5,1000) ISTRT,ILST,ICASE,IYEARS,ISTRTX
       1000 FORMAT(5I10)
            DO 102 I=1,ICASE
            DO 103 K=1,20
            READ  (5,1001) (PSDAA(I,J,K),J=1,14)
       1001 FORMAT(2F4.0,F7.2,5F5.2,3(F6.2,F7.3))
            IF (PSDAA(I,1,K).GE.9999.0D0) GO TO 27
        103 CONTINUE
         27 BVK(I)=PSDAA(I,3,K)
        102 BH(I)=PSDAA(I,4,K)
            DO 104 I=1,ICASE
            GO TO (1,2,3,4,50),I
          1 CALL WSFA(VK,H,BH(I),HL,2,5,WSFAX1,1)
            CALL WSFA(BVK(I),QEV,BH(I),HL,2,5,WSFA1,2)
            GO TO 104
          2 CALL WSFA(VK,H,BH(I),HL,2,5,WSFAX2,3)
            CALL WSFA(BVK(I),QEV,BH(I),HL,2,5,WSFA2,4)
            GO TO 104
          3 CALL WSFA(VK,H,BH(I),HL,2,5,WSFAX3,5)
            CALL WSFA(BVK(I),QEV,BH(I),HL,2,5,WSFA3,6)
            GO TO 104
          4 CALL WSFA(VK,H,BH(I),HL,2,5,WSFAX4,7)
            CALL WSFA(BVK(I),QEV,BH(I),HL,2,5,WSFA4,8)
            GO TO 104
         50 CALL WSFA(VK,H,BH(I),HL,2,5,WSFAX5,16)
            CALL WSFA(BVK(I),QEV,BH(I),HL,2,5,WSFA5,17)
        104 CONTINUE
            READ  (5,1003) (CEV1(J),J=1,12)
            READ  (5,1003) (CEV2(J),J=1,12)
       1003 FORMAT(12F5.3)
            DO 106 M=1,IYEARS
        106 READ  (5,1002) (QKO(M,N),N=1,12)
       1002 FORMAT(5X,12F6.2)
            IDATEX=ISTRTX
        111 YY=IDATEX/100
            MM=IDATEX-YY*100
            DAYS=DFUNC(YY,MM)
            IF ( MM.GT.3 ) GO TO 10
            K=YY-39
            L=MM+9
            GO TO 11
         10 K=YY-38
            L=MM-3
         11 IDAYS=DAYS
            QI=QKO(K,L)/DAYS
            DO 200 IX=1,IDAYS
            IDATE=IDATEX*100+IX
            DO 107 I=1,ICASE
            GO TO ( 12,13,14,15,52 ),I
         12 CALL WSFA(BVK(I),AK,BH(I),HL,2,0,WSFA1,9)
            GO TO 16
         13 CALL WSFA(BVK(I),AK,BH(I),HL,2,0,WSFA2,10)
            GO TO 16
         14 CALL WSFA(BVK(I),AK,BH(I),HL,2,0,WSFA3,11)
            GO TO 16
         15 CALL WSFA(BVK(I),AK,BH(I),HL,2,0,WSFA4,12)
            GO TO 16
         52 CALL WSFA(BVK(I),AK,BH(I),HL,2,0,WSFA5,18)
         16 IF ( MM.GT.3 ) GO TO 17
            J=MM+9
            GO TO 18
         17 J=MM-3
         18 IF (I.EQ.5) GO TO 53
            QEV=CEV1(J)*AK/0.08640D0/DAYS
            GO TO 89
         53 QEV=CEV2(J)*AK/0.08640D0/DAYS
         89 DO 108 K=1,20
            DO 108 J=1,14
        108 PSDA1(J,K)=PSDAA(I,J,K)
            CALL PSCA(IDATE,BVK(I),BH(I),QI-QEV,QE,QSP,VK,DQ,Z,PSDA1,0)
            IF (I.EQ.5) GO TO 55
            QLLX=PSDA1(8,1)
            IF (QE.GT.QLLX) GO TO 19
            QF=Q'
            QS=C.0D0
            GO TO 20
         55 QLLX=PSDA1(8,10)
            IF (QF.GT.QLLX) GO TO 19
            QF=QLLX
            QS=QE-QF
            GO TO 20
         19 QS=QE-QLLX
            QF=QLLX
         20 GO TO ( 21,22,23,24,54 ),I
         21 CALL WSFA(VK,H,BH(I),HL,2,0,WSFAX1,13)
            GO TO 25
         22 CALL WSFA(VK,H,BH(I),HL,2,0,WSFAX2,14)
            GO TO 25
         23 CALL WSFA(VK,H,BH(I),HL,2,0,WSFAX3,15)
            GO TO 25
         24 CALL WSFA(VK,H,BH(I),HL,2,0,WSFAX4,16)
            GO TO 25
         54 CALL WSFA(VK,H,BH(I),HL,2,0,WSFAX5,20)
         25 PF=IDINT(204.0D0*(H-752.0D0)*QF+.50000D0)
            PS=IDINT(204.0D0*(H-752.0D0)*QS+.50000D0)
            P=PF+PS
            BVK(I)=VK
            BH(I)=H
            LL=I*11-11
            DO 107 J=1,11
        107 OUT(LL+J)=DAILY(J)
            OUT(56)=1.0
        200 CALL OUTX  (ISTRT,ILST,IDATE,OUT,LCT,9,DATA,SUM,56,10)
            IF (LCT) 99,99,37
         37 IF ( MM.EQ.12) GO TO 26
            IDATEX=IDATEX+1
            GO TO 111
         26 IDATEX=IDATEX+89
            GO TO 111
         99 END FILE  9
            END FILE 10
            REWIND    9
            REWIND   10
            WRITE (6,1009) IDATE
       1009 FORMAT(5X,'END OF JOB',I10)
            STOP
            END
```

Table II 4-2

Hydroelectric Water Utilization Power Study Summary Monthly Inflow cu. m. per Secper Day

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	432512	414005	121898	59919	53403	50463	1132200	54479	59325	79583	70741	121921	179294	331574	1697547
40	904953	576481	281620	112708	47245	39803	1962810	79676	94282	113588	83796	168113	421736	459779	2924001
41	898980	652141	147384	74039	46319	38113	1856976	63993	125127	72801	70475	93819	224583	362222	2507774
42	779038	651458	145000	47350	34039	32766	1689651	63715	150914	124884	80775	67130	113704	423703	2290773
43	601759	594849	186157	53368	31944	30799	1498876	33889	44595	61169	58009	73472	329120	237245	2059130
44	464641	654884	274502	73183	38762	37431	1543403	44294	80787	61667	50336	45683	83275	238473	1909445
45	55336	646019	176262	49387	30914	27627	985545	45880	37616	42963	40220	40127	147755	160926	1340106
46	595046	649722	261620	65474	41632	32326	1645820	95058	51192	41609	53495	78762	356991	225058	2322927
47	311458	140231	77488	31887	21632	27477	610172	29375	93565	51377	54201	60394	71782	259537	970867
48	646551	626829	253958	42836	29097	28530	1627801	32593	32326	34502	30880	31458	95201	129166	1888761
49	396551	756389	145255	37025	26250	30081	1391551	31331	30984	33009	123391	106319	184109	293703	1900694
50	809443	579861	133507	48831	31863	29028	1632533	62697	55162	48970	52650	45243	249687	202025	2146942
51	323461	444282	214676	59861	33692	39468	1115440	77292	119549	32488	71794	125243	222072	349074	1763878
52	778830	478634	178021	57014	34896	31644	1559039	33218	28125	43958	39236	60220	86551	171539	1850347
53	624433	596620	205266	67280	33981	39005	1566585	41632	45000	62350	66782	78229	351354	252361	2231932
54	757407	775544	322083	108056	39931	35694	2038715	35081	36910	42766	48842	62072	118900	190591	2383287
55	274282	248738	60891	24653	22049	21620	652233	24769	28588	41493	41262	81968	104514	193311	974827
56	617836	455775	215660	54086	29028	37824	1410209	34549	41759	81273	45926	68854	285931	237812	1972501
57	450139	503924	241516	57176	30139	29630	1312524	33391	36539	43553	42500	53032	185405	175624	1706944
58	559537	393403	220150	50613	30243	28970	1282916	34144	33692	40116	42141	35486	151296	151435	1619791
59	463333	424606	234086	57905	26667	25185	1231782	47905	55324	48056	52292	109873	237569	265545	1782801
60	930612	644606	194282	78345	45810	41806	1935461	40035	41030	43414	42407	45312	103206	172163	2250865
61	411701	232442	106065	25532	16794	23137	815671	25255	45139	83148	58102	74433	411667	260822	1513415
62	464143	456771	140567	35995	16285	13380	1127141	21991	32523	82708	91794	116262	211748	323287	1684167
63	616632	631863	518669	117488	40787	39433	1964872	35139	50590	43576	38970	51725	181516	184861	2366388
64	552431	551204	297697	60602	28623	31574	1522131	32951	41007	54468	47697	41725	248275	184897	1988254
65	589988	480405	150532	67870	18831	18565	1326191	54757	66956	87396	195937	156643	288345	506932	2176225
66	589317	538808	230266	75984	25162	28206	1487743	32766	39687	63009	52905	50231	121505	205832	1847846
99	15900350	14800494	5735078	1694467	906018	889585	39925992	1241855	1598297	1659894	1747557	2143749	5775091	7149497	54092435
88	567870	528589	204824	60517	32358	31771	1425929	44352	57082	59282	62413	76562	206253	255339	1921873

Table II 4-3

Hydroelectric Water Utilization Power Study Summary Monthly Evaporation cu. m. per Secper Day

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	3352	6330	8217	15117	12169	5944	51129	2857	951	0	0	0	1469	951	56406
40	3601	6733	8917	17214	14472	7185	58122	3534	1225	0	0	0	2102	1225	64583
41	3858	6808	8828	16512	13568	6667	56241	3232	1126	0	0	0	1714	1126	62313
42	3739	6807	8818	16329	13167	6383	55243	3072	1084	0	0	0	1671	1084	61070
43	3602	6733	8832	16663	13518	6568	55916	3117	1017	0	0	0	1539	1017	61589
44	3563	6815	8974	17002	13999	6884	57237	3313	1116	0	0	0	1453	1116	63119
45	2497	4939	7653	14259	11138	5237	45723	2496	824	0	0	0	1066	824	50109
46	2513	6202	8855	16909	13880	6810	55169	3348	1143	0	0	0	1707	1143	61367
47	3597	5672	6519	11210	8489	4035	39522	1909	647	0	0	0	829	647	42507
48	1998	5321	8260	15914	12706	6092	50291	2858	927	0	0	0	1131	927	55207
49	2339	5791	8697	16096	12834	6160	51917	2894	936	0	0	0	1419	936	57166
50	3513	6733	8732	16147	12586	6261	54372	3000	999	0	0	0	1399	999	59770
51	3012	5875	8168	15590	12516	6035	51196	2925	1021	0	0	0	1581	1021	56723
52	3694	6571	8679	16372	13270	6440	55026	3049	983	0	0	0	1245	983	60303
53	2894	6560	8851	16909	13850	6788	55852	3261	1074	0	0	0	1661	1074	61848
54	3785	7043	9076	17175	14369	7091	58539	3405	1118	0	0	0	1441	1118	64503
55	2824	5103	6196	10478	7951	3768	36320	1793	583	0	0	0	613	583	39309
56	1734	4230	6271	11802	9030	4334	37401	2067	679	0	0	0	1030	679	41177
57	2404	5434	7974	15357	12251	5842	49262	2737	896	0	0	0	1196	896	54091
58	2832	6040	8176	15587	12438	5946	51019	2787	909	0	0	0	1164	909	55879
59	2568	5594	7873	15115	12000	5673	48823	2675	892	0	0	0	1328	892	53718
60	3508	6791	8891	16914	13981	6910	56995	3327	1095	0	0	0	1373	1095	62790
61	2869	5384	6609	11535	8661	4097	39155	1929	639	0	0	0	1042	639	42765
62	2623	5739	7859	14364	11069	5126	46780	2398	779	0	0	0	1234	779	51191
63	3046	6734	9069	17298	14545	7205	57897	3472	1150	0	0	0	1504	1150	64023
64	3443	6725	8919	16884	13757	6696	56424	3184	1038	0	0	0	1428	1038	62074
65	3443	6573	8605	16121	12597	6190	53929	2930	977	0	0	0	1882	977	59718
66	3823	6695	8858	17007	13946	6781	57110	3224	1052	0	0	0	1385	1052	62771
99	86674	171975	231376	433880	349557	169148	1442610	80793	26880	0	0	0	38606	26880	1588889
88	3096	6142	8263	15496	12484	6041	51522	2885	960	0	0	0	1379	960	56746

Table II 4-4

Hydroelectric Water Utilization Power Study Summary Monthly Overflow Discharge cu. m per Sec per Day

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	248386	0	0	0	0	0	248386	0	0	0	0	0	0	0	248386
41	445723	0	0	0	0	0	445723	0	0	0	0	0	0	0	445723
42	213422	0	0	0	0	0	213422	0	0	0	0	0	0	0	213422
43	54769	0	0	0	0	0	54769	0	0	0	0	0	0	0	54769
44	1518	0	0	0	0	0	1518	0	0	0	0	0	0	0	1518
45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	154347	0	0	0	0	0	154347	0	0	0	0	0	0	0	154347
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	195343	0	0	0	0	0	195343	0	0	0	0	0	0	0	195343
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	220363	73911	0	0	0	0	294274	0	0	0	0	0	0	0	294274
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	230675	0	0	0	0	0	230675	0	0	0	0	0	0	0	230675
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	48140	0	0	0	48140	0	0	0	0	0	0	0	48140
64	15403	0	0	0	0	0	15403	0	0	0	0	0	0	0	15403
65	27346	0	0	0	0	0	27346	0	0	0	0	0	0	0	27346
66	103340	0	0	0	0	0	103340	0	0	0	0	0	0	0	103340
99	1910635	73911	48140	0	0	0	2032686	0	0	0	0	0	0	0	2032686
88	68237	2640	1719	0	0	0	72596	0	0	0	0	0	0	0	72596

Table II 4-5

Hydroelectric Water Utilization Power Study Summary Monthly Firm Discharge cu.m. per Sec. per Day

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	103472	110608	431728	1305888
40	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
41	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
42	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
43	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	103472	110608	431728	1305888
44	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
45	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
46	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
47	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	103472	110608	431728	1305888
48	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
49	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
50	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
51	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	103472	110608	431728	1305888
52	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
53	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
54	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
55	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	103472	110608	431728	1305888
56	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
57	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
58	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
59	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	103472	110608	431728	1305888
60	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
61	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
62	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
63	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	103472	110608	431728	1305888
64	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
65	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
66	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	99904	110608	428160	1302320
99	2997120	3097024	2997120	3097024	3097024	2997120	18282432	3097024	2997120	3097024	3097024	2822288	3097024	12013456	36489936
88	107040	110608	107040	110608	110608	107040	652944	110608	107040	110608	110608	100796	110608	429052	1303212

Table II 4-6

Hydroelectric Water Utilization Power Study Summary Monthly Secondary Discharge cu.m. per Sec per Day

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	93180	81092	20760	100192	67952	0	363176	0	0	0	0	0	21452	0	384628
40	234950	175040	125140	100192	67952	0	703274	0	0	0	0	0	294061	0	997335
41	342360	219542	65490	100192	67952	0	795536	0	0	0	0	0	87482	0	883018
42	269240	219542	65319	100192	67952	0	722245	0	0	0	0	0	38492	0	760737
43	203976	193408	49791	100192	67952	0	615319	0	0	0	0	0	30504	0	645823
44	151209	219542	151501	100192	67952	0	690396	0	0	0	0	0	21452	0	711848
45	20760	21452	20760	100192	67952	0	231116	0	0	0	0	0	21452	0	252568
46	27907	96002	84268	100192	67952	0	376321	0	0	0	0	0	64052	0	440373
47	127315	47012	20760	100192	67952	0	363231	0	0	0	0	0	21452	0	384683
48	20760	21452	20760	100192	67952	0	231116	0	0	0	0	0	21452	0	252568
49	20760	44882	27150	100192	67952	0	260936	0	0	0	0	0	21452	0	282388
50	202723	178420	39930	100192	67952	0	589217	0	0	0	0	0	21452	0	610669
51	50580	38492	20760	100192	67952	0	277976	0	0	0	0	0	21452	0	299428
52	252608	125668	20760	100192	67952	0	567180	0	0	0	0	0	21452	0	588632
53	51755	153512	42060	100192	67952	0	415471	0	0	0	0	0	55694	0	471165
54	286420	254182	212460	100192	67952	0	921206	0	0	0	0	0	21452	0	942658
55	22151	21452	20760	100192	67952	0	232507	0	0	0	0	0	14856	0	247363
56	20760	21452	20760	100192	67952	0	231116	0	0	0	0	0	21452	0	252568
57	20760	21452	20760	100192	67952	0	231116	0	0	0	0	0	21452	0	252568
58	42545	51272	20760	100192	67952	0	282721	0	0	0	0	0	21452	0	304173
59	22890	21452	20760	100192	67952	0	233246	0	0	0	0	0	21452	0	254698
60	211708	219542	71465	100192	67952	0	670859	0	0	0	0	0	21452	0	692311
61	39930	29972	20760	100192	67952	0	258806	0	0	0	0	0	21452	0	280258
62	27150	26606	20760	100192	67952	0	242660	0	0	0	0	0	21452	0	264112
63	64694	204064	316637	100192	67952	0	753539	0	0	0	0	0	21452	0	774991
64	139599	153512	141532	100192	67952	0	602787	0	0	0	0	0	21452	0	624239
65	149431	127129	20760	100192	67952	0	465464	0	0	0	0	0	94494	0	559958
66	299270	153512	58357	100192	67952	0	679283	0	0	0	0	0	21452	0	700735
99	3417391	3140657	1741740	2805376	1902656	0	13007820	0	0	0	0	0	1108675	0	14116495
88	122050	112166	62205	100192	67952	0	464565	0	0	0	0	0	39596	0	504161

Table II 4-7

Hydroelectric Water Utilization Power Study Summary Monthly Discharge for Generation cu m. per Sec per Day

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	200220	191700	127800	210800	178560	107040	1016120	110608	107040	110608	110608	103472	132060	431728	1690516
40	341990	285648	232180	210800	178560	107040	1356218	110608	107040	110608	110608	99904	404669	428160	2299655
41	449400	330150	172530	210800	178560	107040	1448480	110608	107040	110608	110608	99904	198090	428160	2185338
42	376280	330150	172359	210800	178560	107040	1375189	110608	107040	110608	110608	99904	149100	428160	2063057
43	311016	304016	156831	210800	178560	107040	1268263	110608	107040	110608	110608	103472	141112	431728	1951711
44	258249	330150	258541	210800	178560	107040	1343340	110608	107040	110608	110608	99904	132060	428160	2014168
45	127800	132060	127800	210800	178560	107040	884060	110608	107040	110608	110608	99904	132060	428160	1554888
46	134947	206610	191308	210800	178560	107040	1029265	110608	107040	110608	110608	99904	174660	428160	1742693
47	234355	157620	127800	210800	178560	107040	1016175	110608	107040	110608	110608	103472	132060	431728	1690571
48	127800	132060	127800	210800	178560	107040	884060	110608	107040	110608	110608	99904	132060	428160	1554888
49	127800	155490	134190	210800	178560	107040	913880	110608	107040	110608	110608	99904	132060	428160	1584708
50	309763	289028	146970	210800	178560	107040	1242161	110608	107040	110608	110608	99904	132060	428160	1912989
51	157620	149100	127800	210800	178560	107040	930920	110608	107040	110608	110608	103472	132060	431728	1605316
52	359648	236276	127800	210800	178560	107040	1220124	110608	107040	110608	110608	99904	132060	428160	1890952
53	158795	264120	149100	210800	178560	107040	1068415	110608	107040	110608	110608	99904	166302	428160	1773485
54	393460	364790	319500	210800	178560	107040	1574150	110608	107040	110608	110608	99904	132060	428160	2244978
55	129191	132060	127800	210800	178560	107040	885451	110608	107040	110608	110608	103472	125464	431728	1553251
56	127800	132060	127800	210800	178560	107040	884060	110608	107040	110608	110608	99904	132060	428160	1554888
57	127800	132060	127800	210800	178560	107040	884060	110608	107040	110608	110608	99904	132060	428160	1554888
58	149585	161880	127800	210800	178560	107040	935665	110608	107040	110608	110608	99904	132060	428160	1606493
59	129930	132060	127800	210800	178560	107040	886190	110608	107040	110608	110608	103472	132060	431728	1560586
60	318748	330150	178505	210800	178560	107040	1323803	110608	107040	110608	110608	99904	132060	428160	1994631
61	146970	140580	127800	210800	178560	107040	911750	110608	107040	110608	110608	99904	132060	428160	1582578
62	134190	137214	127800	210800	178560	107040	895604	110608	107040	110608	110608	99904	132060	428160	1566432
63	171734	314672	423677	210800	178560	107040	1406483	110608	107040	110608	110608	103472	132060	431728	2080879
64	246639	264120	248572	210800	178560	107040	1255731	110608	107040	110608	110608	99904	132060	428160	1926559
65	256471	237737	127800	210800	178560	107040	1118408	110608	107040	110608	110608	99904	205102	428160	1862278
66	406310	264120	165397	210800	178560	107040	1332227	110608	107040	110608	110608	99904	132060	428160	2003055
99	6414511	6237681	4738860	5902400	4999680	2997120	31290252	3097024	2997120	3097024	3097024	2822288	4205699	12013456	50606431
88	229090	222774	169245	210800	178560	107040	1117509	110608	107040	110608	110608	100796	150204	429052	1807373

Table II 4-8

Hydroelectric Water Utilization Power Study Summary Water Surface Elevation at the End of the Months

NEN	4	5	6	7	8	9	KANIKI	10	11	12	1	2	3	11-2	TOTAL
39	84443	84796	84775	84506	84255	84133	506908	84012	83907	83836	83740	83785	83892	335268	1010080
40	84500	84939	84993	84834	84608	84481	508355	84420	84395	84400	84351	84474	84500	337620	1014895
41	84500	84981	84935	84711	84469	84332	507928	84237	84270	84197	84117	84105	84155	336689	1013009
42	84500	84980	84932	84665	84395	84244	507716	84146	84230	84258	84200	84135	84060	336823	1012745
43	84500	84939	84967	84715	84448	84296	507865	84141	84012	83905	83782	83708	84123	335407	1011536
44	84500	84985	84994	84776	84528	84393	508176	84264	84211	84114	83990	83870	83751	336185	1012376
45	83557	84607	84674	84372	84065	83883	505158	83722	83539	83347	83131	82945	82987	332962	1004829
46	84170	84905	84988	84758	84513	84368	507702	84333	84224	84088	83969	83923	84288	336204	1012527
47	84424	84382	84276	83887	83466	83219	503654	82959	82917	82723	82508	82325	82037	330473	959123
48	83771	84710	84885	84603	84317	84154	506440	83989	83815	83629	83410	83206	83098	334064	1007591
49	83838	84908	84911	84624	84335	84176	506792	84009	83839	83647	83680	83697	83821	334863	1009485
50	84500	84939	84909	84641	84364	84205	507558	84104	83995	83859	83719	83577	83867	335150	1010679
51	84207	84715	84834	84572	84291	84149	506768	84076	84099	83936	83848	83897	84085	335780	1010709
52	84500	84872	84930	84678	84412	84260	507652	84102	83935	83780	83599	83491	83357	334805	1009916
53	84405	84923	84987	84759	84501	84368	507943	84232	84107	84008	83913	83864	84244	335892	1012311
54	84500	85000	84992	84826	84586	84451	508355	84307	84169	84032	83899	83811	83776	335911	1012349
55	84090	84308	84167	83737	83285	83003	502590	82727	82419	82104	81745	81625	81500	327893	954710
56	83435	84185	84341	84009	83637	83436	503043	83203	82993	82907	82692	82575	83095	331167	1000508
57	83957	84642	84807	84537	84246	84081	506270	83912	83743	83570	83379	83239	83395	333931	1007508
58	84326	84713	84840	84564	84276	84111	506830	83946	83775	83595	83406	83213	83269	333989	1008034
59	84095	84621	84776	84503	84201	84025	506221	83883	83759	83599	83439	83457	83734	334254	1008092
60	84500	84971	84980	84769	84532	84405	508157	84268	84137	83999	83848	83716	83639	335700	1011764
61	84219	84381	84329	83935	83512	83256	503632	82982	82788	82691	82489	82381	83327	330349	1000290
62	84127	84690	84698	84375	84038	83820	505748	83591	83381	83298	83241	83291	83517	333211	1006067
63	84468	84950	85000	84849	84613	84486	508366	84344	84235	84103	83954	83837	83946	336129	1012785
64	84500	84934	84988	84751	84482	84334	507989	84179	84044	83925	83779	83632	83911	335380	1011459
65	84500	84873	84893	84653	84354	84173	507446	84055	83969	83918	84098	84210	84364	336195	1012060
66	84500	84917	84992	84779	84508	84355	508051	84201	84065	83965	83835	83715	83685	335580	1011517
99	2359532	2373766	2374793	2367388	2359237	2354597	14189313	2350344	2346976	2343433	2339761	2337704	2341423	9367874	28248954
88	84269	84777	84814	84550	84258	84093	506761	83941	83821	83694	83563	83485	83622	334567	1008891

TAble II 4-9

Hydroelectric Water Utilization Power Study Summary Monthly Firm Energy kWh

NEN	4	5	6	7	8	9	KANIKI	10	11	12	1	2	3	11-2	TOTAL
39	197762	212302	209298	212972	207094	196356	1235724	200163	191256	195645	193752	180754	194971	761407	2392265
40	200582	215166	213119	219155	214794	204010	1266826	208709	201042	207530	207020	187808	209818	803400	2488753
41	203076	215700	212579	217113	211838	200861	1261165	204959	197711	203808	202084	181610	201515	785213	2452852
42	201994	215690	212525	216548	210473	199096	1256326	202940	196306	204081	203710	182745	200459	786842	2446567
43	200523	215166	212654	217522	211648	200241	1257754	203458	193797	197609	195011	180356	197197	766773	2425182
44	200053	215746	213384	218509	213249	202187	1263128	209940	197322	202200	199708	177901	194264	777131	2440463
45	184567	201768	206174	210329	203438	191561	1197837	194081	184057	185950	181339	159630	175245	710976	2278139
46	184718	211573	212812	218237	212862	201730	1241932	206451	198208	202048	199171	178229	201524	777654	2427561
47	200281	207264	199313	200377	191273	177756	1176264	177889	168557	171925	167298	152293	157474	660473	2172100
48	170976	275049	209666	215332	208906	197261	1207190	200137	190039	192311	187691	165196	179396	735237	2321960
49	181245	208674	211921	215858	209337	197693	1224728	200608	190478	192732	190989	173003	193178	747200	2365714
50	199575	215166	212084	216025	209860	198330	1251040	202011	193203	196885	193767	172137	192481	755952	2401524
51	193547	209104	209120	214393	208260	196921	1231345	201070	194073	198921	196092	183082	198478	772168	2403061
52	201534	214007	211863	216688	210824	199451	1254367	202602	192519	195322	191530	170049	185539	749420	2391928
53	191404	214010	212782	218241	212752	201607	1250796	205288	195819	199833	197654	177064	200432	770370	2426886
54	202453	217275	213899	219036	214450	203441	1270554	207071	197317	200800	197764	176374	193901	772259	2443781
55	190954	203157	197298	197510	187530	173416	1149865	172982	160996	159311	151684	136848	143191	608839	2074877
56	162194	195120	197975	202457	194584	181991	1134321	183166	172399	174859	171471	151464	172711	670193	2160391
57	182739	205932	208068	213692	207345	195677	1213453	198448	188359	190785	186674	165233	183229	731051	2326181
58	190596	210242	209175	214372	207991	196335	1228711	199174	189084	191425	187256	165225	181457	732990	2342332
59	186203	207046	207491	212963	206465	194584	1214752	197509	188223	191289	187673	174105	189598	741290	2343149
60	199492	215573	212947	218268	213195	202350	1261829	206114	196533	200058	196817	174876	191264	768284	2427491
61	191459	205253	199899	201503	192345	178664	1169123	178594	167796	170101	166720	147420	173694	652037	2173448
62	187244	208135	207307	210631	203172	190584	1207073	191884	180889	183638	182070	164410	185238	711007	2295202
63	193703	215192	213905	219393	215021	204127	1261341	207894	198451	202340	199170	183515	196163	783476	2448874
64	198777	215103	213129	218158	212440	201028	1258635	204311	194558	198188	195188	173307	193587	761241	2417774
65	198781	214023	211440	215970	209880	197868	1247962	201104	192398	197280	198847	182542	205256	771067	2425389
66	202787	214887	212822	218526	213055	201545	1263622	204807	195028	198877	196287	174732	191774	764924	2425127
99	5399159	5903323	5864649	5989778	5814083	5486671	34457663	5569364	5306816	5405749	5324437	4791908	5283034	20828910	66138971
88	192827	210833	209452	213921	207646	195953	1220632	198906	189529	193062	190158	171140	188680	743885	2362107

Table II 4-10

Hydroelectric Water Utilization Power Study Summary Monthly Secondary Energy kWh

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	172983	154695	40593	192916	127228	0	688415	0	0	0	0	0	37814	0	726229
40	444297	340494	249089	198517	131959	0	1364356	0	0	0	0	0	557846	0	1922202
41	649526	428136	130194	196667	130142	0	1534665	0	0	0	0	0	159382	0	1694047
42	509801	428116	129831	196155	129304	0	1393207	0	0	0	0	0	69852	0	1463059
43	384827	376225	98844	197038	130026	0	1186960	0	0	0	0	0	54698	0	1241658
44	284108	428227	301980	197932	131009	0	1343256	0	0	0	0	0	37677	0	1380933
45	35796	39132	39987	190522	124982	0	430419	0	0	0	0	0	33988	0	464407
46	48856	184160	167502	197686	130772	0	728976	0	0	0	0	0	117256	0	846232
47	238407	88163	38656	181507	117509	0	664242	0	0	0	0	0	30542	0	694784
48	33160	39768	40664	195054	128341	0	436987	0	0	0	0	0	34793	0	471780
49	35152	86478	53747	195531	128606	0	499514	0	0	0	0	0	37466	0	536980
50	382862	347069	79158	195682	128927	0	1133698	0	0	0	0	0	37331	0	1171029
51	91994	72097	40558	194204	127945	0	526798	0	0	0	0	0	38494	0	565292
52	477904	242463	41090	196282	129520	0	1087259	0	0	0	0	0	35985	0	1123244
53	94578	297022	83485	197689	130704	0	803478	0	0	0	0	0	101546	0	905024
54	542769	500514	424561	198409	131747	0	1798000	0	0	0	0	0	37606	0	1835606
55	39557	39402	38265	178911	115209	0	411344	0	0	0	0	0	19294	0	430638
56	31457	37843	38397	183391	119543	0	410631	0	0	0	0	0	33497	0	444128
57	35442	39940	40354	193568	127382	0	436686	0	0	0	0	0	35537	0	472223
58	77045	96804	40569	194185	127779	0	536382	0	0	0	0	0	35193	0	571575
59	39978	40156	40242	192908	126842	0	440126	0	0	0	0	0	36772	0	476898
60	400099	427884	142118	197714	130979	0	1298794	0	0	0	0	0	37095	0	1335889
61	72179	55491	38770	182527	118167	0	467134	0	0	0	0	0	33687	0	500821
62	47929	49783	40207	190796	124818	0	453533	0	0	0	0	0	35926	0	489459
63	119388	397602	632844	198733	132098	0	1480665	0	0	0	0	0	38045	0	1518710
64	262081	298540	281788	197614	130512	0	1170535	0	0	0	0	0	37545	0	1208080
65	280962	245329	41008	195632	128940	0	891871	0	0	0	0	0	175448	0	1067319
66	567373	298241	115903	197947	130890	0	1310354	0	0	0	0	0	37194	0	1347548
99	6400510	6079774	3450404	5425717	3571880	0	24928285	0	0	0	0	0	1977509	0	26905794
88	228590	217135	123229	193776	127567	0	890297	0	0	0	0	0	70625	0	960922

Table II 4-11

Hydroelectric Water Utilization Power Study Summary Monthly Energy kWh

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	370685	366997	249891	405888	334322	196356	1924139	200163	191256	195645	193752	180754	232785	761407	3118494
40	644879	555659	462207	417672	346753	204010	2631180	208709	201042	207530	207020	187808	767664	803400	4410553
41	852602	643837	342773	413780	341978	200861	2795831	204959	197711	203808	202084	181610	360897	785213	4146500
42	711795	643807	342356	412703	339777	199096	2649534	202940	196306	204081	203710	182745	270311	786842	3909627
43	585350	591390	311499	414559	341673	200241	2444712	203458	193797	197609	195011	180356	251895	766773	3666838
44	484161	643974	515363	416440	344259	202187	2606384	205940	197322	202200	199708	177901	231941	777131	3821396
45	220362	240900	246161	400851	328420	191561	1628255	194081	184057	185950	181339	159630	209234	710976	2742546
46	233574	395734	380315	415923	343633	201730	1970909	206451	198208	202046	199171	178229	318780	777654	3273794
47	438687	295427	237969	381884	308782	177756	1840505	177889	168957	171925	167298	152293	188016	660473	2866883
48	204137	244817	250330	410387	337247	197261	1644179	200137	190039	192311	187691	165196	214189	735237	2793742
49	216396	295152	265668	411389	337943	197693	1724241	200608	190476	192732	190985	173003	230644	747200	2902693
50	582438	562234	291242	411707	338788	198330	2384739	202011	193203	196885	193767	172137	229812	755992	3572554
51	285541	281201	249678	408597	336205	196921	1758143	201070	194073	198921	196092	183082	236972	772168	2968353
52	679438	456471	252953	412969	340344	199451	2341626	202602	192519	195322	191530	170049	221523	749420	3515171
53	285982	511032	296267	415930	343456	201607	2054274	205288	195819	199833	197654	177064	301978	770370	3331910
54	745222	717789	638460	417445	346197	203441	3068554	207071	197317	200800	197764	176374	231507	772255	4279387
55	230511	242559	235563	376421	302740	173416	1561210	172982	160996	159311	151684	136848	162485	608839	2505516
56	193651	232963	236372	385848	314127	181991	1544952	183166	172399	174859	171471	151464	206208	670193	2604519
57	218180	245871	248422	407260	334727	195677	1650137	198448	188359	190785	186674	165233	218765	731051	2798401
58	267640	307046	249744	408557	335770	196335	1765092	199174	189084	191425	187256	165225	216650	732990	2913906
59	226182	247202	247733	405871	333307	194584	1654879	197509	188223	191289	187673	174105	226370	741290	2820048
60	599592	643457	355065	415982	344177	202350	2560623	206114	196533	200058	196817	174876	228359	768284	3763380
61	263638	260744	238669	384030	310511	178664	1636256	178594	167796	170101	166720	147420	207382	652037	2674269
62	235172	257918	247514	401427	327990	190584	1660605	191884	180889	183638	182070	164410	221164	711007	2784660
63	313091	612795	846749	418126	347120	204127	2742008	207894	198451	202340	199170	183515	234208	783476	3967586
64	460857	513643	494917	415772	342952	201028	2429169	204311	194558	198168	195188	173307	231132	761241	3625853
65	479743	459352	252447	411602	338820	197868	2139832	201104	192398	197280	198847	182542	380704	771067	3492707
66	770161	513128	328726	416474	343945	201545	2573979	204807	195028	198877	196287	174732	228968	764924	3772678
99	11799667	11983099	9315053	11415494	9385963	5486671	59385947	5569364	5306816	5405749	5324437	4791908	7260543	20828910	93044764
88	421417	427968	332680	407696	335213	195953	2120927	198906	189529	193062	190158	171140	259305	743889	3323027

Table II 4-12

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
620401	154.71	0.73	0.0	35.68	6.92	42.60	833.60	4623.00	593944.	115193.	709137.
620402	154.71	0.74	0.0	35.68	6.92	42.60	833.92	4734.38	596273.	115645.	711918.
620403	154.71	0.75	0.0	35.68	6.92	42.60	834.24	4845.74	598602.	116097.	714699.
620404	154.71	0.76	0.0	35.68	6.92	42.60	834.56	4957.09	600931.	116548.	717479.
620405	154.71	0.77	0.0	35.68	6.92	42.60	834.87	5068.44	603188.	116986.	720174.
620406	154.71	0.78	0.0	35.68	6.92	42.60	835.18	5179.77	605444.	117424.	722868.
620407	154.71	0.79	0.0	35.68	6.92	42.60	835.48	5291.10	607628.	117847.	725475.
620408	154.71	0.80	0.0	35.68	6.92	42.60	835.78	5402.42	609811.	118271.	728082.
620409	154.71	0.81	0.0	35.68	6.92	42.60	836.08	5513.73	611995.	118694.	730689.
620410	154.71	0.82	0.0	35.68	6.92	42.60	836.37	5625.03	614106.	119103.	733209.
620411	154.71	0.82	0.0	35.68	6.92	42.60	836.66	5736.32	616216.	119513.	735729.
620412	154.71	0.83	0.0	35.68	6.92	42.60	836.95	5847.60	618327.	119922.	738249.
620413	154.71	0.84	0.0	35.68	6.92	42.60	837.23	5958.87	620365.	120317.	740682.
620414	154.71	0.85	0.0	35.68	6.92	42.60	837.50	6070.13	622331.	120699.	743030.
620415	154.71	0.86	0.0	35.68	6.92	42.60	837.77	6181.37	624296.	121080.	745376.
620416	154.71	0.87	0.0	35.68	6.92	42.60	838.04	6292.62	626261.	121461.	747722.
620417	154.71	0.88	0.0	35.68	6.92	42.60	838.31	6403.85	628226.	121842.	750068.
620418	154.71	0.89	0.0	35.68	6.92	42.60	838.56	6515.07	630046.	122195.	752241.
620419	154.71	0.91	0.0	35.68	6.92	42.60	838.82	6626.28	631938.	122562.	754500.
620420	154.71	0.92	0.0	35.68	6.92	42.60	839.07	6737.47	633758.	122915.	756673.
620421	154.71	0.93	0.0	35.68	6.92	42.60	839.32	6848.66	635578.	123268.	758846.
620422	154.71	0.94	0.0	35.68	6.92	42.60	839.56	6959.84	637325.	123607.	760932.
620423	154.71	0.95	0.0	35.68	6.92	42.60	839.80	7071.01	639072.	123946.	763018.
620424	154.71	0.96	0.0	35.68	6.92	42.60	840.04	7182.16	640819.	124284.	765103.
620425	154.71	0.97	0.0	35.68	6.92	42.60	840.27	7293.31	642493.	124609.	767102.
620426	154.71	0.98	0.0	35.68	6.92	42.60	840.50	7404.44	644167.	124934.	769101.
620427	154.71	1.00	0.0	35.68	6.92	42.60	840.73	7515.55	645841.	125258.	771099.
620428	154.71	1.01	0.0	35.68	28.22	63.90	840.91	7605.36	647151.	511844.	1158995.
620429	154.71	1.02	0.0	35.68	28.22	63.90	841.09	7695.14	648461.	512880.	1161341.
620430	154.71	1.03	0.0	35.68	28.22	63.90	841.27	7784.93	649771.	513917.	1163688.
620400	4641.30	26.21	0.0	1070.40	271.50	1341.90	25132.48	186970.69	18724364.	4792861.	23517225.

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
620501	147.35	1.58	0.0	35.68	28.22	63.90	841.43	7866.79	650936.	514838.	1165774.
620502	147.35	1.60	0.0	35.68	28.22	63.90	841.60	7948.64	652173.	515816.	1167989.
620503	147.35	1.61	0.0	35.68	15.86	51.54	841.78	8042.84	653483.	290432.	943915.
620504	147.35	1.63	0.0	35.68	6.92	42.60	841.98	8145.96	654939.	127023.	781962.
620505	147.35	1.65	0.0	35.68	6.92	42.60	842.18	8249.05	656395.	127305.	783700.
620506	147.35	1.67	0.0	35.68	6.92	42.60	842.38	8352.13	657851.	127588.	785439.
620507	147.35	1.69	0.0	35.68	6.92	42.60	842.58	8455.19	659306.	127870.	787176.
620508	147.35	1.70	0.0	35.68	6.92	42.60	842.78	8558.23	660762.	128152.	788914.
620509	147.35	1.72	0.0	35.68	6.92	42.60	842.97	8661.25	662145.	128421.	790566.
620510	147.35	1.74	0.0	35.68	6.92	42.60	843.17	8764.26	663601.	128703.	792304.
620511	147.35	1.76	0.0	35.68	6.92	42.60	843.36	8867.24	664994.	128971.	793955.
620512	147.35	1.78	0.0	35.68	6.92	42.60	843.55	8970.21	666367.	129239.	795606.
620513	147.35	1.80	0.0	35.68	6.92	42.60	843.74	9073.15	667750.	129508.	797258.
620514	147.35	1.82	0.0	35.68	6.92	42.60	843.93	9176.08	669133.	129776.	798909.
620515	147.35	1.84	0.0	35.68	6.92	42.60	844.11	9278.99	670443.	130030.	800473.
620516	147.35	1.85	0.0	35.68	6.92	42.60	844.30	9381.88	671826.	130298.	802124.
620517	147.35	1.87	0.0	35.68	6.92	42.60	844.48	9484.76	673136.	130552.	803688.
620518	147.35	1.89	0.0	35.68	6.92	42.60	844.66	9587.61	674446.	130806.	805252.
620519	147.35	1.91	0.0	35.68	6.92	42.60	844.84	9690.45	675756.	131060.	806816.
620520	147.35	1.93	0.0	35.68	6.92	42.60	845.02	9793.27	677067.	131314.	808381.
620521	147.35	1.94	0.0	35.68	6.92	42.60	845.20	9896.07	678377.	131569.	809946.
620522	147.35	1.96	0.0	35.68	6.92	42.60	845.38	9998.85	679687.	131823.	811510.
620523	147.35	1.98	0.0	35.68	6.92	42.60	845.55	10101.62	680924.	132063.	812987.
620524	147.35	2.00	0.0	35.68	6.92	42.60	845.72	10204.37	682162.	132303.	814465.
620525	147.35	2.02	0.0	35.68	6.92	42.60	845.90	10307.10	683472.	132557.	816029.
620526	147.35	2.03	0.0	35.68	6.92	42.60	846.07	10409.81	684709.	132797.	817506.
620527	147.35	2.05	0.0	35.68	6.92	42.60	846.24	10512.50	685947.	133037.	818984.
620528	147.35	2.07	0.0	35.68	6.92	42.60	846.40	10615.18	687111.	133263.	820374.
620529	147.35	2.09	0.0	35.68	6.92	42.60	846.57	10717.84	688349.	133503.	821852.
620530	147.35	2.10	0.0	35.68	6.92	42.60	846.73	10820.49	689513.	133728.	823241.
620531	147.35	2.12	0.0	35.68	6.92	42.60	846.90	10923.11	690751.	133968.	824719.
620500	4567.85	57.40	0.0	1106.08	266.06	1372.14	26171.50	290854.92	20813501.	4978313.	25791814.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.C METER INSTALLEC CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
620601	46.86	2.61	0.0	35.68	6.92	42.60	846.90	10924.75	690751.	133968.	824719.
620602	46.86	2.62	0.0	35.68	6.92	42.60	846.90	10926.39	690751.	133968.	824719.
620603	46.86	2.62	0.0	35.68	6.92	42.60	846.91	10928.04	690823.	133983.	824806.
620604	46.86	2.62	0.0	35.68	6.92	42.60	846.91	10929.68	690823.	133983.	824806.
620605	46.86	2.62	0.0	35.68	6.92	42.60	846.91	10931.31	690823.	133983.	824806.
620606	46.86	2.62	0.0	35.68	6.92	42.60	846.91	10932.95	690823.	133983.	824806.
620607	46.86	2.62	0.0	35.68	6.92	42.60	846.92	10934.59	690896.	133997.	824893.
620608	46.86	2.62	0.0	35.68	6.92	42.60	846.92	10936.23	690896.	133997.	824893.
620609	46.86	2.62	0.0	35.68	6.92	42.60	846.92	10937.87	690896.	133997.	824893.
620610	46.86	2.62	0.0	35.68	6.92	42.60	846.92	10939.51	690896.	133997.	824893.
620611	46.86	2.62	0.0	35.68	6.92	42.60	846.93	10941.14	690969.	134011.	824980.
620612	46.86	2.62	0.0	35.68	6.92	42.60	846.93	10942.78	690969.	134011.	824980.
620613	46.86	2.62	0.0	35.68	6.92	42.60	846.93	10944.42	690969.	134011.	824980.
620614	46.86	2.62	0.0	35.68	6.92	42.60	846.93	10946.05	690969.	134011.	824980.
620615	46.86	2.62	0.0	35.68	6.92	42.60	846.94	10947.69	691042.	134025.	825067.
620616	46.86	2.62	0.0	35.68	6.92	42.60	846.94	10949.33	691042.	134025.	825067.
620617	46.86	2.62	0.0	35.68	6.92	42.60	846.94	10950.96	691042.	134025.	825067.
620618	46.86	2.62	0.0	35.68	6.92	42.60	846.94	10952.60	691042.	134025.	825067.
620619	46.86	2.62	0.0	35.68	6.92	42.60	846.95	10954.23	691114.	134039.	825153.
620620	46.86	2.62	0.0	35.68	6.92	42.60	846.95	10955.87	691114.	134039.	825153.
620621	46.86	2.62	0.0	35.68	6.92	42.60	846.95	10957.50	691114.	134039.	825153.
620622	46.86	2.62	0.0	35.68	6.92	42.60	846.95	10959.14	691114.	134039.	825153.
620623	46.86	2.62	0.0	35.68	6.92	42.60	846.96	10960.77	691187.	134053.	825240.
620624	46.86	2.62	0.0	35.68	6.92	42.60	846.96	10962.40	691187.	134053.	825240.
620625	46.86	2.62	0.0	35.68	6.92	42.60	846.96	10964.04	691187.	134053.	825240.
620626	46.86	2.62	0.0	35.68	6.92	42.60	846.96	10965.67	691187.	134053.	825240.
620627	46.86	2.62	0.0	35.68	6.92	42.60	846.97	10967.30	691260.	134067.	825327.
620628	46.86	2.62	0.0	35.68	6.92	42.60	846.97	10968.93	691260.	134067.	825327.
620629	46.86	2.62	0.0	35.68	6.92	42.60	846.97	10970.57	691260.	134067.	825327.
620630	46.86	2.62	0.0	35.68	6.92	42.60	846.98	10972.20	691333.	134081.	825414.
620600	1405.80	78.59	0.0	1070.40	207.60	1278.00	25409.13	328454.91	20730739.	4020650.	24751389.

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
620701	11.61	5.00	0.0	35.68	32.32	68.00	846.88	10910.81	690605.	625570.	1316175.
620702	11.61	4.97	0.0	35.68	32.32	68.00	846.78	10849.45	689877.	624911.	1314788.
620703	11.61	4.95	0.0	35.68	32.32	68.00	846.68	10788.11	689149.	624252.	1313401.
620704	11.61	4.93	0.0	35.68	32.32	68.00	846.58	10726.80	688421.	623592.	1312013.
620705	11.61	4.90	0.0	35.68	32.32	68.00	846.49	10665.51	687766.	622999.	1310765.
620706	11.61	4.88	0.0	35.68	32.32	68.00	846.39	10604.24	687038.	622340.	1309378.
620707	11.61	4.85	0.0	35.68	32.32	68.00	846.29	10543.00	686311.	621680.	1307991.
620708	11.61	4.83	0.0	35.69	32.32	68.00	846.19	10481.78	685583.	621021.	1306604.
620709	11.61	4.81	0.0	35.68	32.32	68.00	846.08	10420.59	684782.	620296.	1305078.
620710	11.61	4.78	0.0	35.68	32.32	68.00	845.98	10359.41	684054.	619636.	1303690.
620711	11.61	4.76	0.0	35.68	32.32	68.00	845.88	10298.27	683326.	618977.	1302303.
620712	11.61	4.73	0.0	35.68	32.32	68.00	845.78	10237.15	682598.	618318.	1300916.
620713	11.61	4.71	0.0	35.69	32.32	68.00	845.68	10176.05	681870.	617658.	1299528.
620714	11.61	4.68	0.0	35.68	32.32	68.00	845.57	10114.98	681070.	616933.	1298003.
620715	11.61	4.66	0.0	35.68	32.32	68.00	845.47	10053.93	680342.	616274.	1296616.
620716	11.61	4.64	0.0	35.68	32.32	68.00	845.37	9992.90	679614.	615615.	1295229.
620717	11.61	4.61	0.0	35.68	32.32	68.00	845.26	9931.90	678813.	614889.	1293702.
620718	11.61	4.59	0.0	35.68	32.32	68.00	845.16	9870.93	678086.	614230.	1292316.
620719	11.61	4.56	0.0	35.68	32.32	68.00	845.05	9809.98	677285.	613505.	1290790.
620720	11.61	4.54	0.0	35.68	32.32	68.00	844.95	9749.05	676557.	612845.	1289402.
620721	11.61	4.51	0.0	35.68	32.32	68.00	844.84	9688.15	675756.	612120.	1287876.
620722	11.61	4.49	0.0	35.68	32.32	68.00	844.73	9627.27	674956.	611395.	1286351.
620723	11.61	4.46	0.0	35.68	32.32	68.00	844.63	9566.42	674228.	610736.	1284964.
620724	11.61	4.44	0.0	35.68	32.32	68.00	844.52	9505.59	673427.	610010.	1283437.
620725	11.61	4.41	0.0	35.68	32.32	68.00	844.41	9444.79	672627.	609285.	1281912.
620726	11.61	4.39	0.0	35.68	32.32	68.00	844.30	9384.02	671826.	608560.	1280386.
620727	11.61	4.36	0.0	35.68	32.32	68.00	844.19	9323.27	671025.	607834.	1278859.
620728	11.61	4.34	0.0	35.68	32.32	68.00	844.08	9262.54	670225.	607109.	1277334.
620729	11.61	4.31	0.0	35.68	32.32	68.00	843.97	9201.84	669424.	606384.	1275808.
620730	11.61	4.29	0.0	35.68	32.32	68.00	843.86	9141.16	668623.	605659.	1274282.
620731	11.61	4.26	0.0	35.68	32.32	68.00	843.75	9080.51	667823.	604933.	1272756.
620700	359.91	143.64	0.0	1106.08	1001.92	2108.00	26205.79	309810.40	21063087.	19079566.	40142653.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
620801	5.25	3.90	0.0	35.68	21.92	57.60	843.65	9024.26	667095.	409829.	1076924.
620802	5.25	3.88	0.0	35.68	21.92	57.60	843.55	8968.04	666367.	409382.	1075749.
620803	5.25	3.86	0.0	35.68	21.92	57.60	843.44	8911.83	665566.	408890.	1074456.
620804	5.25	3.84	0.0	35.68	21.92	57.60	843.34	8855.64	664838.	408443.	1073281.
620805	5.25	3.81	0.0	35.68	21.92	57.60	843.23	8799.48	664038.	407951.	1071989.
620806	5.25	3.79	0.0	35.68	21.92	57.60	843.13	8743.34	663310.	407504.	1070814.
620807	5.25	3.77	0.0	35.68	21.92	57.60	843.02	8687.23	662509.	407012.	1069521.
620808	5.25	3.75	0.0	35.68	21.92	57.60	842.92	8631.13	661781.	406565.	1068346.
620809	5.25	3.73	0.0	35.68	21.92	57.60	842.81	8575.05	660981.	406073.	1067054.
620810	5.25	3.70	0.0	35.68	21.92	57.60	842.70	8519.00	660180.	405581.	1065761.
620811	5.25	3.68	0.0	35.68	21.92	57.60	842.60	8462.98	659452.	405134.	1064586.
620812	5.25	3.66	0.0	35.68	21.92	57.60	842.49	8406.97	658651.	404642.	1063293.
620813	5.25	3.64	0.0	35.68	21.92	57.60	842.38	8350.98	657851.	404150.	1062001.
620814	5.25	3.62	0.0	35.68	21.92	57.60	842.27	8295.02	657050.	403659.	1060709.
620815	5.25	3.59	0.0	35.68	21.92	57.60	842.17	8239.08	656322.	403211.	1059533.
620816	5.25	3.57	0.0	35.68	21.92	57.60	842.06	8183.16	655522.	402720.	1058242.
620817	5.25	3.55	0.0	35.68	21.92	57.60	841.95	8127.26	654721.	402228.	1056949.
620818	5.25	3.53	0.0	35.68	21.92	57.60	841.84	8071.39	653920.	401736.	1055656.
620819	5.25	3.51	0.0	35.68	21.92	57.60	841.73	8015.54	653120.	401244.	1054364.
620820	5.25	3.48	0.0	35.68	21.92	57.60	841.62	7959.71	652319.	400752.	1053071.
620821	5.25	3.46	0.0	35.68	21.92	57.60	841.51	7903.90	651518.	400260.	1051778.
620822	5.25	3.44	0.0	35.68	21.92	57.60	841.40	7848.11	650718.	399768.	1050486.
620823	5.25	3.42	0.0	35.68	21.92	57.60	841.28	7792.35	649844.	399232.	1049076.
620824	5.25	3.39	0.0	35.68	21.92	57.60	841.17	7736.61	649043.	398740.	1047783.
620825	5.25	3.37	0.0	35.68	21.92	57.60	841.06	7680.89	648243.	398248.	1046491.
620826	5.25	3.35	0.0	35.68	21.92	57.60	840.95	7625.20	647442.	397756.	1045198.
620827	5.25	3.33	0.0	35.68	21.92	57.60	840.84	7569.53	646641.	397264.	1043905.
620828	5.25	3.30	0.0	35.68	21.92	57.60	840.72	7513.88	645768.	396727.	1042495.
620829	5.25	3.28	0.0	35.68	21.92	57.60	840.61	7458.25	644967.	396236.	1041203.
620830	5.25	3.26	0.0	35.68	21.92	57.60	840.49	7402.65	644094.	395699.	1039793.
620831	5.25	3.23	0.0	35.68	21.92	57.60	840.38	7347.07	643293.	395207.	1038500.
620800	162.75	110.69	0.0	1106.08	679.52	1785.60	26103.31	253705.53	20317164.	12481843.	32799007.

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
620901	4.46	1.80	0.0	35.68	0.0	35.68	840.31	7314.05	642784.	0.0	642784.
620902	4.46	1.79	0.0	35.68	0.0	35.68	840.24	7281.04	642274.	0.0	642274.
620903	4.46	1.79	0.0	35.68	0.0	35.68	840.17	7248.03	641765.	0.0	641765.
620904	4.46	1.78	0.0	35.68	0.0	35.68	840.11	7215.03	641328.	0.0	641328.
620905	4.46	1.77	0.0	35.68	0.0	35.68	840.04	7182.04	640819.	0.0	640819.
620906	4.46	1.77	0.0	35.68	0.0	35.68	839.97	7149.05	640309.	0.0	640309.
620907	4.46	1.76	0.0	35.68	0.0	35.68	839.90	7116.08	639799.	0.0	639799.
620908	4.46	1.75	0.0	35.68	0.0	35.68	839.83	7083.11	639290.	0.0	639290.
620909	4.46	1.74	0.0	35.68	0.0	35.68	839.76	7050.14	638780.	0.0	638780.
620910	4.46	1.74	0.0	35.68	0.0	35.68	839.69	7017.18	638271.	0.0	638271.
620911	4.46	1.73	0.0	35.68	0.0	35.68	839.62	6984.23	637761.	0.0	637761.
620912	4.46	1.72	0.0	35.68	0.0	35.68	839.54	6951.28	637179.	0.0	637179.
620913	4.46	1.72	0.0	35.68	0.0	35.68	839.47	6918.34	636670.	0.0	636670.
620914	4.46	1.72	0.0	35.68	0.0	35.68	839.40	6885.41	636160.	0.0	636160.
620915	4.46	1.71	0.0	35.68	0.0	35.68	839.33	6852.48	635651.	0.0	635651.
620916	4.46	1.70	0.0	35.68	0.0	35.68	839.26	6819.55	635141.	0.0	635141.
620917	4.46	1.70	0.0	35.68	0.0	35.68	839.18	6786.63	634559.	0.0	634559.
620918	4.46	1.69	0.0	35.68	0.0	35.68	839.11	6753.72	634049.	0.0	634049.
620919	4.46	1.69	0.0	35.68	0.0	35.68	839.03	6720.81	633467.	0.0	633467.
620920	4.46	1.68	0.0	35.68	0.0	35.68	838.96	6687.91	632957.	0.0	632957.
620921	4.46	1.68	0.0	35.68	0.0	35.68	838.89	6655.02	632448.	0.0	632448.
620922	4.46	1.67	0.0	35.68	0.0	35.68	838.81	6622.13	631866.	0.0	631866.
620923	4.46	1.66	0.0	35.68	0.0	35.68	838.74	6589.25	631356.	0.0	631356.
620924	4.46	1.66	0.0	35.68	0.0	35.68	838.66	6556.37	630774.	0.0	630774.
620925	4.46	1.65	0.0	35.68	0.0	35.68	838.58	6523.49	630192.	0.0	630192.
620926	4.46	1.65	0.0	35.68	0.0	35.68	838.51	6490.62	629682.	0.0	629682.
620927	4.46	1.64	0.0	35.68	0.0	35.68	838.43	6457.77	629100.	0.0	629100.
620928	4.46	1.64	0.0	35.68	0.0	35.68	838.35	6424.91	628517.	0.0	628517.
620929	4.46	1.63	0.0	35.68	0.0	35.68	838.28	6392.06	628008.	0.0	628008.
620930	4.46	1.62	0.0	35.68	0.0	35.68	838.20	6359.21	627426.	0.0	627426.
620900	133.80	51.25	0.0	1070.40	0.0	1070.40	25178.37	205086.95	19058382.	0.0	19058382.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
621001	7.09	0.81	0.0	35.68	0.0	35.68	838.13	6329.82	626916.	0.0	626916.
621002	7.09	0.81	0.0	35.68	0.0	35.68	838.06	6300.43	626407.	0.0	626407.
621003	7.09	0.80	0.0	35.68	0.0	35.68	837.99	6271.04	625897.	0.0	625897.
621004	7.09	0.80	0.0	35.68	0.0	35.68	837.92	6241.64	625388.	0.0	625388.
621005	7.09	0.80	0.0	35.68	0.0	35.68	837.85	6212.26	624878.	0.0	624878.
621006	7.09	0.80	0.0	35.68	0.0	35.68	837.78	6182.87	624369.	0.0	624369.
621007	7.09	0.79	0.0	35.68	0.0	35.68	837.71	6153.50	623859.	0.0	623859.
621008	7.09	0.79	0.0	35.68	0.0	35.68	837.63	6124.12	623277.	0.0	623277.
621009	7.09	0.79	0.0	35.68	0.0	35.68	837.56	6094.74	622767.	0.0	622767.
621010	7.09	0.79	0.0	35.68	0.0	35.68	837.49	6065.37	622258.	0.0	622258.
621011	7.09	0.79	0.0	35.68	0.0	35.68	837.42	6036.00	621748.	0.0	621748.
621012	7.09	0.78	0.0	35.68	0.0	35.68	837.34	6006.62	621166.	0.0	621166.
621013	7.09	0.78	0.0	35.68	0.0	35.68	837.27	5977.26	620656.	0.0	620656.
621014	7.09	0.79	0.0	35.68	0.0	35.68	837.20	5947.89	620147.	0.0	620147.
621015	7.09	0.78	0.0	35.68	0.0	35.68	837.12	5918.54	619565.	0.0	619565.
621016	7.09	0.77	0.0	35.68	0.0	35.68	837.05	5889.18	619055.	0.0	619055.
621017	7.09	0.77	0.0	35.68	0.0	35.68	836.98	5859.82	618546.	0.0	618546.
621018	7.09	0.77	0.0	35.68	0.0	35.68	836.90	5830.46	617963.	0.0	617963.
621019	7.09	0.77	0.0	35.68	0.0	35.68	836.83	5801.11	617454.	0.0	617454.
621020	7.09	0.76	0.0	35.68	0.0	35.68	836.75	5771.76	616872.	0.0	616872.
621021	7.09	0.76	0.0	35.68	0.0	35.68	836.68	5742.41	616362.	0.0	616362.
621022	7.09	0.76	0.0	35.68	0.0	35.68	836.60	5713.07	615780.	0.0	615780.
621023	7.09	0.76	0.0	35.68	0.0	35.68	836.53	5683.72	615270.	0.0	615270.
621024	7.09	0.75	0.0	35.68	0.0	35.68	836.45	5654.38	614688.	0.0	614688.
621025	7.09	0.75	0.0	35.68	0.0	35.68	836.37	5625.05	614106.	0.0	614106.
621026	7.09	0.75	0.0	35.68	0.0	35.68	836.30	5595.71	613596.	0.0	613596.
621027	7.09	0.75	0.0	35.68	0.0	35.68	836.22	5566.37	613014.	0.0	613014.
621028	7.09	0.75	0.0	35.68	0.0	35.68	836.14	5537.05	612432.	0.0	612432.
621029	7.09	0.74	0.0	35.68	0.0	35.68	836.06	5507.71	611849.	0.0	611849.
621030	7.09	0.74	0.0	35.68	0.0	35.68	835.99	5478.39	611340.	0.0	611340.
621031	7.09	0.74	0.0	35.68	0.0	35.68	835.91	5449.06	610757.	0.0	610757.
621000	219.79	23.98	0.0	1106.08	0.0	1106.08	25948.23	182567.38	19188382.	0.0	19188382.

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
621101	10.84	0.27	0.0	35.68	0.0	35.68	835.84	5423.96	610248.	0.0	610248.
621102	10.84	0.27	0.0	35.68	0.0	35.68	835.77	5398.85	609738.	0.0	609738.
621103	10.84	0.27	0.0	35.68	0.0	35.68	835.71	5373.74	609302.	0.0	609302.
621104	10.84	0.27	0.0	35.68	0.0	35.68	835.64	5348.63	608792.	0.0	608792.
621105	10.84	0.27	0.0	35.68	0.0	35.68	835.57	5323.53	608283.	0.0	608283.
621106	10.84	0.27	0.0	35.68	0.0	35.68	835.50	5298.42	607773.	0.0	607773.
621107	10.84	0.27	0.0	35.68	0.0	35.68	835.44	5273.32	607336.	0.0	607336.
621108	10.84	0.26	0.0	35.68	0.0	35.68	835.37	5248.21	606827.	0.0	606827.
621109	10.84	0.26	0.0	35.68	0.0	35.68	835.30	5223.11	606317.	0.0	606317.
621110	10.84	0.26	0.0	35.68	0.0	35.68	835.23	5198.01	605808.	0.0	605808.
621111	10.84	0.26	0.0	35.68	0.0	35.68	835.16	5172.91	605298.	0.0	605298.
621112	10.84	0.26	0.0	35.68	0.0	35.68	835.09	5147.80	604789.	0.0	604789.
621113	10.84	0.26	0.0	35.68	0.0	35.68	835.02	5122.70	604279.	0.0	604279.
621114	10.84	0.26	0.0	35.68	0.0	35.68	834.95	5097.61	603770.	0.0	603770.
621115	10.84	0.26	0.0	35.68	0.0	35.68	834.88	5072.50	603260.	0.0	603260.
621116	10.84	0.26	0.0	35.68	0.0	35.68	834.81	5047.41	602751.	0.0	602751.
621117	10.84	0.26	0.0	35.68	0.0	35.68	834.74	5022.31	602241.	0.0	602241.
621118	10.84	0.26	0.0	35.68	0.0	35.68	834.67	4997.21	601732.	0.0	601732.
621119	10.84	0.26	0.0	35.68	0.0	35.68	834.60	4972.12	601272.	0.0	601222.
621120	10.84	0.26	0.0	35.68	0.0	35.68	834.53	4947.02	600713.	0.0	600713.
621121	10.84	0.26	0.0	35.68	0.0	35.68	834.46	4921.93	600203.	0.0	600203.
621122	10.84	0.26	0.0	35.68	0.0	35.68	834.39	4896.83	599694.	0.0	599694.
621123	10.84	0.25	0.0	35.68	0.0	35.68	834.32	4871.74	599184.	0.0	599184.
621124	10.84	0.25	0.0	35.68	0.0	35.68	834.24	4846.64	598602.	0.0	598602.
621125	10.84	0.25	0.0	35.68	0.0	35.68	834.17	4821.55	598092.	0.0	598092.
621126	10.84	0.25	0.0	35.68	0.0	35.68	834.10	4796.46	597583.	0.0	597583.
621127	10.84	0.25	0.0	35.68	0.0	35.68	834.03	4771.37	597073.	0.0	597073.
621128	10.84	0.25	0.0	35.68	0.0	35.68	833.95	4746.28	596491.	0.0	596491.
621129	10.84	0.25	0.0	35.68	0.0	35.68	833.88	4721.19	595982.	0.0	595982.
621130	10.84	0.25	0.0	35.68	0.0	35.68	833.81	4696.10	595472.	0.0	595472.
621100	325.20	7.79	0.0	1070.40	0.0	1070.40	25045.17	151799.46	18088855.	0.0	18088855.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.C METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
621201	26.68	0.0	0.0	35.68	0.0	35.68	833.78	4687.10	595254.	0.0	595254.
621202	26.68	0.0	0.0	35.68	0.0	35.68	833.76	4678.10	595108.	0.0	595108.
621203	26.68	0.0	0.0	35.68	0.0	35.68	833.73	4669.10	594890.	0.0	594890.
621204	26.68	0.0	0.0	35.68	0.0	35.68	833.70	4660.10	594671.	0.0	594671.
621205	26.68	0.0	0.0	35.68	0.0	35.68	833.68	4651.10	594526.	0.0	594526.
621206	26.68	0.0	0.0	35.68	0.0	35.68	833.65	4642.10	594307.	0.0	594307.
621207	26.68	0.0	0.0	35.68	0.0	35.68	833.62	4633.10	594089.	0.0	594089.
621208	26.68	0.0	0.0	35.68	0.0	35.68	833.60	4624.10	593944.	0.0	593944.
621209	26.68	0.0	0.0	35.68	0.0	35.68	833.57	4615.10	593725.	0.0	593725.
621210	26.68	0.0	0.0	35.68	0.0	35.68	833.55	4606.10	593580.	0.0	593580.
621211	26.68	0.0	0.0	35.68	0.0	35.68	833.52	4597.10	593361.	0.0	593361.
621212	26.68	0.0	0.0	35.68	0.0	35.68	833.49	4588.10	593143.	0.0	593143.
621213	26.68	0.0	0.0	35.68	0.0	35.68	833.47	4579.10	592997.	0.0	592997.
621214	26.68	0.0	0.0	35.68	0.0	35.68	833.44	4570.10	592779.	0.0	592779.
621215	26.68	0.0	0.0	35.68	0.0	35.68	833.41	4561.10	592561.	0.0	592561.
621216	26.68	0.0	0.0	35.68	0.0	35.68	833.39	4552.10	592415.	0.0	592415.
621217	26.68	0.0	0.0	35.68	0.0	35.68	833.36	4543.10	592197.	0.0	592197.
621218	26.68	0.0	0.0	35.68	0.0	35.68	833.33	4534.10	591978.	0.0	591978.
621219	26.68	0.0	0.0	35.68	0.0	35.68	833.31	4525.10	591833.	0.0	591833.
621220	26.68	0.0	0.0	35.68	0.0	35.68	833.28	4516.10	591614.	0.0	591614.
621221	26.68	0.0	0.0	35.68	0.0	35.68	833.25	4507.10	591396.	0.0	591396.
621222	26.68	0.0	0.0	35.68	0.0	35.68	833.23	4498.10	591250.	0.0	591250.
621223	26.68	0.0	0.0	35.68	0.0	35.68	833.20	4489.10	591032.	0.0	591032.
621224	26.68	0.0	0.0	35.68	0.0	35.68	833.17	4480.10	590814.	0.0	590814.
621225	26.68	0.0	0.0	35.68	0.0	35.68	833.15	4471.10	590668.	0.0	590668.
621226	26.68	0.0	0.0	35.68	0.0	35.68	833.12	4462.10	590450.	0.0	590450.
621227	26.68	0.0	0.0	35.68	0.0	35.68	833.09	4453.10	590231.	0.0	590231.
621228	26.68	0.0	0.0	35.68	0.0	35.68	833.06	4444.10	590013.	0.0	590013.
621229	26.68	0.0	0.0	35.68	0.0	35.68	833.04	4435.10	589867.	0.0	589867.
621230	26.68	0.0	0.0	35.68	0.0	35.68	833.01	4426.10	589649.	0.0	589649.
621231	26.68	0.0	0.0	35.68	0.0	35.68	832.98	4417.10	589431.	0.0	589431.
621200	827.08	0.0	0.0	1106.08	0.0	1106.08	25834.94	141115.10	18363773.	0.0	18363773.
630101	29.61	0.0	0.0	35.68	0.0	35.68	832.97	4411.03	589358.	0.0	589358.
630102	29.61	0.0	0.0	35.68	0.0	35.68	832.95	4404.96	589212.	0.0	589212.
630103	29.61	0.0	0.0	35.68	0.0	35.68	832.93	4398.89	589067.	0.0	589067.
630104	29.61	0.0	0.0	35.68	0.0	35.68	832.91	4392.82	588921.	0.0	588921.
630105	29.61	0.0	0.0	35.68	0.0	35.68	832.89	4386.75	588776.	0.0	588776.
630106	29.61	0.0	0.0	35.68	0.0	35.68	832.87	4380.69	588630.	0.0	588630.
630107	29.61	0.0	0.0	35.68	0.0	35.68	832.86	4374.62	588557.	0.0	588557.
630108	29.61	0.0	0.0	35.68	0.0	35.68	832.84	4368.55	588412.	0.0	588412.
630109	29.61	0.0	0.0	35.68	0.0	35.68	832.82	4362.48	588266.	0.0	588266.
630110	29.61	0.0	0.0	35.68	0.0	35.68	832.80	4356.41	588121.	0.0	588121.
630111	29.61	0.0	0.0	35.68	0.0	35.68	832.78	4350.34	587975.	0.0	587975.
630112	29.61	0.0	0.0	35.68	0.0	35.68	832.76	4344.27	587829.	0.0	587829.
630113	29.61	0.0	0.0	35.68	0.0	35.68	832.75	4338.20	587757.	0.0	587757.
630114	29.61	0.0	0.0	35.68	0.0	35.68	832.73	4332.13	587611.	0.0	587611.
630115	29.61	0.0	0.0	35.68	0.0	35.68	832.71	4326.07	587465.	0.0	587465.
630116	29.61	0.0	0.0	35.68	0.0	35.68	832.69	4320.00	587320.	0.0	587320.
630117	29.61	0.0	0.0	35.68	0.0	35.68	832.67	4313.93	587174.	0.0	587174.
630118	29.61	0.0	0.0	35.68	0.0	35.68	832.65	4307.86	587029.	0.0	587029.
630119	29.61	0.0	0.0	35.68	0.0	35.68	832.64	4301.79	586956.	0.0	586956.
630120	29.61	0.0	0.0	35.68	0.0	35.68	832.62	4295.72	586810.	0.0	586810.
630121	29.61	0.0	0.0	35.68	0.0	35.68	832.60	4289.65	586665.	0.0	586665.
630122	29.61	0.0	0.0	35.68	0.0	35.68	832.58	4283.58	586519.	0.0	586519.
630123	29.61	0.0	0.0	35.68	0.0	35.68	832.56	4277.51	586374.	0.0	586374.
630124	29.61	0.0	0.0	35.68	0.0	35.68	832.54	4271.45	586228.	0.0	586228.
630125	29.61	0.0	0.0	35.68	0.0	35.68	832.52	4265.37	586083.	0.0	586083.
630126	29.61	0.0	0.0	35.68	0.0	35.68	832.51	4259.30	586010.	0.0	586010.
630127	29.61	0.0	0.0	35.68	0.0	35.68	832.49	4257.23	585864.	0.0	585864.
630128	29.61	0.0	0.0	35.68	0.0	35.68	832.47	4247.17	585719.	0.0	585719.
630129	29.61	0.0	0.0	35.68	0.0	35.68	832.45	4241.10	585573.	0.0	585573.
630130	29.61	0.0	0.0	35.68	0.0	35.68	832.43	4235.03	585427.	0.0	585427.
630131	29.61	0.0	0.0	35.68	0.0	35.68	832.41	4228.96	585282.	0.0	585282.
630100	917.91	0.0	0.0	1106.08	0.0	1106.08	25813.40	133919.87	18206990.	0.0	18206990.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
630201	41.52	0.0	0.0	35.68	0.0	35.68	832.43	4234.80	585427.	0.0	585427.
630202	41.52	0.0	0.0	35.68	0.0	35.68	832.45	4240.64	585573.	0.0	585573.
630203	41.52	0.0	0.0	35.68	0.0	35.68	832.47	4246.49	585719.	0.0	585719.
630204	41.52	0.0	0.0	35.68	0.0	35.68	832.48	4252.33	585791.	0.0	585791.
630205	41.52	0.0	0.0	35.68	0.0	35.68	832.50	4258.17	585937.	0.0	585937.
630206	41.52	0.0	0.0	35.68	0.0	35.68	832.52	4264.01	586083.	0.0	586083.
630207	41.52	0.0	0.0	35.68	0.0	35.68	832.54	4269.86	586228.	0.0	586228.
630208	41.52	0.0	0.0	35.68	0.0	35.68	832.56	4275.70	586374.	0.0	586374.
630209	41.52	0.0	0.0	35.68	0.0	35.68	832.57	4281.54	586446.	0.0	586446.
630210	41.52	0.0	0.0	35.68	0.0	35.68	832.59	4287.38	586592.	0.0	586592.
630211	41.52	0.0	0.0	35.68	0.0	35.68	832.61	4293.22	586738.	0.0	586738.
630212	41.52	0.0	0.0	35.68	0.0	35.68	832.63	4299.07	586883.	0.0	586883.
630213	41.52	0.0	0.0	35.68	0.0	35.68	832.64	4304.91	586956.	0.0	586956.
630214	41.52	0.0	0.0	35.68	0.0	35.68	832.66	4310.75	587102.	0.0	587102.
630215	41.52	0.0	0.0	35.68	0.0	35.68	832.68	4316.59	587247.	0.0	587247.
630216	41.52	0.0	0.0	35.68	0.0	35.68	832.70	4322.43	597393.	0.0	587393.
630217	41.52	0.0	0.0	35.68	0.0	35.68	832.72	4328.28	587538.	0.0	587538.
630218	41.52	0.0	0.0	35.68	0.0	35.68	832.73	4334.12	587611.	0.0	587611.
630219	41.52	0.0	0.0	35.68	0.0	35.68	832.75	4339.96	587757.	0.0	587757.
630220	41.52	0.0	0.0	35.68	0.0	35.68	832.77	4345.80	587902.	0.0	587902.
630221	41.52	0.0	0.0	35.68	0.0	35.68	832.79	4351.64	588048.	0.0	588048.
630222	41.52	0.0	0.0	35.68	0.0	35.68	832.80	4357.49	588171.	0.0	588121.
630223	41.52	0.0	0.0	35.68	0.0	35.68	832.82	4363.33	588266.	0.0	588266.
630224	41.52	0.0	0.0	35.68	0.0	35.68	832.84	4369.17	588412.	0.0	588412.
630225	41.52	0.0	0.0	35.68	0.0	35.68	832.86	4375.02	588557.	0.0	588557.
630226	41.52	0.0	0.0	35.68	0.0	35.68	832.87	4380.86	588630.	0.0	588630.
630227	41.52	0.0	0.0	35.68	0.0	35.68	832.89	4386.70	588776.	0.0	588776.
630228	41.52	0.0	0.0	35.68	0.C	35.68	832.91	4392.54	588921.	0.0	588921.
630200	1162.56	0.0	0.0	999.04	0.0	999.04	23314.78	120782.80	16441028.	0.0	16441028.
630301	68.31	0.38	0.0	35.68	6.92	42.60	832.99	4417.86	589504.	114332.	703836.
630302	68.31	0.38	0.0	35.68	6.92	42.60	833.06	4443.19	590013.	114431.	704444.
630303	68.31	0.38	0.0	35.68	6.92	42.60	833.14	4468.51	590595.	114544.	705139.
630304	68.31	0.39	0.0	35.68	6.92	42.60	833.21	4493.83	591105.	114643.	705748.
630305	68.31	0.39	0.0	35.68	6.92	42.60	833.29	4519.15	591687.	114755.	706442.
630306	68.31	0.39	0.0	35.68	6.92	42.60	833.36	4544.46	592197.	114854.	707051.
630307	68.31	0.39	0.0	35.68	6.92	42.60	833.44	4569.79	592779.	114967.	707746.
630308	68.31	0.39	0.0	35.68	6.92	42.60	833.51	4595.10	593288.	115066.	708354.
630309	68.31	0.39	0.0	35.68	6.92	42.60	833.59	4620.41	593871.	115179.	709050.
630310	68.31	0.39	0.0	35.68	6.92	42.60	833.66	4645.73	594380.	115278.	709658.
630311	68.31	0.39	0.0	35.68	6.92	42.60	833.74	4671.04	594963.	115391.	710354.
630312	68.31	0.39	0.0	35.68	6.92	42.60	833.81	4696.36	595472.	115490.	710962.
630313	68.31	0.39	0.0	35.68	6.92	42.60	833.88	4721.66	595982.	115588.	711570.
630314	68.31	0.40	0.0	35.68	6.92	42.60	833.96	4746.98	596564.	115701.	712265.
630315	68.31	0.40	0.0	35.68	6.92	42.60	834.03	4772.29	597073.	115800.	712873.
630316	68.31	0.40	0.0	35.68	6.92	42.60	834.10	4797.59	597583.	115899.	713482.
630317	68.31	0.40	0.0	35.68	6.92	42.60	834.18	4822.90	598165.	116012.	714177.
630318	68.31	0.40	0.0	35.68	6.92	42.60	834.25	4848.20	598675.	116111.	714786.
630319	68.31	0.40	0.0	35.68	6.92	42.60	834.32	4873.51	599184.	116209.	715393.
630320	68.31	0.40	0.0	35.68	6.92	42.60	834.39	4898.81	599694.	116308.	716002.
630321	68.31	0.40	0.0	35.68	6.92	42.60	834.46	4924.11	600203.	116407.	716610.
630322	68.31	0.40	0.0	35.68	6.92	42.60	834.54	4949.42	600786.	116520.	717306.
630323	68.31	0.41	0.0	35.68	6.92	42.60	834.61	4974.71	601295.	116619.	717914.
630324	68.31	0.41	0.0	35.68	6.92	42.60	834.68	5000.02	601805.	116718.	718523.
630325	68.31	0.41	0.0	35.68	6.92	42.60	834.75	5025.31	602314.	116817.	719131.
630326	68.31	0.41	0.0	35.68	6.92	42.60	834.82	5050.61	602824.	116915.	719739.
630327	68.31	0.41	0.0	35.68	6.92	42.60	834.89	5075.91	603333.	117014.	720347.
630328	68.31	0.41	0.0	35.68	6.92	42.60	834.96	5101.20	603843.	117113.	720956.
630329	68.31	0.41	0.0	35.68	6.92	42.60	835.03	5126.50	604352.	117212.	721564.
630330	68.31	0.41	0.0	35.68	6.92	42.60	835.10	5151.79	604862.	117311.	722173.
630331	68.31	0.41	0.0	35.68	6.92	42.60	835.17	5177.08	605371.	117409.	722780.
630300	2117.61	12.33	0.0	1106.08	214.52	1320.60	25856.92	148724.03	18523762.	3592613.	22116375.
630000	16841.56	511.88	0.0	13023.20	2641.12	15664.32	*********	2453792.04	229520027.	48945846.	278465873.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
630401	205.54	0.79	0.0	35.68	6.92	42.60	835.61	5339.24	608574.	118031.	726605.
630402	205.54	0.80	0.0	35.68	6.92	42.60	836.05	5501.38	611776.	118652.	730428.
630403	205.54	0.81	0.0	35.68	6.92	42.60	836.47	5663.51	614833.	119245.	734078.
630404	205.54	0.83	0.0	35.68	6.92	42.60	836.89	5825.62	617891.	119838.	737729.
630405	205.54	0.84	0.0	35.68	6.92	42.60	837.30	5987.73	620875.	120416.	741291.
630406	205.54	0.86	0.0	35.68	6.92	42.60	837.70	6149.82	623786.	120981.	744767.
630407	205.54	0.87	0.0	35.68	6.92	42.60	838.09	6311.89	626625.	121532.	748157.
630408	205.54	0.89	0.0	35.68	6.92	42.60	838.47	6473.95	629391.	122068.	751459.
630409	205.54	0.90	0.0	35.68	6.92	42.60	838.84	6635.99	632084.	122590.	754674.
630410	205.54	0.92	0.0	35.68	6.92	42.60	839.21	6798.02	634777.	123113.	757890.
630411	205.54	0.93	0.0	35.68	6.92	42.60	839.56	6960.03	637325.	123607.	760932.
630412	205.54	0.95	0.0	35.68	6.92	42.60	839.91	7122.02	639872.	124101.	763973.
630413	205.54	0.96	0.0	35.68	6.92	42.60	840.25	7284.00	642347.	124581.	766928.
630414	205.54	0.98	0.0	35.68	6.92	42.60	840.58	7445.96	644749.	125047.	769796.
630415	205.54	1.00	0.0	35.68	14.83	50.51	840.90	7600.00	647078.	268933.	916011.
630416	205.54	1.02	0.0	35.68	28.22	63.90	841.18	7740.62	649116.	513399.	1162515.
630417	205.54	1.04	0.0	35.68	28.22	63.90	841.46	7881.22	651154.	515010.	1166164.
630418	205.54	1.06	0.0	35.68	28.22	63.90	841.74	8021.81	653192.	516622.	1169814.
630419	205.54	1.08	0.0	35.68	28.22	63.90	842.02	8162.37	655230.	518234.	1173464.
630420	205.54	1.09	0.0	35.68	28.22	63.90	842.29	8302.93	657196.	519789.	1176985.
630421	205.54	1.11	0.0	35.68	28.22	63.90	842.56	8443.46	659161.	521343.	1180504.
630422	205.54	1.13	0.0	35.68	28.22	63.90	842.83	8583.98	661126.	522897.	1184023.
630423	205.54	1.14	0.0	35.68	28.22	63.90	843.09	8724.48	663019.	524394.	1187413.
630424	205.54	1.16	0.0	35.68	28.22	63.90	843.36	8864.96	664984.	525949.	1190933.
630425	205.54	1.18	0.0	35.68	33.65	69.33	843.60	9000.00	666731.	628756.	1295487.
630426	205.54	1.19	0.0	35.68	49.52	85.20	843.82	9119.15	668332.	927573.	1595905.
630427	205.54	1.21	0.0	35.68	49.52	85.20	844.04	9238.28	669933.	929795.	1599728.
630428	205.54	1.22	0.0	35.68	49.52	85.20	844.25	9357.40	671462.	931917.	1603379.
630429	205.54	1.24	0.0	35.68	49.52	85.20	844.47	9476.51	673063.	934139.	1607202.
630430	205.54	1.25	0.0	35.68	49.52	85.20	844.68	9595.61	674592.	936261.	1610853.
630400	6166.20	30.45	0.0	1070.40	646.94	1717.34	25221.22	227611.96	19370274.	11938813.	31309087.
630501	203.83	1.91	0.0	35.68	49.52	85.20	844.88	9712.32	676048.	938281.	1614329.
630502	203.83	1.93	0.0	35.68	49.52	85.20	845.08	9829.02	677503.	940302.	1617805.
630503	203.83	1.95	0.0	35.68	49.52	85.20	845.29	9945.70	679032.	942423.	1621455.
630504	203.83	1.97	0.0	35.68	49.52	85.20	845.48	10062.35	680415.	944342.	1624757.
630505	203.83	1.99	0.0	35.68	49.52	85.20	845.68	10178.99	681870.	946363.	1628233.
630506	203.83	2.01	0.0	35.68	49.52	85.20	845.88	10295.60	683326.	948383.	1631709.
630507	203.83	2.03	0.0	35.68	49.52	85.20	846.07	10412.20	684709.	950303.	1635012.
630508	203.83	2.05	0.0	35.68	65.14	100.82	846.24	10513.16	685947.	1252241.	1938188.
630509	203.83	2.07	0.0	35.68	70.82	106.50	846.39	10608.42	687038.	1363679.	2050717.
630510	203.83	2.08	0.0	35.68	70.82	106.50	846.55	10703.66	688203.	1365990.	2054193.
630511	203.83	2.10	0.0	35.68	70.82	106.50	846.70	10798.89	689295.	1368157.	2057452.
630512	203.83	2.12	0.0	35.68	70.82	106.50	846.85	10894.10	690387.	1370325.	2060712.
630513	203.83	2.13	0.0	35.68	70.82	106.50	847.00	10989.29	691478.	1372492.	2063970.
630514	203.83	2.15	0.0	35.68	70.82	106.50	847.15	11084.47	692570.	1374659.	2067229.
630515	203.83	2.16	0.0	35.68	70.82	106.50	847.30	11179.64	693662.	1376826.	2070488.
630516	203.83	2.18	0.0	35.68	70.82	106.50	847.45	11274.79	694754.	1378993.	2073747.
630517	203.83	2.19	0.0	35.68	70.82	106.50	847.59	11369.92	695773.	1381015.	2076788.
630518	203.83	2.21	0.0	35.68	70.82	106.50	847.74	11465.04	696865.	1383183.	2080048.
630519	203.83	2.23	0.0	35.68	70.82	106.50	847.88	11560.14	697884.	1385205.	2083089.
630520	203.83	2.24	0.0	35.68	70.82	106.50	848.02	11655.22	698903.	1387228.	2086131.
630521	203.83	2.26	0.0	35.68	70.82	106.50	848.16	11750.29	699922.	1389250.	2089172.
630522	203.83	2.27	0.0	35.68	70.82	106.50	848.30	11845.35	700941.	1391273.	2092214.
630523	203.83	2.29	0.0	35.68	70.82	106.50	848.44	11940.39	701960.	1393296.	2095256.
630524	203.83	2.30	0.0	35.68	70.82	106.50	848.58	12035.41	702979.	1395318.	2098297.
630525	203.83	2.32	0.0	35.68	70.82	106.50	848.71	12130.43	703925.	1397196.	2101121.
630526	203.83	2.33	0.0	35.68	70.82	106.50	848.85	12225.42	704944.	1399219.	2104163.
630527	203.83	2.35	0.0	35.68	70.82	106.50	848.98	12320.40	705890.	1401097.	2106987.
630528	203.83	2.36	0.0	35.68	70.82	106.50	849.11	12415.37	706836.	1402975.	2109811.
630529	203.83	2.38	0.0	35.68	70.82	106.50	849.24	12510.32	707783.	1404854.	2112637.
630530	203.83	2.39	0.0	35.68	70.82	106.50	849.37	12605.25	708729.	1406732.	2115461.
630531	203.83	2.40	0.0	35.68	70.82	106.50	849.50	12700.18	709675.	1408610.	2118285.
630500	6318.73	67.35	0.0	1106.08	2040.64	3146.72	26268.46	349011.73	21519246.	39760210.	61279456.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
630601	172.89	2.96	0.0	35.68	70.82	106.50	849.59	12763.61	710330.	1409910.	2120240.
630602	172.89	2.97	0.0	35.68	70.82	106.50	849.67	12827.02	710913.	1411066.	2121979.
630603	172.89	2.99	0.0	35.68	70.82	106.50	849.75	12890.43	711495.	1412222.	2123717.
630604	172.89	3.00	0.0	35.68	70.82	106.50	849.84	12953.82	712150.	1413522.	2125672.
630605	172.89	3.01	0.0	35.68	70.82	106.50	849.92	13017.20	712732.	1414678.	2127410.
630606	172.89	3.02	0.0	35.68	73.39	109.07	850.00	13078.00	713315.	1467292.	2180607.
630607	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630608	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630609	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630610	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630611	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630612	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630613	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630614	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630615	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630616	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630617	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630618	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630619	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630620	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630621	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630622	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630623	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630624	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630625	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630626	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630627	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630628	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630629	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630630	172.89	3.03	20.06	35.68	114.12	149.80	850.00	13078.00	713315.	2281487.	2994802.
630600	5186.70	90.67	481.44	1070.40	3166.37	4236.77	25498.77	391402.08	21390495.	63284378.	84674873.
630701	37.90	5.77	0.0	35.68	32.32	68.00	849.95	13042.12	712951.	645812.	1358763.
630702	37.90	5.76	0.0	35.68	32.32	68.00	849.91	13006.27	712659.	645548.	1358207.
630703	37.90	5.75	0.0	35.68	32.32	68.00	849.86	12970.42	712296.	645218.	1357514.
630704	37.90	5.73	0.0	35.68	32.32	68.00	849.81	12934.59	711932.	644889.	1356821.
630705	37.90	5.72	0.0	35.68	32.32	68.00	849.77	12898.77	711640.	644625.	1356265.
630706	37.90	5.71	0.0	35.68	32.32	68.00	849.72	12862.96	711277.	644295.	1355572.
630707	37.90	5.70	0.0	35.68	32.32	68.00	849.67	12827.16	710913.	643966.	1354879.
630708	37.90	5.68	0.0	35.68	32.32	68.00	849.62	12791.38	710549.	643636.	1354185.
630709	37.90	5.67	0.0	35.68	32.32	68.00	849.58	12755.61	710257.	643372.	1353629.
630710	37.90	5.66	0.0	35.68	32.32	68.00	849.53	12719.85	709894.	643043.	1352937.
630711	37.90	5.64	0.0	35.68	32.32	68.00	849.48	12684.11	709530.	642713.	1352243.
630712	37.90	5.63	0.0	35.68	32.32	68.00	849.43	12648.37	709166.	642383.	1351549.
630713	37.90	5.62	0.0	35.68	32.32	68.00	849.38	12612.66	708802.	642054.	1350856.
630714	37.90	5.61	0.0	35.68	32.32	68.00	849.33	12576.95	708438.	641724.	1350162.
630715	37.90	5.59	0.0	35.68	32.32	68.00	849.29	12541.25	708147.	641460.	1349607.
630716	37.90	5.58	0.0	35.68	32.32	68.00	849.24	12505.57	707783.	641131.	1348914.
630717	37.90	5.57	0.0	35.68	32.32	68.00	849.19	12469.91	707419.	640801.	1348220.
630718	37.90	5.55	0.0	35.68	32.32	68.00	849.14	12434.25	707055.	640471.	1347526.
630719	37.90	5.54	0.0	35.68	32.32	68.00	849.09	12398.61	706691.	640142.	1346833.
630720	37.90	5.53	0.0	35.68	32.32	68.00	849.04	12362.98	706327.	639812.	1346139.
630721	37.90	5.52	0.0	35.68	32.32	68.00	848.99	12327.36	705963.	639482.	1345445.
630722	37.90	5.50	0.0	35.68	32.32	68.00	848.94	12291.75	705599.	639153.	1344752.
630723	37.90	5.49	0.0	35.68	32.32	68.00	848.89	12256.16	705235.	638823.	1344058.
630724	37.90	5.48	0.0	35.68	32.32	68.00	848.84	12220.59	704871.	638493.	1343364.
630725	37.90	5.47	0.0	35.68	32.32	68.00	848.79	12185.02	704507.	638164.	1342671.
630726	37.90	5.45	0.0	35.68	32.32	68.00	848.74	12149.47	704143.	637834.	1341977.
630727	37.90	5.44	0.0	35.68	32.32	68.00	848.69	12113.93	703779.	637504.	1341283.
630728	37.90	5.43	0.0	35.68	32.32	68.00	848.64	12078.40	703416.	637175.	1340591.
630729	37.90	5.41	0.0	35.68	32.32	68.00	848.59	12042.89	703052.	636845.	1339897.
630730	37.90	5.40	0.0	35.68	32.32	68.00	848.54	12007.39	702688.	636515.	1339203.
630731	37.90	5.39	0.0	35.68	32.32	68.00	848.49	11971.90	702324.	636186.	1338510.
630700	1174.90	172.99	0.0	1106.08	1001.92	2108.00	26326.17	387688.67	21939303.	19873269.	41812572.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
630801	13.16	4.95	0.0	35.68	21.92	57.60	848.41	11922.51	701741.	431115.	1132856.
630802	13.16	4.93	0.0	35.68	21.92	57.60	848.34	11873.14	701232.	430802.	1132034.
630803	13.16	4.91	0.0	35.68	21.92	57.60	848.27	11823.78	700722.	430489.	1131211.
630804	13.16	4.90	0.0	35.68	21.92	57.60	848.20	11774.44	700213.	430176.	1130389.
630805	13.16	4.88	0.0	35.68	21.92	57.60	848.12	11725.11	699631.	429818.	1129449.
630806	13.16	4.86	0.0	35.68	21.92	57.60	848.05	11675.81	699121.	429505.	1128626.
630807	13.16	4.85	0.0	35.68	21.92	57.60	847.98	11626.52	698612.	429192.	1127804.
630808	13.16	4.83	0.0	35.68	21.92	57.60	847.91	11577.25	698102.	428879.	1126981.
630809	13.16	4.81	0.0	35.68	21.92	57.60	847.83	11527.99	697520.	428521.	1126041.
630810	13.16	4.80	0.0	35.68	21.92	57.60	847.76	11478.75	697010.	428208.	1125218.
630811	13.16	4.78	0.0	35.68	21.92	57.60	847.68	11429.53	696428.	427850.	1124278.
630812	13.16	4.76	0.0	35.68	21.92	57.60	847.61	11380.32	695918.	427537.	1123455.
630813	13.16	4.74	0.0	35.68	21.92	57.60	847.53	11331.14	695336.	427180.	1122516.
630814	13.16	4.73	0.0	35.68	21.92	57.60	847.46	11281.96	694827.	426867.	1121694.
630815	13.16	4.71	0.0	35.68	21.92	57.60	847.38	11232.81	694244.	426509.	1120753.
630816	13.16	4.69	0.0	35.68	21.92	57.60	847.31	11183.68	693735.	426196.	1119931.
630817	13.16	4.68	0.0	35.68	21.92	57.60	847.23	11134.55	693153.	425838.	1118991.
630818	13.16	4.66	0.0	35.68	21.92	57.60	847.15	11085.45	692570.	425480.	1118050.
630819	13.16	4.64	0.0	35.68	21.92	57.60	847.08	11036.37	692061.	425167.	1117228.
630820	13.16	4.62	0.0	35.68	21.92	57.60	847.00	10987.30	691478.	424810.	1116288.
630821	13.16	4.61	0.0	35.68	21.92	57.60	846.92	10938.25	690896.	424452.	1115348.
630822	13.16	4.59	0.0	35.68	21.92	57.60	846.84	10889.22	690314.	424094.	1114408.
630823	13.16	4.57	0.0	35.68	21.92	57.60	846.77	10840.21	689804.	423781.	1113585.
630824	13.16	4.55	0.0	35.68	21.92	57.60	846.69	10791.21	689222.	423423.	1112645.
630825	13.16	4.54	0.0	35.68	21.92	57.60	846.61	10742.23	688640.	423066.	1111706.
630826	13.16	4.52	0.0	35.68	21.92	57.60	846.53	10693.27	688057.	422708.	1110766.
630827	13.16	4.50	0.0	35.68	21.92	57.60	846.45	10644.32	687475.	422350.	1109825.
630828	13.16	4.48	0.0	35.68	21.92	57.60	846.37	10595.40	686893.	421992.	1108885.
630829	13.16	4.47	0.0	35.68	21.92	57.60	846.29	10546.49	686311.	421635.	1107946.
630830	13.16	4.45	0.0	35.68	21.92	57.60	846.21	10497.59	685728.	421277.	1107005.
630831	13.16	4.43	0.0	35.68	21.92	57.60	846.13	10448.72	685146.	420919.	1106065.
630800	407.96	145.44	0.0	1106.08	679.52	1785.60	26266.11	346715.32	21502140.	13209836.	34711976.
630901	13.14	2.48	0.0	35.68	0.0	35.68	846.09	10423.71	684855.	0.0	684855.
630902	13.14	2.47	0.0	35.68	0.0	35.68	846.05	10398.70	684564.	0.0	684564.
630903	13.14	2.47	0.0	35.68	0.0	35.68	846.01	10373.70	684272.	0.0	684272.
630904	13.14	2.46	0.0	35.68	0.0	35.68	845.97	10348.70	683981.	0.0	683981.
630905	13.14	2.46	0.0	35.68	0.0	35.68	845.92	10323.71	683617.	0.0	683617.
630906	13.14	2.45	0.0	35.68	0.0	35.68	845.88	10298.73	683326.	0.0	683326.
630907	13.14	2.45	0.0	35.68	0.0	35.68	845.84	10273.75	683035.	0.0	683035.
630908	13.14	2.44	0.0	35.68	0.0	35.68	845.80	10248.77	682744.	0.0	682744.
630909	13.14	2.44	0.0	35.68	0.0	35.68	845.76	10223.80	682453.	0.0	682453.
630910	13.14	2.43	0.0	35.68	0.0	35.68	845.72	10198.83	682162.	0.0	682162.
630911	13.14	2.42	0.0	35.68	0.0	35.68	845.67	10173.87	681798.	0.0	681798.
630912	13.14	2.42	0.0	35.68	0.0	35.68	845.63	10148.92	681507.	0.0	681507.
630913	13.14	2.41	0.0	35.68	0.0	35.68	845.59	10123.96	681215.	0.0	681215.
630914	13.14	2.41	0.0	35.68	0.0	35.68	845.55	10099.02	680924.	0.0	680924.
630915	13.14	2.40	0.0	35.68	0.0	35.68	845.50	10074.08	680560.	0.0	680560.
630916	13.14	2.40	0.0	35.68	0.0	35.68	845.46	10049.14	680269.	0.0	680269.
630917	13.14	2.39	0.0	35.68	0.0	35.68	845.42	10024.21	679978.	0.0	679978.
630918	13.14	2.39	0.0	35.68	0.0	35.68	845.38	9999.29	679687.	0.0	679687.
630919	13.14	2.38	0.0	35.68	0.0	35.68	845.33	9974.37	679396.	0.0	679396.
630920	13.14	2.38	0.0	35.68	0.0	35.68	845.29	9949.46	679032.	0.0	679032.
630921	13.14	2.37	0.0	35.68	0.0	35.68	845.25	9924.55	678741.	0.0	678741.
630922	13.14	2.37	0.0	35.68	0.0	35.68	845.21	9899.64	678449.	0.0	678449.
630923	13.14	2.36	0.0	35.68	0.0	35.68	845.16	9874.75	678086.	0.0	678086.
630924	13.14	2.36	0.0	35.68	0.0	35.68	845.12	9849.85	677794.	0.0	677794.
630925	13.14	2.35	0.0	35.68	0.0	35.68	845.08	9824.96	677503.	0.0	677503.
630926	13.14	2.35	0.0	35.68	0.0	35.68	845.03	9800.08	677139.	0.0	677139.
630927	13.14	2.34	0.0	35.68	0.0	35.68	844.99	9775.20	676848.	0.0	676848.
630928	13.14	2.34	0.0	35.68	0.0	35.68	844.95	9750.33	676557.	0.0	676557.
630929	13.14	2.33	0.0	35.68	0.0	35.68	844.91	9725.46	676266.	0.0	676266.
630930	13.14	2.33	0.0	35.68	0.0	35.68	844.86	9700.60	675902.	0.0	675902.
630900	394.20	72.05	0.0	1070.40	0.0	1070.40	25364.43	301854.14	20412660.	0.0	20412660.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.C METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
631001	11.34	1.16	0.0	35.68	0.0	35.68	844.82	9675.10	675611.	0.0	675611.
631002	11.34	1.16	0.0	35.68	0.0	35.68	844.77	9649.59	675247.	0.0	675247.
631003	11.34	1.16	0.0	35.68	0.0	35.68	844.73	9624.09	674956.	0.0	674956.
631004	11.34	1.15	0.0	35.68	0.0	35.68	844.68	9598.60	674592.	0.0	674592.
631005	11.34	1.15	0.0	35.68	0.0	35.68	844.64	9573.10	674301.	0.0	674301.
631006	11.34	1.15	0.0	35.68	0.0	35.68	844.59	9547.61	673937.	0.0	673937.
631007	11.34	1.14	0.0	35.68	0.0	35.68	844.55	9522.12	673646.	0.0	673646.
631008	11.34	1.14	0.0	35.68	0.0	35.68	844.50	9496.63	673282.	0.0	673282.
631009	11.34	1.14	0.0	35.68	0.0	35.68	844.46	9471.15	672990.	0.0	672990.
631010	11.34	1.14	0.0	35.68	0.0	35.68	844.41	9445.67	672627.	0.0	672627.
631011	11.34	1.13	0.0	35.68	0.0	35.68	844.37	9420.19	672335.	0.0	672335.
631012	11.34	1.13	0.0	35.68	0.0	35.68	844.32	9394.71	671971.	0.0	671971.
631013	11.34	1.13	0.0	35.68	0.0	35.68	844.28	9369.24	671680.	0.0	671680.
631014	11.34	1.13	0.0	35.68	0.0	35.68	844.23	9343.77	671316.	0.0	671316.
631015	11.34	1.12	0.0	35.68	0.0	35.68	844.18	9318.30	670952.	0.0	670952.
631016	11.34	1.12	0.0	35.68	0.0	35.68	844.14	9292.84	670661.	0.0	670661.
631017	11.34	1.12	0.0	35.68	0.0	35.68	844.09	9267.37	670297.	0.0	670297.
631018	11.34	1.11	0.0	35.68	0.0	35.68	844.05	9241.91	670006.	0.0	670006.
631019	11.34	1.11	0.0	35.68	0.0	35.68	844.00	9216.46	669642.	0.0	669642.
631020	11.34	1.11	0.0	35.68	0.0	35.68	843.95	9191.00	669278.	0.0	669278.
631021	11.34	1.11	0.0	35.68	0.0	35.68	843.91	9165.55	668987.	0.0	668987.
631022	11.34	1.10	0.0	35.68	0.0	35.68	843.86	9140.11	668623.	0.0	668623.
631023	11.34	1.10	0.0	35.68	0.0	35.68	843.82	9114.66	668332.	0.0	668332.
631024	11.34	1.10	0.0	35.68	0.0	35.68	843.77	9089.21	667968.	0.0	667968.
631025	11.34	1.10	0.0	35.68	0.0	35.68	843.72	9063.78	667604.	0.0	667604.
631026	11.34	1.09	0.0	35.68	0.0	35.68	843.68	9038.34	667313.	0.0	667313.
631027	11.34	1.09	0.0	35.68	0.0	35.68	843.63	9012.90	666949.	0.0	666949.
631028	11.34	1.09	0.0	35.68	0.0	35.68	843.58	8987.47	666585.	0.0	666585.
631029	11.34	1.08	0.0	35.68	0.0	35.68	843.53	8962.04	666221.	0.0	666221.
631030	11.34	1.08	0.0	35.68	0.0	35.68	843.49	8936.61	665930.	0.0	665930.
631031	11.34	1.08	0.0	35.68	0.0	35.68	843.44	8911.19	665566.	0.0	665566.
631000	351.54	34.72	0.0	1106.08	0.0	1106.08	26168.19	288081.32	20789405.	0.0	20789405.
631101	16.86	0.39	0.0	35.68	0.0	35.68	843.41	8891.98	665348.	0.0	665348.
631102	16.86	0.39	0.0	35.68	0.0	35.68	843.37	8872.77	665057.	0.0	665057.
631103	16.86	0.39	0.0	35.68	0.0	35.68	843.33	8853.56	664765.	0.0	664765.
631104	16.86	0.39	0.0	35.68	0.0	35.68	843.30	8834.35	664547.	0.0	664547.
631105	16.86	0.39	0.0	35.68	0.0	35.68	843.26	8815.14	664256.	0.0	664256.
631106	16.86	0.39	0.0	35.68	0.0	35.68	843.23	8795.93	664038.	0.0	664038.
631107	16.86	0.39	0.0	35.68	0.0	35.68	843.19	8776.73	663746.	0.0	663746.
631108	16.86	0.39	0.0	35.68	0.0	35.68	843.15	8757.52	663455.	0.0	663455.
631109	16.86	0.39	0.0	35.68	0.0	35.68	843.12	8738.32	663237.	0.0	663237.
631110	16.86	0.39	0.0	35.68	0.0	35.68	843.08	8719.11	662946.	0.0	662946.
631111	16.86	0.39	0.0	35.68	0.0	35.68	843.05	8699.91	662727.	0.0	662727.
631112	16.86	0.39	0.0	35.68	0.0	35.68	843.01	8680.71	662436.	0.0	662436.
631113	16.86	0.39	0.0	35.68	0.0	35.68	842.97	8661.50	662145.	0.0	662145.
631114	16.86	0.38	0.0	35.68	0.0	35.68	842.94	8642.30	661927.	0.0	661927.
631115	16.86	0.38	0.0	35.68	0.0	35.68	842.90	8623.10	661636.	0.0	661636.
631116	16.86	0.38	0.0	35.68	0.0	35.68	842.87	8603.90	661417.	0.0	661417.
631117	16.86	0.38	0.0	35.68	0.0	35.68	842.83	8584.70	661126.	0.0	661126.
631118	16.86	0.38	0.0	35.68	0.0	35.68	842.79	8565.51	660835.	0.0	660835.
631119	16.86	0.38	0.0	35.68	0.0	35.68	842.76	8546.31	660617.	0.0	660617.
631120	16.86	0.38	0.0	35.68	0.0	35.68	842.72	8527.11	660325.	0.0	660325.
631121	16.86	0.38	0.0	35.68	0.0	35.68	842.68	8507.91	660034.	0.0	660034.
631122	16.86	0.38	0.0	35.68	0.0	35.68	842.65	8488.72	659816.	0.0	659816.
631123	16.86	0.38	0.0	35.68	0.0	35.68	842.61	8469.53	659525.	0.0	659525.
631124	16.86	0.38	0.0	35.68	0.0	35.68	842.57	8450.33	659234.	0.0	659234.
631125	16.86	0.38	0.0	35.68	0.0	35.68	842.54	8431.14	659015.	0.0	659015.
631126	16.86	0.38	0.0	35.68	0.0	35.68	842.50	8411.95	658724.	0.0	658724.
631127	16.86	0.37	0.0	35.68	0.0	35.68	842.46	8392.76	658433.	0.0	658433.
631128	16.86	0.37	0.0	35.68	0.0	35.68	842.43	8373.57	658215.	0.0	658215.
631129	16.86	0.37	0.0	35.68	0.0	35.68	842.39	8354.38	657924.	0.0	657924.
631130	16.86	0.37	0.0	35.68	0.0	35.68	842.35	8335.19	657632.	0.0	657632.
631100	505.60	11.49	0.0	1070.40	0.0	1070.40	25286.46	258405.94	19845138.	0.0	19845138.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
631201	14.06	0.0	0.0	35.68	0.0	35.68	842.31	8313.57	657341.	0.0	657341.
631202	14.06	0.0	0.0	35.68	0.0	35.68	842.27	8291.94	657050.	0.0	657050.
631203	14.06	0.0	0.0	35.68	0.0	35.68	842.23	8270.32	656759.	0.0	656759.
631204	14.06	0.0	0.0	35.68	0.0	35.68	842.18	8248.70	656395.	0.0	656395.
631205	14.06	0.0	0.0	35.68	0.0	35.68	842.14	8227.07	656104.	0.0	656104.
631206	14.06	0.0	0.0	35.68	0.0	35.68	842.10	8205.45	655813.	0.0	655813.
631207	14.06	0.0	0.0	35.68	0.0	35.68	842.06	8183.82	655522.	0.0	655522.
631208	14.06	0.0	0.0	35.68	0.0	35.68	842.02	8162.20	655230.	0.0	655230.
631209	14.06	0.0	0.0	35.68	0.0	35.68	841.97	8140.58	654866.	0.0	654866.
631210	14.06	0.0	0.0	35.68	0.0	35.68	841.93	8118.96	654575.	0.0	654575.
631211	14.06	0.0	0.0	35.68	0.0	35.68	841.89	8097.33	654284.	0.0	654284.
631212	14.06	0.0	0.0	35.68	0.0	35.68	841.85	8075.71	653993.	0.0	653993.
631213	14.06	0.0	0.0	35.68	0.0	35.68	841.80	8054.09	653629.	0.0	653629.
631214	14.06	0.0	0.0	35.68	0.0	35.68	841.76	8032.46	653338.	0.0	653338.
631215	14.06	0.0	0.0	35.68	0.0	35.68	841.72	8010.84	653047.	0.0	653047.
631216	14.06	0.0	0.0	35.68	0.0	35.68	841.68	7989.21	652756.	0.0	652756.
631217	14.06	0.0	0.0	35.68	0.0	35.68	841.63	7967.59	652392.	0.0	652392.
631218	14.06	0.0	0.0	35.68	0.0	35.68	841.59	7945.97	652101.	0.0	652101.
631219	14.06	0.0	0.0	35.68	0.0	35.68	841.55	7924.35	651809.	0.0	651809.
631220	14.06	0.0	0.0	35.68	0.0	35.68	841.50	7902.72	651445.	0.0	651445.
631221	14.06	0.0	0.0	35.68	0.0	35.68	841.46	7881.10	651154.	0.0	651154.
631222	14.06	0.0	0.0	35.68	0.0	35.68	841.42	7859.48	650863.	0.0	650863.
631223	14.06	0.0	0.0	35.68	0.0	35.68	841.38	7837.86	650572.	0.0	650572.
631224	14.06	0.0	0.0	35.68	0.0	35.68	841.33	7816.23	650208.	0.0	650208.
631225	14.06	0.0	0.0	35.68	0.0	35.68	841.29	7794.61	649917.	0.0	649917.
631226	14.06	0.0	0.0	35.68	0.0	35.68	841.25	7772.98	649626.	0.0	649626.
631227	14.06	0.0	0.0	35.68	0.0	35.68	841.20	7751.36	649262.	0.0	649262.
631228	14.06	0.0	0.0	35.68	0.0	35.68	841.16	7729.74	648971.	0.0	648971.
631229	14.06	0.0	0.0	35.68	0.0	35.68	841.12	7708.11	648680.	0.0	648680.
631230	14.06	0.0	0.0	35.68	0.0	35.68	841.07	7686.49	648316.	0.0	648316.
631231	14.06	0.0	0.0	35.68	0.0	35.68	841.03	7664.87	648024.	0.0	648024.
631200	435.86	0.0	0.0	1106.08	0.0	1106.08	26091.89	247665.71	20234042.	0.0	20234042.
640101	12.57	0.0	0.0	35.68	0.0	35.68	840.98	7641.76	647661.	0.0	647661.
640102	12.57	0.0	0.0	35.68	0.0	35.68	840.93	7618.65	647297.	0.0	647297.
640103	12.57	0.0	0.0	35.68	0.0	35.68	840.89	7595.54	647005.	0.0	647005.
640104	12.57	0.0	0.0	35.68	0.0	35.68	840.84	7572.43	646641.	0.0	646641.
640105	12.57	0.0	0.0	35.68	0.0	35.68	840.79	7549.32	646278.	0.0	646278.
640106	12.57	0.0	0.0	35.68	0.0	35.68	840.75	7526.21	645986.	0.0	645986.
640107	12.57	0.0	0.0	35.68	0.0	35.68	840.70	7503.11	645622.	0.0	645622.
640108	12.57	0.0	0.0	35.68	0.0	35.68	840.65	7480.00	645259.	0.0	645259.
640109	12.57	0.0	0.0	35.68	0.0	35.68	840.61	7456.89	644967.	0.0	644967.
640110	12.57	0.0	0.0	35.68	0.0	35.68	840.56	7433.78	644603.	0.0	644603.
640111	12.57	0.0	0.0	35.68	0.0	35.68	840.51	7410.67	644240.	0.0	644240.
640112	12.57	0.0	0.0	35.68	0.0	35.68	840.46	7387.56	643876.	0.0	643876.
640113	12.57	0.0	0.0	35.68	0.0	35.68	840.42	7364.45	643584.	0.0	643584.
640114	12.57	0.0	0.0	35.68	0.0	35.68	840.37	7341.34	643220.	0.0	643220.
640115	12.57	0.0	0.0	35.68	0.0	35.68	840.32	7318.23	642857.	0.0	642857.
640116	12.57	0.0	0.0	35.68	0.0	35.68	840.27	7295.12	642493.	0.0	642493.
640117	12.57	0.0	0.0	35.68	0.0	35.68	840.22	7272.02	642129.	0.0	642129.
640118	12.57	0.0	0.0	35.68	0.0	35.68	840.18	7248.91	641838.	0.0	641838.
640119	12.57	0.0	0.0	35.68	0.0	35.68	840.13	7225.80	641474.	0.0	641474.
640120	12.57	0.0	0.0	35.68	0.0	35.68	840.08	7202.69	641110.	0.0	641110.
640121	12.57	0.0	0.0	35.68	0.0	35.68	840.03	7179.58	640746.	0.0	640746.
640122	12.57	0.0	0.0	35.68	0.0	35.68	839.98	7156.47	640382.	0.0	640382.
640123	12.57	0.0	0.0	35.68	0.0	35.68	839.94	7133.36	640091.	0.0	640091.
640124	12.57	0.0	0.0	35.68	0.0	35.68	839.89	7110.25	639727.	0.0	639727.
640125	12.57	0.0	0.0	35.68	0.0	35.68	839.84	7087.14	639363.	0.0	639363.
640126	12.57	0.0	0.0	35.68	0.0	35.68	839.79	7064.04	638999.	0.0	638999.
640127	12.57	0.0	0.0	35.68	0.0	35.68	839.74	7040.93	638635.	0.0	638635.
640128	12.57	0.0	0.0	35.68	0.0	35.68	839.69	7017.82	638271.	0.0	638271.
640129	12.57	0.0	0.0	35.68	0.0	35.68	839.64	6994.71	637907.	0.0	637907.
640130	12.57	0.0	0.0	35.68	0.0	35.68	839.59	6971.60	637543.	0.0	637543.
640131	12.57	0.0	0.0	35.68	0.0	35.68	839.54	6948.49	637179.	0.0	637179.
640100	389.67	0.0	0.0	1106.08	0.0	1106.08	26048.33	226148.88	19916983.	0.0	19916983.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
640201	17.84	0.0	0.0	35.68	0.0	35.68	839.50	6930.64	636888.	0.0	636888.
640202	17.84	0.0	0.0	35.68	0.0	35.68	839.46	6912.80	636597.	0.0	636597.
640203	17.84	0.0	0.0	35.68	0.0	35.68	839.42	6894.96	636306.	0.0	636306.
640204	17.84	0.0	0.0	35.68	0.0	35.68	839.38	6877.11	636015.	0.0	636015.
640205	17.84	0.0	0.0	35.68	0.0	35.68	839.34	6859.27	635723.	0.0	635723.
640206	17.84	0.0	0.0	35.68	0.0	35.68	839.30	6841.43	635432.	0.0	635432.
640207	17.84	0.0	0.0	35.68	0.0	35.68	839.26	6823.58	635141.	0.0	635141.
640208	17.84	0.0	0.0	35.68	0.0	35.68	839.72	6805.74	634850.	0.0	634850.
640209	17.84	0.0	0.0	35.68	0.0	35.68	839.18	6787.89	634559.	0.0	634559.
640210	17.84	0.0	0.0	35.68	0.0	35.68	839.15	6770.05	634340.	0.0	634340.
640211	17.84	0.0	0.0	35.68	0.0	35.68	839.11	6752.21	634049.	0.0	634049.
640212	17.84	0.0	0.0	35.68	0.0	35.68	839.07	6734.36	633758.	0.0	633758.
640213	17.84	0.0	0.0	35.68	0.0	35.68	839.03	6716.52	633467.	0.0	633467.
640214	17.84	0.0	0.0	35.68	0.0	35.68	838.98	6698.68	633103.	0.0	633103.
640215	17.84	0.0	0.0	35.68	0.0	35.68	838.94	6680.83	632812.	0.0	632812.
640216	17.84	0.0	0.0	35.68	0.0	35.68	838.90	6662.99	632521.	0.0	632521.
640217	17.84	0.0	0.0	35.68	0.0	35.68	838.86	6645.14	632230.	0.0	632230.
640218	17.84	0.0	0.0	35.68	0.0	35.68	838.82	6627.30	631938.	0.0	631938.
640219	17.84	0.0	0.0	35.68	0.0	35.68	838.78	6609.46	631647.	0.0	631647.
640220	17.84	0.0	0.0	35.68	0.0	35.68	838.74	6591.61	631356.	0.0	631356.
640221	17.84	0.0	0.0	35.68	0.0	35.68	838.70	6573.77	631065.	0.0	631065.
640222	17.84	0.0	0.0	35.68	0.0	35.68	838.66	6555.93	630774.	0.0	630774.
640223	17.84	0.0	0.0	35.68	0.0	35.68	838.62	6538.08	630483.	0.0	630483.
640224	17.84	0.0	0.0	35.68	0.0	35.68	838.58	6520.24	630192.	0.0	630192.
640225	17.84	0.0	0.0	35.68	0.0	35.68	838.54	6502.39	629900.	0.0	629900.
640226	17.84	0.0	0.0	35.68	0.0	35.68	838.49	6484.55	629536.	0.0	629536.
640227	17.84	0.0	0.0	35.68	0.0	35.68	838.45	6466.71	629245.	0.0	629245.
640228	17.84	0.0	0.0	35.68	0.0	35.68	838.41	6448.86	628954.	0.0	628954.
640229	17.84	0.0	0.0	35.68	0.0	35.68	838.37	6431.02	628663.	0.0	628663.
640200	517.36	0.0	0.0	1034.72	0.0	1034.72	24329.26	193744.12	18351544.	0.0	18351544.
640301	58.55	0.47	0.0	35.68	6.92	42.60	838.41	6446.50	628954.	121983.	750937.
640302	58.55	0.47	0.0	35.68	6.92	42.60	838.44	6461.98	629173.	122026.	751199.
640303	58.55	0.48	0.0	35.68	6.92	42.60	838.48	6477.46	629464.	122082.	751546.
640304	58.55	0.48	0.0	35.68	6.92	42.60	838.51	6492.93	629682.	122124.	751806.
640305	58.55	0.48	0.0	35.68	6.92	42.60	838.55	6508.41	629973.	122181.	752154.
640306	58.55	0.48	0.0	35.68	6.92	42.60	838.59	6523.89	630264.	122237.	752501.
640307	58.55	0.48	0.0	35.68	6.92	42.60	838.62	6539.36	630483.	122280.	752763.
640308	58.55	0.48	0.0	35.68	6.92	42.60	838.66	6554.84	630774.	122336.	753110.
640309	58.55	0.48	0.0	35.68	6.92	42.60	838.69	6570.31	630992.	122379.	753371.
640310	58.55	0.48	0.0	35.68	6.92	42.60	838.73	6585.79	631283.	122435.	753718.
640311	58.55	0.48	0.0	35.68	6.92	42.60	838.76	6601.25	631502.	122477.	753979.
640312	58.55	0.48	0.0	35.68	6.92	42.60	838.80	6616.73	631793.	122534.	754327.
640313	58.55	0.48	0.0	35.68	6.92	42.60	838.83	6632.20	632011.	122576.	754587.
640314	58.55	0.48	0.0	35.68	6.92	42.60	838.87	6647.67	632302.	122633.	754935.
640315	58.55	0.48	0.0	35.68	6.92	42.60	838.90	6663.14	632521.	122675.	755196.
640316	58.55	0.49	0.0	35.68	6.92	42.60	838.94	6678.61	632812.	122731.	755543.
640317	58.55	0.49	0.0	35.68	6.92	42.60	838.97	6694.07	633030.	122774.	755804.
640318	58.55	0.49	0.0	35.68	6.92	42.60	839.01	6709.54	633321.	122830.	756151.
640319	58.55	0.49	0.0	35.68	6.92	42.60	839.04	6725.01	633540.	122873.	756413.
640320	58.55	0.49	0.0	35.68	6.92	42.60	839.08	6740.47	633831.	122929.	756760.
640321	58.55	0.49	0.0	35.68	6.92	42.60	839.11	6755.94	634049.	122971.	757020.
640322	58.55	0.49	0.0	35.68	6.92	42.60	839.15	6771.40	634340.	123028.	757368.
640323	58.55	0.49	0.0	35.68	6.92	42.60	839.18	6786.86	634559.	123070.	757629.
640324	58.55	0.49	0.0	35.68	6.92	42.60	839.22	6802.32	634850.	123127.	757977.
640325	58.55	0.49	0.0	35.68	6.92	42.60	839.25	6817.79	635068.	123169.	758237.
640326	58.55	0.49	0.0	35.68	6.92	42.60	839.29	6833.25	635359.	123226.	758585.
640327	58.55	0.49	0.0	35.68	6.92	42.60	839.32	6848.71	635578.	123268.	758846.
640328	58.55	0.49	0.0	35.68	6.92	42.60	839.35	6864.16	635796.	123310.	759106.
640329	58.55	0.50	0.0	35.68	6.92	42.60	839.39	6879.62	636087.	123367.	759454.
640330	58.55	0.50	0.0	35.68	6.92	42.60	839.42	6895.08	636306.	123409.	759715.
640331	58.55	0.50	0.0	35.68	6.92	42.60	839.46	6910.54	636597.	123466.	760063.
640300	1815.05	15.05	0.0	1106.08	214.52	1320.60	26007.02	207035.84	19616294.	3804506.	23420800.
640000	23663.97	640.21	481.44	13058.88	7749.91	20808.79	*********	3425365.71	244887524.	151871012.	396758536.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.C METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
640401	184.14	0.94	0.0	35.68	6.92	42.60	839.76	7051.14	638780.	123889.	762669.
640402	184.14	0.96	0.0	35.68	6.92	42.60	840.06	7191.73	640964.	124313.	765277.
640403	184.14	0.97	0.0	35.68	6.92	42.60	840.35	7332.30	643075.	124722.	767797.
640404	184.14	0.99	0.0	35.68	6.92	42.60	840.64	7472.85	645186.	125131.	770317.
640405	184.14	1.01	0.0	35.68	20.31	55.99	840.90	7600.00	647078.	368374.	1015452.
640406	184.14	1.02	0.0	35.68	28.22	63.90	841.14	7719.22	648825.	513168.	1161993.
640407	184.14	1.04	0.0	35.68	28.22	63.90	841.38	7838.43	650572.	514550.	1165122.
640408	184.14	1.05	0.0	35.68	28.22	63.90	841.61	7957.62	652246.	515874.	1168120.
640409	184.14	1.07	0.0	35.68	28.22	63.90	841.85	8076.79	653993.	517256.	1171249.
640410	184.14	1.08	0.0	35.68	28.22	63.90	842.08	8195.95	655667.	518580.	1174247.
640411	184.14	1.10	0.0	35.68	28.22	63.90	842.31	8315.10	657341.	519904.	1177245.
640412	184.14	1.11	0.0	35.68	28.22	63.90	842.54	8434.23	659015.	521228.	1180243.
640413	184.14	1.13	0.0	35.68	28.22	63.90	842.77	8553.35	660689.	522552.	1183241.
640414	184.14	1.14	0.0	35.68	28.22	63.90	842.99	8672.45	662291.	523819.	1186110.
640415	184.14	1.16	0.0	35.68	28.22	63.90	843.22	8791.54	663965.	525143.	1189108.
640416	184.14	1.17	0.0	35.68	28.22	63.90	843.44	8910.61	665566.	526409.	1191975.
640417	184.14	1.18	0.0	35.68	49.52	85.20	843.62	9008.38	666876.	925553.	1592429.
640418	184.14	1.20	0.0	35.68	49.52	85.20	843.80	9106.12	668186.	927371.	1595557.
640419	184.14	1.21	0.0	35.68	49.52	85.20	843.98	9203.86	669497.	929189.	1598686.
640420	184.14	1.22	0.0	35.68	49.52	85.20	844.15	9301.58	670734.	930907.	1601641.
640421	184.14	1.23	0.0	35.68	49.52	85.20	844.33	9399.30	672044.	932725.	1604769.
640422	184.14	1.24	0.0	35.68	49.52	85.20	844.50	9497.00	673282.	934442.	1607724.
640423	184.14	1.25	0.0	35.68	49.52	85.20	844.68	9594.69	674592.	936261.	1610853.
640424	184.14	1.26	0.0	35.68	49.52	85.20	844.85	9692.37	675829.	937978.	1613807.
640425	184.14	1.28	0.0	35.68	70.82	106.50	844.98	9768.74	676775.	1343308.	2020083.
640426	184.14	1.28	21.80	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
640427	194.14	1.29	33.06	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
640428	184.14	1.29	33.06	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
640429	184.14	1.29	33.06	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
640430	184.14	1.29	33.06	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
640400	5524.70	34.45	154.04	1070.40	1395.99	2466.39	25290.93	261585.35	19877673.	26208071.	46085744.
640501	177.81	1.94	0.0	35.68	49.52	85.20	845.16	9870.66	678086.	941110.	1619196.
640502	177.81	1.96	0.0	35.68	49.52	85.20	845.31	9961.31	679177.	942625.	1621802.
640503	177.81	1.97	0.0	35.68	49.52	85.20	845.47	10051.95	680342.	944241.	1624583.
640504	177.81	1.99	0.0	35.68	49.52	85.20	845.62	10142.57	681434.	945757.	1627191.
640505	177.81	2.00	0.0	35.68	49.52	85.20	845.77	10233.17	682526.	947272.	1629798.
640506	177.81	2.02	0.0	35.68	49.52	85.20	845.92	10323.76	683617.	948787.	1632404.
640507	177.81	2.04	0.0	35.68	49.52	85.20	846.07	10414.33	684709.	950303.	1635012.
640508	177.81	2.05	0.0	35.68	49.52	85.20	846.22	10504.89	685801.	951818.	1637619.
640509	177.81	2.07	0.0	35.68	49.52	85.20	846.37	10595.43	686893.	953333.	1640226.
640510	177.81	2.08	0.0	35.68	49.52	85.20	846.52	10685.95	687985.	954849.	1642834.
640511	177.81	2.10	0.0	35.68	49.52	85.20	846.66	10776.46	689004.	956263.	1645267.
640512	177.81	2.11	0.0	35.68	49.52	85.20	846.81	10866.96	690095.	957778.	1647873.
640513	177.81	2.13	0.0	35.68	49.52	85.20	846.95	10957.44	691114.	959192.	1650306.
640514	177.81	2.14	0.0	35.68	49.52	85.20	847.09	11047.91	692133.	960607.	1652740.
640515	177.81	2.16	0.0	35.68	49.52	85.20	847.24	11138.36	693225.	962122.	1655347.
640516	177.81	2.17	0.0	35.68	49.52	85.20	847.38	11228.79	694244.	963536.	1657780.
640517	177.81	2.19	0.0	35.68	49.52	85.20	847.51	11319.21	695191.	964850.	1660041.
640518	177.81	2.20	0.0	35.68	49.52	85.20	847.65	11409.62	696210.	966264.	1662474.
640519	177.81	2.22	0.0	35.68	49.52	85.20	847.79	11500.01	697229.	967678.	1664907.
640520	177.81	2.23	0.0	35.68	49.52	85.20	847.92	11590.39	698175.	968992.	1667167.
640521	177.81	2.25	0.0	35.68	49.52	85.20	848.06	11680.75	699194.	970406.	1669600.
640522	177.81	2.26	0.0	35.68	49.52	85.20	848.19	11771.10	700140.	971719.	1671859.
640523	177.81	2.27	0.0	35.68	49.52	85.20	848.32	11861.43	701086.	973032.	1674118.
640524	177.81	2.29	0.0	35.68	49.52	85.20	848.46	11951.75	702105.	974447.	1676552.
640525	177.81	2.30	0.0	35.68	49.52	85.20	848.59	12042.06	703052.	975760.	1678812.
640526	177.81	2.32	0.0	35.68	49.52	85.20	848.71	12132.35	703925.	976972.	1680897.
640527	177.81	2.33	0.0	35.68	49.52	85.20	848.84	12222.62	704871.	978285.	1683156.
640528	177.81	2.35	0.0	35.68	49.52	85.20	848.97	12312.89	705817.	979599.	1685416.
640529	177.81	2.36	0.0	35.68	49.52	85.20	849.10	12403.13	706764.	980912.	1687676.
640530	177.81	2.37	0.0	35.68	49.52	85.20	849.22	12493.37	707637.	982124.	1689761.
640531	177.81	2.39	0.0	35.68	49.52	85.20	849.34	12583.59	708511.	983336.	1691847.
640500	5512.11	67.26	0.0	1106.08	1535.12	2641.20	26267.23	348074.22	21510292.	29853569.	51364261.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
640601	99.23	2.94	0.0	35.68	49.52	85.20	849.36	12594.68	708656.	983539.	1692195.
640602	99.23	2.94	0.0	35.68	49.52	85.20	849.37	12605.77	708729.	983640.	1692369.
640603	99.23	2.94	0.0	35.68	49.52	85.20	849.39	12616.86	708875.	983842.	1692717.
640604	99.23	2.95	0.0	35.68	49.52	85.20	849.40	12627.95	708947.	983943.	1692890.
640605	99.23	2.95	0.0	35.68	49.52	85.20	849.42	12639.03	709093.	984145.	1693238.
640606	99.23	2.95	0.0	35.68	49.52	85.20	849.43	12650.12	709166.	984246.	1693412.
640607	99.23	2.95	0.0	35.68	49.52	85.20	849.45	12661.20	709311.	984448.	1693759.
640608	99.23	2.95	0.0	35.68	49.52	85.20	849.46	12672.27	709384.	984549.	1693933.
640609	99.23	2.96	0.0	35.68	49.52	85.20	849.48	12683.35	709530.	984751.	1694281.
640610	99.23	2.96	0.0	35.68	49.52	85.20	849.49	12694.43	709602.	984852.	1694454.
640611	99.23	2.96	0.0	35.68	49.52	85.20	849.51	12705.50	709748.	985054.	1694802.
640612	99.23	2.96	0.0	35.68	49.52	85.20	849.52	12716.57	709821.	985155.	1694976.
640613	99.23	2.96	0.0	35.68	49.52	85.20	849.54	12727.64	709966.	985357.	1695323.
640614	99.23	2.97	0.0	35.68	49.52	85.20	849.55	12738.70	710039.	985458.	1695497.
640615	99.23	2.97	0.0	35.68	49.52	85.20	849.57	12749.77	710185.	985660.	1695845.
640616	99.23	2.97	0.0	35.68	49.52	85.20	849.58	12760.83	710257.	985761.	1696018.
640617	99.23	2.97	0.0	35.68	49.52	85.20	849.60	12771.89	710403.	985963.	1696366.
640618	99.23	2.97	0.0	35.68	49.52	85.20	849.61	12782.95	710476.	986064.	1696540.
640619	99.23	2.98	0.0	35.68	43.09	78.77	849.64	12800.43	710694.	858346.	1569040.
640620	99.23	2.98	0.0	35.68	35.34	71.02	849.67	12825.66	710913.	704187.	1415100.
640621	99.23	2.98	0.0	35.68	35.34	71.02	849.70	12850.89	711131.	704310.	1415441.
640622	99.23	2.99	0.0	35.68	35.32	71.00	849.74	12876.13	711422.	704305.	1415727.
640623	99.23	2.99	0.0	35.68	49.52	85.20	849.76	12887.17	711495.	987478.	1698973.
640624	99.23	3.00	0.0	35.68	28.22	63.90	849.79	12919.50	711786.	562965.	1274751.
640625	99.23	3.00	0.0	35.68	49.52	85.20	849.81	12930.53	711932.	988084.	1700016.
640626	99.23	3.00	0.0	35.68	49.52	85.20	849.82	12941.56	712004.	988185.	1700189.
640627	99.23	3.01	0.0	35.68	49.52	85.20	849.84	12952.59	712150.	988388.	1700538.
640628	99.23	3.01	0.0	35.68	49.52	85.20	849.85	12963.61	712223.	988489.	1700712.
640629	99.23	3.01	0.0	35.68	28.22	63.90	849.89	12995.93	712514.	563541.	1276055.
640630	99.23	3.02	0.0	35.68	70.82	106.50	849.88	12985.65	712441.	1414100.	2126541.
640600	2976.90	89.19	0.0	1070.40	1415.31	2485.71	25488.11	383329.16	21312893.	28178805.	49491698.
640701	19.55	5.74	0.0	35.68	32.32	68.00	849.81	12931.46	711932.	644889.	1356821.
640702	19.55	5.72	0.0	35.68	32.32	68.00	849.74	12877.29	711422.	644427.	1355849.
640703	19.55	5.70	0.0	35.68	32.32	68.00	849.67	12823.14	710913.	643966.	1354879.
640704	19.55	5.68	0.0	35.68	32.32	68.00	849.59	12769.01	710330.	643438.	1353768.
640705	19.55	5.66	0.0	35.68	32.32	68.00	849.52	12714.89	709871.	642977.	1352798.
640706	19.55	5.64	0.0	35.68	32.32	68.00	849.45	12660.80	709311.	642515.	1351826.
640707	19.55	5.62	0.0	35.68	32.32	68.00	849.37	12606.73	708729.	641988.	1350717.
640708	19.55	5.60	0.0	35.68	32.32	68.00	849.30	12552.67	708219.	641526.	1349745.
640709	19.55	5.58	0.0	35.68	32.32	68.00	849.23	12498.64	707710.	641065.	1348775.
640710	19.55	5.57	0.0	35.68	32.32	68.00	849.15	12444.62	707128.	640537.	1347665.
640711	19.55	5.55	0.0	35.68	32.32	68.00	849.08	12390.62	706618.	640076.	1346694.
640712	19.55	5.53	0.0	35.68	32.32	68.00	849.00	12336.65	706036.	639548.	1345584.
640713	19.55	5.51	0.0	35.68	32.32	68.00	848.93	12282.69	705526.	639087.	1344613.
640714	19.55	5.49	0.0	35.68	32.32	68.00	848.85	12228.75	704944.	638559.	1343503.
640715	19.55	5.47	0.0	35.68	32.32	68.00	848.78	12174.83	704435.	638098.	1342533.
640716	19.55	5.45	0.0	35.68	32.32	68.00	848.70	12120.93	703852.	637570.	1341422.
640717	19.55	5.43	0.0	35.68	32.32	68.00	849.62	12067.05	703270.	637043.	1340313.
640718	19.55	5.41	0.0	35.68	32.32	68.00	848.54	12013.20	702688.	636515.	1339203.
640719	19.55	5.39	0.0	35.68	32.32	68.00	848.47	11959.36	702178.	636054.	1338232.
640720	19.55	5.37	0.0	35.68	32.32	68.00	848.39	11905.54	701596.	635526.	1337122.
640721	19.55	5.35	0.0	35.68	32.32	68.00	848.31	11851.73	701014.	634999.	1336013.
640722	19.55	5.33	0.0	35.68	32.32	68.00	848.23	11797.95	700431.	634471.	1334902.
640723	19.55	5.31	0.0	35.68	32.32	68.00	848.15	11744.19	699849.	633944.	1333793.
640724	19.55	5.29	0.0	35.68	32.32	68.00	848.07	11690.45	699267.	633416.	1332683.
640725	19.55	5.27	0.0	35.68	32.32	68.00	847.99	11636.73	698684.	632889.	1331573.
640726	19.55	5.25	0.0	35.68	32.32	68.00	847.91	11583.03	698102.	632361.	1330463.
640727	19.55	5.23	0.0	35.68	32.32	68.00	847.83	11529.35	697520.	631834.	1329354.
640728	19.55	5.21	0.0	35.68	32.32	68.00	847.75	11475.69	696937.	631307.	1328244.
640729	19.55	5.19	0.0	35.68	32.32	68.00	847.67	11422.05	696355.	630779.	1327134.
640730	19.55	5.17	0.0	35.68	32.32	68.00	847.59	11368.43	695773.	630252.	1326025.
640731	19.55	5.15	0.0	35.68	32.32	68.00	847.51	11314.84	695191.	629724.	1324915.
640700	606.05	168.86	0.0	1106.08	1001.92	2108.00	26309.20	375773.32	21815781.	19761380.	41577161.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
640801	9.23	4.72	0.0	35.68	21.92	57.60	847.43	11261.75	694608.	426732.	1121340.
640802	9.23	4.70	0.0	35.68	21.92	57.60	847.34	11208.68	693953.	426330.	1120283.
640803	9.23	4.69	0.0	35.68	21.92	57.60	847.26	11155.62	693371.	425972.	1119343.
640804	9.23	4.67	0.0	35.68	21.92	57.60	847.18	11102.59	692789.	425615.	1118404.
640805	9.23	4.65	0.0	35.68	21.92	57.60	847.10	11049.58	692206.	425257.	1117463.
640806	9.23	4.63	0.0	35.68	21.92	57.60	847.01	10996.58	691551.	424854.	1116405.
640807	9.23	4.61	0.0	35.68	21.92	57.60	846.93	10943.61	690969.	424497.	1115466.
640808	9.23	4.59	0.0	35.68	21.92	57.60	846.85	10890.65	690387.	424139.	1114526.
640809	9.23	4.57	0.0	35.68	21.92	57.60	846.76	10837.71	689732.	423736.	1113468.
640810	9.23	4.55	0.0	35.68	21.92	57.60	846.68	10784.79	689149.	423379.	1112528.
640811	9.23	4.53	0.0	35.68	21.92	57.60	846.59	10731.89	688494.	422976.	1111470.
640812	9.23	4.52	0.0	35.68	21.92	57.60	846.51	10679.00	687912.	422618.	1110530.
640813	9.23	4.50	0.0	35.68	21.92	57.60	846.42	10626.14	687257.	422216.	1109473.
640814	9.23	4.48	0.0	35.68	21.92	57.60	846.34	10573.30	686674.	421858.	1108532.
640815	9.23	4.46	0.0	35.68	21.92	57.60	846.25	10520.47	686019.	421456.	1107475.
640816	9.23	4.44	0.0	35.68	21.92	57.60	846.16	10467.67	685364.	421053.	1106417.
640817	9.23	4.42	0.0	35.68	21.92	57.60	846.08	10414.88	684782.	420696.	1105478.
640818	9.23	4.40	0.0	35.68	21.92	57.60	845.99	10362.11	684127.	420293.	1104420.
640819	9.23	4.38	0.0	35.68	21.92	57.60	845.90	10309.37	683472.	419891.	1103363.
640820	9.23	4.36	0.0	35.68	21.92	57.60	845.81	10256.64	682817.	419488.	1102305.
640821	9.23	4.34	0.0	35.68	21.92	57.60	845.72	10203.93	682162.	419086.	1101248.
640822	9.23	4.32	0.0	35.68	21.92	57.60	845.64	10151.23	681579.	418728.	1100307.
640823	9.23	4.30	0.0	35.68	21.92	57.60	845.55	10098.56	680924.	418326.	1099250.
640824	9.23	4.28	0.0	35.68	21.92	57.60	845.46	10045.91	680269.	417923.	1098192.
640825	9.23	4.27	0.0	35.68	21.92	57.60	845.37	9993.28	679614.	417521.	1097135.
640826	9.23	4.25	0.0	35.68	21.92	57.60	845.28	9940.67	678959.	417118.	1096077.
640827	9.23	4.23	0.0	35.68	21.92	57.60	845.19	9888.07	678304.	416716.	1095020.
640828	9.23	4.21	0.0	35.68	21.92	57.60	845.10	9835.50	677649.	416313.	1093962.
640829	9.23	4.19	0.0	35.68	21.92	57.60	845.01	9782.95	676994.	415911.	1092905.
640830	9.23	4.17	0.0	35.68	21.92	57.60	844.91	9730.41	676266.	415464.	1091730.
640831	9.23	4.15	0.0	35.68	21.92	57.60	844.82	9677.89	675611.	415061.	1090672.
640800	286.13	137.58	0.0	1106.08	679.52	1785.60	26230.64	324521.44	21243964.	13051223.	34295187.
640901	10.52	2.32	0.0	35.68	0.0	35.68	844.77	9650.42	675247.	0.0	675247.
640902	10.52	2.31	0.0	35.68	0.0	35.68	844.73	9622.96	674956.	0.0	674956.
640903	10.52	2.31	0.0	35.68	0.0	35.68	844.68	9595.50	674592.	0.0	674592.
640904	10.52	2.30	0.0	35.68	0.0	35.68	844.63	9568.04	674228.	0.0	674228.
640905	10.52	2.29	0.0	35.68	0.0	35.68	844.58	9540.59	673864.	0.0	673864.
640906	10.52	2.29	0.0	35.68	0.0	35.68	844.53	9513.15	673500.	0.0	673500.
640907	10.52	2.28	0.0	35.68	0.0	35.68	844.48	9485.71	673136.	0.0	673136.
640908	10.52	2.28	0.0	35.68	0.0	35.68	844.43	9458.28	672772.	0.0	672772.
640909	10.52	2.27	0.0	35.68	0.0	35.68	844.39	9430.86	672481.	0.0	672481.
640910	10.52	2.26	0.0	35.68	0.0	35.68	844.34	9403.44	672117.	0.0	672117.
640911	10.52	2.26	0.0	35.68	0.0	35.68	844.29	9376.02	671753.	0.0	671753.
640912	10.52	2.25	0.0	35.68	0.0	35.68	844.24	9348.62	671389.	0.0	671389.
640913	10.52	2.25	0.0	35.68	0.0	35.68	844.19	9321.21	671025.	0.0	671025.
640914	10.52	2.24	0.0	35.68	0.0	35.68	844.14	9293.82	670661.	0.0	670661.
640915	10.52	2.24	0.0	35.68	0.0	35.68	844.09	9266.43	670297.	0.0	670297.
640916	10.52	2.23	0.0	35.68	0.0	35.68	844.04	9239.04	669933.	0.0	669933.
640917	10.52	2.22	0.0	35.68	0.0	35.68	843.99	9211.66	669569.	0.0	669569.
640918	10.52	2.22	0.0	35.68	0.0	35.68	843.94	9184.29	669206.	0.0	669206.
640919	10.52	2.21	0.0	35.68	0.0	35.68	843.89	9156.93	668842.	0.0	668842.
640920	10.52	2.21	0.0	35.68	0.0	35.68	843.84	9129.56	668478.	0.0	668478.
640921	10.52	2.20	0.0	35.68	0.0	35.68	843.79	9102.21	668114.	0.0	668114.
640922	10.52	2.19	0.0	35.68	0.0	35.68	843.74	9074.86	667750.	0.0	667750.
640923	10.52	2.19	0.0	35.68	0.0	35.68	843.69	9047.52	667386.	0.0	667386.
640924	10.52	2.18	0.0	35.68	0.0	35.68	843.64	9020.18	667022.	0.0	667022.
640925	10.52	2.18	0.0	35.68	0.0	35.68	843.59	8992.85	666658.	0.0	666658.
640926	10.52	2.17	0.0	35.68	0.0	35.68	843.54	8965.52	666294.	0.0	666294.
640927	10.52	2.16	0.0	35.68	0.0	35.68	843.49	8938.20	665930.	0.0	665930.
640928	10.52	2.16	0.0	35.68	0.0	35.68	843.44	8910.89	665566.	0.0	665566.
640929	10.52	2.15	0.0	35.68	0.0	35.68	843.39	8883.58	665202.	0.0	665202.
640930	10.52	2.15	0.0	35.68	0.0	35.68	843.34	8856.28	664838.	0.0	664838.
640900	315.60	66.97	0.0	1070.40	0.0	1070.40	25321.86	277588.62	20102806.	0.0	20102806.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
641001	10.63	1.07	0.0	35.68	0.0	35.68	843.29	8830.16	664474.	0.0	664474.
641002	10.63	1.07	0.0	35.68	0.0	35.68	843.24	8804.04	664110.	0.0	664110.
641003	10.63	1.06	0.0	35.68	0.0	35.68	843.19	8777.93	663746.	0.0	663746.
641004	10.63	1.06	0.0	35.68	0.0	35.68	843.14	8751.81	663383.	0.0	663383.
641005	10.63	1.06	0.0	35.68	0.0	35.68	843.09	8725.70	663019.	0.0	663019.
641006	10.63	1.06	0.0	35.68	0.0	35.68	843.05	8699.60	662727.	0.0	662727.
641007	10.63	1.05	0.0	35.68	0.0	35.68	843.00	8673.49	662364.	0.0	662364.
641008	10.63	1.05	0.0	35.68	0.0	35.68	842.95	8647.39	662000.	0.0	662000.
641009	10.63	1.05	0.0	35.68	0.0	35.68	842.90	8621.29	661636.	0.0	661636.
641010	10.63	1.04	0.0	35.68	0.0	35.68	842.85	8595.20	661272.	0.0	661272.
641011	10.63	1.04	0.0	35.68	0.0	35.68	842.80	8569.11	660908.	0.0	660908.
641012	10.63	1.04	0.0	35.68	0.0	35.68	842.75	8543.02	660544.	0.0	660544.
641013	10.63	1.04	0.0	35.68	0.0	35.68	842.70	8516.93	660180.	0.0	660180.
641014	10.63	1.03	0.0	35.68	0.0	35.68	842.65	8490.85	659816.	0.0	659816.
641015	10.63	1.03	0.0	35.68	0.0	35.68	842.60	8464.77	659452.	0.0	659452.
641016	10.63	1.03	0.0	35.68	0.0	35.68	842.55	8438.69	659088.	0.0	659088.
641017	10.63	1.02	0.0	35.68	0.0	35.68	842.50	8412.61	658724.	0.0	658724.
641018	10.63	1.02	0.0	35.68	0.0	35.68	842.45	8386.54	658360.	0.0	658360.
641019	10.63	1.02	0.0	35.68	0.0	35.68	842.40	8360.47	657996.	0.0	657996.
641020	10.63	1.02	0.0	35.68	0.0	35.68	842.35	8334.41	657632.	0.0	657632.
641021	10.63	1.01	0.0	35.68	0.0	35.68	842.30	8308.34	657268.	0.0	657268.
641022	10.63	1.01	0.0	35.68	0.0	35.68	842.25	8282.28	656904.	0.0	656904.
641023	10.63	1.01	0.0	35.68	0.0	35.68	842.20	8256.22	656541.	0.0	656541.
641024	10.63	1.00	0.0	35.68	0.0	35.68	842.15	8230.17	656177.	0.0	656177.
641025	10.63	1.00	0.0	35.68	0.0	35.68	842.10	8204.12	655813.	0.0	655813.
641026	10.63	1.00	0.0	35.68	0.0	35.68	842.05	8178.07	655449.	0.0	655449.
641027	10.63	1.00	0.0	35.68	0.0	35.68	842.00	8152.02	655085.	0.0	655085.
641028	10.63	0.99	0.0	35.68	0.0	35.68	841.94	8125.98	654648.	0.0	654648.
641029	10.63	0.99	0.0	35.68	0.0	35.68	841.89	8099.94	654284.	0.0	654284.
641030	10.63	0.99	0.0	35.68	0.0	35.68	841.84	8073.90	653920.	0.0	653920.
641031	10.63	0.98	0.0	35.68	0.0	35.68	841.79	8047.87	653556.	0.0	653556.
641000	329.53	31.84	0.0	1106.08	0.0	1106.08	26118.96	261602.92	20431076.	0.0	20431076.
641101	13.67	0.36	0.0	35.68	0.0	35.68	841.75	8025.50	653265.	0.0	653265.
641102	13.67	0.36	0.0	35.68	0.0	35.68	841.70	8003.13	652901.	0.0	652901.
641103	13.67	0.36	0.0	35.68	0.0	35.68	841.66	7980.76	652610.	0.0	652610.
641104	13.67	0.36	0.0	35.68	0.0	35.68	841.62	7958.39	652319.	0.0	652319.
641105	13.67	0.36	0.0	35.68	0.0	35.68	841.57	7936.02	651955.	0.0	651955.
641106	13.67	0.35	0.0	35.68	0.0	35.68	841.53	7913.66	651664.	0.0	651664.
641107	13.67	0.35	0.0	35.68	0.0	35.68	841.48	7891.29	651300.	0.0	651300.
641108	13.67	0.35	0.0	35.68	0.0	35.68	841.44	7868.93	651009.	0.0	651009.
641109	13.67	0.35	0.0	35.68	0.0	35.68	841.39	7846.57	650645.	0.0	650645.
641110	13.67	0.35	0.0	35.68	0.0	35.68	841.35	7824.20	650354.	0.0	650354.
641111	13.67	0.35	0.0	35.68	0.0	35.68	841.30	7801.84	649990.	0.0	649990.
641112	13.67	0.35	0.0	35.68	0.0	35.68	841.26	7779.48	649699.	0.0	649699.
641113	13.67	0.35	0.0	35.68	0.0	35.68	841.21	7757.12	649335.	0.0	649335.
641114	13.67	0.35	0.0	35.68	0.0	35.68	841.17	7734.76	649043.	0.0	649043.
641115	13.67	0.35	0.0	35.68	0.0	35.68	841.12	7712.41	648680.	0.0	648680.
641116	13.67	0.35	0.0	35.68	0.0	35.68	841.08	7690.05	648388.	0.0	648388.
641117	13.67	0.34	0.0	35.68	0.0	35.68	841.03	7667.69	648024.	0.0	648024.
641118	13.67	0.34	0.0	35.68	0.0	35.68	840.99	7645.34	647733.	0.0	647733.
641119	13.67	0.34	0.0	35.68	0.0	35.68	840.94	7622.98	647369.	0.0	647369.
641120	13.67	0.34	0.0	35.68	0.0	35.68	840.90	7600.63	647078.	0.0	647078.
641121	13.67	0.34	0.0	35.68	0.0	35.68	840.85	7578.28	646714.	0.0	646714.
641122	13.67	0.34	0.0	35.68	0.0	35.68	840.81	7555.93	646423.	0.0	646423.
641123	13.67	0.34	0.0	35.68	0.0	35.68	840.76	7533.58	646059.	0.0	646059.
641124	13.67	0.34	0.0	35.68	0.0	35.68	840.72	7511.23	645768.	0.0	645768.
641125	13.67	0.34	0.0	35.68	0.0	35.68	840.67	7488.88	645404.	0.0	645404.
641126	13.67	0.34	0.0	35.68	0.0	35.68	840.63	7466.53	645113.	0.0	645113.
641127	13.67	0.34	0.0	35.68	0.0	35.68	840.58	7444.19	644749.	0.0	644749.
641128	13.67	0.33	0.0	35.68	0.0	35.68	840.53	7421.84	644385.	0.0	644385.
641129	13.67	0.33	0.0	35.68	0.0	35.68	840.49	7399.50	644094.	0.0	644094.
641130	13.67	0.33	0.0	35.68	0.0	35.68	840.44	7377.15	643730.	0.0	643730.
641100	410.10	10.38	0.0	1070.40	0.0	1070.40	25232.97	231037.86	19455800.	0.0	19455800.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
641201	17.57	0.0	0.0	35.68	0.0	35.68	840.40	7359.04	643439.	0.0	643439.
641202	17.57	0.0	0.0	35.68	0.0	35.68	840.37	7340.93	643220.	0.0	643220.
641203	17.57	0.0	0.0	35.68	0.0	35.68	840.33	7322.82	642929.	0.0	642929.
641204	17.57	0.0	0.0	35.68	0.0	35.68	840.29	7304.71	642638.	0.0	642638.
641205	17.57	0.0	0.0	35.68	0.0	35.68	840.25	7286.61	642347.	0.0	642347.
641206	17.57	0.0	0.0	35.68	0.0	35.68	840.22	7268.50	642129.	0.0	642129.
641207	17.57	0.0	0.0	35.68	0.0	35.68	840.18	7250.39	641838.	0.0	641838.
641208	17.57	0.0	0.0	35.68	0.0	35.68	840.14	7232.28	641546.	0.0	641546.
641209	17.57	0.0	0.0	35.68	0.0	35.68	840.10	7214.16	641255.	0.0	641255.
641210	17.57	0.0	0.0	35.68	0.0	35.68	840.07	7196.05	641037.	0.0	641037.
641211	17.57	0.0	0.0	35.68	0.0	35.68	840.03	7177.95	640746.	0.0	640746.
641212	17.57	0.0	0.0	35.68	0.0	35.68	839.99	7159.84	640455.	0.0	640455.
641213	17.57	0.0	0.0	35.68	0.0	35.68	839.95	7141.73	640163.	0.0	640163.
641214	17.57	0.0	0.0	35.68	0.0	35.68	839.91	7123.62	639872.	0.0	639872.
641215	17.57	0.0	0.0	35.68	0.0	35.68	839.88	7105.51	639654.	0.0	639654.
641216	17.57	0.0	0.0	35.68	0.0	35.68	839.84	7087.40	639363.	0.0	639363.
641217	17.57	0.0	0.0	35.68	0.0	35.68	839.80	7069.29	639072.	0.0	639072.
641218	17.57	0.0	0.0	35.68	0.0	35.68	839.76	7051.18	638780.	0.0	638780.
641219	17.57	0.0	0.0	35.68	0.0	35.68	839.72	7033.07	638489.	0.0	638489.
641220	17.57	0.0	0.0	35.68	0.0	35.68	839.68	7014.96	638198.	0.0	638198.
641221	17.57	0.0	0.0	35.68	0.0	35.68	839.64	6996.85	637907.	0.0	637907.
641222	17.57	0.0	0.0	35.68	0.0	35.68	839.60	6978.74	637616.	0.0	637616.
641223	17.57	0.0	0.0	35.68	0.0	35.68	839.57	6960.63	637398.	0.0	637398.
641224	17.57	0.0	0.0	35.68	0.0	35.68	839.53	6942.52	637106.	0.0	637106.
641225	17.57	0.0	0.0	35.68	0.0	35.68	839.49	6924.41	636815.	0.0	636815.
641226	17.57	0.0	0.0	35.68	0.0	35.68	839.45	6906.30	636524.	0.0	636524.
641227	17.57	0.0	0.0	35.68	0.0	35.68	839.41	6888.19	636233.	0.0	636233.
641228	17.57	0.0	0.0	35.68	0.0	35.68	839.37	6870.08	635942.	0.0	635942.
641229	17.57	0.0	0.0	35.68	0.0	35.68	839.33	6851.97	635651.	0.0	635651.
641230	17.57	0.0	0.0	35.68	0.0	35.68	839.29	6833.86	635359.	0.0	635359.
641231	17.57	0.0	0.0	35.68	0.0	35.68	839.25	6815.75	635068.	0.0	635068.
641200	544.67	0.0	0.0	1106.08	0.0	1106.08	26034.84	219709.34	19818789.	0.0	19818789.
650101	15.39	0.0	0.0	35.68	0.0	35.68	839.20	6795.46	634704.	0.0	634704.
650102	15.39	0.0	0.0	35.68	0.0	35.68	839.16	6775.16	634413.	0.0	634413.
650103	15.39	0.0	0.0	35.68	0.0	35.68	839.11	6754.87	634049.	0.0	634049.
650104	15.39	0.0	0.0	35.68	0.0	35.68	839.07	6734.58	633758.	0.0	633758.
650105	15.39	0.0	0.0	35.68	0.0	35.68	839.02	6714.29	633394.	0.0	633394.
650106	15.39	0.0	0.0	35.68	0.0	35.68	838.97	6693.99	633030.	0.0	633030.
650107	15.39	0.0	0.0	35.68	0.0	35.68	838.93	6673.70	632739.	0.0	632739.
650108	15.39	0.0	0.0	35.68	0.0	35.68	838.88	6653.40	632375.	0.0	632375.
650109	15.39	0.0	0.0	35.68	0.0	35.68	838.84	6633.11	632084.	0.0	632084.
650110	15.39	0.0	0.0	35.68	0.0	35.68	838.79	6612.81	631720.	0.0	631720.
650111	15.39	0.0	0.0	35.68	0.0	35.68	838.74	6592.52	631356.	0.0	631356.
650112	15.39	0.0	0.0	35.68	0.0	35.68	838.70	6572.23	631065.	0.0	631065.
650113	15.39	0.0	0.0	35.68	0.0	35.68	838.65	6551.93	630701.	0.0	630701.
650114	15.39	0.0	0.0	35.68	0.0	35.68	838.60	6531.64	630337.	0.0	630337.
650115	15.39	0.0	0.0	35.68	0.0	35.68	838.56	6511.34	630046.	0.0	630046.
650116	15.39	0.0	0.0	35.68	0.0	35.68	838.51	6491.05	629682.	0.0	629682.
650117	15.39	0.0	0.0	35.68	0.0	35.68	838.46	6470.76	629318.	0.0	629318.
650118	15.39	0.0	0.0	35.68	0.0	35.68	838.41	6450.46	628954.	0.0	628954.
650119	15.39	0.0	0.0	35.68	0.0	35.68	838.37	6430.17	628663.	0.0	628663.
650120	15.39	0.0	0.0	35.68	0.0	35.68	838.32	6409.87	628299.	0.0	628299.
650121	15.39	0.0	0.0	35.68	0.0	35.68	838.27	6389.58	627935.	0.0	627935.
650122	15.39	0.0	0.0	35.68	0.0	35.68	838.22	6369.29	627571.	0.0	627571.
650123	15.39	0.0	0.0	35.68	0.0	35.68	838.18	6348.99	627280.	0.0	627280.
650124	15.39	0.0	0.0	35.68	0.0	35.68	838.13	6328.70	626916.	0.0	626916.
650125	15.39	0.0	0.0	35.68	0.0	35.68	838.08	6308.41	626552.	0.0	626552.
650126	15.39	0.0	0.0	35.68	0.0	35.68	838.03	6288.11	626188.	0.0	626188.
650127	15.39	0.0	0.0	35.68	0.0	35.68	837.98	6267.82	625824.	0.0	625824.
650128	15.39	0.0	0.0	35.68	0.0	35.68	837.93	6247.52	625460.	0.0	625460.
650129	15.39	0.0	0.0	35.68	0.0	35.68	837.88	6727.23	625096.	0.0	625096.
650130	15.39	0.0	0.0	35.68	0.0	35.68	837.84	6206.94	624805.	0.0	624805.
650131	15.39	0.0	0.0	35.68	0.0	35.68	837.79	6186.64	624441.	0.0	624441.
650100	477.09	0.0	0.0	1106.08	0.0	1106.08	25993.62	201222.58	19518755.	0.0	19518755.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
650201	14.90	0.0	0.0	35.68	0.0	35.68	837.74	6165.86	624077.	0.0	624077.
650202	14.90	0.0	0.0	35.68	0.0	35.68	837.69	6145.09	623714.	0.0	623714.
650203	14.90	0.0	0.0	35.68	0.0	35.68	837.63	6124.31	623277.	0.0	623277.
650204	14.90	0.0	0.0	35.68	0.0	35.68	837.58	6103.53	622913.	0.0	622913.
650205	14.90	0.0	0.0	35.68	0.0	35.68	837.53	6082.75	622549.	0.0	622549.
650206	14.90	0.0	0.0	35.68	0.0	35.68	837.48	6061.97	622185.	0.0	622185.
650207	14.90	0.0	0.0	35.68	0.0	35.68	837.43	6041.20	621821.	0.0	621821.
650208	14.90	0.0	0.0	35.68	0.0	35.68	837.38	6020.42	621457.	0.0	621457.
650209	14.90	0.0	0.0	35.68	0.0	35.68	837.33	5999.64	621093.	0.0	621093.
650210	14.90	0.0	0.0	35.68	0.0	35.68	837.28	5978.86	620729.	0.0	620729.
650211	14.90	0.0	0.0	35.68	0.0	35.68	837.22	5958.08	620293.	0.0	620293.
650212	14.90	0.0	0.0	35.68	0.0	35.68	837.17	5937.30	619929.	0.0	619929.
650213	14.90	0.0	0.0	35.68	0.0	35.68	837.12	5916.53	619565.	0.0	619565.
650214	14.90	0.0	0.0	35.68	0.0	35.68	837.07	5895.75	619201.	0.0	619201.
650215	14.90	0.0	0.0	35.68	0.0	35.68	837.01	5874.97	618764.	0.0	618764.
650216	14.90	0.0	0.0	35.68	0.0	35.68	836.96	5854.19	618400.	0.0	618400.
650217	14.90	0.0	0.0	35.68	0.0	35.68	836.91	5833.41	618036.	0.0	618036.
650218	14.90	0.0	0.0	35.68	0.0	35.68	836.86	5812.64	617672.	0.0	617672.
650219	14.90	0.0	0.0	35.68	0.0	35.68	836.80	5791.86	617235.	0.0	617235.
650220	14.90	0.0	0.0	35.68	0.0	35.68	836.75	5771.08	616872.	0.0	616872.
650221	14.90	0.0	0.0	35.68	0.0	35.68	836.70	5750.30	616508.	0.0	616508.
650222	14.90	0.0	0.0	35.68	0.0	35.68	836.64	5729.52	616071.	0.0	616071.
650223	14.90	0.0	0.0	35.68	0.0	35.68	836.59	5708.74	615707.	0.0	615707.
650224	14.90	0.0	0.0	35.68	0.0	35.68	836.54	5687.96	615343.	0.0	615343.
650225	14.90	0.0	0.0	35.68	0.0	35.68	836.48	5667.19	614906.	0.0	614906.
650226	14.90	0.0	0.0	35.68	0.0	35.68	836.43	5646.41	614542.	0.0	614542.
650227	14.90	0.0	0.0	35.68	0.0	35.68	836.37	5625.63	614106.	0.0	614106.
650228	14.90	0.0	0.0	35.68	0.0	35.68	836.32	5604.85	613742.	0.0	613742.
650200	417.20	0.0	0.0	999.04	0.0	999.04	23437.01	164790.04	17330707.	0.0	17330707.
650301	80.09	0.43	0.0	35.68	6.92	42.60	836.42	5641.91	614470.	119174.	733644.
650302	80.09	0.44	0.0	35.68	6.92	42.60	836.51	5678.96	615125.	119301.	734426.
650303	80.09	0.44	0.0	35.68	6.92	42.60	836.61	5716.01	615852.	119442.	735294.
650304	80.09	0.44	0.0	35.68	6.92	42.60	836.70	5753.06	616508.	119569.	736077.
650305	80.09	0.44	0.0	35.68	6.92	42.60	836.80	5790.11	617235.	119710.	736945.
650306	80.09	0.44	0.0	35.68	6.92	42.60	836.89	5827.15	617891.	119838.	737729.
650307	80.09	0.44	0.0	35.68	6.92	42.60	836.99	5864.20	618618.	119979.	738597.
650308	80.09	0.45	0.0	35.68	6.92	42.60	837.08	5901.24	619273.	120106.	739379.
650309	80.09	0.45	0.0	35.68	6.92	42.60	837.17	5938.28	619929.	120233.	740162.
650310	80.09	0.45	0.0	35.68	6.92	42.60	837.27	5975.32	620656.	120374.	741030.
650311	80.09	0.45	0.0	35.68	6.92	42.60	837.36	6012.36	621312.	120501.	741813.
650312	80.09	0.45	0.0	35.68	6.92	42.60	837.45	6049.39	621967.	120628.	742595.
650313	80.09	0.46	0.0	35.68	6.92	42.60	837.54	6086.43	622622.	120755.	743377.
650314	80.09	0.46	0.0	35.68	6.92	42.60	837.63	6123.46	623277.	120882.	744159.
650315	80.09	0.46	0.0	35.68	6.92	42.60	837.72	6160.48	623932.	121009.	744941.
650316	80.09	0.46	0.0	35.68	6.92	42.60	837.81	6197.52	624587.	121136.	745723.
650317	80.09	0.46	0.0	35.68	6.92	42.60	837.90	6234.54	625242.	121263.	746505.
650318	80.09	0.46	0.0	35.68	6.92	42.60	837.99	6271.57	625897.	121390.	747287.
650319	80.09	0.47	0.0	35.68	6.92	42.60	838.08	6308.59	626552.	121517.	748069.
650320	80.09	0.47	0.0	35.68	6.92	42.60	838.17	6345.61	627207.	121644.	748851.
650321	80.09	0.47	0.0	35.68	6.92	42.60	838.26	6382.63	627862.	121772.	749634.
650322	80.09	0.47	0.0	35.68	6.92	42.60	838.34	6419.64	628445.	121884.	750329.
650323	80.09	0.47	0.0	35.68	6.92	42.60	838.43	6456.66	629100.	122012.	751112.
650324	80.09	0.47	0.0	35.68	6.92	42.60	838.52	6493.68	629755.	122139.	751894.
650325	80.09	0.48	0.0	35.68	6.92	42.60	838.60	6530.69	630337.	122251.	752588.
650326	80.09	0.48	0.0	35.68	6.92	42.60	838.69	6567.70	630992.	122379.	753371.
650327	80.09	0.48	0.0	35.68	6.92	42.60	838.77	6604.71	631575.	122491.	754066.
650328	80.09	0.48	0.0	35.68	6.92	42.60	838.86	6641.71	632230.	122619.	754849.
650329	80.09	0.48	0.0	35.68	6.92	42.60	838.94	6678.72	632812.	122731.	755543.
650330	80.09	0.49	0.0	35.68	6.92	42.60	839.02	6715.72	633394.	122844.	756238.
650331	80.09	0.49	0.0	35.68	6.92	42.60	839.11	6752.72	634049.	122971.	757020.
650300	2482.79	14.28	0.0	1106.08	214.52	1320.60	25971.63	152120.77	19358703.	3754544.	23113247.
650000	19882.37	620.81	154.04	13023.20	6242.38	19265.58	********	3241355.62	241777239.	120807992.	362585231.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
650401	196.66	0.93	0.0	35.68	6.92	42.60	839.45	6905.86	636524.	123451.	759975.
650402	196.66	0.94	0.0	35.68	6.92	42.60	839.78	7058.98	638926.	123917.	762843.
650403	196.66	0.96	0.0	35.68	6.92	42.60	840.10	7212.08	641255.	124369.	765624.
650404	196.66	0.97	0.0	35.68	6.92	42.60	840.42	7365.17	643584.	124821.	768405.
650405	196.66	0.99	0.0	35.68	6.92	42.60	840.73	7518.24	645841.	125258.	771099.
650406	196.66	1.01	0.0	35.68	28.22	63.90	841.00	7649.99	647806.	512362.	1160168.
650407	196.66	1.03	0.0	35.68	28.22	63.90	841.26	7781.72	649699.	513859.	1163558.
650408	196.66	1.05	0.0	35.68	28.22	63.90	841.53	7913.44	651664.	515413.	1167077.
650409	196.66	1.06	0.0	35.68	28.22	63.90	841.79	8045.14	653556.	516910.	1170466.
650410	196.66	1.08	0.0	35.68	28.22	63.90	842.04	8176.82	655376.	518349.	1173725.
650411	196.66	1.09	0.0	35.68	28.22	63.90	842.30	8308.49	657268.	519846.	1177114.
650412	196.66	1.11	0.0	35.68	28.22	63.90	842.55	8440.14	659088.	521285.	1180373.
650413	196.66	1.13	0.0	35.68	28.22	63.90	842.80	8571.78	660908.	522725.	1183633.
650414	196.66	1.14	0.0	35.68	28.22	63.90	843.05	8703.40	662727.	524164.	1186891.
650415	196.66	1.16	0.0	35.68	28.22	63.90	843.30	8835.00	664547.	525603.	1190150.
650416	196.66	1.17	0.0	35.68	28.22	63.90	843.54	8966.59	666294.	526985.	1193279.
650417	196.66	1.19	0.0	35.68	49.52	85.20	843.75	9076.86	667823.	926866.	1594689.
650418	196.66	1.20	0.0	35.68	49.52	85.20	843.95	9187.12	669278.	928886.	1598164.
650419	196.66	1.22	0.0	35.68	49.52	85.20	844.15	9297.37	670734.	930907.	1601641.
650420	196.66	1.73	0.0	35.68	49.52	85.20	844.34	9407.60	672117.	932826.	1604943.
650421	196.66	1.24	0.0	35.68	49.52	85.20	844.54	9517.82	673573.	934846.	1608419.
650422	196.66	1.26	0.0	35.68	49.52	85.20	844.73	9628.03	674956.	936766.	1611722.
650423	196.66	1.27	0.0	35.68	70.82	106.50	844.89	9716.92	676120.	1342008.	2018128.
650424	196.66	1.28	0.0	35.68	96.63	132.31	845.00	9780.00	676921.	1833256.	2510177.
650425	196.66	1.29	45.58	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
650426	196.66	1.29	45.58	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
650427	196.66	1.29	45.58	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
650428	196.66	1.29	45.58	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
650429	196.66	1.29	45.58	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
650430	196.66	1.29	45.58	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
650400	5899.80	34.45	273.48	1070.40	1494.31	2564.71	25290.99	261744.56	19878111.	28096188.	47974299.
650501	154.97	1.94	0.0	35.68	49.52	85.20	845.12	9847.82	677794.	940706.	1618500.
650502	154.97	1.95	0.0	35.68	49.52	85.20	845.23	9915.64	678595.	941817.	1620412.
650503	154.97	1.97	0.0	35.68	49.52	85.20	845.35	9983.45	679469.	943029.	1622498.
650504	154.97	1.98	0.0	35.68	49.52	85.20	845.47	10051.24	680342.	944241.	1624583.
650505	154.97	1.99	0.0	35.68	49.52	85.20	845.58	10119.02	681143.	945353.	1626496.
650506	154.97	2.00	0.0	35.68	49.52	85.20	845.70	10186.79	682016.	946565.	1628581.
650507	154.97	2.01	0.0	35.68	49.52	85.20	845.81	10254.54	682817.	947676.	1630493.
650508	154.97	2.02	0.0	35.68	49.52	85.20	845.92	10322.29	683617.	948787.	1632404.
650509	154.97	2.04	0.0	35.68	49.52	85.20	846.03	10390.02	684418.	949899.	1634317.
650510	154.97	2.05	0.0	35.68	49.52	85.20	846.15	10457.75	685291.	951111.	1636402.
650511	154.97	2.06	0.0	35.68	49.52	85.20	846.26	10525.46	686092.	952222.	1638314.
650512	154.97	2.07	0.0	35.68	49.52	85.20	846.37	10593.16	686893.	953333.	1640226.
650513	154.97	2.08	0.0	35.68	49.52	85.20	846.48	10660.84	687693.	954445.	1642138.
650514	154.97	2.09	0.0	35.68	49.52	85.20	846.59	10728.52	688494.	955556.	1644050.
650515	154.97	2.10	0.0	35.68	49.52	85.20	846.70	10796.18	689295.	956667.	1645962.
650516	154.97	2.12	0.0	35.68	49.52	85.20	846.80	10863.84	690023.	957677.	1647700.
650517	154.97	2.13	0.0	35.68	49.52	85.20	846.91	10931.48	690823.	958788.	1649611.
650518	154.97	2.14	0.0	35.68	49.52	85.20	847.02	10999.11	691624.	959900.	1651524.
650519	154.97	2.15	0.0	35.68	49.52	85.20	847.12	11066.73	692352.	960910.	1653262.
650520	154.97	2.16	0.0	35.68	41.29	76.97	847.24	11142.58	693225.	802135.	1495360.
650521	154.97	2.17	0.0	35.68	28.72	63.90	847.38	11231.48	694244.	549091.	1243335.
650522	154.97	2.19	0.0	35.68	28.22	63.90	847.52	11320.36	695263.	549897.	1245160.
650523	154.97	2.20	0.0	35.68	28.22	63.90	847.65	11409.23	696210.	550646.	1246856.
650524	154.97	2.22	0.0	35.68	28.22	63.90	847.79	11498.08	697229.	551452.	1248681.
650525	154.97	2.23	0.0	35.68	28.22	63.90	847.92	11586.92	698175.	552200.	1250375.
650526	154.97	2.24	0.0	35.68	28.22	63.90	848.05	11675.74	699121.	552948.	1252069.
650527	154.97	2.26	0.0	35.68	28.22	63.90	848.18	11764.55	700067.	553697.	1253764.
650528	154.97	2.27	0.0	35.68	23.22	63.90	848.31	11853.35	701014.	554445.	1255459.
650529	154.97	2.29	0.0	35.68	28.22	63.90	848.44	11942.13	701960.	555194.	1257154.
650530	154.97	2.30	0.0	35.68	28.22	63.90	848.57	12030.90	702906.	555942.	1258848.
650531	154.97	2.37	0.0	35.68	6.92	42.60	848.73	12140.95	704071.	136552.	840623.
650500	4804.07	65.74	0.0	1106.08	1271.29	2377.37	26252.39	338290.15	21402276.	24532881.	45935157.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.C METER INSTALLEC CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
650601	50.18	2.86	0.0	35.68	6.92	42.60	848.73	12145.68	704071.	136552.	840623.
650602	50.18	2.86	0.0	35.68	6.92	42.60	848.74	12150.39	704143.	136566.	840709.
650603	50.18	2.86	0.0	35.68	6.92	42.60	848.75	12155.12	704216.	136580.	840796.
650604	50.18	2.86	0.0	35.68	6.92	42.60	848.75	12159.84	704216.	136580.	840796.
650605	50.18	2.86	0.0	35.68	6.92	42.60	848.76	12164.55	704289.	136594.	840883.
650606	50.18	2.86	0.0	35.68	6.92	42.60	848.77	12169.27	704362.	136608.	840970.
650607	50.18	2.86	0.0	35.68	6.92	42.60	848.77	12173.99	704362.	136608.	840970.
650608	50.18	2.86	0.0	35.68	6.92	42.60	848.78	12178.70	704435.	136622.	841057.
650609	50.18	2.86	0.0	35.68	6.92	42.60	848.79	12183.42	704507.	136637.	841144.
650610	50.18	2.86	0.0	35.68	6.92	42.60	848.79	12188.13	704507.	136637.	841144.
650611	50.18	2.86	0.0	35.68	6.92	42.60	848.80	12192.84	704580.	136651.	841231.
650612	50.18	2.87	0.0	35.68	6.92	42.60	848.81	12197.56	704653.	136665.	841318.
650613	50.18	2.87	0.0	35.68	6.92	42.60	848.81	12202.27	704653.	136665.	841318.
650614	50.18	2.87	0.0	35.68	6.92	42.60	848.82	12206.98	704726.	136679.	841405.
650615	50.18	2.87	0.0	35.68	6.92	42.60	848.83	12211.69	704798.	136693.	841491.
650616	50.18	2.87	0.0	35.68	6.92	42.60	848.83	12216.40	704798.	136693.	841491.
650617	50.18	2.87	0.0	35.68	6.92	42.60	848.84	12221.11	704871.	136707.	841578.
650618	50.18	2.87	0.0	35.68	6.92	42.60	848.85	12225.81	704944.	136721.	841665.
650619	50.18	2.87	0.0	35.68	6.92	42.60	848.85	12230.52	704944.	136721.	841665.
650620	50.18	2.87	0.0	35.68	6.92	42.60	848.86	12235.22	705017.	136735.	841752.
650621	50.18	2.87	0.0	35.68	6.92	42.60	848.87	12239.93	705090.	136749.	841839.
650622	50.18	2.87	0.0	35.68	6.92	42.60	848.87	12244.63	705090.	136749.	841839.
650623	50.18	2.87	0.0	35.68	6.92	42.60	848.88	12249.33	705162.	136764.	841926.
650624	50.18	2.88	0.0	35.68	6.92	42.60	848.89	12254.04	705235.	136778.	842013.
650625	50.18	2.88	0.0	35.68	6.92	42.60	848.89	12258.73	705235.	136778.	842013.
650626	50.18	2.88	0.0	35.68	6.92	42.60	848.90	12263.43	705308.	136792.	842100.
650627	50.18	2.88	0.0	35.68	6.92	42.60	848.91	12268.13	705381.	136806.	842187.
650628	50.18	2.88	0.0	35.68	6.92	42.60	848.91	12272.83	705381.	136806.	842187.
650629	50.18	2.88	0.0	35.68	6.92	42.60	848.92	12277.53	705454.	136820.	842274.
650630	50.18	2.88	0.0	35.68	6.92	42.60	848.93	12282.22	705526.	136834.	842360.
650600	1505.40	86.06	0.0	1070.40	207.60	1278.00	25464.90	366420.29	21143954.	4100790.	25244744.
650701	21.89	5.49	0.0	35.68	32.32	68.00	848.85	12230.63	704944.	638559.	1343503.
650702	21.89	5.47	0.0	35.68	32.32	68.00	848.78	12179.05	704435.	638098.	1342533.
650703	21.89	5.45	0.0	35.68	32.32	68.00	848.71	12127.50	703925.	637636.	1341561.
650704	21.89	5.43	0.0	35.68	32.32	68.00	848.63	12075.96	703343.	637109.	1340452.
650705	21.89	5.41	0.0	35.68	32.32	68.00	848.56	12024.44	702833.	636647.	1339480.
650706	21.89	5.39	0.0	35.68	32.32	68.00	848.49	11972.94	702324.	636186.	1338510.
650707	21.89	5.37	0.0	35.68	32.32	68.00	848.41	11921.46	701741.	635658.	1337399.
650708	21.89	5.35	0.0	35.68	32.32	68.00	848.34	11870.00	701232.	635197.	1336429.
650709	21.89	5.34	0.0	35.68	32.32	68.00	848.26	11818.56	700650.	634669.	1335319.
650710	21.89	5.32	0.0	35.68	32.32	68.00	848.19	11767.14	700140.	634208.	1334348.
650711	21.89	5.30	0.0	35.68	32.32	68.00	848.11	11715.73	699558.	633680.	1333238.
650712	21.89	5.28	0.0	35.68	32.32	68.00	848.03	11664.35	698975.	633153.	1332128.
650713	21.89	5.26	0.0	35.68	32.32	68.00	847.96	11612.98	698466.	632691.	1331157.
650714	21.89	5.24	0.0	35.68	32.32	68.00	847.88	11561.63	697884.	632164.	1330048.
650715	21.89	5.22	0.0	35.68	32.32	68.00	847.80	11510.30	697301.	631636.	1328937.
650716	21.89	5.20	0.0	35.68	32.32	68.00	847.73	11459.00	696792.	631175.	1327967.
650717	21.89	5.18	0.0	35.68	32.32	68.00	847.65	11407.71	696210.	630647.	1326857.
650718	21.89	5.16	0.0	35.68	32.32	68.00	847.57	11356.44	695627.	630120.	1325747.
650719	21.89	5.14	0.0	35.68	32.32	68.00	847.49	11305.19	695045.	629592.	1324637.
650720	21.89	5.12	0.0	35.68	32.32	68.00	847.41	11253.96	694463.	629065.	1323528.
650721	21.89	5.10	0.0	35.68	32.32	68.00	847.34	11202.75	693953.	628603.	1322556.
650722	21.89	5.09	0.0	35.68	32.32	68.00	847.26	11151.55	693371.	628076.	1321447.
650723	21.89	5.07	0.0	35.68	32.32	68.00	847.18	11100.38	692789.	627548.	1320337.
650724	21.89	5.05	0.0	35.68	32.32	68.00	847.10	11049.23	692206.	627021.	1319227.
650725	21.89	5.03	0.0	35.68	32.32	68.00	847.02	10998.10	691624.	626493.	1318117.
650726	21.89	5.01	0.0	35.68	32.32	68.00	846.94	10946.98	691042.	625966.	1317008.
650727	21.89	4.99	0.0	35.68	32.32	68.00	846.85	10895.89	690387.	625373.	1315760.
650728	21.89	4.97	0.0	35.68	32.32	68.00	846.77	10844.82	689804.	624845.	1314649.
650729	21.89	4.95	0.0	35.68	32.32	68.00	846.69	10793.76	689222.	624318.	1313540.
650730	21.89	4.93	0.0	35.68	32.32	68.00	846.61	10742.73	688640.	623790.	1312430.
650731	21.89	4.91	0.0	35.68	32.32	68.00	846.53	10691.71	688057.	623263.	1311320.
650700	678.59	161.22	0.0	1106.08	1001.92	2108.00	26279.14	355252.87	21596983.	19563186.	41160169.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
650801	6.07	4.50	0.0	35.68	21.92	57.60	846.44	10635.69	687402.	422305.	1109707.
650802	6.07	4.48	0.0	35.68	21.92	57.60	846.35	10579.68	686747.	421903.	1108650.
650803	6.07	4.46	0.0	35.68	21.92	57.60	846.25	10523.70	686019.	421456.	1107475.
650804	6.07	4.44	0.0	35.68	21.92	57.60	846.16	10467.73	685364.	421053.	1106417.
650805	6.07	4.42	0.0	35.68	21.92	57.60	846.07	10411.79	684709.	420651.	1105360.
650806	6.07	4.40	0.0	35.68	21.92	57.60	845.98	10355.86	684054.	420248.	1104302.
650807	6.07	4.38	0.0	35.68	21.92	57.60	845.88	10299.95	683326.	419801.	1103127.
650808	6.07	4.36	0.0	35.68	21.92	57.60	845.79	10244.07	682671.	419399.	1102070.
650809	6.07	4.34	0.0	35.68	21.92	57.60	845.70	10188.20	682016.	418996.	1101012.
650810	6.07	4.32	0.0	35.68	21.92	57.60	845.60	10132.36	681288.	418549.	1099837.
650811	6.07	4.30	0.0	35.68	21.92	57.60	845.51	10076.54	680633.	418147.	1098780.
650812	6.07	4.28	0.0	35.68	21.92	57.60	845.41	10020.74	679905.	417700.	1097605.
650813	6.07	4.26	0.0	35.68	21.92	57.60	845.32	9964.96	679250.	417297.	1096547.
650814	6.07	4.24	0.0	35.68	21.92	57.60	845.22	9909.20	678522.	416850.	1095372.
650815	6.07	4.21	0.0	35.68	21.92	57.60	845.13	9853.45	677867.	416448.	1094315.
650816	6.07	4.19	0.0	35.68	21.92	57.60	845.03	9797.73	677139.	416000.	1093139.
650817	6.07	4.17	0.0	35.68	21.92	57.60	844.93	9742.04	676411.	415553.	1091964.
650818	6.07	4.15	0.0	35.68	21.92	57.60	844.84	9686.36	675756.	415151.	1090907.
650819	6.07	4.13	0.0	35.68	21.92	57.60	844.74	9630.70	675028.	414704.	1089732.
650820	6.07	4.11	0.0	35.68	21.92	57.60	844.64	9575.06	674301.	414256.	1088557.
650821	6.07	4.09	0.0	35.68	21.92	57.60	844.54	9519.45	673573.	413809.	1087382.
650822	6.07	4.07	0.0	35.68	21.92	57.60	844.44	9463.86	672845.	413362.	1086207.
650823	6.07	4.05	0.0	35.68	21.92	57.60	844.35	9408.28	672190.	412960.	1085150.
650824	6.07	4.03	0.0	35.68	21.92	57.60	844.25	9352.73	671462.	412512.	1083974.
650825	6.07	4.01	0.0	35.68	21.92	57.60	844.15	9297.20	670734.	412065.	1082799.
650826	6.07	3.98	0.0	35.68	21.92	57.60	844.05	9241.69	670006.	411618.	1081624.
650827	6.07	3.96	0.0	35.68	21.92	57.60	843.95	9186.20	669278.	411171.	1080449.
650828	6.07	3.94	0.0	35.68	21.92	57.60	843.84	9130.73	668478.	410679.	1079157.
650829	6.07	3.92	0.0	35.68	21.92	57.60	843.74	9075.29	667750.	410232.	1077982.
650830	6.07	3.90	0.0	35.68	21.92	57.60	843.64	9019.86	667022.	409785.	1076807.
650831	6.07	3.88	0.0	35.68	21.92	57.60	843.54	8964.46	666294.	409338.	1075632.
650800	188.17	129.97	0.0	1106.08	679.52	1785.60	26195.48	303755.56	20988040.	12893998.	33882038.
650901	6.19	2.16	0.0	35.68	0.0	35.68	843.48	8932.80	665857.	0.0	665857.
650902	6.19	2.16	0.0	35.68	0.0	35.68	843.42	8901.15	665421.	0.0	665421.
650903	6.19	2.15	0.0	35.68	0.0	35.68	843.36	8869.51	664984.	0.0	664984.
650904	6.19	2.14	0.0	35.68	0.0	35.68	843.30	8837.87	664547.	0.0	664547.
650905	6.19	2.14	0.0	35.68	0.0	35.68	843.25	8806.25	664183.	0.0	664183.
650906	6.19	2.13	0.0	35.68	0.0	35.68	843.19	8774.62	663746.	0.0	663746.
650907	6.19	2.12	0.0	35.68	0.0	35.68	843.13	8743.01	663310.	0.0	663310.
650908	6.19	2.12	0.0	35.68	0.0	35.68	843.07	8711.40	662873.	0.0	662873.
650909	6.19	2.11	0.0	35.68	0.0	35.68	843.01	8679.80	662436.	0.0	662436.
650910	6.19	2.10	0.0	35.68	0.0	35.68	842.95	8648.21	662000.	0.0	662000.
650911	6.19	2.09	0.0	35.68	0.0	35.68	842.89	8616.62	661563.	0.0	661563.
650912	6.19	2.09	0.0	35.68	0.0	35.68	842.83	8585.04	661126.	0.0	661126.
650913	6.19	2.08	0.0	35.68	0.0	35.68	842.77	8553.47	660689.	0.0	660689.
650914	6.19	2.07	0.0	35.68	0.0	35.68	842.71	8521.90	660253.	0.0	660253.
650915	6.19	2.07	0.0	35.68	0.0	35.68	842.65	8490.34	659816.	0.0	659816.
650916	6.19	2.06	0.0	35.68	0.0	35.68	842.59	8458.79	659379.	0.0	659379.
650917	6.19	2.05	0.0	35.68	0.0	35.68	842.53	8427.25	658943.	0.0	658943.
650918	6.19	2.05	0.0	35.68	0.0	35.68	842.47	8395.71	658506.	0.0	658506.
650919	6.19	2.04	0.0	35.68	0.0	35.68	842.41	8364.18	658069.	0.0	658069.
650920	6.19	2.03	0.0	35.68	0.0	35.68	842.35	8332.66	657632.	0.0	657632.
650921	6.19	2.03	0.0	35.68	0.0	35.68	842.29	8301.14	657196.	0.0	657196.
650922	6.19	2.02	0.0	35.68	0.0	35.68	842.22	8269.63	656686.	0.0	656686.
650923	6.19	2.01	0.0	35.68	0.0	35.68	842.16	8238.12	656249.	0.0	656249.
650924	6.19	2.00	0.0	35.68	0.0	35.68	842.10	8206.63	655813.	0.0	655813.
650925	6.19	2.00	0.0	35.68	0.0	35.68	842.04	8175.14	655376.	0.0	655376.
650926	6.19	1.99	0.0	35.68	0.0	35.68	841.98	8143.66	654939.	0.0	654939.
650927	6.19	1.98	0.0	35.68	0.0	35.68	841.92	8112.18	654503.	0.0	654503.
650928	6.19	1.98	0.0	35.68	0.0	35.68	841.86	8080.72	654066.	0.0	654066.
650929	6.19	1.97	0.0	35.68	0.0	35.68	841.79	8049.26	653556.	0.0	653556.
650930	6.19	1.96	0.0	35.68	0.0	35.68	841.73	8017.80	653120.	0.0	653120.
650900	185.70	61.90	0.0	1070.40	0.0	1070.40	25278.45	254244.89	19786837.	0.0	19786837.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
651001	17.66	0.98	0.0	35.68	0.0	35.68	841.69	7998.81	652828.	0.0	652828.
651002	17.66	0.98	0.0	35.68	0.0	35.68	841.66	7979.82	652610.	0.0	652610.
651003	17.66	0.97	0.0	35.68	0.0	35.68	841.62	7960.83	652319.	0.0	652319.
651004	17.66	0.97	0.0	35.68	0.0	35.68	841.58	7941.84	652028.	0.0	652028.
651005	17.66	0.97	0.0	35.68	0.0	35.68	841.54	7922.86	651737.	0.0	651737.
651006	17.66	0.97	0.0	35.68	0.0	35.68	841.51	7903.87	651518.	0.0	651518.
651007	17.66	0.96	0.0	35.68	0.0	35.68	841.47	7884.89	651227.	0.0	651227.
651008	17.66	0.96	0.0	35.68	0.0	35.68	841.43	7865.91	650936.	0.0	650936.
651009	17.66	0.96	0.0	35.68	0.0	35.68	841.39	7846.93	650645.	0.0	650645.
651010	17.66	0.96	0.0	35.68	0.0	35.68	841.36	7827.96	650426.	0.0	650426.
651011	17.66	0.96	0.0	35.68	0.0	35.68	841.32	7808.99	650135.	0.0	650135.
651012	17.66	0.95	0.0	35.68	0.0	35.68	841.28	7790.02	649844.	0.0	649844.
651013	17.66	0.95	0.0	35.68	0.0	35.68	841.24	7771.05	649553.	0.0	649553.
651014	17.66	0.95	0.0	35.68	0.0	35.68	841.20	7752.09	649262.	0.0	649262.
651015	17.66	0.95	0.0	35.68	0.0	35.68	841.17	7733.12	649043.	0.0	649043.
651016	17.66	0.95	0.0	35.68	0.0	35.68	841.13	7714.16	648752.	0.0	648752.
651017	17.66	0.94	0.0	35.68	0.0	35.68	841.09	7695.20	648461.	0.0	648461.
651018	17.66	0.94	0.0	35.68	0.0	35.68	841.05	7676.24	648170.	0.0	648170.
651019	17.66	0.94	0.0	35.68	0.0	35.68	841.01	7657.29	647879.	0.0	647879.
651020	17.66	0.94	0.0	35.68	0.0	35.68	840.97	7638.34	647588.	0.0	647588.
651021	17.66	0.93	0.0	35.68	0.0	35.68	840.94	7619.38	647369.	0.0	647369.
651022	17.66	0.93	0.0	35.68	0.0	35.68	840.90	7600.43	647078.	0.0	647078.
651023	17.66	0.93	0.0	35.68	0.0	35.68	840.86	7581.49	646787.	0.0	646787.
651024	17.66	0.93	0.0	35.68	0.0	35.68	840.82	7562.54	646496.	0.0	646496.
651025	17.66	0.93	0.0	35.68	0.0	35.68	840.78	7543.60	646205.	0.0	646205.
651026	17.66	0.92	0.0	35.68	0.0	35.68	840.74	7524.66	645914.	0.0	645914.
651027	17.66	0.92	0.0	35.68	0.0	35.68	840.71	7505.72	645695.	0.0	645695.
651028	17.66	0.92	0.0	35.68	0.0	35.68	840.67	7486.79	645404.	0.0	645404.
651029	17.66	0.92	0.0	35.68	0.0	35.68	840.63	7467.86	645113.	0.0	645113.
651030	17.66	0.91	0.0	35.68	0.0	35.68	840.59	7448.93	644822.	0.0	644822.
651031	17.66	0.91	0.0	35.68	0.0	35.68	840.55	7430.00	644531.	0.0	644531.
651000	547.46	29.30	0.0	1106.08	0.0	1106.08	26074.90	239141.62	20110375.	0.0	20110375.
651101	22.32	0.33	0.0	35.68	0.0	35.68	840.52	7416.30	644312.	0.0	644312.
651102	22.32	0.33	0.0	35.68	0.0	35.68	840.49	7402.61	644094.	0.0	644094.
651103	22.32	0.33	0.0	35.68	0.0	35.68	840.47	7388.91	643948.	0.0	643948.
651104	22.32	0.33	0.0	35.68	0.0	35.68	840.44	7375.22	643730.	0.0	643730.
651105	22.32	0.33	0.0	35.68	0.0	35.68	840.41	7361.52	643512.	0.0	643512.
651106	22.32	0.33	0.0	35.68	0.0	35.68	840.38	7347.83	643293.	0.0	643293.
651107	22.32	0.33	0.0	35.68	0.0	35.68	840.35	7334.14	643075.	0.0	643075.
651108	22.32	0.33	0.0	35.68	0.0	35.68	840.32	7320.45	642857.	0.0	642857.
651109	22.32	0.33	0.0	35.68	0.0	35.68	840.30	7306.76	642711.	0.0	642711.
651110	22.32	0.33	0.0	35.68	0.0	35.68	840.27	7293.07	642493.	0.0	642493.
651111	22.32	0.33	0.0	35.68	0.0	35.68	840.24	7279.38	642274.	0.0	642274.
651112	22.32	0.33	0.0	35.68	0.0	35.68	840.21	7265.69	642056.	0.0	642056.
651113	22.32	0.33	0.0	35.68	0.0	35.68	840.18	7252.00	641838.	0.0	641838.
651114	22.32	0.33	0.0	35.68	0.0	35.68	840.15	7238.32	641619.	0.0	641619.
651115	22.32	0.33	0.0	35.68	0.0	35.68	840.13	7224.63	641474.	0.0	641474.
651116	22.32	0.33	0.0	35.68	0.0	35.68	840.10	7210.94	641255.	0.0	641255.
651117	22.32	0.32	0.0	35.68	0.0	35.68	840.07	7197.26	641037.	0.0	641037.
651118	22.32	0.32	0.0	35.68	0.0	35.68	840.04	7183.57	640819.	0.0	640819.
651119	22.32	0.32	0.0	35.68	0.0	35.68	840.01	7169.89	640600.	0.0	640600.
651120	22.32	0.32	0.0	35.68	0.0	35.68	839.98	7156.20	640382.	0.0	640382.
651121	22.32	0.32	0.0	35.68	0.0	35.68	839.95	7142.52	640163.	0.0	640163.
651122	22.32	0.32	0.0	35.68	0.0	35.68	839.93	7128.84	640018.	0.0	640018.
651123	22.32	0.32	0.0	35.68	0.0	35.68	839.90	7115.15	639799.	0.0	639799.
651124	22.32	0.32	0.0	35.68	0.0	35.68	839.87	7101.47	639581.	0.0	639581.
651125	22.32	0.32	0.0	35.68	0.0	35.68	839.84	7087.79	639363.	0.0	639363.
651126	22.32	0.32	0.0	35.68	0.0	35.68	839.81	7074.11	639144.	0.0	639144.
651127	22.32	0.32	0.0	35.68	0.0	35.68	839.78	7060.43	638926.	0.0	638926.
651128	22.32	0.32	0.0	35.68	0.0	35.68	839.75	7046.75	638708.	0.0	638708.
651129	22.32	0.32	0.0	35.68	0.0	35.68	839.72	7033.07	638489.	0.0	638489.
651130	22.32	0.32	0.0	35.68	0.0	35.68	839.69	7019.39	638271.	0.0	638271.
651100	669.60	9.76	0.0	1070.40	0.0	1070.40	25203.30	216534.21	19239841.	0.0	19239841.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
651201	28.19	0.0	0.0	35.68	0.0	35.68	839.68	7011.90	638198.	0.0	638198.
651202	28.19	0.0	0.0	35.68	0.0	35.68	839.66	7004.41	638053.	0.0	638053.
651203	28.19	0.0	0.0	35.68	0.0	35.68	839.64	6996.92	637907.	0.0	637907.
651204	28.19	0.0	0.0	35.68	0.0	35.68	839.63	6989.43	637834.	0.0	637834.
651205	28.19	0.0	0.0	35.68	0.0	35.68	839.61	6981.95	637689.	0.0	637689.
651206	28.19	0.0	0.0	35.68	0.0	35.68	839.60	6974.46	637616.	0.0	637616.
651207	28.19	0.0	0.0	35.68	0.0	35.68	839.58	6966.97	637470.	0.0	637470.
651208	28.19	0.0	0.0	35.68	0.0	35.68	839.56	6959.48	637325.	0.0	637325.
651209	28.19	0.0	0.0	35.68	0.0	35.68	839.55	6952.00	637252.	0.0	637252.
651210	28.19	0.0	0.0	35.68	0.0	35.68	839.53	6944.51	637106.	0.0	637106.
651211	28.19	0.0	0.0	35.68	0.0	35.68	839.51	6937.02	636961.	0.0	636961.
651212	28.19	0.0	0.0	35.68	0.0	35.68	839.50	6929.54	636888.	0.0	636988.
651213	28.19	0.0	0.0	35.68	0.0	35.68	839.48	6922.05	636742.	0.0	636742.
651214	28.19	0.0	0.0	35.68	0.0	35.68	839.46	6914.56	636597.	0.0	636597.
651215	28.19	0.0	0.0	35.68	0.0	35.68	839.45	6907.07	636524.	0.0	636524.
651216	28.19	0.0	0.0	35.68	0.0	35.68	839.43	6899.58	636378.	0.0	636378.
651217	28.19	0.0	0.0	35.68	0.0	35.68	839.42	6892.09	636306.	0.0	636306.
651218	28.19	0.0	0.0	35.68	0.0	35.68	839.40	6884.61	636160.	0.0	636160.
651219	28.19	0.0	0.0	35.68	0.0	35.68	839.38	6877.12	636015.	0.0	636015.
651220	28.19	0.0	0.0	35.68	0.0	35.68	839.37	6869.63	635942.	0.0	635942.
651221	28.19	0.0	0.0	35.68	0.0	35.68	839.35	6862.14	635796.	0.0	635796.
651222	28.19	0.0	0.0	35.68	0.0	35.68	839.33	6854.66	635651.	0.0	635651.
651223	28.19	0.0	0.0	35.68	0.0	35.68	839.32	6847.17	635578.	0.0	635578.
651224	28.19	0.0	0.0	35.68	0.0	35.68	839.30	6839.68	635432.	0.0	635432.
651225	28.19	0.0	0.0	35.68	0.0	35.68	839.28	6832.19	635287.	0.0	635287.
651226	28.19	0.0	0.0	35.68	0.0	35.68	839.27	6824.70	635214.	0.0	635214.
651227	28.19	0.0	0.0	35.68	0.0	35.68	839.25	6817.22	635068.	0.0	635068.
651228	28.19	0.0	0.0	35.68	0.0	35.68	839.23	6809.73	634923.	0.0	634923.
651229	28.19	0.0	0.0	35.68	0.0	35.68	839.22	6802.24	634850.	0.0	634850.
651230	28.19	0.0	0.0	35.68	0.0	35.68	839.20	6794.75	634704.	0.0	634704.
651231	28.19	0.0	0.0	35.68	0.0	35.68	839.18	6787.27	634559.	0.0	634559.
651200	873.89	0.0	0.0	1106.08	0.0	1106.08	26022.37	213887.05	19728025.	0.0	19728025.
660101	63.21	0.0	0.0	35.68	0.0	35.68	839.24	6814.79	634996.	0.0	634996.
660102	63.21	0.0	0.0	35.68	0.0	35.68	839.31	6842.32	635505.	0.0	635505.
660103	63.21	0.0	0.0	35.68	0.0	35.68	839.37	6869.84	635942.	0.0	635942.
660104	63.21	0.0	0.0	35.68	0.0	35.68	839.43	6897.37	636378.	0.0	636378.
660105	63.21	0.0	0.0	35.68	0.0	35.68	839.49	6924.89	636815.	0.0	636815.
660106	63.21	0.0	0.0	35.68	0.0	35.68	839.55	6952.42	637252.	0.0	637252.
660107	63.21	0.0	0.0	35.68	0.0	35.68	839.61	6979.95	637689.	0.0	637689.
660108	63.21	0.0	0.0	35.68	0.0	35.68	839.67	7007.47	638125.	0.0	638125.
660109	63.21	0.0	0.0	35.68	0.0	35.68	839.73	7035.00	638562.	0.0	638562.
660110	63.21	0.0	0.0	35.68	0.0	35.68	839.78	7062.52	638926.	0.0	638926.
660111	63.21	0.0	0.0	35.68	0.0	35.68	839.84	7090.05	639363.	0.0	639363.
660112	63.21	0.0	0.0	35.68	0.0	35.68	839.90	7117.57	639799.	0.0	639799.
660113	63.21	0.0	0.0	35.68	0.0	35.68	839.96	7145.10	640236.	0.0	640236.
660114	63.21	0.0	0.0	35.68	0.0	35.68	840.02	7172.62	640673.	0.0	640673.
660115	63.21	0.0	0.0	35.68	0.0	35.68	840.08	7200.15	641110.	0.0	641110.
660116	63.21	0.0	0.0	35.68	0.0	35.68	840.13	7227.68	641474.	0.0	641474.
660117	63.21	0.0	0.0	35.68	0.0	35.68	840.19	7255.20	641910.	0.0	641910.
660118	63.21	0.0	0.0	35.68	0.0	35.68	840.25	7282.73	642347.	0.0	642347.
660119	63.21	0.0	0.0	35.68	0.0	35.68	840.30	7310.25	642711.	0.0	642711.
660120	63.21	0.0	0.0	35.68	0.0	35.68	840.36	7337.78	643148.	0.0	643148.
660121	63.21	0.0	0.0	35.68	0.0	35.68	840.42	7365.30	643584.	0.0	643584.
660122	63.21	0.0	0.0	35.68	0.0	35.68	840.47	7392.83	643948.	0.0	643948.
660123	63.21	0.0	0.0	35.68	0.0	35.68	840.53	7420.35	644385.	0.0	644385.
660124	63.21	0.0	0.0	35.68	0.0	35.68	840.59	7447.88	644822.	0.0	644822.
660125	63.21	0.0	0.0	35.68	0.0	35.68	840.64	7475.40	645186.	0.0	645186.
660126	63.21	0.0	0.0	35.68	0.0	35.68	840.70	7502.93	645622.	0.0	645622.
660127	63.21	0.0	0.0	35.68	0.0	35.68	840.76	7530.45	646059.	0.0	646059.
660128	63.21	0.0	0.0	35.68	0.0	35.68	840.81	7557.98	646423.	0.0	646423.
660129	63.21	0.0	0.0	35.68	0.0	35.68	840.87	7585.50	646860.	0.0	646860.
660130	63.21	0.0	0.0	35.68	0.0	35.68	840.92	7613.03	647224.	0.0	647224.
660131	63.21	0.0	0.0	35.68	0.0	35.68	840.98	7640.55	647661.	0.0	647661.
660100	1959.51	0.0	0.0	1106.08	0.0	1106.08	26043.90	224057.90	19884735.	0.0	19884735.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
660201	55.94	0.0	0.0	35.68	0.0	35.68	841.02	7660.82	647952.	0.0	647952.
660202	55.94	0.0	0.0	35.68	0.0	35.68	841.06	7681.09	648243.	0.0	648243.
660203	55.94	0.0	0.0	35.68	0.0	35.68	841.10	7701.35	648534.	0.0	648534.
660204	55.94	0.0	0.0	35.68	0.0	35.68	841.14	7721.61	648825.	0.0	648825.
660205	55.94	0.0	0.0	35.68	0.0	35.68	841.18	7741.87	649116.	0.0	649116.
660206	55.94	0.0	0.0	35.68	0.0	35.68	841.22	7762.14	649407.	0.0	649407.
660207	55.94	0.0	0.0	35.68	0.0	35.68	841.26	7782.40	649699.	0.0	649699.
660208	55.94	0.0	0.0	35.68	0.0	35.68	841.31	7802.67	650062.	0.0	650062.
660209	55.94	0.0	0.0	35.68	0.0	35.68	841.35	7822.93	650354.	0.0	650354.
660210	55.94	0.0	0.0	35.68	0.0	35.68	841.39	7843.20	650645.	0.0	650645.
660211	55.94	0.0	0.0	35.68	0.0	35.68	841.43	7863.46	650936.	0.0	650936.
660212	55.94	0.0	0.0	35.68	0.0	35.68	841.47	7883.72	651227.	0.0	651227.
660213	55.94	0.0	0.0	35.68	0.0	35.68	841.51	7903.99	651518.	0.0	651518.
660214	55.94	0.0	0.0	35.68	0.0	35.68	841.55	7924.25	651809.	0.0	651809.
660215	55.94	0.0	0.0	35.68	0.0	35.68	841.59	7944.52	652101.	0.0	652101.
660216	55.94	0.0	0.0	35.68	0.0	35.68	841.63	7964.78	652392.	0.0	652392.
660217	55.94	0.0	0.0	35.68	0.0	35.68	841.67	7985.04	652683.	0.0	652683.
660218	55.94	0.0	0.0	35.68	0.0	35.68	841.71	8005.31	652974.	0.0	652974.
660219	55.94	0.0	0.0	35.68	0.0	35.68	841.75	8025.57	653265.	0.0	653265.
660220	55.94	0.0	0.0	35.68	0.0	35.68	841.79	8045.84	653556.	0.0	653556.
660221	55.94	0.0	0.0	35.68	0.0	35.68	841.83	8066.10	653847.	0.0	653847.
660222	55.94	0.0	0.0	35.68	0.0	35.68	841.87	8086.36	654139.	0.0	654139.
660223	55.94	0.0	0.0	35.68	0.0	35.68	841.91	8106.62	654430.	0.0	654430.
660224	55.94	0.0	0.0	35.68	0.0	35.68	841.95	8126.89	654721.	0.0	654721.
660225	55.94	0.0	0.0	35.68	0.0	35.68	841.99	8147.16	655012.	0.0	655012.
660226	55.94	0.0	0.0	35.68	0.0	35.68	842.03	8167.42	655303.	0.0	655303.
660227	55.94	0.0	0.0	35.68	0.0	35.68	842.07	8187.68	655594.	0.0	655594.
660228	55.94	0.0	0.0	35.68	0.0	35.68	842.10	8207.95	655813.	0.0	655813.
660200	1566.32	0.0	0.0	999.04	0.0	999.04	23563.88	222162.76	18254157.	0.0	18254157.
660301	93.01	0.58	0.0	35.68	28.22	63.90	842.16	8236.48	656249.	519040.	1175289.
660302	93.01	0.58	0.0	35.68	28.22	63.90	842.22	8265.02	656686.	519386.	1176072.
660303	93.01	0.58	0.0	35.68	28.22	63.90	842.27	8293.54	657050.	519674.	1176724.
660304	93.01	0.59	0.0	35.68	28.22	63.90	842.33	8322.07	657487.	520019.	1177506.
660305	93.01	0.59	0.0	35.68	28.22	63.90	842.38	8350.60	657851.	520307.	1178158.
660306	93.01	0.59	0.0	35.68	28.22	63.90	842.44	8379.12	658287.	520652.	1178939.
660307	93.01	0.59	0.0	35.68	28.22	63.90	842.49	8407.65	658651.	520940.	1179591.
660308	93.01	0.59	0.0	35.68	28.22	63.90	842.55	8436.17	659088.	521285.	1180373.
660309	93.01	0.59	0.0	35.68	28.22	63.90	842.60	8464.69	659452.	521573.	1181025.
660310	93.01	0.60	0.0	35.68	28.22	63.90	842.65	8493.21	659816.	521861.	1181677.
660311	93.01	0.60	0.0	35.68	28.22	63.90	842.71	8521.73	660253.	522207.	1182460.
660312	93.01	0.60	0.0	35.68	28.22	63.90	842.76	8550.24	660617.	522494.	1183111.
660313	93.01	0.60	0.0	35.68	28.22	63.90	842.82	8578.75	661053.	522840.	1183893.
660314	93.01	0.60	0.0	35.68	28.22	63.90	842.87	8607.26	661417.	523128.	1184545.
660315	93.01	0.61	0.0	35.68	28.22	63.90	842.93	8635.77	661854.	523473.	1185327.
660316	93.01	0.61	0.0	35.68	28.22	63.90	842.98	8664.28	662218.	523761.	1185979.
660317	93.01	0.61	0.0	35.68	28.22	63.90	843.03	8692.79	662582.	524049.	1186631.
660318	93.01	0.61	0.0	35.68	28.22	63.90	843.09	8721.29	663019.	524394.	1187413.
660319	93.01	0.61	0.0	35.68	28.22	63.90	843.14	8749.79	663383.	524682.	1188065.
660320	93.01	0.61	0.0	35.68	28.22	63.90	843.19	8778.29	663746.	524970.	1188716.
660321	93.01	0.62	0.0	35.68	28.22	63.90	843.25	8806.79	664183.	525315.	1189498.
660322	93.01	0.62	0.0	35.68	28.22	63.90	843.30	8835.29	664547.	525603.	1190150.
660323	93.01	0.62	0.0	35.68	28.22	63.90	843.35	8863.78	664911.	525891.	1190802.
660324	93.01	0.62	0.0	35.68	28.22	63.90	843.41	8892.27	665348.	526236.	1191584.
660325	93.01	0.62	0.0	35.68	28.22	63.90	843.46	8920.76	665712.	526524.	1192236.
660326	93.01	0.63	0.0	35.68	28.22	63.90	843.51	8949.25	666076.	526812.	1192888.
660327	93.01	0.63	0.0	35.68	28.22	63.90	843.56	8977.74	666440.	527100.	1193540.
660328	93.01	0.63	0.0	35.68	34.45	70.13	843.60	9000.00	666731.	643654.	1310385.
660329	93.01	0.63	0.0	35.68	49.52	85.20	843.62	9007.18	666876.	925553.	1592429.
660330	93.01	0.63	0.0	35.68	49.52	85.20	843.63	9014.37	666949.	925654.	1592603.
660331	93.01	0.63	0.0	35.68	49.52	85.20	843.64	9021.55	667022.	975755.	1592777.
660300	2883.31	18.82	0.0	1106.08	944.95	2051.03	26131.94	268437.73	20525554.	17544832.	38070386.
660000	21761.82	597.22	273.48	13023.20	5599.59	18622.79	*********	3263929.59	242538888.	106731875.	349270763.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
660401	196.44	1.20	0.0	35.68	49.52	85.20	843.85	9131.59	668550.	927876.	1596426.
660402	196.44	1.21	0.0	35.68	49.52	85.20	844.05	9241.62	670006.	929896.	1599902.
660403	196.44	1.22	0.0	35.68	49.52	85.20	844.24	9351.64	671389.	931816.	1603205.
660404	196.44	1.24	0.0	35.68	49.52	85.20	844.44	9461.64	672845.	933836.	1606681.
660405	196.44	1.25	0.0	35.68	49.52	85.20	844.64	9571.63	674301.	935857.	1610158.
660406	196.44	1.26	0.0	35.68	49.52	85.20	844.83	9681.61	675684.	937776.	1613460.
660407	196.44	1.27	0.0	35.68	70.82	106.50	844.98	9770.27	676775.	1343308.	2020083.
660408	196.44	1.28	35.63	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660409	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660410	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660411	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660412	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660413	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660414	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660415	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660416	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660417	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660418	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660419	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660420	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660421	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660422	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660423	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660424	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660425	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660426	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660427	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660428	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660429	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660430	196.44	1.29	45.35	35.68	114.12	149.80	845.00	9780.00	676921.	2165085.	2842006.
660400	5893.20	38.31	1033.33	1070.40	2992.70	4063.10	25346.03	291150.00	20278733.	56737320.	77016053.
660501	173.81	1.94	0.0	35.68	49.52	85.20	845.15	9866.66	678013.	941009.	1619022.
660502	173.81	1.96	0.0	35.68	49.52	85.20	845.30	9953.32	679105.	942524.	1621629.
660503	173.81	1.97	0.0	35.68	49.52	85.20	845.45	10039.95	680196.	944039.	1624235.
660504	173.81	1.99	0.0	35.68	49.52	85.20	845.59	10126.57	681215.	945454.	1626669.
660505	173.81	2.00	0.0	35.68	49.52	85.20	845.74	10213.18	682307.	946969.	1629276.
660506	173.81	2.02	0.0	35.68	49.52	85.20	845.88	10299.78	683326.	948383.	1631709.
660507	173.81	2.03	0.0	35.68	49.52	85.70	846.03	10386.35	684418.	949599.	1634317.
660508	173.81	2.05	0.0	35.68	49.52	85.20	846.17	10472.91	685437.	951313.	1636750.
660509	173.81	2.06	0.0	35.68	49.52	85.20	846.31	10559.46	686456.	952727.	1639183.
660510	173.81	2.08	0.0	35.68	49.52	85.20	846.45	10646.00	687475.	954141.	1641616.
660511	173.81	2.09	0.0	35.68	49.52	85.20	846.59	10732.52	688494.	955556.	1644050.
660512	173.81	2.10	0.0	35.68	49.52	85.20	846.73	10819.02	689513.	956970.	1646483.
660513	173.81	2.12	0.0	35.68	49.52	85.20	846.87	10905.51	690532.	958384.	1648916.
660514	173.81	2.13	0.0	35.68	49.52	85.20	847.01	10991.99	691551.	959799.	1651350.
660515	173.81	2.15	0.0	35.68	49.52	85.20	847.14	11078.45	692497.	961112.	1653609.
660516	173.81	2.16	0.0	35.68	49.52	85.20	847.28	11164.89	693516.	962526.	1656042.
660517	173.81	2.18	0.0	35.68	49.52	85.20	847.41	11251.33	694463.	963839.	1658302.
660518	173.81	2.19	0.0	35.68	49.52	85.20	847.54	11337.75	695409.	965153.	1660562.
660519	173.81	2.20	0.0	35.68	49.52	85.20	847.67	11424.15	696355.	966466.	1662821.
660520	173.81	2.22	0.0	35.68	49.52	85.20	847.80	11510.54	697301.	967779.	1665080.
660521	173.81	2.23	0.0	35.68	49.57	85.20	847.93	11596.92	698248.	969093.	1667341.
660522	173.81	2.25	0.0	35.68	49.52	85.20	848.06	11683.28	699194.	970406.	1669600.
660523	173.81	2.26	0.0	35.68	49.52	85.20	848.19	11769.63	700140.	971719.	1671859.
660524	173.81	2.27	0.0	35.68	49.52	85.20	848.32	11855.96	701086.	973032.	1674118.
660525	173.81	2.29	0.0	35.68	49.52	85.20	848.44	11942.29	701960.	974245.	1676205.
660526	173.81	2.30	0.0	35.68	49.52	85.20	848.57	12028.59	702906.	975558.	1678464.
660527	173.81	2.32	0.0	35.68	49.52	85.20	848.69	12114.89	703779.	976770.	1680549.
660528	173.81	2.33	0.0	35.68	49.52	85.20	848.81	12201.17	704653.	977982.	1682635.
660529	173.81	2.34	0.0	35.68	49.52	85.20	848.93	12287.43	705526.	979195.	1684721.
660530	173.81	2.36	0.0	35.68	49.52	85.20	849.05	12373.69	706400.	980407.	1686807.
660531	173.81	2.37	0.0	35.68	49.52	85.20	849.17	12459.93	707273.	981619.	1688892.
660500	5388.11	66.96	0.0	1106.08	1535.12	2641.20	26264.27	346094.11	21488744.	29824068.	51312812.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.C METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
660601	76.76	2.92	0.0	35.68	49.52	85.20	849.16	12448.57	707200.	981518.	1688718.
660602	76.76	2.91	0.0	35.68	49.52	85.20	849.14	12437.21	707055.	981316.	1688371.
660603	76.76	2.91	0.0	35.68	49.52	85.20	849.13	12425.85	706982.	981215.	1688197.
660604	76.76	2.91	0.0	35.68	42.06	77.77	849.12	12421.93	706909.	833903.	1540812.
660605	76.76	2.91	0.0	35.68	28.22	63.50	849.13	12431.87	706982.	559166.	1266148.
660606	76.76	2.91	0.0	35.68	28.22	63.90	849.15	12441.82	707128.	559281.	1266409.
660607	76.76	2.91	0.0	35.68	28.22	63.50	849.16	12451.76	707200.	559338.	1266538.
660608	76.76	2.91	0.0	35.68	28.22	63.90	849.18	12461.70	707346.	559454.	1266800.
660609	76.76	2.92	0.0	35.68	6.92	42.60	849.22	12492.94	707637.	137244.	844881.
660610	76.76	2.92	0.0	35.68	6.92	42.60	849.26	12524.18	707928.	137300.	845228.
660611	76.76	2.93	0.0	35.68	6.92	42.60	849.30	12555.40	708219.	137356.	845575.
660612	76.76	2.93	0.0	35.68	28.22	63.90	849.32	12565.32	708365.	560260.	1268625.
660613	76.76	2.94	0.0	35.68	6.92	42.60	849.36	12596.54	708656.	137441.	846097.
660614	76.76	2.94	0.0	35.68	6.92	42.60	849.40	12627.76	708947.	137498.	846445.
660615	76.76	2.95	0.0	35.68	28.22	63.90	849.42	12637.66	709093.	560835.	1269928.
660616	76.76	2.95	0.0	35.68	6.92	42.60	849.46	12668.87	709384.	137582.	846966.
660617	76.76	2.96	0.0	35.68	6.92	42.60	849.50	12700.07	709675.	137639.	847314.
660618	76.76	2.96	0.0	35.68	6.92	47.60	849.54	12731.27	709966.	137695.	847661.
660619	76.76	2.97	0.0	35.68	28.22	63.90	849.56	12741.15	710112.	561641.	1271753.
660620	76.76	2.97	0.0	35.68	6.92	42.60	849.60	12772.34	710403.	137780.	848183.
660621	76.76	2.97	0.0	35.68	6.92	42.60	849.64	12803.52	710694.	137836.	848530.
660622	76.76	2.98	0.0	35.68	28.22	63.50	849.65	12813.39	710767.	562159.	1272926.
660623	76.76	2.98	0.0	35.68	6.92	42.60	849.69	12844.57	711058.	137907.	848965.
660624	76.76	2.99	0.0	35.68	6.92	42.60	849.74	12875.73	711422.	137978.	849400.
660625	76.76	2.99	0.0	35.68	6.92	42.60	849.78	12906.89	711713.	138034.	849747.
660626	76.76	3.00	0.0	35.68	28.22	63.90	849.79	12916.75	711786.	562965.	1274751.
660627	76.76	3.00	0.0	35.68	6.92	42.60	849.83	12947.91	712077.	138105.	850182.
660628	76.76	3.01	0.0	35.68	6.92	42.60	849.87	12979.05	712368.	138161.	850529.
660629	76.76	3.01	0.0	35.68	28.22	63.90	849.88	12988.89	712441.	563483.	1275924.
660630	76.76	3.01	0.0	35.68	6.92	42.60	849.92	13020.04	712732.	138232.	850964.
660600	2302.80	88.57	0.0	1070.40	583.57	1653.97	25483.90	380230.96	21282245.	11590322.	32872567.
660701	24.51	5.75	0.0	35.68	32.32	68.00	849.86	12970.80	712296.	645218.	1357514.
660702	24.51	5.73	0.0	35.68	32.32	68.00	849.80	12921.57	711859.	644823.	1356682.
660703	24.51	5.72	0.0	35.68	32.32	68.00	849.73	12872.37	711349.	644361.	1355710.
660704	24.51	5.70	0.0	35.68	32.32	68.00	849.67	12823.18	710913.	643966.	1354879.
660705	24.51	5.68	0.0	35.68	32.32	68.00	849.60	12774.02	710403.	643504.	1353907.
660706	24.51	5.66	0.0	35.68	32.32	68.00	849.53	12724.86	709894.	643043.	1352937.
660707	24.51	5.65	0.0	35.69	32.32	68.00	849.47	12675.73	709457.	642647.	1352104.
660708	24.51	5.63	0.0	35.68	32.32	68.00	849.40	12626.61	708947.	642185.	1351132.
660709	24.51	5.61	0.0	35.68	32.32	68.00	849.33	12577.51	708438.	641724.	1350162.
660710	24.51	5.59	0.0	35.68	32.32	68.00	849.27	12528.43	708001.	641328.	1349329.
660711	24.51	5.58	0.0	35.68	32.32	68.00	849.20	12479.36	707492.	640867.	1348359.
660712	24.51	5.56	0.0	35.68	32.32	68.00	849.13	12430.31	706982.	640405.	1347387.
660713	24.51	5.54	0.0	35.68	32.32	68.00	849.06	12381.29	706473.	639944.	1346417.
660714	24.51	5.52	0.0	35.68	32.32	68.00	849.00	12332.27	706036.	639548.	1345584.
660715	24.51	5.51	0.0	35.68	32.32	68.00	848.93	12283.28	705526.	639087.	1344613.
660716	24.51	5.49	0.0	35.68	32.32	68.00	848.86	12234.30	705017.	638625.	1343642.
660717	24.51	5.47	0.0	35.68	32.32	68.00	848.79	12185.34	704507.	638164.	1342671.
660718	24.51	5.45	0.0	35.68	32.32	68.00	848.72	12136.40	703998.	637702.	1341700.
660719	24.51	5.43	0.0	35.68	32.32	68.00	848.65	12087.48	703488.	637241.	1340729.
660720	24.51	5.42	0.0	35.68	32.32	68.00	848.58	12038.57	702979.	636779.	1339758.
660721	24.51	5.40	0.0	35.68	32.32	68.00	848.51	11989.69	702469.	636317.	1338786.
660722	24.51	5.38	0.0	35.68	32.32	68.00	848.44	11940.82	701960.	635856.	1337816.
660723	24.51	5.36	0.0	35.68	32.32	68.00	848.37	11891.96	701450.	635394.	1336844.
660724	24.51	5.34	0.0	35.68	32.32	68.00	848.30	11843.13	700941.	634933.	1335874.
660725	24.51	5.33	0.0	35.68	32.32	68.00	848.23	11794.32	700431.	634471.	1334902.
660726	24.51	5.31	0.0	35.68	32.32	68.00	848.15	11745.52	699849.	633944.	1333793.
660727	24.51	5.29	0.0	35.68	32.32	68.00	848.08	11696.74	699339.	633482.	1332821.
660728	24.51	5.27	0.0	35.68	32.32	68.00	848.01	11647.98	698830.	633021.	1331851.
660729	24.51	5.25	0.0	35.68	32.32	68.00	847.94	11599.24	698320.	632559.	1330879.
660730	24.51	5.23	0.0	35.68	32.32	68.00	847.86	11550.52	697738.	632032.	1329770.
660731	24.51	5.22	0.0	35.68	32.32	68.00	847.79	11501.81	697229.	631570.	1328799.
660700	759.81	170.07	0.0	1106.08	1001.92	2108.00	26314.26	379285.41	21852611.	19794740.	41647351.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
660801	8.12	4.79	0.0	35.68	21.92	57.60	847.71	11447.54	696646.	427984.	1124630.
660802	8.12	4.77	0.0	35.68	21.92	57.60	847.63	11393.29	696064.	427627.	1123691.
660803	8.12	4.75	0.0	35.68	21.92	57.60	847.54	11339.05	695409.	427224.	1122633.
660804	8.12	4.73	0.0	35.68	21.92	57.60	847.46	11284.84	694827.	426867.	1121694.
660805	8.12	4.71	0.0	35.68	21.92	57.60	847.38	11230.65	694244.	426509.	1120753.
660806	8.12	4.69	0.0	35.68	21.92	57.60	847.29	11176.47	693589.	426106.	1119695.
660807	8.12	4.67	0.0	35.68	21.92	57.60	847.21	11122.31	693007.	425749.	1118756.
660808	8.12	4.65	0.0	35.68	21.92	57.60	847.13	11068.18	692425.	425391.	1117816.
660809	8.12	4.64	0.0	35.68	21.92	57.60	847.04	11014.06	691770.	424988.	1116758.
660810	8.12	4.62	0.0	35.68	21.92	57.60	846.96	10959.96	691187.	424631.	1115818.
660811	8.12	4.60	0.0	35.68	21.92	57.60	846.87	10905.88	690532.	424228.	1114760.
660812	8.12	4.58	0.0	35.68	21.92	57.60	846.78	10851.82	689877.	423826.	1113703.
660813	8.12	4.56	0.0	35.68	21.92	57.60	846.70	10797.78	689295.	423468.	1112763.
660814	8.12	4.54	0.0	35.68	21.92	57.60	846.61	10743.75	688640.	423066.	1111706.
660815	8.12	4.52	0.0	35.68	21.92	57.60	846.52	10689.75	687985.	422663.	1110648.
660816	8.12	4.50	0.0	35.68	21.92	57.60	846.44	10635.77	687402.	422305.	1109707.
660817	8.12	4.48	0.0	35.68	21.92	57.60	846.35	10581.80	686747.	421903.	1108650.
660818	8.12	4.46	0.0	35.68	21.92	57.60	846.26	10527.86	686092.	421501.	1107593.
660819	8.12	4.44	0.0	35.68	21.92	57.60	846.17	10473.93	685437.	421098.	1106535.
660820	8.12	4.42	0.0	35.68	21.92	57.60	846.08	10420.03	684782.	420696.	1105478.
660821	8.12	4.40	0.0	35.68	21.92	57.60	845.99	10366.14	684127.	420293.	1104420.
660822	8.12	4.38	0.0	35.68	21.92	57.60	845.91	10312.28	683545.	419935.	1103480.
660823	8.12	4.36	0.0	35.68	21.92	57.60	845.82	10258.43	682890.	419533.	1102423.
660824	8.12	4.34	0.0	35.68	21.92	57.60	845.73	10204.60	682234.	419131.	1101365.
660825	8.12	4.32	0.0	35.68	21.92	57.60	845.63	10150.80	681507.	418683.	1100190.
660826	8.12	4.30	0.0	35.68	21.92	57.60	845.54	10097.01	680851.	418281.	1099132.
660827	8.12	4.28	0.0	35.68	21.92	57.60	845.45	10043.24	680196.	417878.	1098074.
660828	8.12	4.27	0.0	35.68	21.92	57.60	845.36	9989.49	679541.	417476.	1097017.
660829	8.12	4.24	0.0	35.68	21.92	57.60	845.27	9935.76	678886.	417074.	1095960.
660830	8.12	4.22	0.0	35.68	21.92	57.60	845.18	9882.05	678231.	416671.	1094902.
660831	8.12	4.20	0.0	35.68	21.92	57.60	845.08	9828.37	677503.	416224.	1093727.
660800	251.72	139.43	0.0	1106.08	679.52	1785.60	26239.09	329732.89	21305468.	13089009.	34394477.
660901	9.40	2.35	0.0	35.68	0.0	35.68	845.03	9799.74	677139.	0.0	677139.
660902	9.40	2.34	0.0	35.68	0.0	35.68	844.98	9771.12	676775.	0.0	676775.
660903	9.40	2.34	0.0	35.68	0.0	35.68	844.93	9742.51	676411.	0.0	676411.
660904	9.40	2.33	0.0	35.68	0.0	35.68	844.88	9713.90	676048.	0.0	676048.
660905	9.40	2.32	0.0	35.68	0.0	35.68	844.83	9685.30	675684.	0.0	675684.
660906	9.40	2.32	0.0	35.68	0.0	35.68	844.78	9656.70	675320.	0.0	675320.
660907	9.40	2.31	0.0	35.68	0.0	35.68	844.73	9628.11	674956.	0.0	674956.
660908	9.40	2.31	0.0	35.68	0.0	35.68	844.68	9599.53	674592.	0.0	674592.
660909	9.40	2.30	0.0	35.68	0.0	35.68	844.63	9570.95	674228.	0.0	674228.
660910	9.40	2.29	0.0	35.68	0.0	35.68	844.58	9542.37	673864.	0.0	673864.
660911	9.40	2.29	0.0	35.68	0.0	35.68	844.53	9513.81	673500.	0.0	673500.
660912	9.40	2.28	0.0	35.68	0.0	35.68	844.48	9485.25	673136.	0.0	673136.
660913	9.40	2.28	0.0	35.68	0.0	35.68	844.43	9456.70	672772.	0.0	672772.
660914	9.40	2.27	0.0	35.68	0.0	35.68	844.38	9428.15	672408.	0.0	672408.
660915	9.40	2.26	0.0	35.68	0.0	35.68	844.33	9399.61	672044.	0.0	672044.
660916	9.40	2.26	0.0	35.68	0.0	35.68	844.28	9371.07	671680.	0.0	671680.
660917	9.40	2.25	0.0	35.68	0.0	35.68	844.23	9342.54	671316.	0.0	671316.
660918	9.40	2.25	0.0	35.68	0.0	35.68	844.18	9314.02	670952.	0.0	670952.
660919	9.40	2.24	0.0	35.68	0.0	35.68	844.12	9285.50	670516.	0.0	670516.
660920	9.40	2.23	0.0	35.68	0.0	35.68	844.07	9256.99	670152.	0.0	670152.
660921	9.40	2.23	0.0	35.68	0.0	35.68	844.02	9228.48	669788.	0.0	669788.
660922	9.40	2.22	0.0	35.68	0.0	35.68	843.97	9199.99	669424.	0.0	669424.
660923	9.40	2.21	0.0	35.68	0.0	35.68	843.92	9171.49	669060.	0.0	669060.
660924	9.40	2.21	0.0	35.68	0.0	35.68	843.87	9143.01	668696.	0.0	668696.
660925	9.40	2.20	0.0	35.68	0.0	35.68	843.81	9114.53	668259.	0.0	668259.
660926	9.40	2.20	0.0	35.68	0.0	35.68	843.76	9086.05	667895.	0.0	667895.
660927	9.40	2.19	0.0	35.68	0.0	35.68	843.71	9057.58	667531.	0.0	667531.
660928	9.40	2.18	0.0	35.68	0.0	35.68	843.66	9029.12	667167.	0.0	667167.
660929	9.40	2.18	0.0	35.68	0.0	35.68	843.61	9000.66	666804.	0.0	666804.
660930	9.40	2.17	0.0	35.68	0.0	35.68	843.55	8972.21	666367.	0.0	666367.
660900	282.00	67.81	0.0	1070.40	0.0	1070.40	25328.96	281567.00	20154484.	0.0	20154484.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
661001	10.57	1.08	0.0	35.68	0.0	35.68	843.51	8946.02	666076.	0.0	666076.
661002	10.57	1.08	0.0	35.68	0.0	35.68	843.46	8919.83	665712.	0.0	665712.
661003	10.57	1.08	0.0	35.68	0.0	35.68	843.41	8893.64	665348.	0.0	665348.
661004	10.57	1.07	0.0	35.68	0.0	35.68	843.36	8867.46	664984.	0.0	664984.
661005	10.57	1.07	0.0	35.68	0.0	35.68	843.31	8841.28	664620.	0.0	664620.
661006	10.57	1.07	0.0	35.68	0.0	35.68	843.26	8815.10	664256.	0.0	664256.
661007	10.57	1.07	0.0	35.68	0.0	35.68	843.21	8788.92	663892.	0.0	663892.
661008	10.57	1.06	0.0	35.68	0.0	35.68	843.16	8762.75	663528.	0.0	663528.
661009	10.57	1.06	0.0	35.68	0.0	35.68	843.12	8736.58	663237.	0.0	663237.
661010	10.57	1.06	0.0	35.68	0.0	35.68	843.07	8710.41	662873.	0.0	662873.
661011	10.57	1.05	0.0	35.68	0.0	35.68	843.02	8684.25	662509.	0.0	662509.
661012	10.57	1.05	0.0	35.68	0.0	35.68	842.97	8658.09	662145.	0.0	662145.
661013	10.57	1.05	0.0	35.68	0.0	35.68	842.92	8631.93	661781.	0.0	661781.
661014	10.57	1.05	0.0	35.68	0.0	35.68	842.87	8605.77	661417.	0.0	661417.
661015	10.57	1.04	0.0	35.68	0.0	35.68	842.82	8579.62	661053.	0.0	661053.
661016	10.57	1.04	0.0	35.68	0.0	35.68	842.77	8553.47	660689.	0.0	660689.
661017	10.57	1.04	0.0	35.68	0.0	35.68	842.72	8527.32	660325.	0.0	660325.
661018	10.57	1.03	0.0	35.68	0.0	35.68	842.67	8501.18	659962.	0.0	659962.
661019	10.57	1.03	0.0	35.68	0.0	35.68	842.62	8475.04	659598.	0.0	659598.
661020	10.57	1.03	0.0	35.68	0.0	35.68	842.57	8448.89	659234.	0.0	659234.
661021	10.57	1.03	0.0	35.68	0.0	35.68	842.52	8422.76	658870.	0.0	658870.
661022	10.57	1.02	0.0	35.68	0.0	35.68	842.47	8396.63	658506.	0.0	658506.
661023	10.57	1.02	0.0	35.68	0.0	35.68	842.42	8370.50	658142.	0.0	658142.
661024	10.57	1.02	0.0	35.68	0.0	35.68	842.37	8344.37	657778.	0.0	657778.
661025	10.57	1.01	0.0	35.68	0.0	35.68	842.32	8318.25	657414.	0.0	657414.
661026	10.57	1.01	0.0	35.68	0.0	35.68	842.27	8292.12	657050.	0.0	657050.
661027	10.57	1.01	0.0	35.68	0.0	35.68	842.22	8266.00	656686.	0.0	656686.
661028	10.57	1.01	0.0	35.68	0.0	35.68	842.17	8239.89	656322.	0.0	656322.
661029	10.57	1.00	0.0	35.68	0.0	35.68	842.12	8213.78	655958.	0.0	655958.
661030	10.57	1.00	0.0	35.68	0.0	35.68	842.07	8187.67	655594.	0.0	655594.
661031	10.57	1.00	0.0	35.68	0.0	35.68	842.01	8161.56	655158.	0.0	655158.
661000	327.67	32.24	0.0	1106.08	0.0	1106.08	26125.78	265161.09	20480717.	0.0	20480717.
661101	13.23	0.36	0.0	35.68	0.0	35.68	841.97	8138.75	654866.	0.0	654866.
661102	13.23	0.36	0.0	35.68	0.0	35.68	841.93	8115.93	654575.	0.0	654575.
661103	13.23	0.36	0.0	35.68	0.0	35.68	841.88	8093.12	654211.	0.0	654211.
661104	13.23	0.36	0.0	35.68	0.0	35.68	841.84	8070.30	653920.	0.0	653920.
661105	13.23	0.36	0.0	35.68	0.0	35.68	841.79	8047.49	653556.	0.0	653556.
661106	13.23	0.36	0.0	35.68	0.0	35.68	841.75	8024.68	653265.	0.0	653265.
661107	13.23	0.36	0.0	35.68	0.0	35.68	841.70	8001.87	652901.	0.0	652901.
661108	13.23	0.36	0.0	35.68	0.0	35.68	841.66	7979.06	652610.	0.0	652610.
661109	13.23	0.36	0.0	35.68	0.0	35.68	841.61	7956.26	652246.	0.0	652246.
661110	13.23	0.36	0.0	35.68	0.0	35.68	841.57	7933.45	651955.	0.0	651955.
661111	13.23	0.35	0.0	35.68	0.0	35.68	841.52	7910.64	651591.	0.0	651591.
661112	13.23	0.35	0.0	35.68	0.0	35.68	841.48	7887.84	651300.	0.0	651300.
661113	13.23	0.35	0.0	35.68	0.0	35.68	841.43	7865.04	650936.	0.0	650936.
661114	13.23	0.35	0.0	35.68	0.0	35.68	841.38	7842.23	650572.	0.0	650572.
661115	13.23	0.35	0.0	35.68	0.0	35.68	841.34	7819.43	650281.	0.0	650281.
661116	13.23	0.35	0.0	35.68	0.0	35.68	841.29	7796.63	649917.	0.0	649917.
661117	13.23	0.35	0.0	35.68	0.0	35.68	841.25	7773.83	649626.	0.0	649676.
661118	13.23	0.35	0.0	35.68	0.0	35.68	841.20	7751.03	649262.	0.0	649262.
661119	13.23	0.35	0.0	35.68	0.0	35.68	841.16	7728.23	648971.	0.0	648971.
661120	13.23	0.35	0.0	35.68	0.0	35.68	841.11	7705.43	648607.	0.0	648607.
661121	13.23	0.35	0.0	35.68	0.0	35.68	841.06	7682.64	648243.	0.0	648243.
661122	13.23	0.34	0.0	35.68	0.0	35.68	841.02	7659.84	647952.	0.0	647952.
661123	13.23	0.34	0.0	35.68	0.0	35.68	840.97	7637.05	647588.	0.0	647588.
661124	13.23	0.34	0.0	35.68	0.0	35.68	840.93	7614.25	647297.	0.0	647297.
661125	13.23	0.34	0.0	35.68	0.0	35.68	840.88	7591.46	646933.	0.0	646933.
661126	13.23	0.34	0.0	35.68	0.0	35.68	840.83	7568.67	646569.	0.0	646569.
661127	13.23	0.34	0.0	35.68	0.0	35.68	840.79	7545.88	646278.	0.0	646278.
661128	13.23	0.34	0.0	35.68	0.0	35.68	840.74	7523.09	645914.	0.0	645914.
661129	13.23	0.34	0.0	35.68	0.0	35.68	840.69	7500.30	645550.	0.0	645550.
661130	13.23	0.34	0.0	35.68	0.0	35.68	840.65	7477.51	645259.	0.0	645259.
661100	396.90	10.51	0.0	1070.40	0.0	1070.40	25239.42	234241.93	19502751.	0.0	19502751.

Table II 4-12 (Continue)

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
661201	20.33	0.0	0.0	35.68	0.0	35.68	840.62	7462.16	645040.	0.0	645040.
661202	20.33	0.0	0.0	35.68	0.0	35.68	840.58	7446.80	644749.	0.0	644749.
661203	20.33	0.0	0.0	35.68	0.0	35.68	840.55	7431.45	644531.	0.0	644531.
661204	20.33	0.0	0.0	35.68	0.0	35.68	840.52	7416.09	644312.	0.0	644312.
661205	20.33	0.0	0.0	35.68	0.0	35.68	840.49	7400.74	644094.	0.0	644094.
661206	20.33	0.0	0.0	35.68	0.0	35.68	840.46	7385.39	643876.	0.0	643876.
661207	20.33	0.0	0.0	35.68	0.0	35.68	840.43	7370.03	643657.	0.0	643657.
661208	20.33	0.0	0.0	35.68	0.0	35.68	840.40	7354.68	643439.	0.0	643439.
661209	20.33	0.0	0.0	35.68	0.0	35.68	840.36	7339.32	643148.	0.0	643148.
661210	20.33	0.0	0.0	35.68	0.0	35.68	840.33	7323.97	642929.	0.0	642929.
661211	20.33	0.0	0.0	35.68	0.0	35.68	840.30	7308.61	642711.	0.0	642711.
661212	20.33	0.0	0.0	35.68	0.0	35.68	840.27	7293.26	642493.	0.0	642493.
661213	20.33	0.0	0.0	35.68	0.0	35.68	840.24	7277.90	642274.	0.0	642274.
661214	20.33	0.0	0.0	35.68	0.0	35.68	840.20	7262.55	641983.	0.0	641983.
661215	20.33	0.0	0.0	35.68	0.0	35.68	840.17	7247.20	641765.	0.0	641765.
661216	20.33	0.0	0.0	35.68	0.0	35.68	840.14	7231.84	641546.	0.0	641546.
661217	20.33	0.0	0.0	35.68	0.0	35.68	840.11	7216.48	641328.	0.0	641328.
661218	20.33	0.0	0.0	35.68	0.0	35.68	840.08	7201.13	641110.	0.0	641110.
661219	20.33	0.0	0.0	35.68	0.0	35.68	840.05	7185.78	640891.	0.0	640891.
661220	20.33	0.0	0.0	35.68	0.0	35.68	840.01	7170.42	640600.	0.0	640600.
661221	20.33	0.0	0.0	35.68	0.0	35.68	839.98	7155.07	640382.	0.0	640382.
661222	20.33	0.0	0.0	35.68	0.0	35.68	839.95	7139.71	640163.	0.0	640163.
661223	20.33	0.0	0.0	35.68	0.0	35.68	839.92	7124.36	639945.	0.0	639945.
661224	20.33	0.0	0.0	35.68	0.0	35.68	839.88	7109.00	639654.	0.0	639654.
661225	20.33	0.0	0.0	35.68	0.0	35.68	839.85	7093.65	639436.	0.0	639436.
661226	20.33	0.0	0.0	35.68	0.0	35.68	839.82	7078.29	639217.	0.0	639217.
661227	20.33	0.0	0.0	35.68	0.0	35.68	839.79	7062.94	638999.	0.0	638999.
661228	20.33	0.0	0.0	35.68	0.0	35.68	839.75	7047.59	638708.	0.0	638708.
661229	20.33	0.0	0.0	35.68	0.0	35.68	839.72	7032.23	638489.	0.0	638489.
661230	20.33	0.0	0.0	35.68	0.0	35.68	839.69	7016.87	638271.	0.0	638271.
661231	20.33	0.0	0.0	35.68	0.0	35.68	839.65	7001.52	637980.	0.0	637980.
661200	630.23	0.0	0.0	1106.08	0.0	1106.08	26044.31	224187.04	19887720.	0.0	19887720.
670101	17.07	0.0	0.0	35.68	0.0	35.68	839.61	6982.91	637689.	0.0	637689.
670102	17.07	0.0	0.0	35.68	0.0	35.68	839.57	6964.29	637398.	0.0	637398.
670103	17.07	0.0	0.0	35.68	0.0	35.68	839.53	6945.68	637106.	0.0	637106.
670104	17.07	0.0	0.0	35.68	0.0	35.68	839.49	6927.07	636815.	0.0	636815.
670105	17.07	0.0	0.0	35.68	0.0	35.68	839.45	6908.45	636524.	0.0	636524.
670106	17.07	0.0	0.0	35.68	0.0	35.68	839.41	6889.84	636233.	0.0	636233.
670107	17.07	0.0	0.0	35.68	0.0	35.68	839.37	6871.23	635942.	0.0	635942.
670108	17.07	0.0	0.0	35.68	0.0	35.68	839.33	6852.61	635651.	0.0	635651.
670109	17.07	0.0	0.0	35.68	0.0	35.68	839.29	6834.00	635359.	0.0	635359.
670110	17.07	0.0	0.0	35.68	0.0	35.68	839.25	6815.38	635068.	0.0	635068.
670111	17.07	0.0	0.0	35.68	0.0	35.68	839.20	6796.77	634704.	0.0	634704.
670112	17.07	0.0	0.0	35.68	0.0	35.68	839.16	6778.16	634413.	0.0	634413.
670113	17.07	0.0	0.0	35.68	0.0	35.68	839.12	6759.54	634122.	0.0	634122.
670114	17.07	0.0	0.0	35.68	0.0	35.68	839.08	6740.93	633831.	0.0	633831.
670115	17.07	0.0	0.0	35.68	0.0	35.68	839.04	6722.31	633540.	0.0	633540.
670116	17.07	0.0	0.0	35.68	0.0	35.68	839.00	6703.70	633249.	0.0	633249.
670117	17.07	0.0	0.0	35.68	0.0	35.68	838.95	6685.09	632885.	0.0	632885.
670118	17.07	0.0	0.0	35.68	0.0	35.68	838.91	6666.47	632594.	0.0	632594.
670119	17.07	0.0	0.0	35.68	0.0	35.68	838.87	6647.86	632302.	0.0	632302.
670120	17.07	0.0	0.0	35.68	0.0	35.68	838.83	6629.25	632011.	0.0	632011.
670121	17.07	0.0	0.0	35.68	0.0	35.68	838.78	6610.63	631647.	0.0	631647.
670122	17.07	0.0	0.0	35.68	0.0	35.68	838.74	6592.02	631356.	0.0	631356.
670123	17.07	0.0	0.0	35.68	0.0	35.68	838.70	6573.40	631065.	0.0	631065.
670124	17.07	0.0	0.0	35.68	0.0	35.68	838.66	6554.79	630774.	0.0	630774.
670125	17.07	0.0	0.0	35.68	0.0	35.68	838.61	6536.18	630410.	0.0	630410.
670126	17.07	0.0	0.0	35.68	0.0	35.68	838.57	6517.56	630119.	0.0	630119.
670127	17.07	0.0	0.0	35.68	0.0	35.68	838.53	6498.95	629828.	0.0	629828.
670128	17.07	0.0	0.0	35.68	0.0	35.68	838.48	6480.33	629464.	0.0	629464.
670129	17.07	0.0	0.0	35.68	0.0	35.68	838.44	6461.72	629173.	0.0	629173.
670130	17.07	0.0	0.0	35.68	0.0	35.68	838.40	6443.11	628881.	0.0	628881.
670131	17.07	0.0	0.0	35.68	0.0	35.68	838.35	6424.49	628517.	0.0	628517.
670100	529.17	0.0	0.0	1106.08	0.0	1106.08	26008.72	207814.72	19628670.	0.0	19628670.

HYDROELECTRIC WATER UTILIZATION POWER STUDY KILICKAYA 850.0 METER AYVACIK 190.0 METER INSTALLED CAPACITY 123,000 KW

DATE	QI	QEV	QSP	QF	QS	QE	H	VK	PF	PS	P
670201	17.94	0.0	0.0	35.68	0.0	35.68	838.31	6406.75	628226.	0.0	628226.
670202	17.94	0.0	0.0	35.68	0.0	35.68	838.27	6389.01	627935.	0.0	627935.
670203	17.94	0.0	0.0	35.68	0.0	35.68	838.23	6371.27	627644.	0.0	627644.
670204	17.94	0.0	0.0	35.68	0.0	35.68	838.19	6353.53	627353.	0.0	627353.
670205	17.94	0.0	0.0	35.68	0.0	35.68	838.14	6335.79	626989.	0.0	626989.
670206	17.94	0.0	0.0	35.68	0.0	35.68	838.10	6318.05	626698.	0.0	626698.
670207	17.94	0.0	0.0	35.68	0.0	35.68	838.06	6300.31	626407.	0.0	626407.
670208	17.94	0.0	0.0	35.68	0.0	35.68	838.02	6282.57	626115.	0.0	626115.
670209	17.94	0.0	0.0	35.68	0.0	35.68	837.97	6264.83	625752.	0.0	625752.
670210	17.94	0.0	0.0	35.68	0.0	35.68	837.93	6247.09	625460.	0.0	625460.
670211	17.94	0.0	0.0	35.68	0.0	35.68	837.89	6229.35	625169.	0.0	625169.
670212	17.94	0.0	0.0	35.68	0.0	35.68	837.85	6211.61	624878.	0.0	624878.
670213	17.94	0.0	0.0	35.68	0.0	35.68	837.80	6193.87	624514.	0.0	624514.
670214	17.94	0.0	0.0	35.68	0.0	35.68	837.76	6176.13	624223.	0.0	624223.
670215	17.94	0.0	0.0	35.68	0.0	35.68	837.72	6158.39	623932.	0.0	623932.
670216	17.94	0.0	0.0	35.68	0.0	35.68	837.67	6140.65	623568.	0.0	623568.
670217	17.94	0.0	0.0	35.68	0.0	35.68	837.63	6122.91	623277.	0.0	623277.
670218	17.94	0.0	0.0	35.68	0.0	35.68	837.59	6105.16	622986.	0.0	622986.
670219	17.94	0.0	0.0	35.68	0.0	35.68	837.54	6087.43	622622.	0.0	622622.
670220	17.94	0.0	0.0	35.68	0.0	35.68	837.50	6069.68	622331.	0.0	622331.
670221	17.94	0.0	0.0	35.68	0.0	35.68	837.46	6051.95	622039.	0.0	622039.
670222	17.94	0.0	0.0	35.68	0.0	35.68	837.41	6034.20	621675.	0.0	621675.
670223	17.94	0.0	0.0	35.68	0.0	35.68	837.37	6016.46	621384.	0.0	621384.
670224	17.94	0.0	0.0	35.68	0.0	35.68	837.32	5998.72	621020.	0.0	621020.
670225	17.94	0.0	0.0	35.68	0.0	35.68	837.28	5980.98	620729.	0.0	620729.
670226	17.94	0.0	0.0	35.68	0.0	35.68	837.24	5963.24	620438.	0.0	620438.
670227	17.94	0.0	0.0	35.68	0.0	35.68	837.19	5945.50	620074.	0.0	620074.
670228	17.94	0.0	0.0	35.68	0.0	35.68	837.15	5927.76	619783.	0.0	619783.
670200	502.32	0.0	0.0	999.04	0.0	999.04	23456.59	172683.19	17473221.	0.0	17473221.
670301	39.20	0.45	0.0	35.68	6.92	42.60	837.14	5923.91	619710.	120190.	739900.
670302	39.20	0.45	0.0	35.68	6.92	42.60	837.13	5920.05	619637.	120176.	739813.
670303	39.20	0.45	0.0	35.68	6.92	42.60	837.12	5916.20	619565.	120162.	739727.
670304	39.20	0.45	0.0	35.68	6.92	42.60	837.11	5912.35	619492.	120148.	739640.
670305	39.20	0.45	0.0	35.68	6.92	42.60	837.10	5908.49	619419.	120134.	739553.
670306	39.20	0.45	0.0	35.68	6.92	42.60	837.09	5904.64	619346.	120120.	739466.
670307	39.20	0.45	0.0	35.68	6.92	42.60	837.08	5900.79	619273.	120106.	739379.
670308	39.20	0.45	0.0	35.68	6.92	42.60	837.07	5896.93	619201.	120092.	739293.
670309	39.20	0.45	0.0	35.68	6.92	42.60	837.06	5893.08	619128.	120078.	739206.
670310	39.20	0.45	0.0	35.68	6.92	42.60	837.05	5889.23	619055.	120063.	739118.
670311	39.20	0.45	0.0	35.68	6.92	42.60	837.04	5885.37	618982.	120049.	739031.
670312	39.20	0.45	0.0	35.68	6.92	42.60	837.03	5881.52	618910.	120035.	738945.
670313	39.20	0.45	0.0	35.68	6.92	42.60	837.02	5877.67	618837.	120021.	738858.
670314	39.20	0.45	0.0	35.68	6.92	42.60	837.01	5873.82	618764.	120007.	738771.
670315	39.20	0.45	0.0	35.68	6.92	42.60	837.00	5869.97	618691.	119993.	738684.
670316	39.20	0.45	0.0	35.68	6.92	42.60	836.99	5866.12	618618.	119979.	738597.
670317	39.20	0.45	0.0	35.68	6.92	42.60	836.98	5862.27	618546.	119965.	738511.
670318	39.20	0.45	0.0	35.68	6.92	42.60	836.97	5858.41	618473.	119950.	738423.
670319	39.20	0.45	0.0	35.68	6.92	42.60	836.96	5854.56	618400.	119936.	738336.
670320	39.20	0.45	0.0	35.68	6.92	42.60	836.95	5850.71	618327.	119922.	738249.
670321	39.20	0.45	0.0	35.68	6.92	42.60	836.94	5846.86	618254.	119908.	738162.
670322	39.20	0.45	0.0	35.68	6.92	42.60	836.93	5843.01	618182.	119894.	738076.
670323	39.20	0.45	0.0	35.68	6.92	42.60	836.92	5839.16	618109.	119880.	737989.
670324	39.20	0.45	0.0	35.68	6.92	42.60	836.91	5835.31	618036.	119866.	737902.
670325	39.20	0.45	0.0	35.68	6.92	42.60	836.90	5831.46	617963.	119852.	737815.
670326	39.20	0.44	0.0	35.68	6.92	42.60	836.89	5827.61	617891.	119838.	737729.
670327	39.20	0.44	0.0	35.68	6.92	42.60	836.88	5823.76	617818.	119823.	737641.
670328	39.20	0.44	0.0	35.68	6.92	42.60	836.87	5819.91	617745.	119809.	737554.
670329	39.20	0.44	0.0	35.68	6.92	42.60	836.87	5816.06	617745.	119809.	737554.
670330	39.20	0.44	0.0	35.68	6.92	42.60	836.86	5812.21	617672.	119795.	737467.
670331	39.20	0.44	0.0	35.68	6.92	42.60	836.85	5808.36	617599.	119781.	737380.
670300	1215.20	13.89	0.0	1106.08	214.52	1320.60	25946.72	181849.81	19177388.	3719381.	22896769.
670000	18479.13	627.79	1033.33	13023.20	7007.35	20030.55	********	3293998.15	242512752.	134754840.	377267592.

Table II 4-13

Kilickaya Power Production Case 10 Reservoir High Water Level 855m Firm Discharge 46.20m^3/sec

NEN	4	5	6	7	8	9	KAHIKI	10	11	12	1	2	3	11-2	TOTAL
39	482035	539264	307399	295484	291690	278489	2154361	283906	271148	276982	273820	254319	272417	1076265	3826553
40	485915	987675	578395	299943	297193	283850	2932971	290059	278568	286357	284511	256657	522695	1106093	4851818
41	846688	1058480	415149	297461	293906	280395	3192083	285947	274804	282114	278990	249802	413949	1085710	4917689
42	473462	943717	413628	296941	292663	278786	2659197	284076	273491	282425	280655	250991	311531	1087562	4382366
43	397208	609403	440011	298000	293864	279953	2318439	284677	271193	276266	272348	251447	285725	1071254	3964095
44	386317	534199	568993	299090	295496	281900	2365995	287164	274712	280845	276953	246441	269331	1078951	4001441
45	256810	275739	277713	285177	280091	265677	1641207	269266	255294	257687	250847	220190	240635	984018	3135126
46	248667	281581	284161	293786	289760	275518	1673873	281643	269529	274135	269533	240167	270221	1053364	3279101
47	270109	282453	271632	276246	270036	254832	1625308	256143	242631	245615	238628	216635	224381	943509	3049341
48	235596	273671	277196	286039	280827	266409	1619738	269747	255321	257271	249752	218508	236270	980852	3106607
49	236919	271236	275716	282175	276543	262002	1604591	264701	249701	250680	246079	220794	245154	967254	3081700
50	258766	344212	303095	295528	291125	277078	1769804	282117	269417	274286	269851	235586	265586	1053140	3371047
51	264408	283833	281527	290121	285598	271642	1677129	276776	265875	271544	266984	247773	266793	1052176	3272874
52	368167	617726	368750	297583	293534	279686	2225446	284377	270509	274745	269863	239675	261709	1054792	3826224
53	264203	373492	337369	298216	294371	280677	1848328	285794	272502	277725	274103	244650	338626	1069180	3542128
54	490343	988584	664182	299863	296505	283350	3023227	288540	275018	279829	275431	245348	269386	1075626	4656779
55	263294	277430	268635	272464	265700	249851	1597374	249993	233563	222431	222207	199964	208207	888267	2943641
56	224080	261048	262522	270316	264252	248990	1531208	245915	234344	235786	228360	198520	225024	897410	2903557
57	236973	266355	268430	277072	271722	256974	1577526	258840	243595	244329	236379	206219	226750	930522	2993678
58	238344	267465	266358	274310	268623	253549	1568659	254862	239246	239230	230300	198589	215665	907765	2946951
59	225115	255677	258027	266216	259645	243480	1508164	243731	228518	228322	218537	198328	216272	874105	2842272
60	245282	286723	287075	295883	292294	278800	1686057	283751	270301	274790	269982	239478	261572	1054551	3265531
61	259393	276519	268443	273303	266521	250662	1594841	250999	235288	237085	230539	201957	233986	904867	2984693
62	248005	273744	271397	277465	271296	255684	1597591	256454	240508	242314	237928	212494	237647	933244	3024936
63	248933	281873	470064	300179	297404	283954	1882407	289280	276063	281273	276736	254821	271394	1088893	3521974
64	345736	481041	521824	298894	294887	280984	2223366	285805	272248	277176	272885	242409	268936	1064718	3842825
65	345923	441157	307761	296485	292238	277778	1961342	282499	269503	275998	276008	250932	420047	1072841	3736729
66	467148	739405	479572	299200	295410	281398	2562133	286198	272622	277753	273806	243624	267146	1067805	4183282
99	9313839	12773702	9995024	8093440	7963808	7562752	55702365	7667260	7286310	7394995	7252115	6491318	7751695	28424738	99546058
88	332637	456204	356965	289051	284415	270098	1989370	273831	260225	264107	259004	231833	276846	1015169	3555216
88	259908	284802	281161	289051	284415	270098	1669435	273831	260225	264107	259004	231833	254320	1015169	3212755

Firm Energy

Table II 4-14

Kilickaya Power Production Case 14 Reservoir High Water Level 850m Firm Discharge 41 80m^3/sec

NEN	4	5	6	7	8	9	KAHIKI	10	11	12	1	2	3	11-2	TOTAL
39	256714	377747	348604	251672	247931	236146	1718814	240125	228773	233273	230160	213730	229992	905936	3094867
40	470838	911035	566258	258048	255584	243701	2705464	248750	238891	245768	244305	220845	485150	949805	4369173
41	811837	911035	492876	253624	250139	237976	2957487	242081	232652	238885	235873	211080	256541	918494	4374603
42	496151	911035	489393	253050	248701	236098	2634428	239891	231139	239321	237913	212543	233532	920516	4028767
43	340355	731060	527076	254060	249867	237223	2339641	240303	228059	231557	227332	209019	228451	895967	3704362
44	304981	643660	560589	257162	253746	241564	2261702	245518	234556	239538	235713	209176	228068	918983	3654271
45	216892	237046	242153	248998	244313	231342	1420744	234077	221659	223383	217016	190046	208040	852104	2714965
46	218706	372435	537888	256519	252966	240695	1879209	245672	235126	238908	234624	209093	290411	917751	3333043
47	346370	246868	237742	241673	235820	222229	1530702	223015	211239	213936	207623	189028	196557	821826	2772100
48	208915	253812	454637	253389	248662	236055	1695670	238927	226274	228328	221920	194274	210471	870796	3015864
49	212751	277950	412050	252264	247454	234565	1637034	237280	224485	226140	222824	200715	223756	874164	2972234
50	348811	818717	477728	252851	248469	235719	2382295	239363	228089	231515	226737	200275	223552	886616	3731826
51	225706	245920	266065	253524	249462	237039	1477716	241429	232178	237166	233062	216675	224306	919082	2872533
52	479655	911035	526776	253816	249746	237176	2658204	240260	227552	229996	224410	198065	215491	880023	3953978
53	223253	434330	527422	254883	251080	238717	1929685	242349	230355	234120	230464	205386	248196	900325	3320555
54	497434	911035	626732	258333	255661	243560	2792755	247482	235296	238779	234385	208290	228649	916750	4185636
55	225153	239529	232707	235586	228995	214457	1376427	213520	198536	196990	187398	167890	175028	750814	2515789
56	194432	231474	234341	241891	236806	223799	1362743	225380	211986	214036	208560	183566	208051	818148	2614322
57	218671	244710	327481	253447	249241	236507	1530057	239469	226968	229555	224018	197528	218497	878069	2866092
58	226419	274222	414995	253341	248996	236233	1654206	239173	226604	228939	223203	196080	214891	874826	2983096
59	220094	244262	244582	252870	248558	235605	1445971	238752	227109	230390	225435	208174	225834	891112	2801669
60	457803	911035	530098	254820	251485	239450	2644691	243177	231067	234258	229309	202547	220866	897181	4005515
61	221968	239774	233678	237793	231318	216952	1381483	216506	202259	203856	198651	174287	204282	779053	2581324
62	220088	245021	243973	249885	244612	230949	1434528	232573	219155	221802	218751	196323	220393	856031	2743525
63	253751	620757	881647	258523	256046	244057	2514781	248116	236284	240215	235654	216348	230838	928501	3922236
64	306465	626213	594112	257162	253300	240766	2278018	244232	231987	235574	231240	204524	227945	903325	3653520
65	310845	569168	485520	253502	249267	236021	2104323	239231	228080	232950	233705	213635	359913	908370	3611837
66	470104	829020	540308	255952	252211	239473	2587068	242717	230382	234032	229555	203646	222979	898015	3950779
99	8985162	14469905	12297431	7058638	6940636	6584074	56335846	6669368	6336740	6433214	6310245	5652788	6670680	24732987	94408881
88	320899	516782	439194	252094	247880	235146	2011995	238192	226312	229758	225366	201885	238239	883321	3371747
88	228853	250864	245994	252094	247880	235146	1460831	238192	226312	229758	225366	201885	222317	883321	2804661

Firm Energy

Table II 4-15

Kilickaya Power Production Case 12 Reservoir High Water Level 845m Firm Discharge 38.20m^3/sec

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	186792	212252	212378	217769	214151	203502	1246844	206395	196134	199630	196615	182777	204259	775160	2432658
40	514859	791038	535956	223942	221799	211024	2458574	215103	206614	212829	211742	191969	503561	823154	4040252
41	735464	791038	337970	221861	218689	207725	2512747	210995	202977	208666	205928	184361	307737	801932	2833411
42	546594	791038	335552	221213	217078	205591	2317066	208485	201241	209127	208189	185980	303593	804537	3634081
43	371308	738492	367862	222379	218443	206937	2125421	209043	197811	200376	196324	180314	244812	774825	3354101
44	343091	693081	522974	223098	219826	208732	2210802	211536	201741	205760	201895	178458	194101	767854	3404293
45	184187	206005	214039	220478	216239	204485	1245433	206572	195369	196727	190997	167209	183641	750302	2385948
46	233023	617366	459072	222913	219529	208353	2000256	212411	203119	205789	201417	175168	292916	789493	3259078
47	309007	264403	207765	210921	205071	192399	1389566	192214	181824	184109	178323	161846	167947	706102	2455829
48	183464	454290	482173	222474	218243	206599	1767239	208555	196886	197988	191695	167216	181103	753765	2910682
49	185751	441474	335809	220982	216387	204592	1604995	206311	194444	195054	192181	173727	194796	755406	2761908
50	438750	791038	329892	220875	216685	205019	2202259	207719	197589	200044	195339	172079	193342	765051	3368371
51	198131	357892	303925	222887	219187	207990	1510012	211698	203862	208246	204358	190309	307828	806775	2836313
52	546577	791038	360016	222290	218502	207089	2345512	205216	197460	198851	193232	170234	185217	759877	3459822
53	233321	611004	387468	223046	219531	208350	1882720	211071	200142	202995	199528	177733	281416	780298	3155605
54	554239	791038	597527	224172	221736	210750	2599462	213497	202264	204464	199865	176960	194320	783553	3750832
55	193475	208628	203595	205644	199068	185616	1156026	184004	170227	167700	158462	141640	148309	638029	2166366
56	170689	207979	212051	219412	215136	203553	1228820	205468	194010	196747	192659	170142	192681	753559	2381528
57	302280	530740	459702	222756	218902	207349	1941729	209461	197583	199705	194384	171096	190057	763168	3104415
58	268072	472466	344299	222584	218565	206979	1732965	209047	197488	198926	193388	169440	166122	759242	2867376
59	193757	345867	320660	222742	218822	207063	1508911	209453	198954	201531	196929	182044	237331	779458	2725153
60	538471	791038	376656	223063	220066	209258	2358552	212116	201069	203281	198354	174695	190493	777359	3538960
61	194119	212568	208033	211783	205683	192756	1224942	192308	179753	181278	176925	199503	184518	693859	2255627
62	269142	451977	310828	220601	215681	203119	1671348	203878	191597	193788	191432	172341	194724	749158	2819108
63	349814	730871	765520	224365	222157	211202	2504029	214216	203404	206148	201374	184017	196951	794943	3710139
64	330502	671392	551262	223176	219402	207900	2203634	210118	198794	201129	196534	172551	194087	769408	3337247
65	342709	662645	341160	221785	217788	205595	1950982	207831	197842	201988	203540	187289	373131	790659	2362603
66	553645	791038	429835	223346	219830	208190	2425884	210354	198595	201598	197531	174400	191080	772524	3599842
S9	9470533	15419696	10553979	6182557	6072152	5747813	53446730	5809075	5505592	5564474	5469244	4856295	6421475	21459610	87136890
88	338233	550703	376928	220806	216863	205279	1908812	207467	196771	199446	195330	174868	229338	766415	3112032
F8	200375	219903	214992	220806	216863	205279	1278218	207467	196771	199446	195330	174868	193161	766415	2445261

Firm Energy

Table II 4-16

Kilickaya Power Production Case 13 Reservoir High Water Level 840m Firm Discharge 35.10m^3/sec

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	404687	618539	283616	191722	188392	178825	1865781	181150	171976	175067	172622	160939	239121	680604	2966656
40	523055	688405	455939	195175	193228	183417	2279219	166697	179452	185239	184593	188025	490411	717309	3673636
41	666199	688405	299644	192948	189875	179803	2216874	182167	175496	180721	178240	159691	268424	654158	3361623
42	547871	688405	297218	192189	187988	177297	2050968	179228	173474	181243	180804	161521	264206	697042	3231444
43	398543	688405	333225	193419	189436	178715	1981743	179704	169296	170976	167128	153296	202712	660656	3024655
44	368901	662284	483161	194199	190589	180754	2080288	182548	173816	177119	173338	152801	166051	677070	3105557
45	157439	229531	290636	193014	188856	177970	1237446	179186	168905	169565	164094	143133	157696	645697	2220025
46	241452	642137	472426	193657	190285	179935	1919892	183159	175005	176694	172309	153135	252025	677143	3032219
47	360092	256247	181138	183569	177652	165838	1324527	164927	155810	157731	152294	137566	142178	603401	2235033
48	173107	561295	460969	192998	188613	177688	1754670	178430	167483	167414	160936	139245	150385	635078	2718562
49	158319	465202	297477	191916	187169	176118	1476201	176671	165565	165099	162631	147771	167102	641066	2461040
50	450811	688405	289801	191849	187587	176691	1965144	178402	169295	170874	166316	146010	165574	652495	2981615
51	219508	401977	389490	193453	189693	179302	1573422	182104	175652	179324	175464	163760	267134	694200	2716861
52	537796	688405	324197	193357	189549	178946	2112250	179965	168953	169301	163602	143686	156249	645742	3094206
53	226974	628735	364413	193864	190342	179987	1784315	181651	171581	173505	170230	151594	232908	666910	2865384
54	554387	688405	568578	195062	192810	182669	2381911	184348	173910	175049	170428	150543	165628	669926	3401813
55	167037	182971	179539	181039	174671	162470	1047727	160566	147921	144790	135817	121119	127593	549647	1865533
56	152552	311746	350706	193494	189454	178869	1376821	180121	169650	172036	168529	148665	154046	659080	2410068
57	342121	622535	437367	193401	189463	178661	1963548	179586	168867	169507	164156	143845	160806	646375	2950315
58	263865	538979	392311	193409	189303	178469	1756336	179377	168572	168929	163365	142288	156715	643154	2735582
59	183807	395383	417031	193414	189395	178348	1557378	179604	170039	171654	167112	154562	162199	663367	2583548
60	530712	688405	352649	193929	191022	181107	2137824	182933	172725	173907	168969	148227	161608	663832	3146197
61	176864	202665	183704	187000	181074	169110	1100417	168342	157061	158473	154797	136500	172602	606831	2048192
62	338420	605091	292943	191779	186682	174748	1789663	174221	162714	164131	162281	146662	167475	635788	2767147
63	366791	688405	666199	195290	193299	183317	2293301	185190	175252	177017	172162	156771	168593	681202	3328286
64	332908	662363	524801	193879	190036	179289	2083276	180340	169797	171126	166592	145542	165309	653458	3082383
65	343105	675483	300523	192921	188892	177376	1878300	178544	169601	173094	175573	163065	369189	681332	3107366
66	564686	688405	410157	194066	190540	179629	2227483	180614	170027	171663	167726	147597	161933	657013	3227043
S9	9752009	15547213	10339858	5386003	5276295	4975348	51274726	5009775	4737899	4751250	4662308	4188160	5676472	18399617	80362590
88	348286	555258	369281	192357	188439	177691	1831312	178921	169211	171116	167225	149577	202731	657129	2810093
87	175964	192600	187510	192357	188439	177691	1114761	178921	169211	171116	167225	149577	166205	657129	2117016

Firm Energy

Table II 4-17

Ayvacik Power Production Case 123 Reservoir High Water Level Kilickaya 850m Firm Discharge 41.80m^3/sec
Reservoir High Water Level Ayvacik 195m Firm Discharge 94.80m^3/sec

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	745747	1075067	863874	784787	770650	732285	4972410	751852	732985	773332	1734107	2214888	2135693	5455316	13315271
40	3835930	3966601	1998343	859042	785473	748263	12153652	761421	732418	765977	1147756	2275366	3653112	4921517	21529702
41	4025467	3114256	965427	784547	767940	722526	10380163	727289	690266	706456	705496	542920	1170136	3045178	15322766
42	2635300	3420281	776584	775239	755101	709491	5071996	715311	683797	716423	735659	959855	1110622	3135734	14033663
43	2534635	3124062	1649576	786442	772847	730405	9557967	737570	702471	720159	721066	1010754	1326948	3154450	14816535
44	1725792	2155025	1352339	785386	769526	724506	7512574	727605	688607	699971	689191	613134	679166	2690903	11610248
45	1884746	1954119	763670	782833	764598	716871	6868837	721965	682769	655122	688421	621589	707186	2687901	10985685
46	1044892	1493018	1253491	787206	776937	738371	6093915	750632	720724	741233	742018	1257309	1636523	3461284	11942354
47	1139533	801752	741794	746932	722449	674998	4827458	674288	639317	658092	659008	630158	711723	2586575	8800044
48	2002257	2142964	1791742	783437	764512	718875	8203792	724390	688601	702895	695430	623738	801713	2710664	12440559
49	2412302	3053221	1063408	782712	762908	717798	8752349	722302	684527	699042	679363	553996	592474	2657328	13164453
50	2010747	2944868	962722	781748	760965	711153	8172203	710246	669463	676613	662244	585984	641826	2594304	12118579
51	614892	655506	653713	655962	624503	572378	3776954	561492	523292	518435	557897	594626	1140190	2194250	7672886
52	3619402	2707990	1245044	786918	774034	731447	5864835	736605	698079	711381	703469	717600	762252	2830529	14154221
53	2224375	1012095	1151435	784195	769093	728175	6669368	740827	717631	750289	762367	1584414	2778406	3814701	14003302
54	3852911	4159649	1767020	785442	770934	727941	12063897	731615	691802	704653	701978	676388	709157	2774821	16279490
55	709375	760818	737102	737042	706496	655674	4306507	665102	652133	708497	760692	2029302	2090318	4150624	11212551
56	1685869	1240802	993270	784131	764852	718552	6187476	722903	684722	697056	685685	624064	1098052	2691527	10659558
57	974650	1354106	733621	711091	683461	630058	5066987	621341	578604	569013	561162	535224	678253	2244003	8630584
58	1242016	1462777	1517812	784564	764337	711739	6483245	705890	657805	658987	646600	579708	656275	2543100	10428510
59	1179359	1448948	1199468	780880	757352	706324	6072331	701572	654274	653131	630346	587252	665226	2525003	9964132
60	821828	2821843	1337124	779157	748725	689883	7198560	679924	633113	638080	642568	601192	706718	2514952	11100155
61	747106	778031	754850	774285	753987	704734	4512993	706641	668767	692450	717303	1075632	1600405	3154152	9974191
62	962432	766840	720712	714162	679947	626756	4470849	621020	582359	597419	629874	992986	1743093	2802638	9637600
63	2361586	2762848	2655143	810422	783576	745356	10118931	765498	748050	908061	803623	1585012	1605558	4044746	16534733
64	1121332	1583111	1332243	780853	754111	698857	6270507	693825	652220	665319	665243	613422	1025196	2596204	10585732
65	1407937	1820926	1103493	779714	752981	699226	6564283	694233	654673	693250	1647671	1998409	1811133	4994003	14063652
66	2097823	2269452	1030652	787769	777799	739442	7702937	751691	713785	733830	753012	1194685	2250526	3395312	14100466
99	516202415685097633115672216768982104010119734088						204037576158250501882765815455206217292452835960736927880							88371720	249162626
88	1843580	2030392	1182703	774175	751432	704789	7287071	708038	672416	694829	776045	1012842	1318853	3156132	12470095
E8	741957	780271	756558	771077	751432	704789	4506084	708038	672416	690535	697858	641454	731140	2702262	8647525

Firm Energy

Table II 4-18

Ayvacik Power Production Case 124 Reservoir High Water Level Kilickaya 840m Firm Discharge 35.00m^3/sec
Reservoir High Water Level Ayvacik 195m Firm Discharge 92.80m^3/sec

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	851057	1593941	796216	765839	748721	707548	5463322	722649	701825	739778	1424834	2163586	2187815	5030023	13403809
40	3770348	3975086	1578185	803112	767643	728433	12022807	737618	706049	736202	891178	2225778	3713072	4555207	21032704
41	3940643	3122741	820531	762064	741649	692564	10080192	692089	651873	662446	657214	605685	1200518	2577222	14550021
42	3093217	3428766	742913	743780	717943	668561	5395180	668023	633463	661157	678159	772886	528472	2745665	13737340
43	2645544	3576563	1437128	768611	752294	707063	9887603	709479	671603	684261	681285	830211	1164528	2867360	14628570
44	1804915	2804464	1320443	767562	748501	700966	8147251	659425	657339	663294	647835	571563	628913	2540027	12015616
45	1469589	1975151	848275	766059	745179	696678	6500931	695320	652983	660031	648854	582132	660593	2544001	10400845
46	756174	2448225	1262505	769377	756479	715346	6708106	722950	690207	706014	703148	571628	1585557	3070995	12087608
47	1199989	812652	728437	730638	702940	652532	4827188	646837	608381	621562	617869	588287	665083	2436099	8575207
48	1624390	2903664	1879109	765600	743797	695210	8611770	696174	657314	666314	654361	582735	675376	2560724	12544044
49	2095755	3517670	950011	764885	742169	694116	8744606	694039	653535	662316	637527	551091	762584	2504473	12725702
50	2315926	3310208	818280	759455	734646	681290	8619805	674905	630629	631465	611447	534568	579088	2408109	12281507
51	551102	609865	645552	656063	621890	566652	3651124	551220	479353	479951	543231	575658	1147564	2078193	7428101
52	3582041	2705628	1035071	769082	753505	708150	9553477	708521	667086	675128	662787	597556	688753	2602557	13553308
53	1966077	1836006	976909	766360	748466	704750	6958568	712737	687029	715527	725410	1264853	2795437	3392815	13899557
54	3897850	4071998	1775695	767611	750342	704504	11968200	703472	660616	668146	661235	596662	665911	2586659	15924042
55	665159	714208	688636	680081	642171	585504	3975759	585705	572057	627149	685124	1521069	1861410	3405359	9828269
56	1501519	1375942	1181974	766290	744140	694877	6264742	694654	653329	660258	644159	583104	854046	2540850	10354292
57	1080001	2201047	724289	711018	681165	625339	6022851	613244	566715	551854	538381	510131	647843	2167081	9451019
58	1140132	1862885	1591139	766742	743612	688024	6792534	677351	625722	620769	602813	535482	647161	2384788	10501832
59	809311	1677187	1509799	763052	736516	682576	6178441	672944	622092	614573	585254	540187	613804	2362108	9827295
60	1192660	2952975	1149937	761330	727792	666062	7450757	650957	600318	598591	598466	558847	658351	2356222	11116287
61	687131	735331	711075	724230	696102	641764	4195633	634657	592567	609289	623856	728382	1143446	2564094	8537830
62	1096222	1073043	744600	746478	714850	661284	5036477	656367	615230	627639	651591	1190214	1736168	3084674	10513686
63	2481490	3612649	2665193	774085	764482	724026	11021925	740293	721271	760604	768512	1435243	1528173	3685620	16576021
64	1204133	2084260	1292220	763024	733219	675079	4751935	665080	619993	627412	622774	571866	775551	2442045	10634611
65	1382471	2234594	952054	761890	732081	675450	6738540	665487	622513	656360	1348420	1956112	1869555	4583405	13856587
66	2476116	2574526	916667	769762	757146	716239	8210456	723797	682869	658160	714795	978182	2083071	3074006	14051330
99	512809626579167532142839211140802044584119060583						2058399801501599417903557102866246198405172512370334447843							81154423	344478240
88	1831463	2349703	1147959	754074	730351	680735	7494285	679143	639427	653080	708590	857275	1220594	2858372	12302794
E8	719644	762231	740149	753058	730351	680735	4386168	679143	639427	652080	659152	608155	659152	2559814	8324277

Firm Energy

Table II 4-19

Ayvacik Power Production Case 125 Reservoir High Water Level Kilickaya 855m Firm Discharge 46.20m^3/sec
Reservoir High Water Level Ayvacik 190m Firm Discharge 96 20m^3/sec

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	847449	1258417	746366	764321	747952	709564	5074069	729952	714977	778442	1830628	2110967	2093548	5435014	13332583
40	3196971	3683055	1903294	864151	765432	727069	11740012	738990	712139	745137	1263764	2167758	3576511	4892758	20948311
41	3946825	2992308	854305	759048	739256	692761	9984545	696643	661485	678675	680370	921523	1424232	2942457	15047877
42	2431698	3003510	762294	737331	713725	668067	8317025	672303	643542	679193	703796	965886	1075403	2992417	13057148
43	2589960	2663169	1438258	766772	750955	707580	8916694	714082	681136	700144	703747	589487	1504495	3074514	14209785
44	1710122	1814929	1222826	765322	746737	700711	6960647	703100	665828	677952	668931	596435	663499	2609146	10936392
45	2063314	1913921	749942	763258	742169	695899	6928503	698611	661110	674459	669979	652576	685341	2658124	10974579
46	1189629	1380413	809807	767852	756218	717098	5621017	728790	701182	723129	726479	1408243	1482092	3559033	11350932
47	980766	753153	718660	721749	697077	650382	4521787	649147	616482	637319	641437	657410	768415	2552648	8451597
48	2065925	2108938	1422674	762647	740485	694263	7754932	699528	665779	681143	675774	630085	910226	2652781	12057467
49	2380505	2929589	841942	761674	738511	693022	8345243	697200	661703	676883	658065	575391	1166112	2572042	12780597
50	1815250	2048728	738811	747650	722361	671337	6744137	667873	628361	634768	621205	545634	603616	2433968	10445594
51	580221	625894	628054	629312	597181	545774	3606436	507524	466433	529406	556840	667931	1439283	2220610	7773853
52	3437140	2132737	985673	767436	752480	708826	8784292	713047	676314	650542	684611	816739	763137	2868206	13128682
53	2173300	907476	823596	763679	746139	704921	6119111	717616	697662	723149	749408	1708889	2769830	3889108	13495665
54	3695530	3944186	1708990	765399	748492	704689	11567286	707511	669357	683137	682959	778376	678944	2813825	15767570
55	685378	742277	721559	720232	689717	639700	4198863	650456	641490	702381	538560	2063863	2050074	4346694	11246087
56	1658991	1212426	1021326	763589	740942	693696	6091170	697889	661489	674710	665043	727465	1057623	2728703	10575385
57	1013700	1354964	700295	665571	636140	581381	4952051	568678	527244	395348	543650	524700	773278	1950942	8264545
58	1415911	1372376	1325211	764200	740346	686315	6304359	678940	631508	632395	621647	559436	754408	2444986	10222693
59	1236477	1420721	1210619	759211	731805	680254	6039087	674045	627507	625705	603245	564706	648241	2421162	9762536
60	739921	1367480	928841	756946	721737	661870	5176795	649705	603600	608532	616976	583235	748262	2412343	8987105
61	877916	756713	736980	756438	734336	685233	4547616	687135	651170	677173	706552	1297131	1519686	3332026	10086463
62	911167	743772	696816	688628	652274	600177	4293934	593483	557040	574440	613528	1182233	1716475	2927241	9521133
63	2243970	2175262	1761265	817373	762836	723335	8484041	743894	731145	1009854	808522	1555935	1535923	4105456	14869314
64	1983566	1281996	1150698	759189	728006	671934	5675389	665361	625211	639435	642457	627670	1058288	2534177	9923815
65	1457128	1554308	826576	757686	726644	672344	5994686	665813	627537	670385	1767722	1504363	1823390	4570407	13454256
66	1950010	1874000	932039	767740	756416	717453	6997658	728997	692526	713995	737806	1324537	2145496	3468864	13341015
99	5097874050017158283677172108440420327511119005855						189781385190463131810135312851839217841012911300437479828							87850297	334157823
88	1820669	1786327	1013133	753014	725983	678781	6777907	680225	646477	673280	778004	1039750	1338565	3137511	11934208
86	720291	758885	736594	748148	725983	678761	4368692	680225	646477	664121	678796	621421	708259	2610815	8367581

Firm Energy

Table II 4-20

Ayvacik Power Production Case 129 Reservoir High Water Level Kilickaya 850m Firm Discharge 41.80m^3/sec
Reservour High Water Level Ayvacik 180m Firm Discharge 89 60m^3/sec

NEN	4	5	6	7	8	9	KAMIKI	10	11	12	1	2	3	11-2	TOTAL
39	651054	941425	826845	734682	718551	681238	4553795	700351	685573	728763	1793804	2080084	2059070	5288224	12601440
40	3645200	3816351	1923855	828813	734580	697718	11646517	708660	682457	717585	1204238	2128905	3558191	4743185	20656953
41	3790599	2996292	928065	733907	714843	669862	9833568	673445	635209	655384	656460	885906	1275528	2840959	14623500
42	2519367	3290725	732098	723118	701077	657078	8623463	662017	633667	667285	689462	1036721	1031193	3027135	13343808
43	2524083	3006415	1588295	736279	720618	678497	9254188	684167	652064	669728	672712	946282	1425860	2940784	14304599
44	1620299	2088197	1302321	734876	716560	671873	7134126	673577	637247	648225	638915	569069	632562	2493456	10933721
45	1988141	1846275	751630	732891	712162	667234	6698333	669238	632689	644833	639931	594408	661847	2511861	10541279
46	1152187	1500343	1155440	737304	725693	687677	5958644	698357	671415	691937	694704	1345462	1520779	3403518	11581298
47	1062097	748355	691317	693903	669738	624384	4489794	622597	590641	610005	613394	605686	736679	2419726	8268796
48	2033190	2063223	1735905	732303	710547	665660	7940828	670132	637199	651303	645535	580294	870760	2514331	11956051
49	2349432	2937569	1024334	731366	708635	664477	8415817	667868	633258	647178	628374	548608	1088433	2457418	12629536
50	1912062	2849126	924796	730311	706622	657615	7781532	655189	616910	623418	610252	540201	592939	2390881	11420541
51	569567	612365	615187	617671	587384	537981	3540155	528105	477573	506043	534258	636540	1403813	2154414	7626487
52	3417943	2589662	1217467	736906	722094	679692	9363764	683168	647399	660416	654136	758075	731401	2720026	13498359
53	2102971	1059492	1083783	733293	715985	675932	6371456	687564	668009	701646	716958	1625301	2698552	3711908	13469480
54	3679505	3916953	1701295	734946	718258	675709	11426664	677835	640668	653222	652530	719715	651853	2666135	15422487
55	657585	711840	691550	689635	659610	610899	4021119	620463	611558	669877	853462	2032765	2015597	4167660	10824835
56	1626979	1293273	961065	733208	710981	665304	5900810	668542	633054	645071	635145	665345	1016663	2582619	10168634
57	992462	1315221	679253	651410	623490	571113	4832949	559713	519452	433552	521781	503045	734192	1977830	6104684
58	1372238	1372510	1518735	733783	710406	658006	6365678	650241	604054	604069	592999	533069	737344	2334191	10087454
59	1189527	1363121	1199934	729001	702183	652160	5835926	645512	600190	597583	575113	537777	617692	2310663	9409793
60	915979	2769386	1287683	726826	692498	634434	7026806	622012	577033	580913	588473	556244	675211	2302663	10630692
61	845329	726601	707260	725487	703716	656017	4764410	657116	622024	646392	674429	1226345	1466475	3169190	9677191
62	880468	713964	668388	659904	625307	573463	4121494	566035	530309	546150	583574	1100743	1655965	2760776	9144270
63	2223276	2687916	2555777	782034	732482	694118	9675603	713391	700819	955124	773183	1519723	1508764	3548845	15846607
64	1041954	1537870	1283317	728972	658530	644142	5934785	637124	597573	610910	613242	569301	1018852	2391428	9981987
65	1431779	1740355	1086965	727534	697222	644536	6328391	637552	600616	640896	1703225	1849426	1783530	4794163	13543636
66	2011180	2171450	1017790	738067	726797	688940	7354224	699560	664053	684154	766672	1268256	2117248	3323135	13494167
99	502074505457627531860354202984301556697118285759						194795239183955311740710718091660208670632798129636390793							84347128	333832689
88	1793123	1949153	1137870	724944	658820	653063	6956973	654983	621682	646131	745252	959332	1258243	3012397	11922596
8?	692342	710276	708851	720421	658820	653063	4203773	654983	621682	638470	650520	556192	660236	2506663	8045857

Firm Energy

Table II 4-21

Ayvacik Power Production Case 127 Reservour High Water Level Kilickaya 845m Firm Discharge 38 20m^3/sec
Reservour High Water Level Ayvacik 190m Firm Discharge 91.20m^3/sec

NEN	4	5	6	7	8	9	KANIKI	10	11	12	1	2	3	11-2	TOTAL
39	639261	713784	701849	716324	698019	659194	4128431	675548	660065	701615	1557785	2053762	2040394	4973227	11817600
4	3613820	3820645	1921352	799900	724575	686119	11566416	654917	667390	700361	1077541	2113519	2575709	4558811	19355853
41	3741634	3000585	801730	718780	697723	651203	9611655	651855	619504	628950	627851	781504	1254680	2654209	14172299
42	2736492	3295019	706467	698346	673495	627629	8737452	628427	598576	629754	651497	887170	1000629	2766957	13133505
43	2546434	3254181	1405363	725868	708614	665151	9305611	668487	634683	649860	650850	913205	1219255	2848798	14142151
44	1666469	2449797	1289475	724465	704568	658526	7493300	657819	619815	627875	616100	546243	605147	2410033	11166299
45	1782196	1845915	706024	721351	698919	652604	6407009	652003	613717	622846	615547	555744	635996	2407854	10102862
46	1016371	2029075	1216357	726884	713671	674361	6376719	682696	654279	672422	673265	1153032	1547548	3153102	11800065
47	1030468	751314	685129	686128	660333	613452	4426820	609132	575257	591687	592691	569205	649075	2328840	8013667
48	1953489	2371518	1802858	721928	698571	652338	8200702	654338	619780	631021	622876	557789	703992	2431466	11990498
49	2321775	3223284	944384	720996	696672	651157	8558268	652059	615769	626807	605264	524907	517167	2372747	12500241
50	2084826	3180952	804252	715394	689658	639069	8114151	633389	593208	596096	579820	509706	556274	2278830	11582644
51	531148	583128	607499	610064	577634	526112	3435585	502266	423837	486236	525829	614784	1452557	2050686	7441094
52	3434827	2561727	1062041	726493	710085	666361	9161538	667475	630139	640334	631717	616254	705435	2518544	13052992
53	2108294	1538757	909110	722908	703993	662588	6645650	671886	650976	682265	696102	1511266	2701062	3540629	13559227
54	3693154	3866355	1705057	724549	706257	662359	11357731	662111	623298	632976	630070	577477	642290	2463821	15125953
55	646191	698121	676547	672057	639499	588665	3921080	594805	584918	641758	698579	1920815	1987388	3846070	10349343
56	1599460	1161118	946975	722823	699003	651979	5781358	652733	615558	624654	612247	558166	576507	2410625	9821223
57	1030680	1821254	679390	660558	632213	579262	5403357	567301	525212	474221	513472	492837	657253	2005742	8673653
58	1409581	1716337	1389130	723403	698424	644671	6581546	634249	586150	582674	568671	508709	623588	2246204	10085587
59	1085555	1509040	1321982	718657	690232	638827	5964293	625482	582217	575997	550185	511543	590563	2220342	9405080
60	1250035	2837250	1113045	716488	680603	621049	7218470	605780	558568	558892	564008	532914	635118	2214382	10673750
61	668545	716261	695613	711764	688052	638855	4119090	636922	600033	621560	648495	1040069	1459302	2910157	9125471
62	939416	717094	697306	693717	661602	610743	4319878	605986	569002	583882	614332	1308459	1740024	3075675	9741563
63	2307401	3251177	2560862	753121	722104	682534	10277199	659678	685931	847379	744270	1498322	1477251	3775902	16220030
64	1100245	1751200	1283732	718629	686605	630786	6171197	621032	579564	585724	585648	546481	910356	2305817	10008402
65	1426054	1947348	944588	717196	685299	631173	6351658	621471	582678	620444	1554930	1826577	1762665	4584629	13320423
66	2218698	2476869	868717	727500	714616	675473	7681871	683738	646848	664439	685384	1123357	2070753	3120028	13556390
99	50582517	59089105	30446831	19996291	19261051	17942240	197318035	17917585	16914072	17506745	15699030	26354316	35238378	80514167	330988165
88	1806518	2110325	1087387	714153	687855	640794	7047072	639914	604074	625241	703537	942654	1258514	2875506	11821006
EG	681557	720683	700513	711008	687855	640794	4142459	639914	604074	620973	630965	579764	664087	2435776	7863227

Firm Energy

Table II 4-22

Ayvacik Power Production Case 128 Reservoir High Water Level Kilickaya 840m Firm Discharge 35.10m^3/sec
Reservoir High Water Level Ayvacik 190m Firm Discharge 90.50m^3/sec

NEN	4	5	6	7	8	9	KANIKI	10	11	12	1	2	3	11-2	TOTAL
39	731035	1516320	792179	716599	697073	656835	5110041	671321	654101	693601	1494473	2030879	2109024	4873054	12763440
4	3585354	3824515	1904461	775002	718164	678309	11465805	685025	655975	686923	953338	2091295	3587001	4387535	20145366
41	3712098	3004455	778949	711845	689011	640871	9537229	638907	601018	611188	607791	634500	1219060	2454497	13849653
42	2919442	3298888	695102	690278	663474	615732	8882916	613647	581922	610573	630858	822147	888305	2645500	13030268
43	2567028	3441472	1383899	719449	700517	655484	9467849	656487	621104	633387	632266	858692	1153786	2745449	14023571
44	1698952	2715092	1271634	718059	696455	648847	7749039	645644	605718	610826	596393	525883	580250	2338820	11313753
45	1581196	1889600	824318	716106	692063	644206	6347489	641196	600992	607284	597484	537377	614214	2343137	9946036
46	873629	2374310	1215890	720467	705592	664761	6554649	670800	641023	656608	655493	1045025	1510007	2998149	11733605
47	1119952	763354	679474	678573	650782	601952	4494127	594606	558464	571737	570217	546665	624739	2247083	7960555
48	1747359	2818050	1809138	715522	650455	642625	8423149	642110	605672	614044	603416	538020	629796	2361152	12056207
49	2181765	3352714	915232	714594	688542	641435	8494283	639801	601582	609743	585076	503499	753410	2299900	12187394
50	2321112	3184822	736167	708658	681132	628840	8300731	620395	578110	577536	558044	487081	528146	2200771	11650043
51	503837	566100	608347	619330	586065	533107	3416790	518334	432681	469180	520313	595459	1408998	2017633	7361155
52	3402722	2554633	1051147	720070	701990	656697	9087259	655449	616252	623597	612499	553517	643577	2406265	12792950
53	2050543	1765010	943702	716501	655886	652909	6824551	659944	637570	666606	678822	1348092	2646582	3331090	13462167
54	3695950	3835835	1709641	718135	698152	652689	11310402	650012	609266	616047	610782	552941	615899	2389036	14969349
55	623665	674203	651613	642871	605792	551098	3749242	552019	542039	599162	659542	1619826	1856034	3420569	9577864
56	1575546	1334224	1141233	716418	690881	642273	6100575	640486	601368	607544	592368	538391	868881	2339671	9549613
57	1073001	2155512	672785	654975	624612	569567	5750452	554381	509649	367026	508000	485366	656339	1890041	6851213
58	1388247	1844560	1496402	716994	690305	634914	6771422	621734	571334	564197	547016	486577	599616	2169124	10161896
59	917278	1599321	1486703	712260	682104	629019	6026685	616906	567289	557303	527843	488351	563892	2140786	9348269
60	1315020	2841120	1107586	710106	672476	611081	7257389	592831	543034	539676	542209	511907	611727	2136826	10598773
61	646456	696150	674751	688034	661148	609194	3975733	602363	562925	580955	608131	854238	1273722	2606349	8458167
62	1018954	1066439	695661	691719	658174	605731	4736678	598660	559511	571536	600115	1223195	1685326	2954357	9975021
63	2374101	3475806	2565446	728223	715658	674725	10533999	665818	674782	741519	726533	1473514	1448749	3616348	16268514
64	1124072	2024296	1237413	712234	678475	620912	6397402	608338	564985	571482	568838	526143	797358	2231448	10034546
65	1388663	2205055	874494	710800	677171	621309	6477492	608784	567771	603213	1409720	1810488	1756637	4391192	13234105
66	2487419	2424409	932401	721022	706489	665828	7937568	671784	633265	648326	667793	993583	2020401	2942967	13512720
99	50624396	63246305	30895769	19764844	19018682	17650950	201200946	17561782	16499406	16830815	18865373	24663151	33655876	76878745	329257353
88	1808014	2258797	1103420	705887	679239	630391	7185748	627207	589265	601101	673763	881541	1201996	2745670	11760621
E8	673270	714565	654446	704118	679239	630391	4056029	627207	589265	600225	612496	564058	651167	2366044	7740447

Firm Energy

Table II 4-23

Ayvacik Power Production Case 129 Reservoir High Water Level Kilickaya 850m Firm Discharge 41 80m^3/sec
Reservoir High Water Level Ayvacik 180m Firm Discharge 89 60m^3/sec

NEN	4	5	6	7	8	9	KANIKI	10	11	12	1	2	3	11-2	TOTAL
39	557576	831516	769012	655469	639128	604596	4058097	623123	614285	781195	1653928	1876168	1513730	4925580	11520530
40	3269627	3498285	1772720	764220	655816	621173	10581841	630109	608331	645030	1214992	1931333	3288090	4399686	18859726
41	2385437	2760364	853297	654783	635070	591785	8880736	552588	561670	577294	581385	792794	1278776	2513143	13265243
42	2384588	3031613	658565	643849	620899	578842	7918360	581235	557153	592772	620376	565661	547891	2735962	12183448
43	2497507	2769799	1463586	657333	641526	601445	8631196	604682	576236	593467	599541	848366	1421958	2617610	13275446
44	1516150	1948531	1200125	655696	636825	593840	6551171	592480	559123	568745	560575	500070	555429	2188517	9851597
45	2020030	1726059	662225	653389	631731	588515	6281953	587440	553821	564808	562143	512230	620078	2193002	9682473
46	1240998	1334409	1090957	658525	647388	611997	5584274	620872	598274	618647	624270	1258815	1467561	3100010	10772717
47	1034344	668086	612703	612012	586760	542825	4056730	538010	510128	529966	536546	532548	774827	2109990	7479557
48	1926326	1952113	1582935	652696	625866	586706	7330642	588473	559070	572310	568603	512936	853448	2212915	10985482
49	2273665	2706264	944027	651612	627664	585349	7788581	585850	554482	567530	548597	477172	1056051	2148181	11578703
50	1882663	2613720	849604	650687	625648	577740	7200062	571394	535752	540702	529015	467929	515376	2073403	10360235
51	497156	543353	553700	555195	525778	478512	3153694	466554	411451	455152	487708	666218	1517087	2020525	7157864
52	3180197	2345961	1168937	658066	643237	602831	8559229	603531	570871	582810	578460	648391	765576	2380532	12353268
53	2012574	964522	1029695	653859	636161	598497	5895308	608552	594403	629550	649061	1534791	2606731	3407805	12518396
54	2343268	3498285	1567684	655785	638786	598243	10302051	597398	563094	574521	576618	612634	586448	2326867	12812764
55	595378	778236	626779	622433	591725	544735	3763286	553764	551181	613472	1080605	1832493	1873824	4077751	10268625
56	1515737	1087616	890633	653756	630378	586296	5364416	586623	554245	565088	556619	563315	1075098	2239267	9269404
57	941445	1239767	557581	560787	531225	478490	4349295	431938	382074	314561	470660	462535	510582	1630234	7322049
58	1450467	1285055	1358140	654436	629716	577848	5955662	565185	520731	517968	508377	459210	684649	2006292	9211788
59	1256340	1270937	1073391	648856	620190	571043	5440757	559635	516299	510269	486926	458603	542836	1572097	8515325
60	1015185	2565323	1186639	646319	608585	550165	6572616	532388	488892	490192	502510	485675	688301	1967665	9760974
61	872779	644676	630886	648057	625505	579242	4001145	577356	545473	570758	605174	1175488	1436088	2856653	8931482
62	863869	631356	587254	573569	536199	484564	3676811	471904	419019	461584	509381	1056212	1597372	2446156	8192283
63	2194756	2512507	2354883	721125	652910	617008	9053189	635529	629243	964725	712303	1265739	1461530	3572010	14722258
64	1024629	1404395	1178449	648830	615984	561639	5423926	549875	513758	525965	531876	500399	1047563	2071996	9103362
65	1375529	1606749	984306	647143	614463	562101	5790291	550374	516827	560273	1696724	1637123	1600283	4410947	12351895
66	1977851	2006967	914400	659412	648666	613452	6820748	622242	589924	609861	637604	1176253	2035342	3013642	12451574
99	48110471	50226864	29163117	18117899	17328233	16089483	175036067	16029104	15155821	16059215	19192187	25211905	35134965	75659132	305859268
88	1718231	1793817	1041540	647068	618865	574624	6354145	572468	541275	574972	685435	900425	1254820	2702111	10923544
86	617452	651188	632750	641374	618865	574624	3736253	572468	541275	559764	576171	520072	608745	2207286	7124752

Firm Energy

Table II 4-24

Ayvacik Power Production Case 130 Reservoir High Water Level Kilickaya 840m Firm Discharge 35 10m^3/sec
Reservoir High Water Level Ayvacik 180m Firm Discharge 87 80m^3/sec

NEN	4	5	6	7	8	9	KANIKI	10	11	12	1	2	3	11-2	TOTAL
39	624099	1378596	725865	639849	619532	581451	4569392	554827	583029	624732	1509265	1830885	1555567	4547915	11671696
40	3214536	3427994	1754852	714646	640615	602730	10255377	606805	581600	613655	982232	1887406	2251908	4064538	18279026
41	2317413	2767884	706172	634538	610466	563288	8559761	557517	522110	531248	520318	536065	1255147	2119745	12522170
42	2695026	3039133	620034	610419	581926	534848	8065386	525366	501471	531610	557592	718946	877566	2309615	11801937
43	2501025	3170490	1275279	642120	622355	578748	8750057	576465	543917	555004	556508	736883	1192085	2352312	12950519
44	1649536	2487738	1171854	640497	617685	571079	7138393	563798	525903	529131	515626	453590	502988	2024250	10229429
45	1637235	1720516	775532	638219	612597	565704	5550203	558572	520467	525115	516874	466868	541327	2025324	9079426
46	970495	2194506	1120500	643295	628262	589404	6146466	592011	566968	581774	583067	973314	1450521	2705122	10855121
47	1101134	680729	602545	597722	567575	519751	4069856	508239	474801	487627	489277	476047	556963	1927752	7062810
48	1779429	2628752	1667035	637531	610734	563875	7887356	559650	525842	532754	523664	467613	558901	2049872	11055780
49	2191477	3047763	843517	636455	608533	562498	7890243	556922	521119	527905	502335	426855	758670	1978266	11184101
50	2200803	2934048	704521	630734	601264	549104	7620476	535830	495685	491883	471851	404186	440964	1863605	10460875
51	404379	502603	555416	566596	533856	483588	3046438	467264	405209	431511	471414	621597	1472175	1929731	6915608
52	3197359	2353481	568728	642842	624056	580135	8366641	575267	538249	543594	533876	485442	596982	2101161	11640051
53	2045437	1614943	876302	638683	617030	575782	6368177	580497	562990	593156	609371	1256738	2578057	3022255	12548586
54	3317413	3427994	1575372	640587	619650	575519	10156535	568910	530062	534984	522000	484312	547698	2081358	13354501
55	559392	613400	594958	584004	546216	493572	3391542	494152	489500	550338	616271	1763671	1825634	3420180	9131508
56	1467972	1202204	1062384	638575	611239	563465	5545839	557726	520890	525391	510958	467564	841723	2025203	8970491
57	1114104	1973928	593154	568222	535113	479266	5263787	433811	349271	280664	457696	445702	751795	1533333	8022726
58	1477893	1729991	1370250	639247	610571	554835	6382787	535837	485951	473755	456254	406097	524402	1822057	9265083
59	1034338	1474805	1347178	633732	601078	547904	5639035	530227	481079	465211	250324	426770	506640	1723394	8359296
60	1541435	2617410	1020723	631223	585873	526765	6927429	501791	451255	413300	459381	444406	545394	1768342	9742556
61	675141	636283	615026	627696	600677	550214	3705037	541416	505356	524338	556116	841744	1401535	2427554	8075542
62	993675	973939	621250	612753	576452	523955	4302024	512823	475827	487142	523437	1129530	1568909	2615936	8959692
63	2378895	3202121	2363751	671551	637735	598567	9852660	612312	603077	768069	662729	1234597	1401072	3268872	15134516
64	1098230	1844845	1143002	633702	596866	538301	5854946	520279	478308	482694	483010	453813	727034	1897825	9000084
65	1416939	2050121	802030	632040	555356	538765	6035251	520791	481682	520172	1421106	1602339	1595653	4025300	12177195
66	2380637	2264378	831497	644024	629374	590706	7340616	594224	558115	572345	597027	906928	1540762	2634415	12530021
99	48989447	57960995	28308767	17671506	16847176	15503819	185281710	15288324	14280133	14659155	16579598	22350756	32232272	68309642	301111548
88	1749623	2070036	1011027	631125	601685	553708	6617204	546012	510005	524970	606414	798241	1151153	2435630	10753595
88	600624	638351	621427	628021	601685	553708	3643826	546012	510005	520574	534783	498572	581279	2062924	6835051

Firm Energy

Table II 4-25 Kilickaya Sedimentation Amount Month January

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average days day	Inflow m^3/s-day	Sediment. Concentration p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	93.74					5,400		
2	81.20	87.47	0.286	0.286	25.02	4,100	4,750	10.268
3	70.34	75.77	0.464	0.178	13.49	3,200	3,650	4.254
4	60.93	65.64	1.143	0.679	44.57	2,475	2,838	10.929
5	52.78	56.86	1.321	0.178	10.12	1,900	2,188	1.913
6	45.72	49.25	1,571	0.250	12.31	1,475	1,688	1.795
7	39.60	42.66	2.286	0.715	30.50	1,150	1,313	3.460
8	34.30	36.95	2.536	0.250	9.24	880	1,015	0.810
9	29.72	32.01	3.214	0.678	21.70	680	780	1.462
10	25.74	27.73	4.429	1.215	33.69	520	600	1.746
11	22.30	24.02	7.179	2.750	66.06	400	460	2.625
12	19.31	20.81	10.786	3.607	75.06	310	355	2.302
13	16.73	18.02	15.750	4.964	89.45	240	275	2.125
14	14.49	15.61	20.714	4.964	77.49	190	215	1.439
15	12.55	13.52	26.429	5.715	77.27	150	170	1.135
16	10.87	11.71	29.643	3.214	37.64	110	130	0.423
17	9.42	10.15	31.000	1.357	13.77	85	98	0.116
Total				31.000				46.802

Table II 4-26 Kilickaya Sedimentation Amount Month February

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average days day	Inflow m^3/s-day	Sediment. Concentration p.p.m.	Ave. sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	181.51					14,700		
2	151.40	166.46	0.107	0.107	17.81	12,000	13,350	20.543
3	126.29	138.80	0.179	0.072	9.99	9,500	10,750	9.279
4	105.34	115.82	0.214	0.035	4.05	7,650	8,575	3.001
5	87.87	96.61	0.321	0.107	10.34	6,200	6,925	6.187
6	73.30	80.59	0.714	0.393	31.67	5,000	5,600	15.323
7	61.14	67.22	1.393	0.679	45.64	4,000	4,500	17.745
8	51.00	56.07	2.893	1.500	84.11	3,250	3,625	26.343
9	42.54	46.77	4.143	1.250	58.46	2,600	2,925	14.774
10	35.48	39.01	6.214	2.071	80.79	2,100	2,350	16.404
11	29.60	32.54	8.429	2.215	72.08	1,650	1,875	11.677
12	24.69	27.15	10.536	2.107	57.21	1,350	1,500	7,414
13	20.59	22.64	14.964	4.428	100.25	1,100	1,225	10.610
14	17.18	18.89	18.214	3.250	61.39	890	995	5.278
15	14.33	15.76	23.143	4.929	77.68	720	805	5,403
16	11.95	13.14	26.429	3.286	43.18	580	650	2.425
17	9.97	10.96	28.250	1.821	19.96	460	520	0.897
Total	21,489.820							173.303

Table II 4-27 Kilickaya Sedimentation Amount Month March

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment Concentration . p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	351.80					17,600		
2	284.71	318.26	0.143	0.143	45.51	14,500	16,050	63.110
3	230.41	257.56	0.500	0.357	91.95	12,100	13,300	105.662
4	186.47	208.44	1.143	0.643	134.03	10,000	11,050	127.961
5	150.90	168.69	1.821	0.678	114.37	8,400	9,200	90.910
6	122.12	136.51	3.429	1.608	219.51	6,880	7,640	144.898
7	98.83	110.48	5.786	2.357	260.40	5,710	6,295	141.628
8	79.98	89.41	8.750	2.964	265.01	4,750	5,230	119.751
9	64.73	72.36	11.821	3.071	222.22	3,900	4,325	83.039
10	52.38	58.56	15.286	3.465	202.91	3,280	3,590	62.938
11	42.39	47.39	18.357	3.071	145.53	2,700	2,990	37.596
12	34.31	38.35	20.321	1.964	75.32	2,240	2,470	16.074
13	27.77	31.04	23.786	3.465	107.55	1,840	2,040	18.956
14	22.47	25.12	26.821	3.035	76.24	1,540	1,690	11.132
15	18.18	20.33	28.821	2.000	40.66	1,290	1,415	4.971
16	14.72	16.45	30.107	1.286	21.15	1,060	1,175	1,193
17	11.91	13.32	31.000	0.893	11.89	865	963	0.989
Total	56,474.860			31.000				1,030.808

Table II 4-28 Kilickaya Sedimentation Amount Month April

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment. Concentration p.p.m.	Ave. Sedim. Concenet. p.p.m.	Sedimentation Amount 10^3 ton
1	533.96					11,900		
2	440.22	487.09	0.286	0.286	139.31	9,550	10,725	129.090
3	362.94	401.58	1.393	1.107	444.55	7,500	8,525	327.438
4	299.23	331.09	3.500	2.107	697.61	5,800	6,650	400.819
5	246.70	272.97	8.107	4.607	1,257.57	4,650	5,225	567.717
6	203.39	225.05	12.214	4.107	924.28	3,620	4,135	330.212
7	167.69	185.54	15.393	3.179	589.83	2,890	3,255	165.879
8	138.25	152.97	19.607	4.214	644.62	2,280	2,585	143.972
9	113.98	126.12	22.536	2.929	369.41	1,800	2,040	65.111
10	93.97	103.98	24.929	2.393	248.82	1,420	1,610	34.612
11	77.47	85.72	27.393	2.464	211.21	1,120	1,270	23.176
12	63.87	70.67	28.857	1.464	103.46	880	1,000	8.939
13	52.66	58.27	29.607	0.750	43.70	695	788	2.975
14	43.42	48.04	29.821	0.214	10.28	550	623	0.553
15	35.79	39.61	29.857	0.036	1.43	433	492	0.608
16	29.51	32.65	29.929	0.072	2.35	352	393	0.798
17	24.33	26.92	30.000	0.071	1.91	270	311	0.513
Total	158,536.890			30.000				2,202.412

Table II 4-29 Kilickaya Sedimentaion Amount Month May

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment. Concentration p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	407.55					12,400		
2	347.85	377.70	0.500	0.500	188.85	8,900	10,650	173.772
3	296.90	322.38	1.179	0.679	218.90	6,400	7,650	144.684
4	253.41	275.16	3.250	2.071	569.86	4,700	5,550	273.259
5	216.29	234.85	6.179	2.929	687.88	3,500	4,100	243.675
6	184.61	200.45	10.179	4.000	801.80	2,480	2,990	207.134
7	157.57	171.09	14.571	4.392	751.43	1,760	2,120	137.638
8	134.49	146.03	19.214	4.643	678.02	1,300	1,530	89,629
9	114.79	124.64	23.679	4.465	556.52	955	1,128	54,238
10	97.97	106.38	27.000	3.321	353.29	675	815	24.877
11	83.62	90.80	28.250	1.250	113.50	505	590	5.786
12	71.37	77.50	28.893	0.643	45.83	353	429	1.699
13	60.92	66.15	29.179	0.286	18.92	258	306	0.500
14	52.00	56.46	29.429	0.250	14.12	186	222	0.271
15	44.38	48.19	30.000	0.571	27.52	136	161	0.383
16	37.88	41.13	30.607	0.607	24.97	98	117	0.252
17	32.33	35.11	31.000	0.393	13.80	70	84	0.100
Total	141,779.330			31.000				1,357.897

Table II 4-30 Kilickaya Sedimentaion Amount Month June

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment. Concentration p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	285.56					42,000		
2	231.54	258.55	0.250	0.250	64.64	35,500	38,750	216.415
3	187.75	209.65	0.429	0.179	37.53	23,800	29,650	96.143
4	152.23	169.99	0.786	0.357	60.69	15,200	19,500	102.251
5	123.44	137.84	1.750	0.964	132.88	9,450	12,325	141.501
6	100.09	111.77	4.714	2.964	331.29	6,000	7,725	221.116
7	81.16	90.63	8.607	3.893	352.82	3,700	4,850	147.846
8	65.81	73.49	12.964	4.357	320.20	2,580	3,140	86.869
9	53.36	59.59	17.321	4.357	259.63	1,440	2,010	45.088
10	43.26	48.31	20.679	3.358	162.22	900	1,170	16.398
11	35.08	39.17	23.893	3.214	125.89	575	738	8.027
12	28.45	31.77	25.964	2.071	65.80	360	468	2.661
13	23.06	25.76	27.786	1.822	46.93	224	342	1.387
14	18.70	20.88	28.571	0.785	16.39	137	181	0.256
15	15.16	16.93	29.357	0.786	13.31	88	113	0.300
16	12.30	13.73	19.607	0.250	3.43	54	71	0.021
17	9.97	11.14	30.000	0.393	4.38	34	44	0.167
Total	55,506.430			30.000				1,086.846

Table II 4-31 Kilickaya Sedimentation Amount Month July

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment. Concentration p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	75.80					6,600		
2	65.20	70.50	0.357	0.357	25.17	4,850	5,725	12.450
3	56.08	60.64	0.571	0.214	12.98	3,600	4,225	4.738
4	48.23	52.16	1.179	0.608	31.71	2,600	3,100	8.493
5	41.48	44.86	1.571	0.392	17.59	1,860	2,230	3.389
6	35.68	38.58	2.321	0.750	28.94	1,350	1,605	4.013
7	30.69	33.19	3.429	1.108	36.77	990	1,170	3.717
8	26.40	28.55	5.179	1.750	49.96	730	860	3.712
9	22.70	24.55	8.000	2.821	69.26	520	625	3.740
10	19.53	21.12	11.321	3.321	70.14	390	455	2.757
11	16.80	18.17	15.857	4.536	82.42	280	335	2.386
12	14.45	15.63	19.250	3.393	53.03	210	245	1.123
13	12.43	13.44	24.179	4.929	66.25	150	180	1.030
14	10.69	11.56	27.071	2.892	33.43	110	130	0.375
15	9.19	9.94	28.643	1.572	15.63	82	96	0.130
16	7.91	8.55	29.643	1.000	8.55	76	79	0.058
17	6.80	7.36	31.000	1.357	9.99	44	60	0.052
Total	17,057.370			31.000				52.163

Table II 4-32 Kilickaya Sedimentation Amount Month August

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment Concentration p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	34.40					4,150		
2	30.65	32.53	0.071	0.071	2.31	3,120	3,635	0.725
3	27.30	28.98	0.179	0.108	3.13	2,380	2,750	0.744
4	24.33	25.82	0.393	0.214	5.53	1,800	2,090	0.999
5	21.67	23.00	0.536	0.143	3.29	1,340	1,570	0.446
6	19.31	20.49	0.821	0.285	5.84	1,026	1,183	0.597
7	17.20	18.26	1.679	0.858	15.67	780	903	1.223
8	15.33	16.27	3.893	2.214	36.02	580	680	2.116
9	13.65	14.49	5.857	1.964	28.46	440	510	1.254
10	12.17	12.91	8.464	2.607	33.66	340	390	1.134
11	10.84	11.51	14.643	6.179	71.12	250	295	1.813
12	9.66	10.25	21.107	6.464	66.26	195	223	1.277
13	8.60	9.13	24.429	3.322	30.33	151	173	0.453
14	7.66	8.13	26.679	2.250	18.29	116	134	0.212
15	6.83	7.25	29.179	2.500	18.13	89	103	0.161
16	6.08	6.46	30.536	1.357	8.77	67	78	0.059
17	5.42	5.75	31.000	0.464	2.67	49	58	0.014
Total	9,751.920			31.000				13.227

Table II 4-33 Kilickaya Sedimentation Amount Month September

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment Concentration p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	38.54					13,600		
2	34.29	36.42	0.071	0.071	2.59	9,500	11,550	2.585
3	30.51	32.40	0.107	0.036	1.17	6,300	7,900	0.799
4	27.14	28.83	0.179	0.072	2.08	4,550	5,425	0.975
5	24.15	25.65	0.357	0.178	4.57	3,200	3,875	1.530
6	21.48	22.82	0.643	0.286	6.53	2,150	2,675	1.509
7	19.11	20.30	0.964	0.321	6.52	1,550	1,850	1.042
8	17.01	18.06	1.429	0.465	3.40	1,080	1,315	0.386
9	15.13	16.07	2.929	1.500	24.11	750	915	1.906
10	13.46	14.30	4.679	1.750	25.03	520	635	1.373
11	11.98	12.72	8.643	3.964	50.42	360	440	1.917
12	10.66	11.32	15.036	6.393	72.37	250	305	1.907
13	9.48	10.07	23.250	8.214	82.71	180	215	1.536
14	8.43	8.96	26.214	2.964	26.56	125	153	0.351
15	7.50	7.97	27.036	0.822	6.55	88	107	0.061
16	6.68	7.09	28.714	1.678	11.90	62	75	0.077
17	5.94	6.31	30.000	1.286	8.11	46	54	0.038
Total	9,501.080			30.000				17.992

Table II 4-34 Kilickaya Sedimentation Amount Month October

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment. Concentration. p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	123.69					20,900		
2	103.04	113.37	0.071	0.071	8.05	16,000	18,450	12.832
3	85.83	94.44	0.071	0	0	10,600	13,300	0
4	71.50	78.67	0.107	0.036	2.83	7,300	8,950	2.188
5	59.56	65.53	0.107	0	0	4,900	6,100	0
6	49.61	54.59	0.321	0.214	11.68	3,300	4,100	4.138
7	41.33	45.47	0.679	0.358	16.28	2,250	2,775	3.903
8	34.43	37.38	0.964	0.285	10.65	1,500	1,875	1.725
9	28.68	31.56	1.571	0.607	19.16	1,000	1,250	2.069
10	23.89	26.29	3.286	1.715	45.09	750	875	3.409
11	19.90	21.90	4.821	1.535	33.62	450	600	1.743
12	16.58	18.24	7.571	2.750	50.16	310	380	1.647
13	13.81	15.20	10.393	2.822	42.89	209	260	0.963
14	11.50	12.66	16.357	5.964	75.50	145	177	1.155
15	9.58	10.54	27.107	10.750	113.31	96	121	1.185
16	7.98	8.78	30.214	3.107	27.28	64	80	0.189
17	6.65	7.32	31.000	0.786	5.75	45	55	0.027
Total	12,858.700			31.000				37.173

Table II 4-35 Kilickaya Sedimentation Amount Month November

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment. Concentration. p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	137.14					9,800		
2	114.98	126.06	0.107	0.107	13.49	7,200	8,500	9.907
3	96.41	105.70	0.250	0.143	15.12	5,250	6,225	8.132
4	80.83	88.62	0.357	0.107	9.48	3,800	4,525	3.706
5	67.77	74.30	0.393	0.036	2.67	2,780	3,290	0.759
6	56.82	62.30	0.714	0.321	20.00	2,050	2,415	4.173
7	47.64	52.23	0.964	0.250	13.06	1,460	1,755	1.980
8	39.95	43.80	1.571	0.607	26.59	1,070	1,265	2.906
9	33.49	36.72	2.536	0.965	35.43	770	920	2.816
10	28.08	30.79	4.429	1.893	58.29	565	668	3.364
11	23.55	25.82	6.286	1.857	47.95	410	488	2.022
12	19.74	21.65	9.000	2.714	58.76	295	353	1.792
13	16.55	18.15	13.250	4.250	77.14	220	258	1.720
14	13.88	15.22	16.679	3.429	52.19	159	190	0.857
15	11.64	12.76	23.357	6.678	85.21	115	137	1.009
16	9.76	10.70	18.929	5.572	59.62	87	101	0.520
17	8.18	8.97	30.000	1.071	9.61	63	75	0.062
Total	16,205.650			30.000				45.725

Table II 4-36 Kilickaya Sedimentation Amount Month Decmber

Rank	Discharge m^3/s	Average Discharge m^3/s	Duration day	Average Days day	Inflow m^3/s-day	Sediment. Concentration. p.p.m.	Ave. Sedim. Concent. p.p.m.	Sedimentation Amount 10^3 ton
1	114.72					9,200		
2	98.13	106.43	0.036	0.036	3.83	6,850	8,025	2.656
3	83.93	91.03	0.071	0.035	3.19	4,950	5,900	1.626
4	71.79	77.86	0.107	0.036	2.80	3,650	4,300	1.040
5	61.41	66.60	0.357	0.250	16.65	2,680	3,165	4.553
6	52.53	56.97	0.607	0.250	14.24	2,000	2,340	2.879
7	44.93	48.73	0.821	0.214	10.43	1,440	1,720	1.550
8	38.43	41.68	1.214	0.393	16.38	1,070	1,255	1.776
9	32.87	35.65	2.143	0.929	33.12	770	920	2.633
10	28.12	30.50	3.643	1.500	45.75	580	675	2.668
11	24.05	26.09	6.536	2.893	75.48	425	503	3.280
12	20.57	22.31	10.250	3.714	82.86	310	368	2.635
13	17.60	19.09	14.464	4.214	80.45	229	270	1.877
14	15.05	16.33	19.500	5.036	82.24	173	201	1.428
15	12.88	13.97	24.643	5.143	71.85	124	149	0.925
16	11.01	11.95	29.643	5.000	59.75	90	107	0.552
17	9.42	10.22	31.000	1.357	13.87	66	78	0.093
Total	17,154.840							32.171
							In Amount	6,096.119

Table II 4-37 Monthly Discharge Duration at Tepekisla (Natural)

Rank	Jan. Discharge cum/s	Jan. Duration day	Feb. Discharge cum/s	Feb. Duration day	Mar. Discharge cum/s	Mar. Duration day	Apr. Discharge cum/s	Apr. Duration day	May. Discharge cum/s	May. Duration day	Jun. Discharge cum/s	Jun. Duration day
1	146.06		284.71		553.72		841.48		641.79		449.08	
2	125.48	0.286	235.56	0.107	445.04	0.143	691.52	0.286	546.51	0.536	361.13	0.250
3	107.80	0.500	194.90	0.179	357.69	0.536	568.28	1.429	465.37	1.250	290.40	0.429
4	92.6	1.250	161.26	0.214	287.49	1.143	467.01	3.679	396.28	3.286	233.52	0.821
5	79.56	1.393	133.42	0.321	231.06	2.036	383.79	8.321	337.45	6.286	187.78	1.964
6	68.35	1.607	110.39	0.857	185.71	4.000	315.39	12.321	287.35	10.286	151.01	5.286
7	58.72	2.357	91.33	1.714	149.26	6.179	259.19	15.750	244.69	14.679	121.43	9.250
8	50.45	2.607	75.57	3.107	119.97	9.107	213.00	19.964	208.36	19.571	97.65	13.821
9	43.34	3.357	62.52	4.571	96.42	12.143	175.04	22.821	177.43	24.143	78.52	17.857
10	37.23	4.857	51.73	6.643	77.50	15.857	143.84	25.107	151.08	27.071	63.14	21.429
11	31.99	8.179	42.80	8.821	62.29	18.821	118.21	27.607	128.65	28.250	50.78	24.250
12	27.48	12.321	35.41	11.143	50.06	21.143	97.14	28.964	109.55	28.893	40.83	26.393
13	23.61	17.214	29.30	15.536	40.24	24.179	79.83	29.714	93.29	29.179	32.83	27.929
14	20.28	21.429	24.24	19.036	32.34	27.500	65.61	29.821	79.44	29.429	26.40	28.679
15	17.42	27.321	20.06	23.429	25.99	29.000	53.91	29.857	67.64	30.107	21.23	29.357
16	14.97	29.750	16.59	26.679	20.89	30.143	44.31	29.929	57.60	30.607	17.07	29.607
17	12.86	31.000	13.73	28.250	16.79	31.000	36.41	30.000	49.05	31.000	13.73	30.000
Ave.	30.50		40.90		100.76		296.12		256.01		102.36	

Table II 4-38 Monthly Discharge Duration at Tepekisla (Natural)

Rank	Jul. Discharge cum/s	Jul. Duration day	Aug. Discharge cum/s	Aug. Duration day	Sep. Discharge cum/s	Sep. Duration day	Oct. Discharge cum/s	Oct. Duration day	Nov. Discharge cum/s	Nov. Duration day	Dec. Discharge cum/s	Dec. Duration day
1	117.72		52.32		58.86		193.37		214.62		179.20	
2	100.05	0.357	45.94	0.071	51.69	0.071	159.04	0.071	178.15	0.107	152.00	0.036
3	85.03	0.607	40.34	0.214	45.39	0.107	130.81	0.071	147.87	0.250	128.92	0.071
4	72.26	1.250	35.43	0.429	39.86	0.179	107.59	0.107	122.74	0.357	109.35	0.179
5	61.41	1.750	31.11	0.607	35.00	0.393	88.49	0.143	101.88	0.536	92.75	0.429
6	52.19	2.714	27.32	0.964	30.74	0.643	72.78	0.393	84.57	0.714	78.67	0.643
7	44.36	3.679	23.99	2.036	26.99	1.036	59.86	0.714	70.20	1.071	66.73	0.857
8	37.70	5.964	21.07	4.964	23.70	1.857	49.23	1.143	58.27	1.750	56.60	1.500
9	32.04	9.250	18.50	6.500	20.81	3.393	40.49	1.964	48.37	3.036	48.01	2.607
10	27.23	12.821	16.24	10.286	18.28	6.107	33.31	3.607	40.15	4.893	40.72	4.429
11	23.14	17.036	14.26	17.500	16.05	11.286	27.39	5.536	33.32	6.857	34.54	7.643
12	19.67	20.571	12.53	22.964	14.09	18.536	22.53	8.179	27.66	9.607	29.29	11.036
13	16.71	25.750	11.00	25.357	12.38	24.357	18.53	11.429	22.96	14.071	24.85	15.357
14	14.21	27.536	9.66	27.786	10.87	26.750	15.24	20.607	19.06	17.250	21.07	20.286
15	12.07	28.714	8.48	29.464	9.54	27.679	12.54	28.000	15.82	25.179	17.88	25.607
16	10.26	29.750	7.45	30.536	8.38	29.107	10.31	30.464	13.13	29.036	15.16	29.750
17	8.72	31.000	6.54	31.000	7.36	30.000	8.48	31.000	10.90	30.000	12.86	31.000
Ave.	29.02		15.73		15.85		21.38		28.45		29.20	

Table II 4-39 Monthly Discharge Duration at Tepekisla (Regulated with Afterbay)

Rank	Jan. Discharge cu m/s	Jan. Duration day	Feb. Dishcarge cu m/s	Feb. Duration day	Mar. Discharge cu m/s	Mar. Duration day	Apr. Discharge cu m/s	Apr. Duration day	May Discharge cu m/s	May Duration day	Jun. Discharge cu m/s	Jun. Duration day
1	94.12		145.00	0.036	243.72		498.98		452.74		333.38	
2	89.91	0.179	134.88	0.071	219.80	0.107	434.18	0.643	398.40	0.643	294.39	0.286
3	85.88	0.321	125.46	0.107	198.23	0.214	377.79	1.214	350.57	1.964	259.95	0.571
4	82.04	0.464	116.71	0.143	178.78	0.643	328.73	1.357	308.49	3.464	229.55	0.786
5	78.37	0.607	108.56	0.179	161.23	1.179	286.04	2.321	271.46	6.143	202.70	1.071
6	74.86	1.214	100.98	0.214	145.41	2.000	248.89	3.786	238.88	9.286	178.99	1.393
7	71.51	1.321	93.93	0.286	131.14	2.714	216.56	6.500	210.21	11.571	158.05	3.893
8	68.31	1.429	87.38	0.357	118.27	3.536	188.44	9.821	184.97	14.036	139.57	7.250
9	65.25	1.679	81.28	0.821	106.66	5.464	163.97	13.107	162.77	17.321	123.24	9.607
10	62.33	2.321	75.61	1.393	96.19	7.214	142.67	16.286	143.23	19.893	108.83	15.250
11	59.54	2.536	70.33	2.500	86.75	7,286	124.14	20.000	126.04	21.964	96.10	19.321
12	56.88	3.214	65.42	3.821	78.24	11.286	108.02	23.143	110.91	24.929	84.86	20.821
13	54.33	4.786	60.85	5.571	70.50	15.036	93.99	25.679	97.60	27.714	74.93	22.000
14	51.90	9.286	56.61	8.536	63.64	18.679	81.79	28.214	85.88	28.821	66.17	23.750
15	49.58	15.357	52.65	12.893	57.39	22.464	71.16	29.607	75.57	29.214	58.43	25.821
16	47.36	23.964	48.98	20.179	51.76	28.071	61.92	29.857	66.50	29.857	51.59	28.286
17	45.24	31.000	45.56	28.250	46.68	31.000	53.88	30.000	58.52	31.000	45.56	30.000
Ave.	51.71		55.53		80.21		170.21		192.44		111.30	

Table II-4-40 Monthly Discharge Duration at Tepekisla (Regulated with after bay)

Rank	Jul. Discharge cu m/s	Jul. Duration day	Aug. Discharge cu m/s	Aug. Duration day	Sep. Discharge cu m/s	Sep. Duration day	Oct. Discharge cu m/s	Oct. Duration day	Nov. Discharge cu m/s	Nov. Duration day	Dec. Discharge cu m/s	Dec. Duration day
1	83.72		59.72		62.12		111.48		119.28		106.28	
2	80.39	0.214	58.50	0.036	60.73	0.071	105.13	0.071	112.15	0.036	100.76	0.036
3	71.17	0.357	57.30	0.107	59.37	0.071	99.14	0.071	105.45	0.107	95.52	0.036
4	74.12	0.536	56.13	0.143	58.04	0.071	93.50	0.071	99.16	0.143	90.55	0.071
5	71.77	0.643	54.99	0.250	56.73	0.107	88.17	0.071	93.23	0.250	85.85	0.071
6	68.34	1.107	53.86	0.393	55.46	0.179	83.15	0.071	87.66	0.250	81.38	0.107
7	65.62	1.321	52.76	0.500	54.22	0.357	78.42	0.107	82.43	0.357	77.15	0.321
8	63.01	1.750	51.68	0.679	53.00	0.464	73.95	0.143	77.50	0.536	73.14	0.500
9	60.50	2.321	50.63	0.964	51.82	0.643	69.74	0.286	72.87	0.714	69.34	0.643
10	58.09	3.214	49.59	1.786	50.65	1.036	65.77	0.536	68.52	0.857	65.74	0.821
11	55.78	4.536	48.58	4.250	49.52	1.607	62.02	0.714	64.43	1.357	62.32	1.214
12	53.56	7.036	47.59	6.036	48.41	3.071	58.49	1.143	60.58	2.036	59.08	2.071
13	51.43	10.607	46.61	9.036	47.32	5.000	55.16	2.036	56.96	3.893	56.01	3.750
14	49.38	16.250	45.66	18.857	46.26	12.500	52.02	4.250	53.56	5.964	53.10	7.786
15	47.42	21.786	44.73	24.643	45.22	23.607	49.06	8.107	50.36	9.964	50.34	13.607
16	45.53	27.786	43.82	28.964	44.21	27.000	46.26	18.714	47.35	17.643	47.72	22.036
17	43.72	31.000	42.92	31.000	43.22	30.000	43.63	31.000	44.52	30.000	45.24	31.000
Ave.	51.17		46.29		46.33		48.37		50.96		51.23	

Table II-4-41 Monthly Discharge Duration at Tepekisla (Regulated with after bay)

Rank	Jan. Discharge cu m/s	Jan. Duration day	Feb. Discharge cu m/s	Feb. Duration day	Mar. Discharge cu m/s	Mar. Duration day	Apr. Discharge cu m/s	Apr. Duration day	May. Discharge cu m/s	May. Duration day	Jun Discharge cu m/s	Jun Duration day
1	202.80		253.68		352.40		502.46		456.22		336.86	
2	157.19	5.590	194.97	0.120	269.69	0.245	398.03	1.164	371.05	1.400	254.35	0.630
3	121.83	8.680	149.85	7.910	206.40	1.957	315.30	2.840	301.77	4.491	192.05	6.080
4	94.43	8.680	115.17	7.910	157.96	9.002	249.77	6.712	245.43	11.351	145.01	14.859
5	73.19	8.680	88.51	7.987	120.89	9.759	197.85	11.360	199.61	16.893	109.49	14.864
6	56.73	8.680	68.03	8.039	92.52	10.296	156.73	14.299	162.35	18.112	82.67	14.974
7	43.97	8.911	52.28	8.039	70.80	11.240	124.15	17.364	132.04	19.470	62.42	15.735
8	34.08	9.451	40.18	8.450	54.19	13.166	98.35	19.730	107.39	20.996	47.13	17.768
9	26.41	9.709	30.88	9.299	41.47	15.505	77.91	22.970	87.34	23.362	35.59	20.250
10	20.47	10.377	23.74	10.661	31.74	18.374	61.72	25.329	71.03	25.822	26.87	23.015
11	15.87	10.763	18.24	12.487	24.29	21.383	48.89	27.045	57.77	28.155	20.29	25.133
12	12.30	12.563	14.02	14.339	18.59	13.106	38.73	28.652	46.99	29.122	15.32	26.884
13	9.53	15.803	10.78	17.193	14.23	25.806	30.68	29.614	38.21	29.524	11.57	28.298
14	7.39	21.074	8.28	20.536	10.89	27.991	24.30	29.871	31.08	29.740	8.73	28.971
15	5.73	25.394	6.37	24.341	8.33	29.560	19.25	29.897	25.28	30.100	6.60	29.537
16	4.44	29.791	4.89	26.939	6.38	30.383	15.25	29.949	20.56	30.666	4.98	29.717
17	3.44	31.000	3.76	28.250	4.88	31.000	12.08	30.000	16.72	31.000	3.76	30.000
Ave.	51.71		55.53		80.21		170.21		192.44		111.30	

Table II-4-42 Monthly Discharge Duration at Tepekisla (Regulated Without Afterbay)

Rank	Jul. Discharge cu m/s	Jul. Duration day	Aug. Discharge cu m/s	Aug. Duration day	Sep. Discharge cu m/s	Sep. Duration day	Oct. Discharge cu m/s	Oct. Duration day	Nov. Discharge cu m/s	Nov. Duration day	Dec. Discharge cu m/s	Dec. Duration day
1	192.40		168.40		170.80		220.16		227.96		214.96	
2	144.26	8.680	123.10	8.680	126.61	8.400	163.20	0.683	172.84	0.400	166.00	0.850
3	108.17	8.680	89.99	8.680	93.86	8.400	120.98	8.680	131.05	8.400	128.20	8.680
4	81.10	8.680	65.79	8.680	69.57	8.400	89.68	8.680	99.37	8.400	99.00	8.680
5	60.81	8.680	48.09	8.680	51.57	8.400	66.48	8.706	75.34	8.426	76.46	8.680
6	45.60	8.680	35.11	8.680	38.23	8.400	49.28	8.731	57.13	8.503	59.04	8.706
7	34.19	8.963	25.70	8.680	28.34	8.400	36.53	8.757	43.31	8.657	45.60	8.731
8	25.63	9.554	18.79	8.680	21.01	8.400	27.08	8.911	32.84	8.811	35.21	8.911
9	19.22	10.249	13.73	8.834	15.57	8.477	20.07	9.220	24.90	9.146	27.19	9.143
10	14.41	11.663	10.04	9.143	11.54	8.683	14.88	9.786	18.80	9.814	21.00	9.529
11	10.81	14.774	7.34	10.274	8.56	9.146	11.03	11.251	14.32	11.563	16.22	10.557
12	8.10	19.146	5.36	13.669	6.34	10.843	8.18	13.386	10.85	13.491	12.52	12.743
13	6.07	23.157	3.92	21.280	4.70	16.191	6.06	16.034	8.23	16.166	9.67	16.394
14	4.55	27.940	2.87	26.809	3.49	24.934	4.49	21.820	6.24	19.971	7.47	20.406
15	3.42	29.251	2.10	29.251	2.58	27.737	3.33	28.840	4.73	25.217	5.77	25.111
16	2.56	30.023	1.53	30.640	1.92	28.946	2.47	30.691	3.59	29.229	4.45	29.843
17	1.92	31.000	1.12	31.000	1.42	30.000	1.83	31.000	2.72	30.000	3.44	31.000
Ave.	51.17		46.29		46.33		48.37		50.96		51.23	

Table II 4-43 Annual Sedimentation Amount at Kilickaya and Tepekisla

Location Condition		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
KILICKAYA Natural Discharge	Inflow $10^6 m^3$	55.15	66.32	174.26	489.19	437.49	171.28	52.63	30.08	29.32	39.67	50.00	52.93	
	Sediment $10^3 t$	46.80	173.30	1,030.30	2,202.41	1,537.90	1,086.85	52.16	13.23	18.00	37.17	45.73	32.17	6,096.12
TEPEKISLA Natural	Inflow	81.69	99.83	296.88	767.54	685.70	265.32	77.73	42.13	41.08	57.26	73.74	78.21	
	Sediment	149.44	198.96	2,200.42	9,427.49	4,559.79	2,032.28	205.00	32.33	61.53	85.01	153.66	72.74	19,178
TEPEKISLA Regulated with Afterbay	Inflow	138.50	135.54	214.83	441.18	515.43	288.49	137.05	123.98	120.09	125.55	132.09	137.31	
	Sediment	149.44	199.63	870.73	2,737.34	2,199.24	1,874.38	466.55	32.33	61.53	85.01	153.66	72.74	8,902.58
TEPEKISLA Regulated without Afterbay	Inflow	138.50	135.54	214.83	441.18	515.43	288.49	137.05	123.98	120.09	125.55	132.09	137.21	
	Sediment	149.44	157.20	1,263.69	3,192.34	2,531.19	3,176.71	2,439.30	32.33	61.53	85.01	153.66	72.74	13,315.13
SEDIMENT coming to TEPEKISLA	with Afterbay	102.6	112.9	355.5	1,636.1	1,520.2	1,330.9	440.5	19.1	43.5	47.8	108.0	40.5	5,757.6
	without Afterbay	102.6	70.5	748.49	2,091.1	1,852.2	2,633.2	2,413.2	19.1	43.5	47.8	108.0	40.5	10,170.2

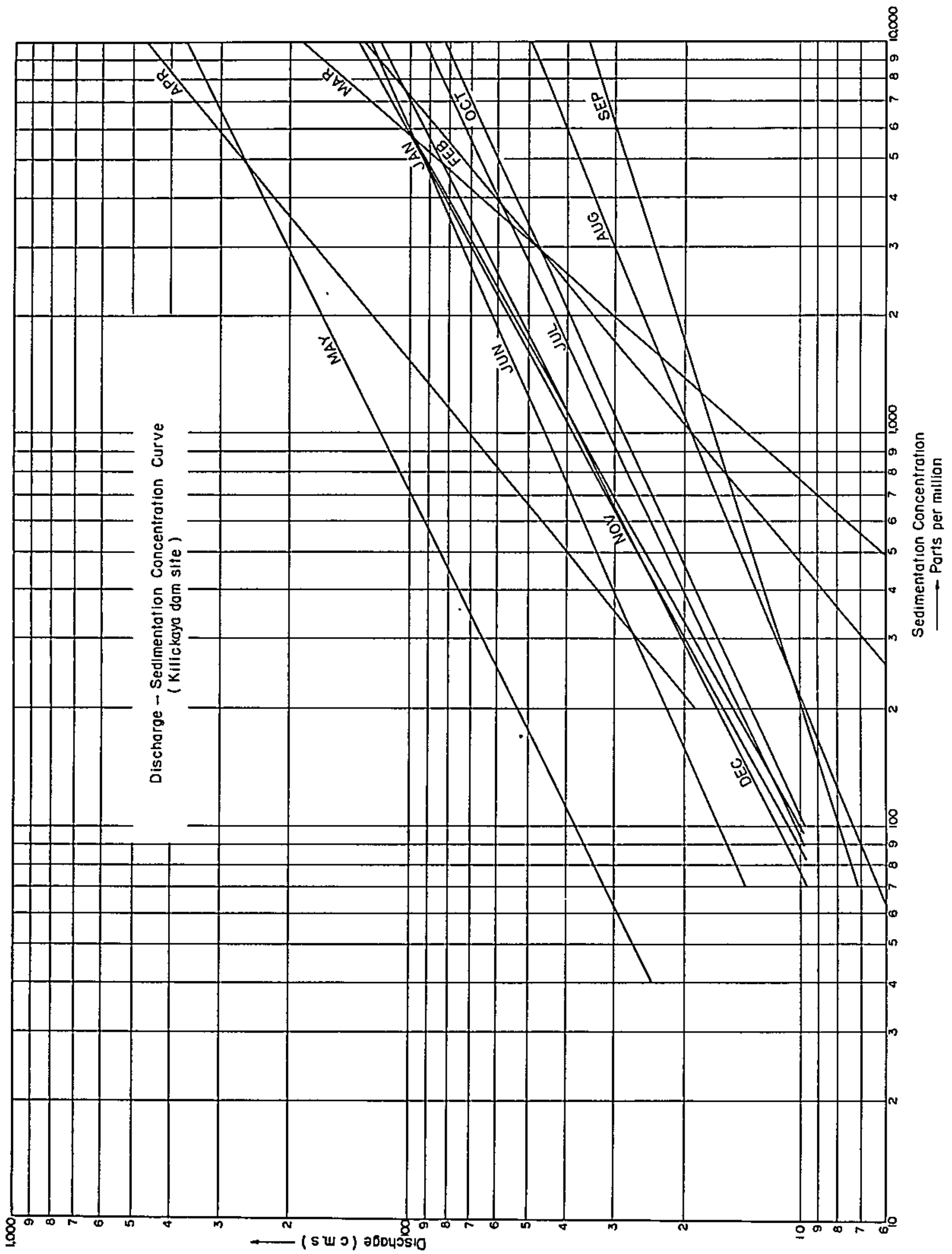
1. From FEB. to JUL. Sediment coming to Tepekisla is got reducting half of the amount caught in Kilickaya from the value caluculated at Tepekisla according to the regulated discharge.
2. From AUG. to JAN. Sediment coming to Tepekisla is got reducting the amount caught in Kilickaya from the value caluculated at Tepekisla according to the natural discharge.

Table II 4-44 Sedimentation Amount Comming to Ayvacik Considering the Discharge Regulation Effect by Kilickaya Dam

Discharge Condition	Upstream Area: Tepekisla.	Upstream Area: Tasova	Upstream Area: between Tepekisla, Tasova & Ayvacik	Ayvacik: Primary Sediment Load	Ayvacik: Bed load	Ayvacik: Total Load 10^3ton	Ayvacik: Total Volume $10^6 m^3$
Natural	19.179	9.818	2.233	31.230	6.246	37.476	30.00
Regulated with Afterbay	5.758	9.818	1.475	17.051	3.410	20.461	16.35
Regulated without Afterbay	10.170	9.818	1.829	21.817	4.364	26.181	20.96

Note : 1. From Tasova, Almus dam effect is not considered.
2. Sediment amount produced in the area between Tepekisla, Tasova and Ayvacik is approximately modified considering the discharge regulation.
3. For the addition of bed load, 20% factor is applied.

Fig. II 4-1


Discharge – Sedimentation Concentration Curve
(Kilickaya dam site)
Discharge (c.m.s)
Sedimentation Concentration
Parts per million
APR
MAR
JAN
FEB
OCT
SEP
AUG
MAY
JUN
JUL
NOV
DEC

II 5 Power Study

Contents

Tables

Figure

II-5 POWER STUDY

II-5.1 Preparation of Development Plan

Power demand in Turkey is increasing at the rate of about 13% annually. To meet this demand in the most economical and technically reliable manner, it is necessary to select a reasonable combination of hydro and thermal power and determine the start-up time of each power plant. Such a development plan is being studied from every points of view, and six proposals have been presented by Etibank. Since the No. 6 plan is considered the most appropriate, facility expansion plans and other plans are being studied on the basis of this plan. The No. 6 plan, as shown in Table II 5-1, covers the development project up to 1977. It dose not envisage any means of direct supply of power to meet the demand in the Eastern Black Sea system, but proposes instead the construction of 380 kV transmission lines between Keban and Trabzon.

Against the proposed of Etibank the supply of power to the Eastern Black Sea system was made the essential core of the present studies and a development plan was worked out which includes both the Ayvacik and Kilickaya Project with the following considerations.

(1) Among the projects proposed in the No. 6 plan which covers the period up to 1977 those that are scheduled to start operation by 1972 are seemingly at construction stage by present time and will allow no change. Therefore the present plan was formulated for the period from 1973 to 1977 with the inclusion of the Ayvacik and Kilickaya Projects.

Because of the need for the study of kw balance and economic evaluation, a project for the period from 1978 to 1983 was also formulated as additional information.

(2) The EPDC plan calls for the postponment of the Oymapinar 216MW Project of the No. 6 plan to 1977, and instead suggests to move the Ayvacik1st stage250 MW power plant to 1975. The starting time of operation of Ayvacik powerstation was decided in view of an expected shortage in the supply capacity of the Eastern Black Sea system in 1974 and the estimated construction period of the project.

(3) Operation of Kilickaya Project, in view of its function to protect Ayvacik Reservoir from sedimentation and to supply irrigation water to Carcamba Plain in the downstream area, was proposed for 1977 in order to start construction as early as possible after the completion of Ayvacik Project. It was also proposed to expand the Ayvacik powerplant in second stage since its firm discharge will increase with the completion of Kilickaya Project.

(4) Operation of nuclear power generating facilities was proposed for 1982 taking into account the current progress in this field in foreign countries.

(5) The EPDC proposal approxmates the power capacity of the No. 6 plan. In other words, the dependable capacity, firm energy and reserve capacity would be the same as those under the No. 6 plan.

The EPDC development plan is shown in Table II 5-2.

II-5.2 Evaluation of Development Plan

Comparative evaluation of the development plan was made from two different aspects, namely, the amount of investment and the surplus benefit, as well as from a technical point of view. As described in paragraph 1 of the previous section, the only difference between the No. 6 plan and the EPDC plan lies in the period from 1973 to 1977 (a substantial difference lies in the period from 1975 to 1977), and therefore the comparison was made only for this period.

(1) Amount of Investment

A comparison was made by calculating the required funds for both plans for each calender year and converting them to the current worth in 1969. Data for both the Ayvacik and Kilickaya Project is based on EPDC's interim results (for power only after allocation to irrigation), and all others are based on Etibank's data. Present worth was computed at the interest rate of 8% and 5% respectively, and in both cases the present worth under the EPDC plan is found to be lower than that under the No. 6 plan. Although the No. 6 plan includes the cost of the 380 kw transmission line between Keban and Trabzan, computation reveals the superiority of the EPDC plan even when the cost of the transmission line is not included. (See Table II 4-3)

(2) Surplus Benefit

Benefit and cost were calculated for a service life of 50 years on the following conditions and converted into the present worth in 1975, at interest rates of 8% and 5%, upon which an equalized annual cost and benefit over 50 years was calculated, From this figure the surplus benefit was calculated.

For the kw for hydro power.dependable capacity or the December output was taken, and for alternative thermal power installed capacity was adopted. Kwh for hydro power was obtained in two cases, namely, firm energy and average available energy, and for thermal power it was obtained on an assumed plant factor. In the case of thermal power it would not be practical to consider that a high plant factor of 70% to 80% could be maintained throughout the entire period of service life and there is a possibility of overevaluating kwh value of thermal power. A thermal power plant can be operated with a high plant factor for 5 years or so after start-up, but thereafter it is operated with a decreasingly lower plant factor until in the end it is for stand-by use only. For this reason, the power energy to be generated was obtained by using a lower factor of 15%, the plant factor at the initial stage of operation, as the plant factor for the entire period of service life. As for gas turbine power, since it was considered to be used for relite purposes for a short period of time, and no kwh was considered to incur after a five years period, it was designated for stand-by use.

To simplify the calculation, it was assumed that one-half of the power energy generated would be effectively used in the first year of operation and the total energy was presumed to be used effectively from the second year.

As for the unit price of the benefit, the kw and kwh cost for the oil-burning 300 MW unit standard thermal power plant of the central system, calculated in the chapter for economic evaluation , was adopted. For the kw value, however, a kw compesation factor was adopted to make the reliability of hydro and thermal power even, and a factor of 1.15 was adopted for hydro power and 1.0 for thermal power.

As for the annual cost factor, the value shown in Table II 5-4 was adopted for each category of the facilities such as hydro power and thermal power. For fuel cost, calculation was made on the basis of heavy oil for thermal plants, at a unit price of 253 TL/ton, the price agreed on with Etibank and diesel oil at a unit price of 455 TL/ton for gas turbine plants. For the fuel cost for nuclear power generation, 2.0 mill per kwh or 1.8 kr/kwh was adopted.

Results of the calculations made under the conditions described above are summarized in Tables Table II 5-5. These results show the EPDC plan is superior to the No. 6 plan at both 8% and 5% interest rates, and the superiority is greater when the interest rate is 8%.

It is not conceivable that the No. 6 plan would be more advantageous than the EPDC plan even when the transmission line between Keban and Trabzon is excluded from the plan. Also with fuel cost for nuclear power generation, it is obvious that the superiority of the EPDC plan over the No. 6 plan will be kept even when the cost drops to 1.5 mill./kwh level.

II 5-3 Supply and Demand Balance

II 5-3-1 Annual Load Factor and Daily Load Factor

As shown in Table II 5-6, the annual load factor for the entire area of Turkey was a considerably low rate of 48.9% in 1965 and 47.7% in 1966.

The interconnected system, on the other hand, because of its coverage in many industrialized districts, had a load factor of 63.6% in 1965 and 62.1% in 1966, about 15% higher than the former. Data on the daily load factor is available only for the interconnected system, and it ahows a factor of around 75%. However, in the future when the interconnected system program is extended and low demand density districts come under the system, it is conceivable that the daily load factor will drop accordingly.

In this load forecast a constant load factor was used for the entire period of forecast with an annual load factor of 60% and a daily load factor of 71.5%. A model load duration curve was provided on the badis of these daily load curves for the convenience of the study of supply and demand balance and the study of kw balance.

II 5-3-2 KW Balance

The most critical month in the supply and demand balance is December. During this month the power supply capacity of hydro power plants drops because of the decrease in river flow while the demand reaches the highest level of the year. Therefore, the kw balance was based on the daily load curve for weekdays of December, and the study was made with the use of the model daily load curve described in the prceding section. For the demand in this case, an annual maximum demand was obtained on the basis of Etibank's load forecast and the supply power from the EPDC plan. As for hydro power supply capacity, either the dependable capacity or the December output was adopted. For daily power generation, 1/365 of the annual firm energy was adopted because of the inadequacy of available data. For thermal power supply capacity installed capacity was adopted and flat operation with a 100% plant factor was considered. Details of the elements of each supply capacity, used for the study of balance, are shown in Table II 5-7.

In preparing the kw balance the thermal power plant was presumed to take over the basic portion of the load in the system. The hydro electric system was divided into the run-of-river type and the reservoir type with regulating ability. The run-of-river type were presumed to take charge of flat operation and the reservoir type, the peak portion. Whichever comes first into operation was designated to take over the peak portion before the other. However, even the hydro power plants with an extremely higher power energy (designed for a higher plant factor) compared with the installed capacity such as the Keban and the Lower Firat were designated to take over the basic portion of the load in the system.

The study covered every year during a period of 9 years from 1975 to 1983. Since the operarion of the Kilickaya power plant is scheduled for 1977, this coverage is considered sufficient for the study of the effectiveness of the Kilickaya power plant facilities.

The results of the study are shown in Fig.II 5-1. It shows that the Kilickaya power plant will have an effective 50MW as against a dependable capacity of 76MW in December 1977, the year of initial operation. It clearly shows that the whole dependable capacity is used effectively in 1979, two years later.

II 5-3-3 KWH Balance

Annual kwh balance shown in Table II 5-2-2 shows that there is a 1.6% or more reserve capacity even in terms of firm energy and sufficient supplying capacity.

Table II 5-1-1 Expansion Plan-6

Power Station		Type	Date	Output
Ambarli	4	T	Aug. 1970	150
Ambarli	3	T	Sept. 1970	115
Ambarli	5	T	Oct. 1970	150
Hopa		H	May 1970	50
Dogankent		H	May 1970	12
Dogankent (Extension)		H	May 1970	8
Tortum (Extension)		H	Jan. 1971	7
Gokcekaya	1	H	Aug. 1971	100
Seyitomer	1	T	Aug. 1971	150
Gokcekaya	2	H	Nov. 1971	100
Kovada II		H	Jan. 1972	51
Gokcekaya	3	H	Feb. 1972	100
Kadincik I		H	Mar. 1972	70
Keban	1,2	H	Mar. 1972	310
Cagcag		H	Mar. 1972	9
Mersin (Extension)		T	Mar. 1972	50
Keban	3	H	Jun. 1972	155
Keban	4	H	Nov. 1972	155
Oymapinar	1	H	Jun. 1975	72
Keban	5	H	Aug. 1975	155
Oymapinar	2	H	Sept. 1975	72
Oymapinar	3	H	Nov. 1975	72
Seyitomer	2	T	Aug. 1976	150
Keban	6	H	Sept. 1976	155
Gas Turbine		T	Aug. 1977	75
Nuclear		T	Sept. 1977	500

Table II 5-1-2 Expansion Plan-6

Year	System Capacity			Demand		Reserve					
	MW	Ave. GWH	Firm GWH	MW	GWH	MW	%	GWH	%	Dry GWH	%
1968	1,185	5,934	5,466	1,095	5,300	90	8.2	534	12.0	166	3.0
1969	1,305	6,098	5,625	1,235	6,337	70	5.6	-239	-3.7	-712	-11.0
1970	1,804	7,943	7,296	1,550	8,100	254	16.4	-157	-1.9	-804	-11.1
1971	2,169	10,881	10,019	1,920	9,262	252	13.1	1,633	17.6	757	8.1
1972	3,162	15,906	14,855	2,260	11,842	902	40.0	4,063	34.3	3,013	25.0
1973	3,162	18,193	16,977	2,550	13,672	612	24.0	4,521	33.0	3,305	23.0
1974	3,162	18,193	16,977	2,900	15,222	263	9.2	2,971	19.5	1,755	11.5
1975	3,534	19,073	17,957	3,180	16,700	354	10.8	2,373	14.2	1,257	7.5
1976	3,839	20,933	19,617	3,520	18,500	319	9.1	2,433	13.1	1,117	6.1
1977	4,414	22,553	21,237	3,920	20,600	494	12.6	1,953	9.5	637	3.1

Table II 5-2-1 Recommended Program of Development Plan (EPDC)

Year	Project	Plant Capability: Dependable (Dec.) Output MW	Plant Capability: Ave. Energy GWh	Plant Capability: Firm (Dry Year) Energy (GWh)	System Capability: Dependable (Dec.) Output MW	System Capability: Ave. Energy GWh	System Capability: Firm (Dry Year) Energy (GWh)
1974		-	-	-	3,162	18,193	16,977
1975	Ayvacik 1, 2	175	1,100	600			
	Keban 6	155	800	550	3,492	20,093	18,127
1976	Seyitomer 2	150	1,120	1,120			
	Keban. 6	155	200	-	3,797	21,413	19,247
1977	Kilickaya	76	337	280			
	Oymapinar 1 - 3	216	1,440	750			
	Ayvacik 3, 4	175	100	200			
	Gas Turbine	75	460	460	4,339	25,750	20,937
1978	Lower Firat 1 - 3	540	4,300	4,300	4,879	28,050	25,237
1979	Lower Firat 4, 5	360	2,290	1,320	5,239	30,340	26,557
1980	Izmir (Nuclear)	500	3,700	3,700	5,739	34,040	30,257
1981	Keban 7, 8	310	270	-			
	Elbistan 1	300	2,100	2,100	6,349	36,410	32,357
1982	Lower Firat 6 - 8	540	3,500	3,500	6,889	39,910	35,857
1983	Lower Firat 9, 10	360	3,400	3,400			
	Elbistan 2	300	2,100	2,100	7,549	45,410	40,357

Table II 5-2-2 Recommended Program of Development Plan (EPDC)

Year	System Capability: Dependable (Dec.) Output (MW)	System Capability: Ave. Energy (GWh)	System Capability: Firm (Dry Year) Energy (GWh)	Demand: Peak Demand (MW)	Demand: Energy Demand (GWh)	Reserve: Dependable (Dec.) Output MW	%	Reserve: Ave. Energy GWh	%	Reserve: Firm (Dry Year) Energy GWh	%
1974	3,162	18,193	16,977	-	-	-	-	-	-	-	-
1975	3,492	20,093	18,127	3,180	16,700	312	10.1	3,393	20.3	1,427	8.5
1976	3,797	21,413	19,247	3,520	18,500	277	7.9	2,913	15.7	747	4.0
1977	4,339	25,750	20,937	3,920	20,600	419	10.7	3,150	15.3	337	1.6
1978	4,879	28,050	25,327	4,310	22,650	569	13.2	5,400	23.8	2,587	11.4
1979	5,239	30,340	26,557	4,740	24,850	499	10.5	5,480	22.0	1,707	6.9
1980	5,739	34,040	30,257	5,210	27,400	529	10.1	6,640	24.2	2,857	10.4
1981	6,349	36,410	32,357	5,730	30,100	619	10.8	6,310	21.0	2,257	7.5
1982	6,889	39,910	35,857	6,300	33,100	589	9.4	6,810	20.6	2,757	8.3
1983	7,549	45,410	40,357	6,880	36,200	669	9.7	9,210	25.4	4,157	11.5

Table II 5-3-1 Investment Schedule No 6 Plan

Unit: 10^6 TL

Power Plant	Total Construction Cost	1969	1970	1971	1972	1973	1974	1975	1976	1977
Oymapinar 1.2.3	700.0	-		50.0	100.0	200.0	300.0	50.0		
Keban 5	70.0						40.0	30.0		
Seyitomer 2	361.2						43.3	227.6	90.3	
Keban 6	70.0							40.0	30.0	
Gas Turbine	100.0								30.0	70.0
Nuclear	1,080.5	13.5	8.0	8.0	8.0	8.0	160.1	384.1	405.4	85.4
380 KV Transmission Line (Keban - Trabzon)	128.7	0.2	10.2	63.5	50.0	4.7				
Total	2,510.4	13.7	18.2	121.5	158.0	212.7	543.4	731.7	555.7	155.4
5% Interest Rate										
Present Worth Factor		0.9524	0.9070	0.8638	0.8227	0 7835	0.7462	0.7107	0.6768	0.6446
Present Worth in 1969	1,832.5	13.0	16.5	105.0	130.0	166.7	405.5	520.0	376.1	99.7
8% Interest Rate										
Present Worth Factor		0.9259	0.8573	0.7938	0.7350	0.6806	0.6302	0.5835	0.5403	0 5002
Present Worth in 1969	1,533.3	13.1	15.6	96.4	116.1	144.8	342.5	426.9	300.2	77.7

Table II 5-3-2 Investment Schedule EPDC Plan

Unit: 10^6 TL

Power Plant	Total Construction Cost	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Ayvacik 1,2	365.0			36.5	66.0	87.5	84.0	62.0	29.0		
Keban 5	70.0						40.0	30.0			
Seyitomer 2	361.2						43.3	227.6	90.3		
Keban 6	70.0							40.0	30.0		
Kelkit	263.0					26.5	47.0	63.0	60.5	45.0	21.0
Oymepinar 1, 2, 3	700.0					50.0	100.0	200.0	300.0	50.0	
Ayvacik 3, 4	110.0								65.0	45.0	
Gas Turbine	100.0								30.0	70.0	
Total	2,039.2			36.5	66.0	164.0	314.3	722.6	604.8	210.0	21.0
5% Interest Rate											
Present Worth Factor		0.9524	0.9070	0.8638	0.8227	0.7835	0.7462	0.7107	0.6768	0.6446	0.6139
Present Worth in 1969	1,448.9			31.5	54.3	128.5	234.5	442.5	409.3	135.4	12.9
8% Interest Rate											
Present Rate		0.9259	0.8573	0.3938	0.7350	0.6806	0.6302	0.5835	0.5403	0.5002	0.4632
Present Worth in 1969	1,192.0			29.0	48.5	111.6	198.1	363.3	326.8	105.0	

Table II 5-4 Annual Cost Factor

	Serviceable Year	Interest Rate,	Interest and Depreciation	Interim Replacement	Insurance	Operation and Maintenance	Administration	Total
Hydro	50	5	5,478	0.20	0.056	0.7	0.3	6,734
		8	8,174	0.20	0.056	0.7	0.3	9,430
Thermal	35	5	6,107	0.35	0.200	2.2	0.3	9,157
		8	8,580	0.35	0.200	2.2	0.3	11,630
Nuclear	35	5	6,107	0.35	0.750	2.2	0.3	9,707
		8	8,580	0.35	0.750	2.2	0.3	12,180
Gas Turbine	25	5	7,095	0.50	0.202	2.2	0.3	10,297
		8	9,368	0.50	0.202	2.2	0.3	12,570
Transmission Line	50	5	5,478	0.05	-	2.5	0.5	8,525
		8	8,174	0.05	-	2.5	0.5	11,224

Table II 5-5-1 No. 6 Plan benefit and Cost Over 50 Years (Interest Rate 5%)

Unit: 10^6 TL

	Capability			Benefit					Cost			Surplus Benefit	
	Dependable Output (MW)	Firm Energy (GWH)	Average Year Energy (GWH)	(1) KW	KWh Firm(2)	KWh Average(3)	Total (4) (1)+(2)	Total (5) (1)+(3)	Fixed	Fuel	(6) Total	(4)-(6)	(5)-(6)
Oymapinar	216	750	1,440	562.1	745.0	1,431.3	1,307.1	1,993.4	835.7		835.7		
Keban 5	155	550	800	404.0	518.2	794.8	922.2	1,198.8	83.6		83.6		
Seyitomer 2	150	790	790	323.1	748.4	748.4	1,071.4	1,071.4	558.7	736.6	1,295.3		
Keban 6	155	-	200	384.8	-	189.7	348.8	574.5	79.6	-	79.6		
Gas Turbine	75	400	400	154.0	78.3	78.3	232.3	232.3	166.0	237.7	403.7		
Nuclear	500	3,070	3,070	1,027.5	2,767.2	2,767.2	3,794.7	3,794.7	1,691.5	891.8	2,583.3		
Transmission Line (Keban - Trabzon)	-	-	-	-	-	-	-	-	296.3	-	296.3		
Total Present Worth in 1975							7,712.5	8,865.1	3,711.4	1,866.4	5,577.5	2,135.0	3,287.6
Equalized Annual Benefit and Cost Over 50 years (Capital Recovery Factor: 5.478%)							422.4	485.6	203.3	102.2	305.5	117.0	180.1

Table II 5-5-2 EPDC Plan Benefit and Cost Over 50 Years (Interest Rate 5%)

Unit: 10^6 TL

	Capability			Benefit					Cost			Surplus Benefit	
	Dependable Output (MW)	Firm Energy (GWH)	Average Year Energy (GWH)	KW (1)	KWh Firm (2)	KWh Average (3)	Total (4) (1)+(2)	Total (5) (1)+(3)	Fixed	Fuel	(6) Total	(4)-(6)	(5)-(6)
Ayvacik 1, 2	175	600	1,100	456.4	595.5	1,098.6	1,051.9	1,555.0	436.5		611.7		
Keban 5	155	550	800	403.5	547.7	794.8	951.2	1,198.3	83.7		117.3		
Seyitomer 2	150	790	790	323.4	748.8	748.4	1,071.8	1,071.8	560.1	736.6	1,447.7		
Keban 6	155	-	200	384.2	-	189.7	384.2	573.9	79.7		111.7		
Kilickaya	76	280	337	178.7	253.1	303.1	431.8	491.8	285.4		399.9		
Oymapinar	216	750	1,440	510.7	675.7	1,298.1	1,186.4	1,808.8	759.4		1,064.3		
Ayvacik 3, 4	175	200	100	414.0	180.6	90.3	594.6	504.3	119.7		167.7		
Gas Turbine	75	400	400	153.6	78.3	78.3	241.9	241.9	166.0	237.7	403.7		
Total Present Worth in 1975							5,913.8	7,445.8	2,490.6	974.3	3,464.9	2,446.9	3,980.9
Equalized Annual Benefit and Cost over 50 years (Capital Recovery Factor: 5.478%)							324.0	407.9	136.4	53.4	189.8	134.2	218.1

Table II 5-5-3 No 6 Plan Benefit and Cost Over 50 Years (Interest Rate 8%)

Unit: 10^6 TL

	Capability			Benefit					Cost			Surplus Benefit	
	Dependable Output (MW)	Firm Energy (GWH)	Average Year Energy (GWH)	(1) KW	KWh Firm (2)	KWh Average (3)	Total (4) (1)+(2)	Total (5) (1)+(3)	Fixed	Fuel	(6) Total	(4)-(6)	(5)-(6)
Oygapinar	216	750	1,440	478.3	493.2	947.4	971.5	1,425.7	776.9	-	776.9		
Keban 5	155	550	800	343.7	361.3	526.1	705.0	869.8	77.7	-	77.7		
Seyitomer 2	150	790	790	267.3	481.6	481.6	748.9	748.9	457.7	474.1	931.8		
Keban 6	155	-	200	318.2	-	122.1	318.2	440.3	71.9	-	71.9		
Gas Turbine	75	400	400	123.7	67.8	67.8	191.5	191.5	127.1	205.8	332.9		
Nuclear	500	3,070	3,070	826.4	1,731.6	1,731.6	2,558.0	2,558.0	1,327.9	558.0	1,885.9		
Transmission Line (Keban - Trabzon)	-	-	-	-	-	-	-	-	213.6	-	213.6		
Total Present Worth in 1975							5,493.1	6,234.2	3,052.8	1,237.9	4,290.7	1,202.4	1,934.5
Equalized Annual Benefit and Cost over 50 years (Capital Recovery Factor: 8.174%)							449.0	509.6	249.5	101.2	350.7	98.3	158.9

Table II 5-5-4 EPDC Plan Benefit and Cost Over 50 Years (Interest Rate 8%)

Unit: 10^6 TL

	Capability			Benefit					Cost			Surplus Benefit	
	Dependable Output (MW)	Firm Energy (GWH)	Average Year Energy	KW (1)	KWh Firm (2)	KWh Average (3)	Total (4) (1)+(2)	Total (5) (1)+(3)	Fixed	Fuel	Total (6)	(4)-(6)	(5)-(6)
Ayvacik 1, 2	175	600	1,100	387.5	395.3	722.2	782.8	1,109.7	404.9	-	404.9		
Keban 5	155	550	800	343.7	361.3	526.1	705.0	869.8	77.7	-	77.7		
Seyitomer 2	150	790	790	267.3	481.6	481.6	748.9	748.9	457.7	474.1	931.8		
Keban 6	155	-	200	318.2	-	122.1	318.2	440.3	71.9	-	71.9		
Kilickaya	76	280	337	144.5	158.3	189.7	302.8	334.2	250.2	-	250.2		
Oymapinar	216	750	1,440	410.1	422.8	812.2	832.9	1,222.3	666.0	-	666.0		
Ayvacik 3, 4	175	200	100	332.5	112.4	56.5	454.9	389.0	104.9	-	104.9		
Gas Turbine	75	400	400	123.5	68.0	68.0	191.5	191.5	127.1	205.8	332.9		
Total Present Worth in 1975							4,337.0	5,305.7	2,160.4	679.9	2,840.3	1,496.7	2,465.4
Equalized Annual Benefit and Cost over 50 years (Capital Recovery Factor: 8.174%)							354.5	433.7	176.6	55.6	232.2	122.3	201.5

Table II 5-6 Load Factor in whole Turkey

Year	Peak Load (MW)	Annual Consumption (GWH)	Average Power (MW)	Annual Load Factor (%)
1955	366	1,347	153.8	41.2
1956	399	1,545	176.4	40.6
1957	434	1,757	200.6	46.1
1958	50.1	1,962	224.0	44.7
1959	558	2,170	247.7	44.3
1960	617	2,396	273.5	44.3
1961	694	2,585	295.1	42.5
1962	725	3,059	349.2	48.2
1963	829	3,406	388.8	46.9
1964	884	3,750	428.1	48.4
1965	980	4,202	479.7	48.9
1966	1,127	4,707	537.3	47.7
1967	1,272			

Table II 5-7-1 Hydroelectric Plants

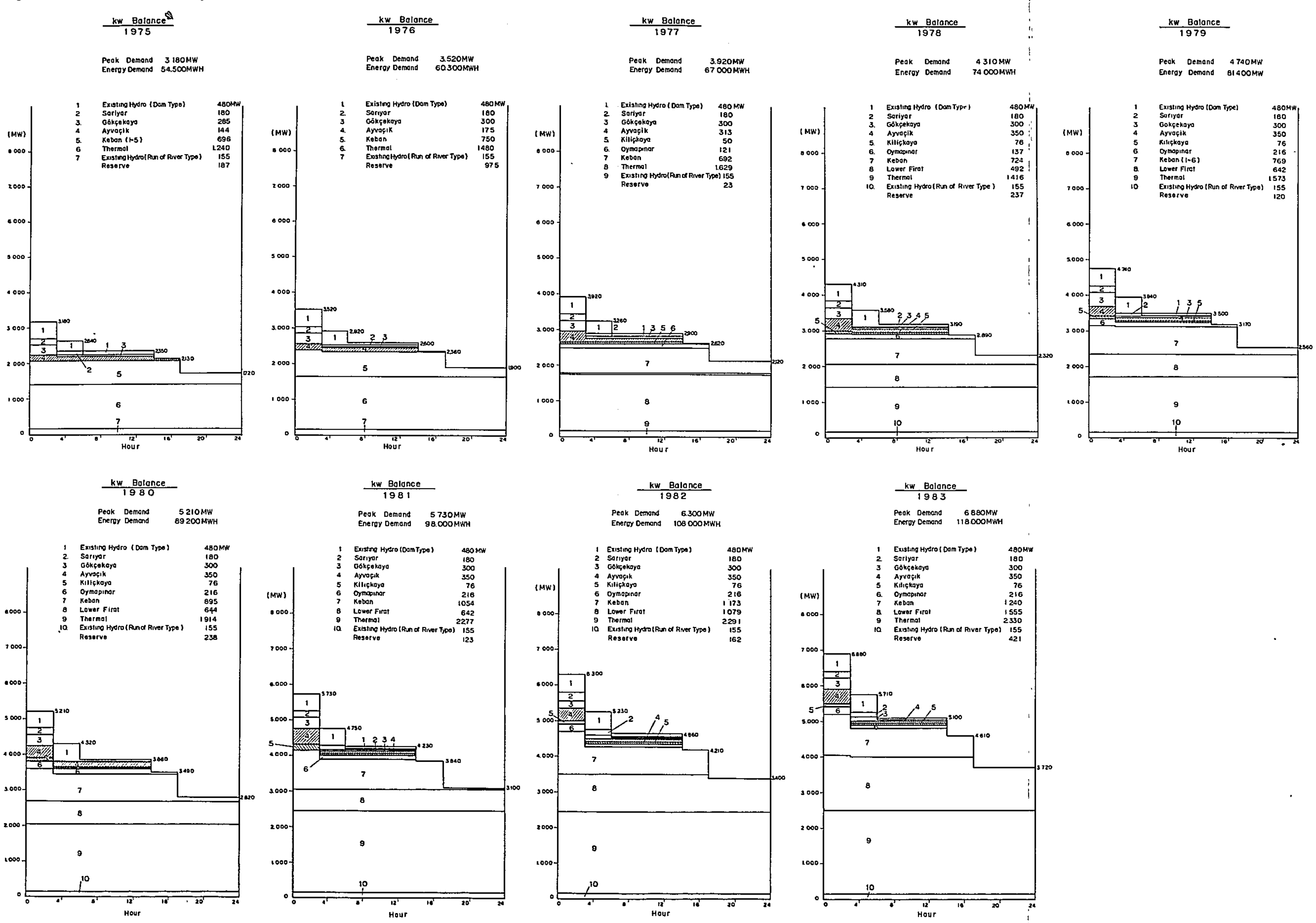
Power Plant	Type	Year of Initial Operation	Installed Capacity MW	Dependable (or Dec.) Output MW	Annual Energy Average Year	Annual Energy Firm (or Dry year) GWH
Sariyar	D	1956	4 x 40	180	430	310
Hrifanli	D	1959	3 x 32	93	320	200
Kesikkopru	D	1967	2 x 38	76	210	160
Demirkopru	D	1960	3 x 23	72	200	130
Kemer	D	1958	3 x 16	48	160	80
Almus	D	1966	27	27	66	35
Hazar I & II	D	1957	20 + 10	30	188	158
Seyhan	D	1958	54	50	352	248
Kadincik	D	1970	2 x 35	70	315	190
Dogankent	R	1970	32.8	20	228	100
Tortum	D	1970	11 + 2 x 7	13	130	69
Kovada II	R	1972	48	51.2	220	220
Gokcekaya 1-2	D	1971	2 x 100	200	500	500
Gokcekaya 3	D	1972	1 x 100	100	70	-
Keban 1-4	D	1972	4 x 155	620	4,600	4,600
Miscellaneous Run of River type	R	-	121.6	81.8	665	517
Ayvacik 1, 2	D	1975	2 x 125	175	1,100	600
Keban 5	D	1975	1 x 155	155	800	550
Keban 6	D	1976	1 x 155	155	200	-
Kilickaya	D	1977	2 x 60	76	337	280
Oymapinar	D	1977	3 x 90	216	1,440	750
Ayvacik 3, 4	D	1977	2 x 125	175	100	200
Lower Firat 1, 2, 3	D	1978	3 x 180	540	4,300	4,300
Lower Firat 4, 5	D	1979	2 x 180	360	2,290	1,320
Keban 7, 8	D	1981	2 x 155	310	270	-
Lower Firat 6, 7, 8	D	1982	3 x 180	540	3,500	3,500
Lower Firat 9, 10	D	1983	2 x 180	360	3,400	3,400

* Note: D: Dam Type
R: Run of River Type

Table II 5-7-2 Thermal Power Plant

Power Plant	Year of Initial Operation	Installed Capacity (MW)	Maximum Continuous Rating (MW)	Annual Energy (GWH)
Catalagzi	1948	6 x 20	120	775
Tuncbilek	1956	2 x 32 + 60	120	830
Ambarli	1967	2 x 110	230	1,610
Silahtar	1913	120	80	500
Mersin	1963	4 x 25	100	700
Ambarli 3	1970	1 x 110	115	800
Ambarli 4, 5	1970	2 x 150	300	2,100
Hopa	1970	2 x 25	50	350
Miscellaneous	-	193	165	825
Seyitomer 1	1971	1 x 150	150	1,120
Seyitomer 2	1976	1 x 150	150	1,120
Gas Turbine	1977	1 x 75	75	450
Nuclear	1980	1 x 500	500	3,800
Elbistan 1	1981	1 x 300	300	2,100
Elbistan 2	1983	1 x 300	300	2,100

Fig. II 5-1 KW Balance in Turkey



II 6 Irrigation

Contents

Tables

II 6 IRRIGATION
(EXISTING REPORT)

II-6.1 Summary of NIKSAR Report

Project Site

Niksar plain spreads along the Kelkit River around the town of Niksar and is located just upstream of Erbaa Plain.

Introduction of the Project

In order to obtain the utmost benefit out of the Kelkit River, the following development schemes have been proposed.

1. Construction of a diversion dam for irrigation purpose at the Fatili site.
2. Irrigation system for 6,714 hectares of land based on land classification of 10,215 hectares of the Niksar plain i.e., a 32,400 meter canal on the left bank to provide irrigation water to 2,021 hectares and a 29,600 meter canal on the right bank to beed 4,693 hectares of lands.
3. A drainage canal system which is to discharge the return flow from the irrigation system. The system will also serve drain the intermittent creaks and the swamp areas which cover about 570 hectare on the left bank.
4. Construction of dikes for the intermittent creaks to protect the plain against flood.

The charcteristics

1. Agricultural

Total plain area	10,215 ha
Irrigable land	7,273 ha
Average elevation of Agricultural land	995 m
Growing season	March 15–Nov. 5 (236 days)
Population in the irrigation area (1955)	17,522
Estimated population (1969)	24,800
Annual increase of population	2.5%

2. Irrigation

Land classification

Irrigation area

Land class	Right bank	Left bank	Total
I	655	264	919
II	484	1,162	1,646
III	882	3,267	4,149
Total	2,021	4,693	6,714

Net irrigated area at the end of the development

Right bank	Left bank	Total
1,710	3,970	5,680

Note: As a result of the DSI investigation, total irrigated area at the end of the development has been changed to 6,871 ha.

* Irrigation water requirement (including losses)
  per hectare 8,730 m^3/year
  Total (for 5,680 ha) 49.59 x 10^6 m^3/year
  Max. irrigation water requirement 0.796 *l*/sec/ha

3. Drain system

Deep drain area 570 ha.

4. Improvement of the river

	Right bank	Left bank	Total
Protected irrigable land	415 ha	3,525 ha	3,940 ha
Length of the dike	10,500 m	23,150 m	33,650 m

ECONOMY

1. Costs:

Multi-purposes-structures (For power and irrigation)	49,400,165 T.L.
Irrigation system and improvements	33,339,252 T.L.
Power plant	36,340,000 T.L.
Land acquisition	3,774,000 T.L.
Total	122,853,417 T.L.

2. Annual costs (Allocated)

For irrigation and reclamation	3,132,342 T.L.
For power	5,882,488 T.L.
Total	9,014,830 T.L.

3. Annual benefits

a. Irrigation and reclamation

Annual increase of income (per hectare) 1)	1,285.90 T.L.
Annual increase of income (per hectare) 2)	2,403.50 T.L.
Total annual increase of income (for 4,510.2 net ha) (1)	5,799,666 T.L.
Total annual increase of income (for 1,170.0 net ha) (2)	2,812,095 T.L.
Total	8,611,761 T.L.

4. Benefit-cost ratio

For irrigation and reclamation	R = 2.75
For power-plant	R = 3.37
For the whole project	R = 3.16

5. Operation, maintenance and replacement costs

Per hectare	74 T.L.
For the whole project (6,714 gross ha)	497,642 T.L.

6. Cost characteristics

Irrigation and reclamation cost per hectare:

$$\frac{\text{Costs for irrigation and reclamation}}{\text{Gross irrigation area}} = 6{,}417 \text{ T.L.}$$

Annual irrigation and reclamation costs per hectare:

$$\frac{\text{Total annual costs of irrigation and reclamation}}{\text{Net irrigated area}} = 552 \text{ T.L.}$$

II 6-2 Summary of Erbaa Report

Project Site

The irrigation area of Erbaa plain lies in the North of Tokat in the junction of Kelkit-Yesilirmak, on the left side of Kelkit on the right side of Yesilirmak.

Introduction of the Project

This project supply water for an area of 4,760 ha in Erbaa plain receiving water from the Kelkit by pump. The project includes the rehabilitation of old network and development of irrigation area.

1. Rehabilitation of Old Network

a. Agricultural area

The area to be irrigated with project	3,970 ha
Growing season	April 1 – November 30
Irrigation water demand	15,643 m^3/ha/year

b. Structure

Length of main canal	23,800 m
Max. capacity of main canal	3,375 m^3/s.

2. Network in New Pump Area

a. Agricultural area

Irrigation area .	790 ha
Growing season	April – November 30
Irrigation water demand	22,084 m^3/ha/year

b. Structures

Length of main canal	10,927 m
Max. capacity of main canal	1,138 m^3/s.

General Knowledge about Erbaa Project

1.	Agricultural Area	
	The area which will be irrigated according to the project	4,760 ha
	Annual irrigation water demand	80×10^6 m^3/year
2.	Annual Expenses	
	a. Expenses in 1965	1,636,000 T.L.
	b. Initial expenditures which will be added by the improvement project	1,314,321.28 T.L.
	c. Total annual expenses	2,951,133.28 T.L.
3.	Annual Incomes	
	a. Gross National Agricultural Income from an area of 987.06 ha in the year 1965	2,737,822.36 T.L.
	b. Gross National Agricultural Income per ha existing area in 1965	2,793.50 T.L.
	c. Gross National Agricultural Income from an area of 4,760 ha in 1965	13,297,060.00 T.L.
	d. Gross National Income per ha after the improvement project	4,288.50 T.L.
	e. Annual Gross National Income from an area of 4,760 ha after the improvement project	20,413,260.00 T.L.
	f. Increment of Annual Gross National Agricultural Income by the aid of improvement project	7,116,200.00 T.L.
4.	Benefit Cost Ratio	
	a. At present (3a/2a)	1.67
	b. After the project (3f/2c)	2.41
5.	Characteristics of Cost	
	a. Cost of irrigation facilities per ha	619.99 T.L.
	b. Cost of 1 m^3 water at the irrigation area	4 kurus

However, the land classification at the Erbaa plain revealed the following facts:

Irrigation Area

Classification	Area, ha	Ratio, %
1st Class	1,559	10.22
2nd Class	2,658	17.43
3rd Class	5,077	33.88
1 + 2 + 3	9,294	60.93
5th Class	1,257	8.25
6th Class	4,702	30.82
Total	15,253	100.00

As can be seen from the above table, there is an irrigable area of 9,294 ha in this district, but DSI is planning to develop 5,500 ha of land, or 3,000 ha by the end of 1969 in the first stage of the project, and 2,500 ha in the second stage.

II 6-3 SUMMARY OF LEEDSHILL REPORT

The Carsamba plain development project constitutes part of the Lower Yesilirmak project which involves construction of dams at Ayvacik and Balahor and irrigation of arable land of 80,500 ha in the Carsamba plain.

Land Classification

	Right Bank		Left Bank		Total
	above 2m	below 2m	above 2m	below 2m	
1st Class	11,510	270	3,690		15,470
2nd Class	16,760	1,110	11,390	440	29,700
3rd Class	14,120	8,400	11,000	1,840	35,360
Total	42,390	9,780	26,080	2,280	80,530

Carsamba Plain

Proposed project data

1. Hydrology

Drainage area:	36,000 km^2
Annual mean precipitation	530 mm
Runoff at Kale:	
Period of record	1939–1963
Average annual	4,200 x 10^6 m^3
Maximum annual	6,832.6 x 10^6 m^3
Minimum annual	2,176.5 x 10^6 m^3

Streamflow at Kale:	
Average	133.2 m^3/s
Maximum	1,706 m^3/s
Minimum	10.7 m^3/s
Estimated Flood Peak	5,000 m^3/s

2. Irrigation Service Area

Location	Right bank Yesilirmak above 2m contour
Area:	
Gross	46,540 ha
Gross irrigated	33,890 ha

3. Irrigation and Drainage Facilities

Main irrigation canal:	
Capacity at intake	47.4 m^3/s
Total length	47.2 km
Section	Trapezoidal
Secondary canals:	
Total length	289.8 km
Tertiary flumes:	
Area served	33,890 ha
Main and lateral drain:	
Total length	124.8 km
Area requiring drainage:	
Surface only	5,500 ha
Surface and subsurface	29,150 ha
Surface, subsurface and on farm	11,890 ha

Required Capital Investment for Proposed Project

	Local Currency Millions of T.L.	Foreign Exchange Millions of $
Ayvacik Dam and Power Plant	287.9	34.2
Lower Balahor Dam and Power Plant	65.8	6.5
Transmission Facilities	80.7	7.3
Irrigation and Drainage Facilities	212.5	5.5
Total	646.9	53.5
Total in T.L.	1,128.4	

Costs of Proposed Project

(Equivalent Annual Values in Millions of T.L.)

	5% Interest Rate
Project Capital Costs:	
Dams, power plants, transmission facilities	43.1
Irrigation and drainage facilities	13.1
Subtotal	56.2
Operation and Maintenance Costs:	
Dams, power plants and transmission facilities	7.5
Irrigation and drainage facilities	2.4
Subtotal	9.9
Total Reimbursable Costs	66.1
Non-project Capital Costs	5.8
Total Costs	71.9

All costs discounted at 5% interest

Table II 6-1 Economic Justification of Proposed Project
(Equivalent Annual Values in Millions of T.L.)

	5% Interest Rate		
	Power	Agri.	Total
Primary Benefits	69.0	40.3	109.3
Allocated Costs	38.9	27.2	66.1
Net Benefits	30.1	13.1	43.2
Benefit Cost Ratio	1.77	1.48	1.69

All costs and benefits discounted at 5% interest

Table II 6-2 Economic Analysis of Carsamba Plain Irrigation for Various Areas

Interest = 5%, Annual equivalent cost = 10^6 TL.

	Project direct profits	Irrigation network cost	Profit cash	Balance % of total	Allocated from Dam	Total irrigation costs	Ratio direct profit to cost	Indirect profit	Total profit	Total ratio profit to cost
Yesilirmak Right Bank										
-Above 2 m. el.	40.30	15.49	24.81	73.70	13.87	29.36	1.37			
-Below 2 m. el.	2.88	1.51	1.37	4.07	0.77	2.28	1.26			
Yesilirmak Left Bank										
-Above 2 m. el.	15.45	8.17	7.28	21.67	4.08	12.25	1.26			
-Below 2 m. el.	0.65	0.46	0.19	0.56	0.10	0.56	1.16			
Total	59.28	25.63	33.65	100.00	18.82	44.45	1.33	8.92	68.20	1.53
If only Yesilirmak R.H. bank irrigated above 2 m. elevation	40.30	15.59			18.82	34.31	1.17	6.48	46.78	1.36

Source : Lower Yesilirmak project planning report revision summary